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Natural
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National Park
Service

Soil Survey of Valley Forge National Historical Park, Pennsylvania



How To Use This Soil Survey

This publication consists of text, tables, and a map. The text includes descriptions of detailed soil map units and provides an explanation of the information presented in the tables. It also includes a glossary of terms used in the text and tables and a list of references.

The detailed soil map can be useful in planning the use and management of small areas. To find information about your area of interest, locate that area on the map sheet. Note the map unit symbols that are in that area. Go to the Contents, which lists the map units by symbol and name and shows where each map unit is described.

The Contents shows which table has data on a specific land use for each detailed soil map unit. Also see the Contents for sections of this publication that may address your specific needs.

National Cooperative Soil Survey

This soil survey is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service has leadership for the Federal part of the National Cooperative Soil Survey.

The soil map in this survey may be copied without permission. Enlargement of this map, however, could cause misunderstanding of the detail of mapping. If enlarged, the map does not show the small areas of contrasting soils that could have been shown at a larger scale.

Literature Citation

The correct citation for this survey is as follows:

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Cover Caption

Soldiers' huts at Valley Forge were located on high parts of the landscape. This hut is on Conestoga silt loam, 0 to 3 percent slopes. Nearby soils were part of the daub used to fill spaces between logs.

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Preface

This soil survey was developed in conjunction with the National Park Service's Soil Inventory and Monitoring Program and is intended to serve as the official source document for soils occurring within Valley Forge National Historical Park, Pennsylvania.

This soil survey contains information that affects current and future land use planning in the park. It contains predictions of soil behavior for selected land uses. The survey highlights soil limitations, actions needed to overcome the limitations, and the impact of selected land uses on the environment. It is designed to meet the needs of the National Park Service and its partners to better understand the properties of the soils in the park and the effects of these properties on various natural ecological characteristics. This knowledge can help the National Park Service and its partners to understand, protect, and enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. The information in this report is intended to identify soil properties that are used in making various land use or land treatment decisions. Statements made in this report are intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

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

These and many other soil properties that affect land use are described in this soil survey. The location of each map unit is shown on the detailed soil map. Each soil in the survey area is described, and information on specific uses is given. Help in using this publication and additional information are available at the local office of the Natural Resources Conservation Service or the park office for Valley Forge National Historical Park.

Soil Survey of Valley Forge National Historical Park, Pennsylvania

United States Department of Agriculture, Natural Resources Conservation Service, and United States Department of the Interior, National Park Service

How This Survey Was Made

This survey was made in conjunction with the National Park Service's Soil Inventory and Monitoring Program to provide information about the soils and miscellaneous areas within Valley Forge National Historical Park.

The data for the park soil survey was clipped from two county-based soil survey areas: Chester County, Pennsylvania, and Montgomery County, Pennsylvania. Chester County was mapped starting in 1988, at a scale of 1:24,000. The data was refreshed in March 2010. Montgomery County was mapped starting in 1957, at a scale of 1:12,000. The soils were recorrelated in 2008, and the data last certified in March 2010. There are 74 map units in the park and 210 map unit components. Because data was clipped from more than one county-based set of soil maps, some same-named detailed soil map units may have more than one map symbol and their properties may vary.

The information includes a description of the soils and miscellaneous areas and their location and a discussion of their suitability, limitations, and management for specified uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of native plants; and the kinds of bedrock. They dug many holes to study the soil profile, which is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

The soils and miscellaneous areas in the survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them

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to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units).

Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they delineated the boundaries of these bodies on digital imagery and identified each as a specific map unit.

Detailed Soil Map Units

The map units delineated on the detailed soil map in this survey represent the soils or miscellaneous areas in the park. The map unit descriptions in this section, along with the map, can be used to determine the suitability and potential of a unit for specific uses. They also can be used to plan the management needed for those uses.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the map. The contrasting components are mentioned in the map unit descriptions. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives the principal hazards and limitations to be considered in planning for specific uses.

Soils that have profiles that are almost alike make up a *soil series*. All the soils of a series have major horizons that are similar in composition, thickness, and arrangement. The soils of a given series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil map are phases of soil series. The name of a soil

phase commonly indicates a feature that affects use or management. For example, Birdsboro silt loam, 0 to 3 percent slopes, is a phase of the Birdsboro series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes. A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the map. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Urban land-Penn complex, 8 to 25 percent slopes, is an example.

This survey includes *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Water is an example.

For some map units, component percentages do not add up to 100 percent due to the vintage of the data. In older soil surveys, components of minor extent were not assigned a component percentage.

Table 1 lists each map unit in the park, its major and minor components, and the percentage of each component in the unit. Other tables give properties of the soils and the limitations, capabilities, and potentials for many uses. The Glossary defines many of the terms used in describing the soils or miscellaneous areas.

541148—Birdsboro silt loam, 0 to 3 percent slopes

Map Unit Setting

Major land resource area (MLRA): 148—Northern Piedmont

Elevation: 200 to 1,200 feet

Mean annual precipitation: 38 to 50 inches

Mean annual air temperature: 46 to 59 degrees F

Frost-free period: 140 to 200 days

Map Unit Composition

Birdsboro and similar soils: 97 percent

Dissimilar minor components: 3 percent

Description of the Birdsboro Soil

Classification

Fine-loamy, mixed, active, mesic Oxyaquic Hapludults

Setting

Landscape: Valleys

Landform: High stream terraces and old alluvial fans

Landform position (two-dimensional): Footslope and toeslope

Landform position (three-dimensional): Tread

Slope range: 0 to 3 percent

Down-slope shape: Convex and linear

Across-slope shape: Linear and convex

Representative aspect: South

Aspect range: All aspects

Soil temperature class: Mesic

Soil temperature regime: Mesic

Properties and Qualities

Runoff: Low

Parent material: Old reddish alluvium derived from sedimentary rock

Restrictive feature(s): Lithic bedrock at a depth of 72 to 99 inches

Frequency of flooding: None

Frequency of ponding: None

Depth to water table: About 24 to 72 inches (see table 19)
Drainage class: Well drained
Shrink-swell potential: Low (about 1.5 LEP)
Salinity maximum: Not saline
Sodicity maximum: Not sodic
Calcium carbonate equivalent (maximum weight percentage): 0
Available water capacity: High (about 10.2 inches)

Interpretive Groups

Land capability subclass (nonirrigated): 1
Meets hydric soil criteria: No
Hydrologic soil group: B

Typical Profile

Ap—0 to 9 inches; silt loam
Bt—9 to 49 inches; silt loam
C—49 to 73 inches; very gravelly sandy loam

Minor Components

Lamington soils

Percent of map unit: 3 percent
Landform: Terraces
Geomorphic position (two-dimensional): Toeslope
Geomorphic position (three-dimensional): Tread
Representative aspect: South
Aspect range: All aspects
Slope range: 0 to 3 percent
Down-slope shape: Linear and concave
Across-slope shape: Linear and concave
Meets hydric soil criteria: Yes

541159—Brecknock channery silt loam, 8 to 25 percent slopes, extremely stony

Map Unit Setting

Major land resource area (MLRA): 148—Northern Piedmont
Elevation: 245 to 1,095 feet
Mean annual precipitation: 40 to 48 inches
Mean annual air temperature: 48 to 55 degrees F
Frost-free period: 150 to 200 days

Map Unit Composition

Brecknock, extremely stony and similar soils: 94 percent
Dissimilar minor components: 6 percent

Description of the Brecknock, Extremely Stony Soil

Classification

Fine-loamy, mixed, superactive, mesic Ultic Hapludalfs

Setting

Landscape: Uplands
Landform: Low ridges and nearly level to very steep hills
Landform position (two-dimensional): Summit, shoulder, and backslope
Landform position (three-dimensional): Side slope and interfluvium

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Slope range: 8 to 25 percent
Down-slope shape: Linear and convex
Across-slope shape: Linear and convex
Representative aspect: South
Aspect range: All aspects
Soil temperature class: Mesic
Soil temperature regime: Mesic

Properties and Qualities

Runoff: Medium
Parent material: Residuum weathered from porcellanite and/or red metamorphosed
residuum weathered from sandstone and shale
Restrictive feature(s): Lithic bedrock at a depth of 40 to 60 inches
Frequency of flooding: None
Frequency of ponding: None
Depth to water table: More than 72 inches
Drainage class: Well drained
Shrink-swell potential: Low (about 1.5 LEP)
Salinity maximum: Not saline
Sodicity maximum: Not sodic
Calcium carbonate equivalent (maximum weight percentage): 0
Available water capacity: Low (about 4.4 inches)

Interpretive Groups

Land capability subclass (nonirrigated): 7s
Meets hydric soil criteria: No
Hydrologic soil group: B

Typical Profile

A—0 to 10 inches; channery silt loam
Bt—10 to 32 inches; channery silt loam
C—32 to 41 inches; very channery silt loam
R—41 to 51 inches; bedrock

Minor Components

Lehigh, extremely stony soils

Percent of map unit: 6 percent
Landform: Hillsides
Geomorphic position (two-dimensional): Shoulder and backslope
Geomorphic position (three-dimensional): Side slope
Representative aspect: Southeast
Aspect range: All aspects
Slope range: 8 to 25 percent
Down-slope shape: Concave and linear
Across-slope shape: Linear and concave
Meets hydric soil criteria: No

541164—Codorus silt loam

Map Unit Setting

Major land resource area (MLRA): 148—Northern Piedmont
Elevation: 200 to 2,000 feet
Mean annual precipitation: 35 to 50 inches
Mean annual air temperature: 45 to 57 degrees F
Frost-free period: 120 to 220 days

Map Unit Composition

Codorus and similar soils: 85 percent
Dissimilar minor components: 15 percent

Description of the Codorus Soil

Classification

Fine-loamy, mixed, active, mesic Fluvaquentic Dystrudepts

Setting

Landscape: Uplands

Landform: Nearly level flood plains

Landform position (two-dimensional): Toeslope

Landform position (three-dimensional): Tread

Slope range: 0 to 3 percent

Down-slope shape: Linear

Across-slope shape: Linear

Representative aspect: South

Aspect range: All aspects

Soil temperature class: Mesic

Soil temperature regime: Mesic

Properties and Qualities

Runoff: Low

Parent material: Alluvium derived from gneiss and/or alluvium derived from mica schist

Restrictive feature(s): Lithic bedrock at a depth of 72 to 99 inches

Frequency of flooding: Occasional

Frequency of ponding: None

Depth to water table: About 18 to 36 inches (see table 19)

Drainage class: Moderately well drained

Shrink-swell potential: Low (about 1.5 LEP)

Salinity maximum: Not saline

Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 0

Available water capacity: Moderate (about 8.5 inches)

Interpretive Groups

Land capability subclass (nonirrigated): 2w

Meets hydric soil criteria: No

Hydrologic soil group: C

Typical Profile

Ap—0 to 12 inches; silt loam

Bw—12 to 48 inches; silt loam

C—48 to 60 inches; silt loam

Minor Components

Hatboro soils

Percent of map unit: 8 percent

Landform: Flood plains

Geomorphic position (two-dimensional): Toeslope

Geomorphic position (three-dimensional): Tread

Representative aspect: South

Aspect range: All aspects

Slope range: 0 to 3 percent

Down-slope shape: Linear and concave

Across-slope shape: Linear and concave

Meets hydric soil criteria: Yes

Glenville soils

Percent of map unit: 4 percent

Landform: Hillslopes

Geomorphic position (two-dimensional): Backslope and footslope

Geomorphic position (three-dimensional): Head slope and side slope

Representative aspect: South

Aspect range: All aspects

Slope range: 0 to 3 percent

Down-slope shape: Linear and concave

Across-slope shape: Linear and concave

Meets hydric soil criteria: No

Baile soils

Percent of map unit: 3 percent

Landform: Depressions

Geomorphic position (two-dimensional): Footslope

Geomorphic position (three-dimensional): Base slope

Representative aspect: South

Aspect range: All aspects

Slope range: 0 to 3 percent

Down-slope shape: Concave and linear

Across-slope shape: Linear and concave

Meets hydric soil criteria: Yes

541165—Croton silt loam, 0 to 3 percent slopes

Map Unit Setting

Major land resource area (MLRA): 148—Northern Piedmont

Elevation: 295 to 895 feet

Mean annual precipitation: 36 to 50 inches

Mean annual air temperature: 46 to 57 degrees F

Frost-free period: 160 to 200 days

Map Unit Composition

Croton and similar soils: 82 percent

Dissimilar minor components: 18 percent

Description of the Croton Soil

Classification

Fine-silty, mixed, active, mesic Typic Fragiaqualfs

Setting

Landscape: Uplands

Landform: Depressions

Landform position (two-dimensional): Toeslope

Landform position (three-dimensional): Base slope

Slope range: 0 to 3 percent

Down-slope shape: Linear and concave

Across-slope shape: Linear and concave

Representative aspect: South

Aspect range: All aspects

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Soil temperature class: Mesic
Soil temperature regime: Mesic

Properties and Qualities

Runoff: Very high
Parent material: Residuum weathered from sandstone and shale
Restrictive feature(s): Fragipan at a depth of 12 to 25 inches; lithic bedrock at a depth of 40 to 60 inches
Frequency of flooding: None
Frequency of ponding: Occasional
Water table (depth, kind): At the soil surface to 6 inches, perched (see table 19)
Drainage class: Poorly drained
Shrink-swell potential: Moderate (about 4.5 LEP)
Salinity maximum: Not saline
Sodicity maximum: Not sodic
Calcium carbonate equivalent (maximum weight percentage): 0
Available water capacity: Low (about 5.8 inches)

Interpretive Groups

Land capability subclass (nonirrigated): 4w
Meets hydric soil criteria: Yes
Hydrologic soil group: D

Typical Profile

Ap—0 to 11 inches; silt loam
Btg—11 to 19 inches; silty clay loam
Btxg—19 to 30 inches; channery silty clay loam
Cx—30 to 44 inches; channery silt loam
R—44 to 64 inches; bedrock

Minor Components

Readington soils

Percent of map unit: 18 percent
Landform: Red shale, siltstone, and sandstone hillslopes
Geomorphic position (two-dimensional): Backslope and footslope
Geomorphic position (three-dimensional): Side slope, head slope, and base slope
Representative aspect: South
Aspect range: All aspects
Slope range: 0 to 3 percent
Down-slope shape: Linear and concave
Across-slope shape: Linear and concave
Meets hydric soil criteria: No

541194—Lawrenceville silt loam, 0 to 3 percent slopes

Map Unit Setting

Major land resource area (MLRA): 148—Northern Piedmont
Elevation: 200 to 1,600 feet
Mean annual precipitation: 38 to 48 inches
Mean annual air temperature: 50 to 57 degrees F
Frost-free period: 140 to 200 days

Map Unit Composition

Lawrenceville and similar soils: 81 percent
Dissimilar minor components: 19 percent

Description of the Lawrenceville Soil

Classification

Fine-silty, mixed, active, mesic Oxyaquic Fragiudalfs

Setting

Landform: Upland slopes

Landform position (two-dimensional): Footslope

Landform position (three-dimensional): Base slope

Slope range: 0 to 3 percent

Down-slope shape: Linear and concave

Across-slope shape: Linear and concave

Representative aspect: Southeast

Aspect range: All aspects

Soil temperature class: Mesic

Soil temperature regime: Mesic

Properties and Qualities

Runoff: Low

Parent material: Loess over residuum weathered from shale and siltstone

Restrictive feature(s): Fragipan at a depth of 24 to 38 inches; lithic bedrock at a depth of 48 to 99 inches

Frequency of flooding: None

Frequency of ponding: None

Water table (depth, kind): About 18 to 36 inches, perched (see table 19)

Drainage class: Moderately well drained

Shrink-swell potential: Low (about 1.5 LEP)

Salinity maximum: Not saline

Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 0

Available water capacity: High (about 11.9 inches)

Interpretive Groups

Land capability subclass (nonirrigated): 2w

Meets hydric soil criteria: No

Hydrologic soil group: C

Typical Profile

Ap—0 to 12 inches; silt loam

Bt—12 to 26 inches; silt loam

Bx—26 to 47 inches; silt loam

C—47 to 75 inches; silt loam

Minor Components

Lansdale soils

Percent of map unit: 13 percent

Landform: Rolling hillsides

Geomorphic position (two-dimensional): Summit, shoulder, and backslope

Geomorphic position (three-dimensional): Side slope

Representative aspect: South

Aspect range: All aspects

Slope range: 0 to 3 percent

Down-slope shape: Convex

Across-slope shape: Convex

Meets hydric soil criteria: No

Doylestown soils

Percent of map unit: 4 percent

Landform: Drainageways

Geomorphic position (two-dimensional): Backslope, footslope, and toeslope

Geomorphic position (three-dimensional): Head slope

Representative aspect: Southeast

Aspect range: All aspects

Slope range: 0 to 3 percent

Down-slope shape: Concave and linear

Across-slope shape: Linear and concave

Meets hydric soil criteria: Yes

Chalfont soils

Percent of map unit: 2 percent

Landform: Upland slopes

Geomorphic position (two-dimensional): Footslope

Geomorphic position (three-dimensional): Side slope

Representative aspect: South

Aspect range: All aspects

Slope range: 0 to 3 percent

Down-slope shape: Linear and concave

Across-slope shape: Linear and concave

Meets hydric soil criteria: No

541245—Raritan silt loam, 0 to 3 percent slopes

Map Unit Setting

Major land resource area (MLRA): 148—Northern Piedmont

Elevation: 150 to 1,000 feet

Mean annual precipitation: 38 to 55 inches

Mean annual air temperature: 48 to 57 degrees F

Frost-free period: 150 to 200 days

Map Unit Composition

Raritan and similar soils: 96 percent

Dissimilar minor components: 4 percent

Description of the Raritan Soil

Classification

Fine-loamy, mixed, active, mesic Aquic Fragiudults

Setting

Landscape: Uplands

Landform: Red shale and sandstone stream terraces

Landform position (two-dimensional): Footslope and toeslope

Landform position (three-dimensional): Tread

Slope range: 0 to 3 percent

Down-slope shape: Convex and linear

Across-slope shape: Linear and convex

Representative aspect: South

Aspect range: All aspects

Soil temperature class: Mesic

Soil temperature regime: Mesic

Properties and Qualities

Runoff: Low

Parent material: Reddish alluvium derived from shale and siltstone

Restrictive feature(s): Fragipan at a depth of 20 to 30 inches; lithic bedrock at depth of 60 to 99 inches

Frequency of flooding: None

Frequency of ponding: None

Water table (depth, kind): About 6 to 31 inches, perched (see table 19)

Drainage class: Moderately well drained

Shrink-swell potential: Low (about 1.5 LEP)

Salinity maximum: Not saline

Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 0

Available water capacity: Moderate (about 7.1 inches)

Interpretive Groups

Land capability subclass (nonirrigated): 2w

Meets hydric soil criteria: No

Hydrologic soil group: C

Typical Profile

Ap—0 to 9 inches; silt loam

Bt—9 to 27 inches; clay loam

Btx—27 to 43 inches; clay loam

2C—43 to 60 inches; stratified gravelly sand to silt loam

Minor Components

Knauers soils

Percent of map unit: 2 percent

Landform: Backwater areas on flood plains

Geomorphic position (two-dimensional): Foothlope and toeslope

Geomorphic position (three-dimensional): Tread

Representative aspect: South

Aspect range: All aspects

Slope range: 0 to 3 percent

Down-slope shape: Linear and concave

Across-slope shape: Linear and concave

Meets hydric soil criteria: Yes

Reaville soils

Percent of map unit: 2 percent

Landform: Red shale, siltstone, and sandstone hillslopes

Geomorphic position (two-dimensional): Summit and foothlope

Geomorphic position (three-dimensional): Base slope and interfluvium

Representative aspect: South

Aspect range: All aspects

Slope range: 0 to 3 percent

Down-slope shape: Linear and concave

Across-slope shape: Linear and concave

Meets hydric soil criteria: No

541247—Readington silt loam, 0 to 3 percent slopes

Map Unit Setting

Major land resource area (MLRA): 148—Northern Piedmont

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Elevation: 200 to 1,000 feet
Mean annual precipitation: 36 to 55 inches
Mean annual air temperature: 46 to 57 degrees F
Frost-free period: 160 to 200 days

Map Unit Composition

Readington and similar soils: 85 percent
Dissimilar minor components: 15 percent

Description of the Readington Soil

Classification

Fine-loamy, mixed, active, mesic Oxyaquic Fragiudalfs

Setting

Landscape: Uplands
Landform: Red shale, siltstone, and sandstone hillslopes
Landform position (two-dimensional): Backslope and footslope
Landform position (three-dimensional): Side slope, head slope, and base slope
Slope range: 0 to 3 percent
Down-slope shape: Linear and concave
Across-slope shape: Linear and concave
Representative aspect: South
Aspect range: All aspects
Soil temperature class: Mesic
Soil temperature regime: Mesic

Properties and Qualities

Runoff: Low
Parent material: Residuum weathered from shale and siltstone
Restrictive feature(s): Fragipan at a depth of 20 to 36 inches; lithic bedrock at a depth of 40 to 70 inches
Frequency of flooding: None
Frequency of ponding: None
Water table (depth, kind): About 18 to 36 inches, perched (see table 19)
Drainage class: Moderately well drained
Shrink-swell potential: Low (about 1.5 LEP)
Salinity maximum: Not saline
Sodicity maximum: Not sodic
Calcium carbonate equivalent (maximum weight percentage): 0
Available water capacity: Moderate (about 6.3 inches)

Interpretive Groups

Land capability subclass (nonirrigated): 2w
Meets hydric soil criteria: No
Hydrologic soil group: C

Typical Profile

Ap—0 to 8 inches; silt loam
Bt—8 to 29 inches; silt loam
Btx—29 to 58 inches; channery silt loam
R—58 to 68 inches; bedrock

Minor Components

Penn soils

Percent of map unit: 8 percent
Landform: Hillslopes

Geomorphic position (two-dimensional): Shoulder and backslope
Geomorphic position (three-dimensional): Nose slope and side slope
Representative aspect: South
Aspect range: All aspects
Slope range: 3 to 8 percent
Down-slope shape: Linear and convex
Across-slope shape: Linear and convex
Meets hydric soil criteria: No

Reaville soils

Percent of map unit: 4 percent
Landform: Red shale, siltstone, and sandstone hillslopes
Geomorphic position (two-dimensional): Summit and footslope
Geomorphic position (three-dimensional): Interfluvium and base slope
Representative aspect: South
Aspect range: All aspects
Slope range: 0 to 3 percent
Down-slope shape: Linear and concave
Across-slope shape: Linear and concave
Meets hydric soil criteria: No

Croton soils

Percent of map unit: 3 percent
Landform: Depressions
Geomorphic position (two-dimensional): Toeslope
Geomorphic position (three-dimensional): Base slope
Representative aspect: South
Aspect range: All aspects
Slope range: 0 to 3 percent
Down-slope shape: Linear and concave
Across-slope shape: Linear and concave
Meets hydric soil criteria: Yes

541254—Rowland silt loam, terrace

Map Unit Setting

Major land resource area (MLRA): 148—Northern Piedmont
Elevation: 150 to 1,000 feet
Mean annual precipitation: 36 to 50 inches
Mean annual air temperature: 48 to 57 degrees F
Frost-free period: 150 to 200 days

Map Unit Composition

Rowland and similar soils: 82 percent
Dissimilar minor components: 14 percent

Description of the Rowland Soil

Classification

Fine-loamy, mixed, superactive, mesic Fluvaquent Dystrudepts

Setting

Landscape: Uplands
Landform: Relatively narrow, nearly level flood plains
Landform position (two-dimensional): Footslope and toeslope

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Landform position (three-dimensional): Base slope and head slope

Slope range: 0 to 3 percent

Down-slope shape: Linear and concave

Across-slope shape: Linear and concave

Representative aspect: South

Aspect range: All aspects

Soil temperature class: Mesic

Soil temperature regime: Mesic

Properties and Qualities

Runoff: Low

Parent material: Alluvium derived from sandstone and shale

Restrictive feature(s): Lithic bedrock at depth of 60 to 99 inches

Frequency of flooding: Occasional

Frequency of ponding: None

Depth to water table: About 12 to 36 inches (see table 19)

Drainage class: Moderately well drained

Shrink-swell potential: Low (about 1.5 LEP)

Salinity maximum: Not saline

Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 0

Available water capacity: Moderate (about 8.0 inches)

Interpretive Groups

Land capability subclass (nonirrigated): 2w

Meets hydric soil criteria: No

Hydrologic soil group: C

Typical Profile

A—0 to 12 inches; silt loam

B—12 to 34 inches; silty clay loam

Cg—34 to 46 inches; silty clay loam

2Cg—46 to 61 inches; stratified gravel to sand

Minor Components

Knauers soils

Percent of map unit: 8 percent

Landform: Backwater areas on flood plains

Geomorphic position (two-dimensional): Footslope and toeslope

Geomorphic position (three-dimensional): Tread

Representative aspect: South

Aspect range: All aspects

Slope range: 0 to 3 percent

Down-slope shape: Linear and concave

Across-slope shape: Linear and concave

Meets hydric soil criteria: Yes

Abbottstown soils

Percent of map unit: 6 percent

Landform: Hillslopes

Geomorphic position (two-dimensional): Footslope and toeslope

Geomorphic position (three-dimensional): Head slope and base slope

Representative aspect: South

Aspect range: All aspects

Slope range: 0 to 3 percent

Down-slope shape: Concave and linear

Across-slope shape: Linear and concave

Meets hydric soil criteria: No

541256—Rowland silt loam, 0 to 3 percent slopes

Map Unit Setting

Major land resource area (MLRA): 148—Northern Piedmont

Elevation: 150 to 895 feet

Mean annual precipitation: 36 to 50 inches

Mean annual air temperature: 46 to 57 degrees F

Frost-free period: 150 to 200 days

Map Unit Composition

Rowland and similar soils: 95 percent

Dissimilar minor components: 5 percent

Description of the Rowland Soil

Classification

Fine-loamy, mixed, superactive, mesic Fluvaquentic Dystrudepts

Setting

Landscape: Uplands

Landform: Relatively narrow, nearly level flood plains

Landform position (two-dimensional): Footslope and toeslope

Landform position (three-dimensional): Base slope and head slope

Slope range: 0 to 3 percent

Down-slope shape: Linear and concave

Across-slope shape: Linear and concave

Representative aspect: South

Aspect range: All aspects

Soil temperature class: Mesic

Soil temperature regime: Mesic

Properties and Qualities

Runoff: Low

Parent material: Alluvium derived from sandstone and shale

Restrictive feature(s): Lithic bedrock at depth of 60 to 99 inches

Frequency of flooding: Frequent

Frequency of ponding: None

Water table (depth, kind): About 18 to 36 inches, perched (see table 19)

Drainage class: Moderately well drained

Shrink-swell potential: Low (about 1.5 LEP)

Salinity maximum: Not saline

Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 0

Available water capacity: Low (about 5.6 inches)

Interpretive Groups

Land capability subclass (nonirrigated): 2w

Meets hydric soil criteria: No

Hydrologic soil group: C

Typical Profile

A—0 to 6 inches; silt loam

Bw—6 to 29 inches; gravelly silt loam

C—29 to 54 inches; gravelly silt loam

Minor Components

Knauers soils

Percent of map unit: 5 percent

Landform: Backwater areas on flood plains

Geomorphic position (two-dimensional): Footslope and toeslope

Geomorphic position (three-dimensional): Tread

Representative aspect: South

Aspect range: All aspects

Slope range: 0 to 3 percent

Down-slope shape: Linear and concave

Across-slope shape: Linear and concave

Meets hydric soil criteria: Yes

541257—Rowland silt loam, 3 to 8 percent slopes

Map Unit Setting

Major land resource area (MLRA): 148—Northern Piedmont

Elevation: 150 to 1,000 feet

Mean annual precipitation: 36 to 50 inches

Mean annual air temperature: 46 to 57 degrees F

Frost-free period: 150 to 200 days

Map Unit Composition

Rowland and similar soils: 90 percent

Dissimilar minor components: 10 percent

Description of the Rowland Soil

Classification

Fine-loamy, mixed, superactive, mesic Fluvaquentic Dystrudepts

Setting

Landscape: Uplands

Landform: Relatively narrow, nearly level flood plains

Landform position (two-dimensional): Footslope and toeslope

Landform position (three-dimensional): Base slope and head slope

Slope range: 3 to 8 percent

Down-slope shape: Linear and concave

Across-slope shape: Linear and concave

Representative aspect: South

Aspect range: All aspects

Soil temperature class: Mesic

Soil temperature regime: Mesic

Properties and Qualities

Runoff: Medium

Parent material: Alluvium derived from sandstone and shale

Restrictive feature(s): Lithic bedrock at depth of 60 to 99 inches

Frequency of flooding: Frequent

Frequency of ponding: None

Water table (depth, kind): About 18 to 36 inches, perched (see table 19)

Drainage class: Moderately well drained

Shrink-swell potential: Low (about 1.5 LEP)
Salinity maximum: Not saline
Sodicity maximum: Not sodic
Calcium carbonate equivalent (maximum weight percentage): 0
Available water capacity: Low (about 5.9 inches)

Interpretive Groups

Land capability subclass (nonirrigated): 2w
Meets hydric soil criteria: No
Hydrologic soil group: C

Typical Profile

A—0 to 7 inches; silt loam
Bw—7 to 40 inches; gravelly silt loam
C—40 to 52 inches; gravelly silt loam

Minor Components

Abbottstown soils

Percent of map unit: 5 percent
Landform: Hillslopes
Geomorphic position (two-dimensional): Footslope and toeslope
Geomorphic position (three-dimensional): Head slope and base slope
Representative aspect: South
Aspect range: All aspects
Slope range: 0 to 3 percent
Down-slope shape: Concave and linear
Across-slope shape: Linear and concave
Meets hydric soil criteria: No

Knauers soils

Percent of map unit: 5 percent
Landform: Backwater areas on flood plains
Geomorphic position (two-dimensional): Footslope and toeslope
Geomorphic position (three-dimensional): Tread
Representative aspect: South
Aspect range: All aspects
Slope range: 0 to 3 percent
Down-slope shape: Linear and concave
Across-slope shape: Linear and concave
Meets hydric soil criteria: Yes

641312—Duffield silt loam, 3 to 8 percent slopes

Map Unit Setting

Major land resource area (MLRA): 148—Northern Piedmont
Elevation: 200 to 1,495 feet
Mean annual precipitation: 32 to 50 inches
Mean annual air temperature: 46 to 57 degrees F
Frost-free period: 120 to 200 days

Map Unit Composition

Duffield and similar soils: 90 percent
Dissimilar minor components: 10 percent

Description of the Duffield Soil

Classification

Fine-loamy, mixed, active, mesic Ultic Hapludalfs

Setting

Landscape: Limestone valleys

Landform: Hills

Landform position (two-dimensional): Summit

Landform position (three-dimensional): Interfluve

Slope range: 3 to 8 percent

Down-slope shape: Linear

Across-slope shape: Linear

Representative aspect: South

Aspect range: All aspects

Soil temperature class: Mesic

Soil temperature regime: Mesic

Soil moisture class: Udic

Properties and Qualities

Runoff: Medium

Parent material: Residuum weathered from limestone and siltstone

Restrictive feature(s): Lithic bedrock at a depth of 48 to 120 inches

Frequency of flooding: None

Frequency of ponding: None

Depth to water table: More than 72 inches

Drainage class: Well drained

Shrink-swell potential: Moderate (about 4.5 LEP)

Salinity maximum: Not saline

Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 0

Available water capacity: Very high (about 12.4 inches)

Interpretive Groups

Land capability subclass (nonirrigated): 2e

Meets hydric soil criteria: No

Hydrologic soil group: B

Typical Profile

Ap—0 to 10 inches; silt loam

Bt—10 to 53 inches; silty clay loam

C—53 to 72 inches; silt loam

Minor Components

Clarksburg soils

Percent of map unit: 5 percent

Landform: Limestone valley flats

Geomorphic position (two-dimensional): Footslope and toeslope

Geomorphic position (three-dimensional): Base slope

Representative aspect: South

Aspect range: All aspects

Slope range: 0 to 3 percent

Down-slope shape: Concave and linear

Across-slope shape: Linear and concave

Meets hydric soil criteria: No

Ryder soils

Percent of map unit: 3 percent

Landform: Hills

Geomorphic position (two-dimensional): Summit, shoulder, and backslope

Geomorphic position (three-dimensional): Interfluvium and side slope

Representative aspect: South

Aspect range: All aspects

Slope range: 8 to 15 percent

Down-slope shape: Linear and convex

Across-slope shape: Linear and convex

Meets hydric soil criteria: No

Thorndale soils

Percent of map unit: 2 percent

Landform: Depressions

Geomorphic position (two-dimensional): Footslope

Geomorphic position (three-dimensional): Base slope

Representative aspect: South

Aspect range: All aspects

Slope range: 0 to 3 percent

Down-slope shape: Concave and linear

Across-slope shape: Linear and concave

Meets hydric soil criteria: Yes

641350—Edgemont channery loam, 3 to 8 percent slopes

Map Unit Setting

Major land resource area (MLRA): 148—Northern Piedmont

Elevation: 495 to 2,400 feet

Mean annual precipitation: 35 to 50 inches

Mean annual air temperature: 46 to 57 degrees F

Frost-free period: 120 to 185 days

Map Unit Composition

Edgemont and similar soils: 93 percent

Dissimilar minor components: 7 percent

Description of the Edgemont Soil

Classification

Fine-loamy, mixed, active, mesic Typic Hapludults

Setting

Landscape: Mountains

Landform: Quartzite and shale ridges

Landform position (two-dimensional): Summit

Landform position (three-dimensional): Mountaintop

Slope range: 3 to 8 percent

Down-slope shape: Convex and linear

Across-slope shape: Linear and convex

Representative aspect: South

Aspect range: All aspects

Soil temperature class: Mesic

Soil temperature regime: Mesic

Properties and Qualities

Runoff: Low

Parent material: Residuum weathered from quartzite and/or residuum weathered from orthoquartzite

Restrictive feature(s): Lithic bedrock at a depth of 42 to 84 inches

Frequency of flooding: None

Frequency of ponding: None

Depth to water table: More than 72 inches

Drainage class: Well drained

Shrink-swell potential: Low (about 1.5 LEP)

Salinity maximum: Not saline

Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 0

Available water capacity: Low (about 5.8 inches)

Interpretive Groups

Land capability subclass (nonirrigated): 2e

Meets hydric soil criteria: No

Hydrologic soil group: B

Typical Profile

Ap—0 to 8 inches; channery loam

Bt—8 to 36 inches; channery fine sandy loam

C—36 to 60 inches; channery sandy loam

Minor Components

Buchanan soils

Percent of map unit: 4 percent

Landform: Very steep terraces

Geomorphic position (two-dimensional): Foothlope

Geomorphic position (three-dimensional): Mountain base

Representative aspect: South

Aspect range: All aspects

Slope range: 3 to 8 percent

Down-slope shape: Linear and concave

Across-slope shape: Linear and concave

Meets hydric soil criteria: No

Andover soils

Percent of map unit: 3 percent

Landform: Drainageways

Geomorphic position (two-dimensional): Foothlope and toeslope

Geomorphic position (three-dimensional): Mountain base

Representative aspect: South

Aspect range: All aspects

Slope range: 3 to 8 percent

Down-slope shape: Linear and concave

Across-slope shape: Linear and concave

Meets hydric soil criteria: Yes

641351—Edgemont channery loam, 8 to 15 percent slopes

Map Unit Setting

Major land resource area (MLRA): 148—Northern Piedmont

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Elevation: 495 to 1,800 feet
Mean annual precipitation: 35 to 50 inches
Mean annual air temperature: 46 to 59 degrees F
Frost-free period: 120 to 185 days

Map Unit Composition

Edgemont and similar soils: 93 percent
Dissimilar minor components: 7 percent

Description of the Edgemont Soil

Classification

Fine-loamy, mixed, active, mesic Typic Hapludults

Setting

Landscape: Mountains
Landform: Quartzite and shale ridges
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Upper third of mountain flank
Slope range: 8 to 15 percent
Down-slope shape: Convex and linear
Across-slope shape: Linear and convex
Representative aspect: South
Aspect range: All aspects
Soil temperature class: Mesic
Soil temperature regime: Mesic

Properties and Qualities

Runoff: Low
Parent material: Residuum weathered from quartzite and/or residuum weathered from orthoquartzite
Restrictive feature(s): Lithic bedrock at a depth of 42 to 84 inches
Frequency of flooding: None
Frequency of ponding: None
Depth to water table: More than 72 inches
Drainage class: Well drained
Shrink-swell potential: Low (about 1.5 LEP)
Salinity maximum: Not saline
Sodicity maximum: Not sodic
Calcium carbonate equivalent (maximum weight percentage): 0
Available water capacity: Low (about 5.8 inches)

Interpretive Groups

Land capability subclass (nonirrigated): 3e
Meets hydric soil criteria: No
Hydrologic soil group: B

Typical Profile

Ap—0 to 8 inches; channery loam
Bt—8 to 36 inches; channery fine sandy loam
C—36 to 60 inches; channery sandy loam

Minor Components

Buchanan soils

Percent of map unit: 4 percent
Landform: Very steep terraces
Geomorphic position (two-dimensional): Footslope

Geomorphic position (three-dimensional): Mountain base
Representative aspect: South
Aspect range: All aspects
Slope range: 3 to 8 percent
Down-slope shape: Linear and concave
Across-slope shape: Linear and concave
Meets hydric soil criteria: No

Andover soils

Percent of map unit: 3 percent
Landform: Drainageways
Geomorphic position (two-dimensional): Foothlope and toeslope
Geomorphic position (three-dimensional): Mountain base
Representative aspect: South
Aspect range: All aspects
Slope range: 3 to 8 percent
Down-slope shape: Linear and concave
Across-slope shape: Linear and concave
Meets hydric soil criteria: Yes

641352—Edgemont channery loam, 15 to 25 percent slopes

Map Unit Setting

Major land resource area (MLRA): 148—Northern Piedmont
Elevation: 495 to 1,800 feet
Mean annual precipitation: 35 to 50 inches
Mean annual air temperature: 46 to 59 degrees F
Frost-free period: 120 to 185 days

Map Unit Composition

Edgemont and similar soils: 93 percent
Dissimilar minor components: 7 percent

Description of the Edgemont Soil

Classification

Fine-loamy, mixed, active, mesic Typic Hapludults

Setting

Landscape: Mountains
Landform: Quartzite and shale ridges
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Upper third of mountain flank
Slope range: 15 to 25 percent
Down-slope shape: Convex and linear
Across-slope shape: Linear and convex
Representative aspect: South
Aspect range: All aspects
Soil temperature class: Mesic
Soil temperature regime: Mesic

Properties and Qualities

Runoff: Medium

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Parent material: Residuum weathered from quartzite and/or residuum weathered from orthoquartzite

Restrictive feature(s): Lithic bedrock at a depth of 42 to 84 inches

Frequency of flooding: None

Frequency of ponding: None

Depth to water table: More than 72 inches

Drainage class: Well drained

Shrink-swell potential: Low (about 1.5 LEP)

Salinity maximum: Not saline

Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 0

Available water capacity: Low (about 5.8 inches)

Interpretive Groups

Land capability subclass (nonirrigated): 4e

Meets hydric soil criteria: No

Hydrologic soil group: B

Typical Profile

Ap—0 to 8 inches; channery loam

Bt—8 to 36 inches; channery fine sandy loam

C—36 to 60 inches; channery sandy loam

Minor Components

Buchanan soils

Percent of map unit: 4 percent

Landform: Very steep terraces

Geomorphic position (two-dimensional): Footslope

Geomorphic position (three-dimensional): Mountain base

Representative aspect: South

Aspect range: All aspects

Slope range: 3 to 8 percent

Down-slope shape: Linear and concave

Across-slope shape: Linear and concave

Meets hydric soil criteria: No

Andover soils

Percent of map unit: 3 percent

Landform: Drainageways

Geomorphic position (two-dimensional): Footslope and toeslope

Geomorphic position (three-dimensional): Mountain base

Representative aspect: South

Aspect range: All aspects

Slope range: 3 to 8 percent

Down-slope shape: Linear and concave

Across-slope shape: Linear and concave

Meets hydric soil criteria: Yes

641353—Edgemont channery sandy loam, 0 to 8 percent slopes, extremely stony

Map Unit Setting

Major land resource area (MLRA): 148—Northern Piedmont

Elevation: 495 to 2,400 feet

Mean annual precipitation: 35 to 50 inches

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Mean annual air temperature: 46 to 57 degrees F

Frost-free period: 120 to 185 days

Map Unit Composition

Edgemont, extremely stony and similar soils: 90 percent

Dissimilar minor components: 7 percent

Description of the Edgemont, Extremely Stony Soil

Classification

Fine-loamy, mixed, active, mesic Typic Hapludults

Setting

Landscape: Mountains

Landform: Quartzite and shale ridges

Landform position (two-dimensional): Summit

Landform position (three-dimensional): Mountaintop

Slope range: 0 to 8 percent

Down-slope shape: Convex and linear

Across-slope shape: Linear and convex

Representative aspect: South

Aspect range: All aspects

Soil temperature class: Mesic

Soil temperature regime: Mesic

Properties and Qualities

Runoff: Very low

Parent material: Residuum weathered from quartzite and/or residuum weathered from orthoquartzite

Restrictive feature(s): Lithic bedrock at a depth of 42 to 84 inches

Frequency of flooding: None

Frequency of ponding: None

Depth to water table: More than 72 inches

Drainage class: Well drained

Shrink-swell potential: Low (about 1.5 LEP)

Salinity maximum: Not saline

Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 0

Available water capacity: Low (about 5.8 inches)

Interpretive Groups

Land capability subclass (nonirrigated): 7s

Meets hydric soil criteria: No

Hydrologic soil group: B

Typical Profile

A—0 to 8 inches; channery sandy loam

Bt—8 to 36 inches; channery fine sandy loam

C—36 to 60 inches; channery sandy loam

Minor Components

Buchanan, extremely stony soils

Percent of map unit: 4 percent

Landform: Very steep terraces

Geomorphic position (two-dimensional): Footslope

Geomorphic position (three-dimensional): Mountain base

Representative aspect: South

Aspect range: All aspects
Slope range: 0 to 8 percent
Down-slope shape: Linear and concave
Across-slope shape: Linear and concave
Meets hydric soil criteria: No

Andover, extremely stony soils

Percent of map unit: 3 percent
Landform: Drainageways
Geomorphic position (two-dimensional): Foothlope and toeslope
Geomorphic position (three-dimensional): Mountain base
Representative aspect: South
Aspect range: All aspects
Slope range: 0 to 8 percent
Down-slope shape: Linear and concave
Across-slope shape: Linear and concave
Meets hydric soil criteria: Yes

641354—Edgemont channery sandy loam, 8 to 25 percent slopes, extremely stony

Map Unit Setting

Major land resource area (MLRA): 148—Northern Piedmont
Elevation: 495 to 2,400 feet
Mean annual precipitation: 35 to 50 inches
Mean annual air temperature: 46 to 57 degrees F
Frost-free period: 120 to 185 days

Map Unit Composition

Edgemont, extremely stony and similar soils: 93 percent
Dissimilar minor components: 7 percent

Description of the Edgemont, Extremely Stony Soil

Classification

Fine-loamy, mixed, active, mesic Typic Hapludults

Setting

Landscape: Mountains
Landform: Quartzite and shale ridges
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Upper third of mountain flank
Slope range: 8 to 25 percent
Down-slope shape: Convex and linear
Across-slope shape: Linear and convex
Representative aspect: South
Aspect range: All aspects
Soil temperature class: Mesic
Soil temperature regime: Mesic

Properties and Qualities

Runoff: Low
Parent material: Residuum weathered from quartzite and/or residuum weathered from orthoquartzite
Restrictive feature(s): Lithic bedrock at a depth of 42 to 84 inches

Frequency of flooding: None
Frequency of ponding: None
Depth to water table: More than 72 inches
Drainage class: Well drained
Shrink-swell potential: Low (about 1.5 LEP)
Salinity maximum: Not saline
Sodicity maximum: Not sodic
Calcium carbonate equivalent (maximum weight percentage): 0
Available water capacity: Low (about 5.8 inches)

Interpretive Groups

Land capability subclass (nonirrigated): 7s
Meets hydric soil criteria: No
Hydrologic soil group: B

Typical Profile

A—0 to 8 inches; channery sandy loam
Bt—8 to 36 inches; channery fine sandy loam
C—36 to 60 inches; channery sandy loam

Minor Components

Buchanan, extremely stony soils

Percent of map unit: 4 percent
Landform: Very steep terraces
Geomorphic position (two-dimensional): Footslope
Geomorphic position (three-dimensional): Mountain base
Representative aspect: South
Aspect range: All aspects
Slope range: 8 to 25 percent
Down-slope shape: Linear and concave
Across-slope shape: Linear and concave
Meets hydric soil criteria: No

Andover, extremely stony soils

Percent of map unit: 3 percent
Landform: Drainageways
Geomorphic position (two-dimensional): Footslope and toeslope
Geomorphic position (three-dimensional): Mountain base
Representative aspect: South
Aspect range: All aspects
Slope range: 0 to 8 percent
Down-slope shape: Linear and concave
Across-slope shape: Linear and concave
Meets hydric soil criteria: Yes

641355—Edgemont channery sandy loam, 25 to 60 percent slopes, extremely stony

Map Unit Setting

Major land resource area (MLRA): 148—Northern Piedmont
Elevation: 495 to 2,400 feet
Mean annual precipitation: 35 to 50 inches
Mean annual air temperature: 46 to 57 degrees F
Frost-free period: 120 to 185 days

Map Unit Composition

Edgemont, extremely stony and similar soils: 93 percent

Dissimilar minor components: 7 percent

Description of the Edgemont, Extremely Stony Soil

Classification

Fine-loamy, mixed, active, mesic Typic Hapludults

Setting

Landscape: Mountains

Landform: Quartzite and shale ridges

Landform position (two-dimensional): Backslope

Landform position (three-dimensional): Center third of mountain flank

Slope range: 25 to 60 percent

Down-slope shape: Convex and linear

Across-slope shape: Linear and convex

Representative aspect: South

Aspect range: All aspects

Soil temperature class: Mesic

Soil temperature regime: Mesic

Properties and Qualities

Runoff: Medium

Parent material: Residuum weathered from quartzite and/or residuum weathered from orthoquartzite

Restrictive feature(s): Lithic bedrock at a depth of 42 to 84 inches

Frequency of flooding: None

Frequency of ponding: None

Depth to water table: More than 72 inches

Drainage class: Well drained

Shrink-swell potential: Low (about 1.5 LEP)

Salinity maximum: Not saline

Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 0

Available water capacity: Low (about 5.8 inches)

Interpretive Groups

Land capability subclass (nonirrigated): 7s

Meets hydric soil criteria: No

Hydrologic soil group: B

Typical Profile

A—0 to 8 inches; channery sandy loam

Bt—8 to 36 inches; channery fine sandy loam

C—36 to 60 inches; channery sandy loam

Minor Components

Buchanan, extremely stony soils

Percent of map unit: 4 percent

Landform: Very steep terraces

Geomorphic position (two-dimensional): Footslope

Geomorphic position (three-dimensional): Mountain base

Representative aspect: South

Aspect range: All aspects

Slope range: 8 to 25 percent

Down-slope shape: Linear and concave

Across-slope shape: Linear and concave

Meets hydric soil criteria: No

Andover, extremely stony soils

Percent of map unit: 3 percent

Landform: Drainageways

Geomorphic position (two-dimensional): Foothlope and toeslope

Geomorphic position (three-dimensional): Mountain base

Representative aspect: South

Aspect range: All aspects

Slope range: 0 to 8 percent

Down-slope shape: Linear and concave

Across-slope shape: Linear and concave

Meets hydric soil criteria: Yes

641418—Codus silt loam

Map Unit Setting

Major land resource area (MLRA): 148—Northern Piedmont

Elevation: 200 to 2,000 feet

Mean annual precipitation: 35 to 50 inches

Mean annual air temperature: 45 to 57 degrees F

Frost-free period: 120 to 220 days

Map Unit Composition

Codus and similar soils: 85 percent

Dissimilar minor components: 15 percent

Description of the Codus Soil

Classification

Fine-loamy, mixed, active, mesic Fluvaquentic Dystrudepts

Setting

Landscape: Uplands

Landform: Nearly level flood plains

Landform position (two-dimensional): Toeslope

Landform position (three-dimensional): Tread

Slope range: 0 to 3 percent

Down-slope shape: Linear

Across-slope shape: Linear

Representative aspect: South

Aspect range: All aspects

Soil temperature class: Mesic

Soil temperature regime: Mesic

Properties and Qualities

Runoff: Low

Parent material: Alluvium derived from gneiss and/or alluvium derived from mica schist

Restrictive feature(s): Lithic bedrock at a depth of 72 to 99 inches

Frequency of flooding: Occasional

Frequency of ponding: None

Depth to water table: About 18 to 36 inches (see table 19)

Drainage class: Moderately well drained

Shrink-swell potential: Low (about 1.5 LEP)

Salinity maximum: Not saline

Sodicity maximum: Not sodic
Calcium carbonate equivalent (maximum weight percentage): 0
Available water capacity: Moderate (about 8.5 inches)

Interpretive Groups

Land capability subclass (nonirrigated): 2w
Meets hydric soil criteria: No
Hydrologic soil group: C

Typical Profile

Ap—0 to 12 inches; silt loam
Bw—12 to 48 inches; silt loam
C—48 to 60 inches; silt loam

Minor Components

Hatboro soils

Percent of map unit: 8 percent
Landform: Flood plains
Geomorphic position (two-dimensional): Toeslope
Geomorphic position (three-dimensional): Tread
Representative aspect: South
Aspect range: All aspects
Slope range: 0 to 3 percent
Down-slope shape: Linear and concave
Across-slope shape: Linear and concave
Meets hydric soil criteria: Yes

Glenville soils

Percent of map unit: 4 percent
Landform: Hillslopes
Geomorphic position (two-dimensional): Backslope and footslope
Geomorphic position (three-dimensional): Head slope and side slope
Representative aspect: South
Aspect range: All aspects
Slope range: 0 to 3 percent
Down-slope shape: Linear and concave
Across-slope shape: Linear and concave
Meets hydric soil criteria: No

Baile soils

Percent of map unit: 3 percent
Landform: Depressions
Geomorphic position (two-dimensional): Footslope
Geomorphic position (three-dimensional): Base slope
Representative aspect: South
Aspect range: All aspects
Slope range: 0 to 3 percent
Down-slope shape: Concave and linear
Across-slope shape: Linear and concave
Meets hydric soil criteria: Yes

641481—Conestoga silt loam, 0 to 3 percent slopes

Map Unit Setting

Major land resource area (MLRA): 148—Northern Piedmont

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Elevation: 295 to 1,600 feet
Mean annual precipitation: 34 to 50 inches
Mean annual air temperature: 46 to 57 degrees F
Frost-free period: 140 to 200 days

Map Unit Composition

Conestoga and similar soils: 90 percent
Dissimilar minor components: 10 percent

Description of the Conestoga Soil

Classification

Fine-loamy, mixed, active, mesic Typic Hapludalfs

Setting

Landscape: Hills
Landform: Hillsides
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Side slope
Slope range: 0 to 3 percent
Down-slope shape: Convex
Across-slope shape: Convex
Representative aspect: South
Aspect range: All aspects
Soil temperature class: Mesic
Soil temperature regime: Mesic

Properties and Qualities

Runoff: Low
Parent material: Residuum weathered from schist and/or residuum weathered from limestone
Restrictive feature(s): Lithic bedrock at depth of 60 to 99 inches
Frequency of flooding: None
Frequency of ponding: None
Depth to water table: More than 72 inches
Drainage class: Well drained
Shrink-swell potential: Low (about 1.5 LEP)
Salinity maximum: Not saline
Sodicity maximum: Not sodic
Calcium carbonate equivalent (maximum weight percentage): 0
Available water capacity: Moderate (about 8.6 inches)

Interpretive Groups

Land capability subclass (nonirrigated): 1
Meets hydric soil criteria: No
Hydrologic soil group: B

Typical Profile

Ap—0 to 10 inches; silt loam
Bt—10 to 38 inches; silty clay loam
C—38 to 75 inches; channery loam

Minor Components

Clarksburg soils

Percent of map unit: 5 percent
Landform: Limestone valley flats

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Geomorphic position (two-dimensional): Footslope and toeslope

Geomorphic position (three-dimensional): Base slope

Representative aspect: South

Aspect range: All aspects

Slope range: 0 to 3 percent

Down-slope shape: Concave and linear

Across-slope shape: Linear and concave

Meets hydric soil criteria: No

Duffield soils

Percent of map unit: 1 percent

Landform: Hills

Geomorphic position (two-dimensional): Summit

Geomorphic position (three-dimensional): Interfluve

Representative aspect: South

Aspect range: All aspects

Slope range: 0 to 3 percent

Down-slope shape: Linear

Across-slope shape: Linear

Meets hydric soil criteria: No

Hollinger soils

Percent of map unit: 1 percent

Landform: Nearly level to steep dissected hills

Geomorphic position (two-dimensional): Summit, shoulder, and backslope

Geomorphic position (three-dimensional): Nose slope, side slope, and interfluve

Representative aspect: South

Aspect range: All aspects

Slope range: 0 to 3 percent

Down-slope shape: Linear and convex

Across-slope shape: Linear and convex

Meets hydric soil criteria: No

Letort soils

Percent of map unit: 1 percent

Landform: Hillslopes

Geomorphic position (two-dimensional): Shoulder and backslope

Geomorphic position (three-dimensional): Nose slope and side slope

Representative aspect: South

Aspect range: All aspects

Slope range: 0 to 3 percent

Down-slope shape: Linear and convex

Across-slope shape: Linear and convex

Meets hydric soil criteria: No

Penlaw soils

Percent of map unit: 1 percent

Landform: Swales

Geomorphic position (two-dimensional): Footslope and toeslope

Geomorphic position (three-dimensional): Base slope

Representative aspect: South

Aspect range: All aspects

Slope range: 0 to 3 percent

Down-slope shape: Concave

Across-slope shape: Concave

Meets hydric soil criteria: No

Pequea soils

Percent of map unit: 1 percent

Landform: Hillslopes

Geomorphic position (two-dimensional): Shoulder and backslope

Geomorphic position (three-dimensional): Side slope

Representative aspect: South

Aspect range: All aspects

Slope range: 8 to 15 percent

Down-slope shape: Convex and linear

Across-slope shape: Linear and convex

Meets hydric soil criteria: No

641483—Conestoga silt loam, 3 to 8 percent slopes

Map Unit Setting

Major land resource area (MLRA): 148—Northern Piedmont

Elevation: 295 to 1,600 feet

Mean annual precipitation: 34 to 50 inches

Mean annual air temperature: 46 to 57 degrees F

Frost-free period: 140 to 200 days

Map Unit Composition

Conestoga and similar soils: 90 percent

Dissimilar minor components: 10 percent

Description of the Conestoga Soil

Classification

Fine-loamy, mixed, active, mesic Typic Hapludalfs

Setting

Landscape: Hills

Landform: Hillsides

Landform position (two-dimensional): Shoulder

Landform position (three-dimensional): Side slope

Slope range: 3 to 8 percent

Down-slope shape: Convex

Across-slope shape: Convex

Representative aspect: South

Aspect range: All aspects

Soil temperature class: Mesic

Soil temperature regime: Mesic

Properties and Qualities

Runoff: Medium

Parent material: Residuum weathered from limestone and/or residuum weathered from schist

Restrictive feature(s): Lithic bedrock at depth of 60 to 99 inches

Frequency of flooding: None

Frequency of ponding: None

Depth to water table: More than 72 inches

Drainage class: Well drained

Shrink-swell potential: Low (about 1.5 LEP)

Salinity maximum: Not saline

Sodicity maximum: Not sodic

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Calcium carbonate equivalent (maximum weight percentage): 0

Available water capacity: Moderate (about 8.6 inches)

Interpretive Groups

Land capability subclass (nonirrigated): 2e

Meets hydric soil criteria: No

Hydrologic soil group: B

Typical Profile

Ap—0 to 10 inches; silt loam

Bt—10 to 38 inches; silty clay loam

C—38 to 75 inches; channery loam

Minor Components

Clarksburg soils

Percent of map unit: 5 percent

Landform: Limestone valley flats

Geomorphic position (two-dimensional): Footslope and toeslope

Geomorphic position (three-dimensional): Base slope

Representative aspect: South

Aspect range: All aspects

Slope range: 0 to 3 percent

Down-slope shape: Concave and linear

Across-slope shape: Linear and concave

Meets hydric soil criteria: No

Duffield soils

Percent of map unit: 1 percent

Landform: Hills

Geomorphic position (two-dimensional): Summit

Geomorphic position (three-dimensional): Interfluvium

Representative aspect: South

Aspect range: All aspects

Slope range: 3 to 8 percent

Down-slope shape: Linear

Across-slope shape: Linear

Meets hydric soil criteria: No

Hollinger soils

Percent of map unit: 1 percent

Landform: Nearly level to steep dissected hills

Geomorphic position (two-dimensional): Summit, shoulder, and backslope

Geomorphic position (three-dimensional): Nose slope, side slope, and interfluvium

Representative aspect: South

Aspect range: All aspects

Slope range: 3 to 8 percent

Down-slope shape: Linear and convex

Across-slope shape: Linear and convex

Meets hydric soil criteria: No

Letort soils

Percent of map unit: 1 percent

Landform: Hillslopes

Geomorphic position (two-dimensional): Shoulder and backslope

Geomorphic position (three-dimensional): Side slope and nose slope

Representative aspect: South

Aspect range: All aspects

Slope range: 3 to 8 percent
Down-slope shape: Linear and convex
Across-slope shape: Linear and convex
Meets hydric soil criteria: No

Penlaw soils

Percent of map unit: 1 percent
Landform: Swales
Geomorphic position (two-dimensional): Foothlope and toeslope
Geomorphic position (three-dimensional): Base slope
Representative aspect: South
Aspect range: All aspects
Slope range: 0 to 3 percent
Down-slope shape: Concave
Across-slope shape: Concave
Meets hydric soil criteria: No

Pequea soils

Percent of map unit: 1 percent
Landform: Hillslopes
Geomorphic position (two-dimensional): Shoulder and backslope
Geomorphic position (three-dimensional): Side slope
Representative aspect: South
Aspect range: All aspects
Slope range: 8 to 15 percent
Down-slope shape: Convex and linear
Across-slope shape: Linear and convex
Meets hydric soil criteria: No

641484—Conestoga silt loam, 8 to 15 percent slopes

Map Unit Setting

Major land resource area (MLRA): 148—Northern Piedmont
Elevation: 295 to 1,600 feet
Mean annual precipitation: 34 to 50 inches
Mean annual air temperature: 46 to 57 degrees F
Frost-free period: 140 to 200 days

Map Unit Composition

Conestoga and similar soils: 90 percent
Dissimilar minor components: 9 percent

Description of the Conestoga Soil

Classification

Fine-loamy, mixed, active, mesic Typic Hapludalfs

Setting

Landscape: Hills
Landform: Hillsides
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Side slope
Slope range: 8 to 15 percent
Down-slope shape: Convex
Across-slope shape: Convex
Representative aspect: South

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Aspect range: All aspects
Soil temperature class: Mesic
Soil temperature regime: Mesic

Properties and Qualities

Runoff: Medium
Parent material: Residuum weathered from limestone and/or residuum weathered from schist
Restrictive feature(s): Lithic bedrock at depth of 60 to 99 inches
Frequency of flooding: None
Frequency of ponding: None
Depth to water table: More than 72 inches
Drainage class: Well drained
Shrink-swell potential: Low (about 1.5 LEP)
Salinity maximum: Not saline
Sodicity maximum: Not sodic
Calcium carbonate equivalent (maximum weight percentage): 0
Available water capacity: Moderate (about 8.6 inches)

Interpretive Groups

Land capability subclass (nonirrigated): 3e
Meets hydric soil criteria: No
Hydrologic soil group: B

Typical Profile

Ap—0 to 10 inches; silt loam
Bt—10 to 38 inches; silty clay loam
C—38 to 75 inches; channery loam

Minor Components

Clarksburg soils

Percent of map unit: 5 percent
Landform: Limestone valley flats
Geomorphic position (two-dimensional): Footslope and toeslope
Geomorphic position (three-dimensional): Base slope
Representative aspect: South
Aspect range: All aspects
Slope range: 0 to 3 percent
Down-slope shape: Concave and linear
Across-slope shape: Linear and concave
Meets hydric soil criteria: No

Duffield soils

Percent of map unit: 1 percent
Landform: Hills
Geomorphic position (two-dimensional): Shoulder
Geomorphic position (three-dimensional): Interfluvium
Representative aspect: South
Aspect range: All aspects
Slope range: 3 to 8 percent
Down-slope shape: Linear
Across-slope shape: Linear
Meets hydric soil criteria: No

Hollinger soils

Percent of map unit: 1 percent
Landform: Nearly level to steep dissected hills

Geomorphic position (two-dimensional): Summit, shoulder, and backslope
Geomorphic position (three-dimensional): Nose slope, side slope, and interfluvium
Representative aspect: South
Aspect range: All aspects
Slope range: 8 to 15 percent
Down-slope shape: Linear and convex
Across-slope shape: Linear and convex
Meets hydric soil criteria: No

Letort soils

Percent of map unit: 1 percent
Landform: Hillslopes
Geomorphic position (two-dimensional): Shoulder and backslope
Geomorphic position (three-dimensional): Side slope and nose slope
Representative aspect: South
Aspect range: All aspects
Slope range: 8 to 15 percent
Down-slope shape: Linear and convex
Across-slope shape: Linear and convex
Meets hydric soil criteria: No

Pequea soils

Percent of map unit: 1 percent
Landform: Hillslopes
Geomorphic position (two-dimensional): Shoulder and backslope
Geomorphic position (three-dimensional): Side slope
Representative aspect: South
Aspect range: All aspects
Slope range: 8 to 15 percent
Down-slope shape: Convex and linear
Across-slope shape: Linear and convex
Meets hydric soil criteria: No

641523—Glenville silt loam, 3 to 8 percent slopes

Map Unit Setting

Major land resource area (MLRA): 148—Northern Piedmont
Elevation: 200 to 2,000 feet
Mean annual precipitation: 35 to 55 inches
Mean annual air temperature: 45 to 61 degrees F
Frost-free period: 110 to 235 days

Map Unit Composition

Glenville and similar soils: 90 percent
Dissimilar minor components: 10 percent

Description of the Glenville Soil

Classification

Fine-loamy, mixed, active, mesic Aquic Fragiudults

Setting

Landscape: Hills
Landform: Hillslopes
Landform position (two-dimensional): Backslope and footslope
Landform position (three-dimensional): Head slope and side slope

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Slope range: 3 to 8 percent
Down-slope shape: Linear and concave
Across-slope shape: Linear and concave
Representative aspect: South
Aspect range: All aspects
Soil temperature class: Mesic
Soil temperature regime: Mesic

Properties and Qualities

Runoff: Medium
Parent material: Colluvium and/or residuum weathered from mica schist
Restrictive feature(s): Fragipan at a depth of 15 to 30 inches; paralithic bedrock at a depth of 60 to 99 inches
Frequency of flooding: None
Frequency of ponding: None
Water table (depth, kind): About 6 to 36 inches, perched (see table 19)
Drainage class: Moderately well drained
Shrink-swell potential: Low (about 1.5 LEP)
Salinity maximum: Not saline
Sodicity maximum: Not sodic
Calcium carbonate equivalent (maximum weight percentage): 0
Available water capacity: Moderate (about 8.9 inches)

Interpretive Groups

Land capability subclass (nonirrigated): 2e
Meets hydric soil criteria: No
Hydrologic soil group: C

Typical Profile

Ap—0 to 9 inches; silt loam
Bt—9 to 19 inches; silt loam
Bx—19 to 39 inches; silt loam
C—39 to 82 inches; channery loam

Minor Components

Baile soils

Percent of map unit: 5 percent
Landform: Depressions
Geomorphic position (two-dimensional): Footslope
Geomorphic position (three-dimensional): Base slope
Representative aspect: South
Aspect range: All aspects
Slope range: 0 to 3 percent
Down-slope shape: Concave and linear
Across-slope shape: Linear and concave
Meets hydric soil criteria: Yes

Glenelg soils

Percent of map unit: 5 percent
Landform: Nearly level to steep dissected hillslopes
Geomorphic position (two-dimensional): Summit, shoulder, and backslope
Geomorphic position (three-dimensional): Nose slope, side slope, and interfluvium
Representative aspect: South
Aspect range: All aspects
Slope range: 3 to 8 percent

Down-slope shape: Linear and convex
Across-slope shape: Linear and convex
Meets hydric soil criteria: No

641543—Lindside silt loam

Map Unit Setting

Major land resource area (MLRA): 148—Northern Piedmont
Elevation: 295 to 1,495 feet
Mean annual precipitation: 30 to 55 inches
Mean annual air temperature: 45 to 61 degrees F
Frost-free period: 133 to 205 days

Map Unit Composition

Lindside and similar soils: 85 percent
Dissimilar minor components: 15 percent

Description of the Lindside Soil

Classification

Fine-silty, mixed, active, mesic Fluvaquentic Eutrudepts

Setting

Landscape: Uplands
Landform: Valleys, nearly level flood plains, and drainageways
Landform position (two-dimensional): Footslope and toeslope
Landform position (three-dimensional): Side slope and head slope
Slope range: 0 to 3 percent
Down-slope shape: Convex
Across-slope shape: Linear
Representative aspect: South
Aspect range: All aspects
Soil temperature class: Mesic
Soil temperature regime: Mesic

Properties and Qualities

Runoff: Low
Parent material: Alluvium derived from limestone
Restrictive feature(s): None within a depth of 60 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Depth to water table: About 18 to 36 inches (see table 19)
Drainage class: Moderately well drained
Shrink-swell potential: Low (about 1.5 LEP)
Salinity maximum: Not saline
Sodicity maximum: Not sodic
Calcium carbonate equivalent (maximum weight percentage): 0
Available water capacity: High (about 11.8 inches)

Interpretive Groups

Land capability subclass (nonirrigated): 2w
Meets hydric soil criteria: No
Hydrologic soil group: C

Typical Profile

Ap—0 to 10 inches; silt loam

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Bw—10 to 50 inches; silty clay loam

C—50 to 60 inches; stratified gravelly sandy loam to silty clay loam

Minor Components

Holly soils

Percent of map unit: 12 percent

Landform: Flood plains

Geomorphic position (two-dimensional): Toeslope

Geomorphic position (three-dimensional): Base slope

Representative aspect: Southeast

Aspect range: All aspects

Slope range: 0 to 3 percent

Down-slope shape: Concave

Across-slope shape: Concave

Meets hydric soil criteria: Yes

Elk soils

Percent of map unit: 1 percent

Landform: Stream terraces

Geomorphic position (two-dimensional): Footslope and toeslope

Geomorphic position (three-dimensional): Tread

Representative aspect: South

Aspect range: All aspects

Slope range: 0 to 3 percent

Down-slope shape: Linear

Across-slope shape: Linear

Meets hydric soil criteria: No

Newark soils

Percent of map unit: 1 percent

Landform: Nearly level flood plains and depressions

Geomorphic position (three-dimensional): Side slope and head slope

Representative aspect: South

Aspect range: All aspects

Slope range: 0 to 3 percent

Down-slope shape: Linear and concave

Across-slope shape: Linear and concave

Meets hydric soil criteria: No

Nolin soils

Percent of map unit: 1 percent

Landform: Flood plains and depressions

Geomorphic position (two-dimensional): Footslope

Geomorphic position (three-dimensional): Base slope and riser

Representative aspect: South

Aspect range: All aspects

Slope range: 0 to 3 percent

Down-slope shape: Linear and concave

Across-slope shape: Linear and concave

Meets hydric soil criteria: No

641583—Penn silt loam, 3 to 8 percent slopes

Map Unit Setting

Major land resource area (MLRA): 148—Northern Piedmont

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Elevation: 245 to 1,295 feet
Mean annual precipitation: 36 to 55 inches
Mean annual air temperature: 46 to 57 degrees F
Frost-free period: 130 to 200 days

Map Unit Composition

Penn and similar soils: 87 percent
Dissimilar minor components: 13 percent

Description of the Penn Soil

Classification

Fine-loamy, mixed, superactive, mesic Ultic Hapludalfs

Setting

Landscape: Uplands
Landform: Nearly level to steep dissected hillslopes
Landform position (two-dimensional): Summit, shoulder, and backslope
Landform position (three-dimensional): Nose slope, side slope, and interfluvium
Slope range: 3 to 8 percent
Down-slope shape: Linear and convex
Across-slope shape: Linear and convex
Representative aspect: South
Aspect range: All aspects
Soil temperature class: Mesic
Soil temperature regime: Mesic

Properties and Qualities

Runoff: Low
Parent material: Residuum weathered from shale and siltstone
Restrictive feature(s): Lithic bedrock at a depth of 20 to 40 inches
Frequency of flooding: None
Frequency of ponding: None
Depth to water table: More than 72 inches
Drainage class: Well drained
Shrink-swell potential: Low (about 1.5 LEP)
Salinity maximum: Not saline
Sodicity maximum: Not sodic
Calcium carbonate equivalent (maximum weight percentage): 0
Available water capacity: Low (about 4.1 inches)

Interpretive Groups

Land capability subclass (nonirrigated): 2e
Meets hydric soil criteria: No
Hydrologic soil group: C

Typical Profile

Ap—0 to 10 inches; silt loam
Bt—10 to 22 inches; channery silt loam
C—22 to 28 inches; very channery silt loam
R—28 to 48 inches; bedrock

Minor Components

Readington soils

Percent of map unit: 5 percent
Landform: Red shale, siltstone, and sandstone hillslopes
Geomorphic position (two-dimensional): Backslope and footslope

Geomorphic position (three-dimensional): Side slope, head slope, and base slope

Representative aspect: South

Aspect range: All aspects

Slope range: 0 to 3 percent

Down-slope shape: Linear and concave

Across-slope shape: Linear and concave

Meets hydric soil criteria: No

Reaville soils

Percent of map unit: 5 percent

Landform: Red shale, siltstone, and sandstone hillslopes

Geomorphic position (two-dimensional): Summit and footslope

Geomorphic position (three-dimensional): Base slope and interfluvium

Representative aspect: South

Aspect range: All aspects

Slope range: 3 to 8 percent

Down-slope shape: Linear and concave

Across-slope shape: Linear and concave

Meets hydric soil criteria: No

Klinesville soils

Percent of map unit: 3 percent

Geomorphic position (two-dimensional): Summit and shoulder

Geomorphic position (three-dimensional): Nose slope and interfluvium

Representative aspect: South

Aspect range: All aspects

Slope range: 8 to 15 percent

Down-slope shape: Convex

Across-slope shape: Convex

Meets hydric soil criteria: No

641584—Penn silt loam, 8 to 15 percent slopes

Map Unit Setting

Major land resource area (MLRA): 148—Northern Piedmont

Elevation: 245 to 1,295 feet

Mean annual precipitation: 36 to 55 inches

Mean annual air temperature: 46 to 57 degrees F

Frost-free period: 130 to 200 days

Map Unit Composition

Penn and similar soils: 90 percent

Dissimilar minor components: 10 percent

Description of the Penn Soil

Classification

Fine-loamy, mixed, superactive, mesic Ultic Hapludalfs

Setting

Landscape: Uplands

Landform: Nearly level to steep dissected hillslopes

Landform position (two-dimensional): Summit, shoulder, and backslope

Landform position (three-dimensional): Nose slope, side slope, and interfluvium

Slope range: 8 to 15 percent

Down-slope shape: Linear and convex

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Across-slope shape: Linear and convex

Representative aspect: South

Aspect range: All aspects

Soil temperature class: Mesic

Soil temperature regime: Mesic

Properties and Qualities

Runoff: Low

Parent material: Residuum weathered from shale and siltstone

Restrictive feature(s): Lithic bedrock at a depth of 20 to 40 inches

Frequency of flooding: None

Frequency of ponding: None

Depth to water table: More than 72 inches

Drainage class: Well drained

Shrink-swell potential: Low (about 1.5 LEP)

Salinity maximum: Not saline

Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 0

Available water capacity: Low (about 4.1 inches)

Interpretive Groups

Land capability subclass (nonirrigated): 3e

Meets hydric soil criteria: No

Hydrologic soil group: C

Typical Profile

Ap—0 to 10 inches; silt loam

Bt—10 to 22 inches; channery silt loam

C—22 to 28 inches; very channery silt loam

R—28 to 48 inches; bedrock

Minor Components

Readington soils

Percent of map unit: 4 percent

Landform: Red shale, siltstone, and sandstone hillslopes

Geomorphic position (two-dimensional): Backslope and footslope

Geomorphic position (three-dimensional): Side slope, head slope, and base slope

Representative aspect: South

Aspect range: All aspects

Slope range: 0 to 3 percent

Down-slope shape: Linear and concave

Across-slope shape: Linear and concave

Meets hydric soil criteria: No

Klinesville soils

Percent of map unit: 3 percent

Geomorphic position (two-dimensional): Summit and shoulder

Geomorphic position (three-dimensional): Interfluvium and nose slope

Representative aspect: South

Aspect range: All aspects

Slope range: 15 to 25 percent

Down-slope shape: Convex

Across-slope shape: Convex

Meets hydric soil criteria: No

Reaville soils

Percent of map unit: 3 percent

Landform: Red shale, siltstone, and sandstone hillslopes
Geomorphic position (two-dimensional): Summit and footslope
Geomorphic position (three-dimensional): Base slope and interfluvium
Representative aspect: South
Aspect range: All aspects
Slope range: 3 to 8 percent
Down-slope shape: Linear and concave
Across-slope shape: Linear and concave
Meets hydric soil criteria: No

641586—Penn silt loam, 15 to 25 percent slopes

Map Unit Setting

Major land resource area (MLRA): 148—Northern Piedmont
Elevation: 245 to 950 feet
Mean annual precipitation: 36 to 50 inches
Mean annual air temperature: 46 to 57 degrees F
Frost-free period: 160 to 200 days

Map Unit Composition

Penn and similar soils: 90 percent
Dissimilar minor components: 3 percent

Description of the Penn Soil

Classification

Fine-loamy, mixed, superactive, mesic Ultic Hapludalfs

Setting

Landscape: Uplands
Landform: Nearly level to steep dissected hillslopes
Landform position (two-dimensional): Shoulder and backslope
Landform position (three-dimensional): Nose slope and side slope
Slope range: 15 to 25 percent
Down-slope shape: Linear and convex
Across-slope shape: Linear and convex
Representative aspect: South
Aspect range: All aspects
Soil temperature class: Mesic
Soil temperature regime: Mesic

Properties and Qualities

Runoff: Medium
Parent material: Residuum weathered from shale and siltstone
Restrictive feature(s): Lithic bedrock at a depth of 20 to 40 inches
Frequency of flooding: None
Frequency of ponding: None
Depth to water table: More than 72 inches
Drainage class: Well drained
Shrink-swell potential: Low (about 1.5 LEP)
Salinity maximum: Not saline
Sodicity maximum: Not sodic
Calcium carbonate equivalent (maximum weight percentage): 0
Available water capacity: Low (about 5.6 inches)

Interpretive Groups

Land capability subclass (nonirrigated): 4e

Meets hydric soil criteria: No

Hydrologic soil group: C

Typical Profile

Ap—0 to 8 inches; silt loam

Bt1—8 to 20 inches; channery silt loam

Bt2—20 to 33 inches; channery loam

C—33 to 36 inches; very channery fine sandy loam

R—36 to 37 inches; bedrock

Minor Components

Readington soils

Percent of map unit: 3 percent

Landform: Red shale, siltstone, and sandstone hillslopes

Geomorphic position (two-dimensional): Backslope and footslope

Geomorphic position (three-dimensional): Side slope, head slope, and base slope

Representative aspect: South

Aspect range: All aspects

Slope range: 3 to 8 percent

Down-slope shape: Linear and concave

Across-slope shape: Linear and concave

Meets hydric soil criteria: No

641605—Udorthents, limestone, 0 to 8 percent slopes

Map Unit Setting

Major land resource area (MLRA): 148—Northern Piedmont

Elevation: 295 to 895 feet

Mean annual precipitation: 42 to 48 inches

Mean annual air temperature: 50 to 57 degrees F

Frost-free period: 160 to 200 days

Map Unit Composition

Udorthents, limestone and similar soils: 100 percent

Description of the Udorthents, Limestone

Classification

Udorthents

Setting

Landscape: Uplands

Landform: Hills

Landform position (three-dimensional): Nose slope, side slope, and interfluve

Slope range: 0 to 8 percent

Down-slope shape: Linear and convex

Across-slope shape: Linear and convex

Representative aspect: South

Aspect range: All aspects

Soil temperature class: Mesic

Soil temperature regime: Mesic

Soil moisture class: Udic

Properties and Qualities

Runoff: Very high

Parent material: Argillaceous limestone in graded areas

Restrictive feature(s): Lithic bedrock at a depth of 40 to 99 inches

Frequency of flooding: None

Frequency of ponding: None

Depth to water table: About 60 inches (see table 19)

Drainage class: Well drained

Shrink-swell potential: Moderate (about 4.5 LEP)

Salinity maximum: Not saline

Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 0

Available water capacity: High (about 10.2 inches)

Interpretive Groups

Land capability subclass (nonirrigated): 7s

Meets hydric soil criteria: No

Hydrologic soil group: C/D

Typical Profile

A/B—0 to 6 inches; silty clay loam

C—6 to 60 inches; clay

641614—Urban land-Conestoga complex, 0 to 8 percent slopes

Map Unit Setting

Major land resource area (MLRA): 148—Northern Piedmont

Elevation: 295 to 1,600 feet

Mean annual precipitation: 30 to 50 inches

Mean annual air temperature: 45 to 57 degrees F

Frost-free period: 140 to 215 days

Map Unit Composition

Urban land: 50 percent

Conestoga and similar soils: 35 percent

Dissimilar minor components: 15 percent

Description of Urban Land

General

Urban land consists of areas covered by pavement, buildings, or other artificial materials.

Setting

Landscape: Uplands

Landform: Hills

Landform position (two-dimensional): Summit, shoulder, and backslope

Landform position (three-dimensional): Nose slope, side slope, and interfluvium

Description of the Conestoga Soil

Classification

Fine-loamy, mixed, active, mesic Typic Hapludalfs

Setting

Landscape: Hills

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Landform: Hillsides
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Side slope
Slope range: 0 to 8 percent
Down-slope shape: Convex
Across-slope shape: Convex
Representative aspect: South
Aspect range: All aspects
Soil temperature class: Mesic
Soil temperature regime: Mesic

Properties and Qualities

Runoff: Low
Parent material: Residuum weathered from schist and/or residuum weathered from limestone
Restrictive feature(s): Lithic bedrock at depth of 60 to 99 inches
Frequency of flooding: None
Frequency of ponding: None
Depth to water table: More than 72 inches
Drainage class: Well drained
Shrink-swell potential: Low (about 1.5 LEP)
Salinity maximum: Not saline
Sodicity maximum: Not sodic
Calcium carbonate equivalent (maximum weight percentage): 0
Available water capacity: Moderate (about 7.6 inches)

Interpretive Groups

Land capability subclass (nonirrigated): 2e
Meets hydric soil criteria: No
Hydrologic soil group: B

Typical Profile

Ap—0 to 9 inches; silt loam
Bt—9 to 40 inches; silty clay loam
C—40 to 60 inches; loam

Minor Components

Catoctin soils

Percent of map unit: 5 percent
Landform: Mountainsides
Geomorphic position (two-dimensional): Summit
Geomorphic position (three-dimensional): Upper third of mountain flank
Representative aspect: South
Aspect range: All aspects
Slope range: 8 to 15 percent
Down-slope shape: Convex
Across-slope shape: Convex
Meets hydric soil criteria: No

Clarksburg soils

Percent of map unit: 5 percent
Landform: Limestone valley flats
Geomorphic position (two-dimensional): Footslope and toeslope
Geomorphic position (three-dimensional): Base slope
Representative aspect: South

Aspect range: All aspects
Slope range: 3 to 8 percent
Down-slope shape: Concave and linear
Across-slope shape: Linear and concave
Meets hydric soil criteria: No

Hagerstown soils

Percent of map unit: 3 percent
Landform: Valley floors
Geomorphic position (two-dimensional): Shoulder and backslope
Geomorphic position (three-dimensional): Side slope
Representative aspect: South
Aspect range: All aspects
Slope range: 3 to 8 percent
Down-slope shape: Linear and convex
Across-slope shape: Linear and convex
Meets hydric soil criteria: No

Penlaw soils

Percent of map unit: 2 percent
Landform: Swales
Geomorphic position (two-dimensional): Foothlope and toeslope
Geomorphic position (three-dimensional): Base slope
Representative aspect: South
Aspect range: All aspects
Slope range: 0 to 3 percent
Down-slope shape: Concave
Across-slope shape: Concave
Meets hydric soil criteria: No

641641—Water

Map Unit Setting

Major land resource area (MLRA): 148—Northern Piedmont
Mean annual precipitation: 36 to 50 inches
Mean annual air temperature: 46 to 59 degrees F

Map Unit Composition

Water: 100 percent

Description of Water

This map unit includes rivers, streams, and ponds.

810899—Mattapex silt loam, 0 to 3 percent slopes

Map Unit Setting

Major land resource area (MLRA): 148—Northern Piedmont
Elevation: 3.3 to 600 feet
Mean annual precipitation: 36 to 48 inches
Mean annual air temperature: 52 to 57 degrees F
Frost-free period: 140 to 210 days

Map Unit Composition

Mattapex and similar soils: 95 percent
Dissimilar minor components: 2 percent

Description of the Mattapex Soil

Classification

Fine-silty, mixed, active, mesic Aquic Hapludults

Setting

Landscape: Uplands
Landform: Terraces (outwash or marine)
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Slope range: 0 to 3 percent
Down-slope shape: Linear
Across-slope shape: Linear
Representative aspect: South
Aspect range: All aspects
Soil temperature class: Mesic
Soil temperature regime: Mesic

Properties and Qualities

Runoff: Low
Parent material: Eolian deposits over marine deposits
Restrictive feature(s): Lithic bedrock at depth of 60 to 99 inches
Frequency of flooding: None
Frequency of ponding: None
Depth to water table: About 18 to 36 inches (see table 19)
Drainage class: Moderately well drained
Shrink-swell potential: Low (about 1.5 LEP)
Salinity maximum: Not saline
Sodicity maximum: Not sodic
Calcium carbonate equivalent (maximum weight percentage): 0
Available water capacity: High (about 11.0 inches)

Interpretive Groups

Land capability subclass (nonirrigated): 2w
Meets hydric soil criteria: No
Hydrologic soil group: C

Vegetation

Existing plants: Serviceberry, dogwood, American holly, blackgum, and sassafras

Typical Profile

Ap—0 to 9 inches; silt loam
Bt—9 to 42 inches; silt loam
C—42 to 45 inches; sandy loam
2C—45 to 70 inches; sandy loam

Minor Components

Hatboro soils

Percent of map unit: 1 percent
Landform: Flood plains
Geomorphic position (two-dimensional): Toeslope
Geomorphic position (three-dimensional): Tread
Representative aspect: South

Aspect range: All aspects
Slope range: 0 to 3 percent
Down-slope shape: Linear and concave
Across-slope shape: Linear and concave
Meets hydric soil criteria: Yes

Othello soils

Percent of map unit: 1 percent
Landform: Marine terraces
Geomorphic position (two-dimensional): Toeslope
Geomorphic position (three-dimensional): Tread
Representative aspect: South
Aspect range: All aspects
Slope range: 0 to 3 percent
Down-slope shape: Linear
Across-slope shape: Linear
Meets hydric soil criteria: Yes

810907—Clarksburg silt loam, 3 to 8 percent slopes

Map Unit Setting

Major land resource area (MLRA): 148—Northern Piedmont
Elevation: 200 to 1,495 feet
Mean annual precipitation: 32 to 48 inches
Mean annual air temperature: 48 to 57 degrees F
Frost-free period: 120 to 200 days

Map Unit Composition

Clarksburg and similar soils: 90 percent
Dissimilar minor components: 5 percent

Description of the Clarksburg Soil

Classification

Fine-loamy, mixed, superactive, mesic Oxyaquic Fragiudalfs

Setting

Landscape: Uplands
Landform: Limestone valley flats
Landform position (two-dimensional): Footslope and toeslope
Landform position (three-dimensional): Base slope
Slope range: 3 to 8 percent
Down-slope shape: Concave and linear
Across-slope shape: Linear and concave
Representative aspect: South
Aspect range: All aspects
Soil temperature class: Mesic
Soil temperature regime: Mesic
Soil moisture class: Udic

Properties and Qualities

Runoff: Medium
Parent material: Residuum weathered from limestone
Restrictive feature(s): Fragipan at a depth of 20 to 36 inches
Frequency of flooding: None

Frequency of ponding: None

Water table (depth, kind): About 18 to 36 inches, perched (see table 19)

Drainage class: Moderately well drained

Shrink-swell potential: Moderate (about 4.5 LEP)

Salinity maximum: Not saline

Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 0

Available water capacity: High (about 10.0 inches)

Interpretive Groups

Land capability subclass (nonirrigated): 2e

Meets hydric soil criteria: No

Hydrologic soil group: C

Typical Profile

Ap—0 to 8 inches; silt loam

Bt—8 to 27 inches; silt loam

Btx—27 to 51 inches; silt loam

C—51 to 84 inches; silt loam

Minor Components

Thorndale soils

Percent of map unit: 5 percent

Landform: Depressions

Geomorphic position (two-dimensional): Footslope

Geomorphic position (three-dimensional): Base slope

Representative aspect: East

Aspect range: All aspects

Slope range: 0 to 3 percent

Down-slope shape: Concave

Across-slope shape: Linear and concave

Meets hydric soil criteria: Yes

1482148—Croton silt loam, 3 to 8 percent slopes

Map Unit Setting

Major land resource area (MLRA): 148—Northern Piedmont

Elevation: 200 to 895 feet

Mean annual precipitation: 36 to 50 inches

Mean annual air temperature: 46 to 57 degrees F

Frost-free period: 160 to 200 days

Map Unit Composition

Croton and similar soils: 90 percent

Dissimilar minor components: 5 percent

Description of the Croton Soil

Classification

Fine-silty, mixed, active, mesic Typic Fragiaqualfs

Setting

Landscape: Uplands

Landform: Depressions

Landform position (two-dimensional): Toeslope

Landform position (three-dimensional): Base slope

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Slope range: 3 to 8 percent
Down-slope shape: Linear and concave
Across-slope shape: Linear and concave
Representative aspect: South
Aspect range: All aspects
Soil temperature class: Mesic
Soil temperature regime: Mesic

Properties and Qualities

Runoff: Negligible
Parent material: Residuum weathered from sandstone and shale
Restrictive feature(s): Fragipan at a depth of 15 to 25 inches; lithic bedrock at a depth of 42 to 99 inches
Frequency of flooding: None
Frequency of ponding: Occasional
Water table (depth, kind): At the soil surface to 6 inches, perched (see table 19)
Drainage class: Poorly drained
Shrink-swell potential: Moderate (about 4.5 LEP)
Salinity maximum: Not saline
Sodicity maximum: Not sodic
Calcium carbonate equivalent (maximum weight percentage): 0
Available water capacity: High (about 9.7 inches)

Interpretive Groups

Land capability subclass (nonirrigated): 4w
Meets hydric soil criteria: Yes
Hydrologic soil group: D

Typical Profile

Ap—0 to 6 inches; silt loam
Btg—6 to 19 inches; silty clay loam
Bx—19 to 49 inches; silt loam
Cx—49 to 78 inches; silt loam
C—78 to 90 inches; extremely channery loam
R—90 to 99 inches; bedrock

Minor Components

Readington soils

Percent of map unit: 5 percent
Landform: Red shale, siltstone, and sandstone hillslopes
Geomorphic position (two-dimensional): Backslope and footslope
Geomorphic position (three-dimensional): Side slope, head slope, and base slope
Representative aspect: South
Aspect range: All aspects
Slope range: 3 to 8 percent
Down-slope shape: Linear and concave
Across-slope shape: Linear and concave
Meets hydric soil criteria: No

1486423—Lawrenceville silt loam, 3 to 8 percent slopes

Map Unit Setting

Major land resource area (MLRA): 148—Northern Piedmont
Elevation: 200 to 1,600 feet
Mean annual precipitation: 38 to 48 inches

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Mean annual air temperature: 50 to 57 degrees F

Frost-free period: 140 to 200 days

Map Unit Composition

Lawrenceville and similar soils: 83 percent

Dissimilar minor components: 17 percent

Description of the Lawrenceville Soil

Classification

Fine-silty, mixed, active, mesic Oxyaquic Fragiudalfs

Setting

Landform: Upland slopes

Landform position (two-dimensional): Footslope

Landform position (three-dimensional): Base slope

Slope range: 3 to 8 percent

Down-slope shape: Linear and concave

Across-slope shape: Linear and concave

Representative aspect: Southeast

Aspect range: All aspects

Soil temperature class: Mesic

Soil temperature regime: Mesic

Properties and Qualities

Runoff: Medium

Parent material: Loess over residuum weathered from shale and siltstone

Restrictive feature(s): Fragipan at a depth of 24 to 38 inches; lithic bedrock at a depth of 48 to 99 inches

Frequency of flooding: None

Frequency of ponding: None

Water table (depth, kind): About 18 to 36 inches, perched (see table 19)

Drainage class: Moderately well drained

Shrink-swell potential: Low (about 1.5 LEP)

Salinity maximum: Not saline

Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 0

Available water capacity: High (about 11.9 inches)

Interpretive Groups

Land capability subclass (nonirrigated): 2e

Meets hydric soil criteria: No

Hydrologic soil group: C

Typical Profile

Ap—0 to 12 inches; silt loam

Bt—12 to 26 inches; silt loam

Btx—26 to 47 inches; silt loam

C—47 to 75 inches; silt loam

Minor Components

Lansdale soils

Percent of map unit: 12 percent

Landform: Rolling hillsides

Geomorphic position (two-dimensional): Summit, shoulder, and backslope

Geomorphic position (three-dimensional): Side slope

Representative aspect: South

Aspect range: All aspects
Slope range: 3 to 8 percent
Down-slope shape: Convex
Across-slope shape: Convex
Meets hydric soil criteria: No

Doylestown soils

Percent of map unit: 3 percent
Landform: Drainageways
Geomorphic position (two-dimensional): Backslope, footslope, and toeslope
Geomorphic position (three-dimensional): Head slope
Representative aspect: Southeast
Aspect range: All aspects
Slope range: 0 to 3 percent
Down-slope shape: Concave and linear
Across-slope shape: Linear and concave
Meets hydric soil criteria: Yes

Chalfont soils

Percent of map unit: 2 percent
Landform: Upland slopes
Geomorphic position (two-dimensional): Footslope
Geomorphic position (three-dimensional): Side slope
Representative aspect: South
Aspect range: All aspects
Slope range: 0 to 3 percent
Down-slope shape: Linear and concave
Across-slope shape: Linear and concave
Meets hydric soil criteria: No

1539365—Gibraltar silt loam

Map Unit Setting

Major land resource area (MLRA): 148—Northern Piedmont
Elevation: 95 to 835 feet
Mean annual precipitation: 30 to 50 inches
Mean annual air temperature: 48 to 55 degrees F
Frost-free period: 133 to 200 days

Map Unit Composition

Gibraltar and similar soils: 95 percent
Dissimilar minor components: 5 percent

Description of the Gibraltar Soil

Classification

Coarse-loamy, mixed, active, nonacid, mesic Mollic Udifluvents

Setting

Landscape: Sandstone hills
Landform: Levees and alluvial flood plains
Landform position (two-dimensional): Footslope and toeslope
Landform position (three-dimensional): Base slope
Slope range: 0 to 2 percent
Down-slope shape: Linear
Across-slope shape: Linear

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Representative aspect: South
Aspect range: All aspects
Soil temperature class: Mesic
Soil temperature regime: Mesic
Soil moisture class: Udic

Properties and Qualities

Runoff: Low
Parent material: Coal overwash over alluvium derived from shale and siltstone
Restrictive feature(s): Lithic bedrock at a depth of 60 to 72 inches
Frequency of flooding: Rare
Frequency of ponding: None
Depth to water table: About 36 to 60 inches (see table 19)
Drainage class: Well drained
Shrink-swell potential: Low (about 1.5 LEP)
Salinity maximum: Not saline
Sodicity maximum: Not sodic
Calcium carbonate equivalent (maximum weight percentage): 0
Available water capacity: High (about 11.0 inches)

Interpretive Groups

Land capability subclass (nonirrigated): 2w
Meets hydric soil criteria: No
Hydrologic soil group: C

Vegetation

Existing plants: Wild hydrangea, yellow-poplar, Virginia creeper, black cherry, and eastern poison ivy

Typical Profile

A—0 to 4 inches; silt loam
C1—4 to 24 inches; silt loam
C2—24 to 30 inches; sandy loam
2Apb—30 to 62 inches; silt loam

Minor Components

Holly soils

Percent of map unit: 5 percent
Landform: Flood plains
Geomorphic position (two-dimensional): Toeslope
Geomorphic position (three-dimensional): Base slope
Representative aspect: Southeast
Aspect range: All aspects
Slope range: 0 to 3 percent
Down-slope shape: Concave
Across-slope shape: Concave
Meets hydric soil criteria: Yes

1602815—Holly silt loam

Map Unit Setting

Major land resource area (MLRA): 148—Northern Piedmont
Elevation: 95 to 1,295 feet
Mean annual precipitation: 30 to 50 inches

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Mean annual air temperature: 46 to 55 degrees F

Frost-free period: 120 to 214 days

Map Unit Composition

Holly and similar soils: 90 percent

Dissimilar minor components: 6 percent

Description of the Holly Soil

Classification

Fine-loamy, mixed, active, nonacid, mesic Fluvaquentic Endoaquepts

Setting

Landscape: Sandstone and shale hills

Landform: Flood plains

Landform position (two-dimensional): Toeslope

Landform position (three-dimensional): Base slope

Slope range: 0 to 3 percent

Down-slope shape: Concave

Across-slope shape: Concave

Representative aspect: Southeast

Aspect range: All aspects

Soil temperature class: Mesic

Soil temperature regime: Mesic

Soil moisture class: Udic

Properties and Qualities

Runoff: Negligible

Parent material: Alluvium derived from sandstone and shale

Restrictive feature(s): None within a depth of 60 inches

Frequency of flooding: Frequent

Frequency of ponding: Occasional

Depth to water table: At the soil surface to 12 inches

Drainage class: Poorly drained

Shrink-swell potential: Low (about 1.5 LEP)

Salinity maximum: Not saline

Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 3

Available water capacity: High (about 10.2 inches)

Interpretive Groups

Land capability subclass (nonirrigated): 3w

Meets hydric soil criteria: Yes

Hydrologic soil group: B/D

Typical Profile

Ap—0 to 7 inches; silt loam

Bg—7 to 26 inches; silty clay loam

Cg—26 to 44 inches; silty clay loam

2Cg—44 to 62 inches; gravelly loamy sand

Minor Components

Brinkerton soils

Percent of map unit: 2 percent

Landform: Depressions

Geomorphic position (two-dimensional): Footslope

Geomorphic position (three-dimensional): Base slope

Representative aspect: Southeast

Aspect range: All aspects

Slope range: 0 to 3 percent

Down-slope shape: Concave

Across-slope shape: Concave

Meets hydric soil criteria: Yes

Gibraltar soils

Percent of map unit: 2 percent

Landform: Flood plains

Geomorphic position (two-dimensional): Footslope and toeslope

Geomorphic position (three-dimensional): Base slope

Representative aspect: South

Aspect range: All aspects

Slope range: 0 to 2 percent

Down-slope shape: Linear and convex

Across-slope shape: Linear and convex

Meets hydric soil criteria: No

Linden soils

Percent of map unit: 2 percent

Landform: Flood plains

Geomorphic position (two-dimensional): Footslope

Geomorphic position (three-dimensional): Tread

Representative aspect: South

Aspect range: All aspects

Slope range: 0 to 3 percent

Down-slope shape: Linear and concave

Across-slope shape: Linear and concave

Meets hydric soil criteria: No

1612216—Penn silt loam, 25 to 35 percent slopes

Map Unit Setting

Major land resource area (MLRA): 148—Northern Piedmont

Elevation: 245 to 950 feet

Mean annual precipitation: 36 to 50 inches

Mean annual air temperature: 46 to 57 degrees F

Frost-free period: 160 to 200 days

Map Unit Composition

Penn and similar soils: 90 percent

Dissimilar minor components: 3 percent

Description of the Penn Soil

Classification

Fine-loamy, mixed, superactive, mesic Ultic Hapludalfs

Setting

Landscape: Uplands

Landform: Nearly level to steep dissected hillslopes

Landform position (two-dimensional): Shoulder and backslope

Landform position (three-dimensional): Nose slope and side slope

Slope range: 25 to 35 percent

Down-slope shape: Linear and convex

Across-slope shape: Linear and convex

Representative aspect: South

Aspect range: All aspects

Soil temperature class: Mesic

Soil temperature regime: Mesic

Properties and Qualities

Runoff: Medium

Parent material: Residuum weathered from shale and siltstone

Restrictive feature(s): Lithic bedrock at a depth of 20 to 40 inches

Frequency of flooding: None

Frequency of ponding: None

Depth to water table: More than 72 inches

Drainage class: Well drained

Shrink-swell potential: Low (about 1.5 LEP)

Salinity maximum: Not saline

Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 0

Available water capacity: Low (about 4.2 inches)

Interpretive Groups

Land capability subclass (nonirrigated): 4e

Meets hydric soil criteria: No

Hydrologic soil group: C

Typical Profile

A—0 to 7 inches; silt loam

Bt1—7 to 13 inches; channery silt loam

Bt2—13 to 21 inches; channery loam

C—21 to 33 inches; very channery fine sandy loam

R—33 to 37 inches; bedrock

Minor Components

Readington soils

Percent of map unit: 3 percent

Landform: Red shale, siltstone, and sandstone hillslopes

Geomorphic position (two-dimensional): Backslope and footslope

Geomorphic position (three-dimensional): Side slope, head slope, and base slope

Representative aspect: South

Aspect range: All aspects

Slope range: 3 to 8 percent

Down-slope shape: Linear and concave

Across-slope shape: Linear and concave

Meets hydric soil criteria: No

1612248—Urban land-Penn complex, 0 to 8 percent slopes

Map Unit Setting

Major land resource area (MLRA): 148—Northern Piedmont

Elevation: 200 to 1,000 feet

Mean annual precipitation: 36 to 55 inches

Mean annual air temperature: 46 to 57 degrees F

Frost-free period: 160 to 215 days

Map Unit Composition

Urban land: 65 percent
Penn and similar soils: 25 percent
Dissimilar minor components: 10 percent

Description of Urban Land

General

Urban land consists of areas covered by pavement, buildings, or other artificial materials.

Setting

Landscape: Uplands

Landform: Hills

Description of the Penn Soil

Classification

Fine-loamy, mixed, superactive, mesic Ultic Hapludalfs

Setting

Landscape: Uplands

Landform: Hillslopes

Landform position (two-dimensional): Shoulder and backslope

Landform position (three-dimensional): Nose slope and side slope

Slope range: 0 to 8 percent

Down-slope shape: Linear and convex

Across-slope shape: Linear and convex

Representative aspect: South

Aspect range: All aspects

Soil temperature class: Mesic

Soil temperature regime: Mesic

Properties and Qualities

Runoff: Very low

Parent material: Residuum weathered from shale and siltstone

Restrictive feature(s): Lithic bedrock at a depth of 20 to 40 inches

Frequency of flooding: None

Frequency of ponding: None

Depth to water table: More than 72 inches

Drainage class: Well drained

Shrink-swell potential: Low (about 1.5 LEP)

Salinity maximum: Not saline

Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 0

Available water capacity: Low (about 4.1 inches)

Interpretive Groups

Land capability subclass (nonirrigated): 2e

Meets hydric soil criteria: No

Hydrologic soil group: C

Typical Profile

Ap—0 to 8 inches; channery silt loam

Bt—8 to 21 inches; channery silt loam

C—21 to 34 inches; very channery silt loam

R—34 to 44 inches; bedrock

Minor Components

Croton soils

Percent of map unit: 4 percent

Landform: Depressions

Geomorphic position (two-dimensional): Toeslope

Geomorphic position (three-dimensional): Base slope

Representative aspect: South

Aspect range: All aspects

Slope range: 3 to 8 percent

Down-slope shape: Linear and concave

Across-slope shape: Linear and concave

Meets hydric soil criteria: Yes

Readington soils

Percent of map unit: 4 percent

Landform: Red shale, siltstone, and sandstone hillslopes

Geomorphic position (two-dimensional): Backslope and footslope

Geomorphic position (three-dimensional): Side slope, head slope, and base slope

Representative aspect: South

Aspect range: All aspects

Slope range: 0 to 3 percent

Down-slope shape: Linear and concave

Across-slope shape: Linear and concave

Meets hydric soil criteria: No

Reaville soils

Percent of map unit: 2 percent

Landform: Red shale, siltstone, and sandstone hillslopes

Geomorphic position (two-dimensional): Summit and footslope

Geomorphic position (three-dimensional): Base slope and interfluvium

Representative aspect: South

Aspect range: All aspects

Slope range: 3 to 8 percent

Down-slope shape: Linear and concave

Across-slope shape: Linear and concave

Meets hydric soil criteria: No

2229473—Udorthents, limestone, 0 to 8 percent slopes

Map Unit Setting

Major land resource area (MLRA): 148—Northern Piedmont

Elevation: 295 to 895 feet

Mean annual precipitation: 42 to 48 inches

Mean annual air temperature: 50 to 57 degrees F

Frost-free period: 160 to 200 days

Map Unit Composition

Udorthents, limestone and similar soils: 100 percent

Description of the Udorthents, Limestone

Classification

Udorthents

Setting

Landscape: Uplands

Landform: Hills

Landform position (three-dimensional): Nose slope, side slope, and interfluvium

Slope range: 0 to 8 percent

Down-slope shape: Linear and convex

Across-slope shape: Linear and convex

Representative aspect: South

Aspect range: All aspects

Soil temperature class: Mesic

Soil temperature regime: Mesic

Soil moisture class: Udic

Properties and Qualities

Runoff: Very high

Parent material: Argillaceous limestone in graded areas

Restrictive feature(s): Lithic bedrock at a depth of 40 to 99 inches

Frequency of flooding: None

Frequency of ponding: None

Depth to water table: About 60 inches (see table 19)

Drainage class: Well drained

Shrink-swell potential: Moderate (about 4.5 LEP)

Salinity maximum: Not saline

Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 0

Available water capacity: High (about 10.2 inches)

Interpretive Groups

Land capability subclass (nonirrigated): 7s

Meets hydric soil criteria: No

Hydrologic soil group: C/D

Typical Profile

A/B—0 to 6 inches; silty clay loam

C—6 to 60 inches; clay

2229474—Udorthents, limestone, 8 to 25 percent slopes

Map Unit Setting

Major land resource area (MLRA): 148—Northern Piedmont

Elevation: 295 to 895 feet

Mean annual precipitation: 42 to 48 inches

Mean annual air temperature: 50 to 57 degrees F

Frost-free period: 160 to 200 days

Map Unit Composition

Udorthents, limestone and similar soils: 100 percent

Description of the Udorthents, Limestone

Classification

Udorthents

Setting

Landscape: Uplands

Landform: Hills

Landform position (three-dimensional): Nose slope, side slope, and interfluvium

Slope range: 8 to 25 percent

Down-slope shape: Linear and convex

Across-slope shape: Linear and convex

Representative aspect: South

Aspect range: All aspects

Soil temperature class: Mesic

Soil temperature regime: Mesic

Soil moisture class: Udic

Properties and Qualities

Runoff: Very high

Parent material: Argillaceous limestone in graded areas

Restrictive feature(s): Lithic bedrock at a depth of 40 to 99 inches

Frequency of flooding: None

Frequency of ponding: None

Depth to water table: About 60 inches (see table 19)

Drainage class: Well drained

Shrink-swell potential: Moderate (about 4.5 LEP)

Salinity maximum: Not saline

Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 0

Available water capacity: High (about 10.2 inches)

Interpretive Groups

Land capability subclass (nonirrigated): 7e

Meets hydric soil criteria: No

Hydrologic soil group: C/D

Typical Profile

A/B—0 to 6 inches; silty clay loam

C—6 to 60 inches; clay

2229478—Udorthents, shale and sandstone, 0 to 8 percent slopes

Map Unit Setting

Major land resource area (MLRA): 148—Northern Piedmont

Elevation: 200 to 1,495 feet

Mean annual precipitation: 36 to 55 inches

Mean annual air temperature: 45 to 57 degrees F

Frost-free period: 160 to 214 days

Map Unit Composition

Udorthents, shale and sandstone and similar soils: 85 percent

Dissimilar minor components: 15 percent

Description of the Udorthents, Shale and Sandstone

Classification

Udorthents

Setting

Landscape: Uplands

Landform: Ridges

Landform position (two-dimensional): Summit, shoulder, and backslope

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Landform position (three-dimensional): Nose slope, side slope, and interfluvium

Slope range: 0 to 8 percent

Down-slope shape: Linear and convex

Across-slope shape: Linear and convex

Representative aspect: Southeast

Aspect range: All aspects

Soil temperature class: Mesic

Soil temperature regime: Mesic

Soil moisture class: Udic

Properties and Qualities

Runoff: Very high

Parent material: Shale and siltstone in graded areas; sandstone and shale in graded areas

Restrictive feature(s): Lithic bedrock at a depth of 20 to 99 inches

Frequency of flooding: None

Frequency of ponding: None

Depth to water table: About 60 inches (see table 19)

Drainage class: Well drained

Shrink-swell potential: Low (about 1.5 LEP)

Salinity maximum: Not saline

Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 0

Available water capacity: Very low (about 2.9 inches)

Interpretive Groups

Land capability subclass (nonirrigated): 7s

Meets hydric soil criteria: No

Hydrologic soil group: B/D

Typical Profile

Ap—0 to 6 inches; silt loam

C—6 to 60 inches; silt loam

Minor Components

Penn soils

Percent of map unit: 5 percent

Landform: Hillslopes

Geomorphic position (two-dimensional): Shoulder and backslope

Geomorphic position (three-dimensional): Nose slope and side slope

Representative aspect: South

Aspect range: All aspects

Slope range: 3 to 8 percent

Down-slope shape: Linear and convex

Across-slope shape: Linear and convex

Meets hydric soil criteria: No

Abbottstown soils

Percent of map unit: 2 percent

Landform: Concave hillslopes

Geomorphic position (two-dimensional): Footslope and toeslope

Geomorphic position (three-dimensional): Head slope and base slope

Representative aspect: South

Aspect range: All aspects

Slope range: 3 to 8 percent

Down-slope shape: Linear and concave

Across-slope shape: Linear and concave

Meets hydric soil criteria: No

Bowmansville soils

Percent of map unit: 2 percent

Landform: Nearly level flood plains

Geomorphic position (two-dimensional): Foothlope and toeslope

Geomorphic position (three-dimensional): Head slope

Representative aspect: South

Aspect range: All aspects

Slope range: 0 to 3 percent

Down-slope shape: Concave and linear

Across-slope shape: Linear and concave

Meets hydric soil criteria: No

Readington soils

Percent of map unit: 2 percent

Landform: Red shale, siltstone, and sandstone hillslopes

Geomorphic position (two-dimensional): Backslope and foothlope

Geomorphic position (three-dimensional): Side slope, head slope, and base slope

Representative aspect: South

Aspect range: All aspects

Slope range: 3 to 8 percent

Down-slope shape: Linear and concave

Across-slope shape: Linear and concave

Meets hydric soil criteria: No

Reaville soils

Percent of map unit: 2 percent

Landform: Red shale, siltstone, and sandstone hillslopes

Geomorphic position (two-dimensional): Summit and foothlope

Geomorphic position (three-dimensional): Base slope and interfluve

Representative aspect: South

Aspect range: All aspects

Slope range: 3 to 8 percent

Down-slope shape: Linear and concave

Across-slope shape: Linear and concave

Meets hydric soil criteria: No

Berks soils

Percent of map unit: 1 percent

Landform: Valleys and ridges

Geomorphic position (two-dimensional): Backslope

Geomorphic position (three-dimensional): Side slope

Representative aspect: South

Aspect range: All aspects

Slope range: 0 to 8 percent

Down-slope shape: Convex and linear

Across-slope shape: Linear and convex

Meets hydric soil criteria: No

Croton soils

Percent of map unit: 1 percent

Landform: Depressions

Geomorphic position (two-dimensional): Toeslope

Geomorphic position (three-dimensional): Base slope

Representative aspect: South

Aspect range: All aspects
Slope range: 3 to 8 percent
Down-slope shape: Linear and concave
Across-slope shape: Linear and concave
Meets hydric soil criteria: Yes

2229480—Urban land, 0 to 8 percent slopes

Map Unit Setting

Major land resource area (MLRA): 148—Northern Piedmont
Elevation: 800 to 1,495 feet
Mean annual precipitation: 36 to 46 inches
Mean annual air temperature: 41 to 62 degrees F
Frost-free period: 130 to 170 days

Map Unit Composition

Urban land: 90 percent
Dissimilar minor components: 10 percent

Description of Urban Land

General

Urban land consists of areas covered by pavement, buildings, or other artificial materials.

Minor Components

Udorthents, unstable fill

Percent of map unit: 10 percent
Representative aspect: Southeast
Aspect range: All aspects
Slope range: 0 to 8 percent
Down-slope shape: Linear
Across-slope shape: Linear
Meets hydric soil criteria: No

2229481—Urban land, 8 to 25 percent slopes

Map Unit Setting

Major land resource area (MLRA): 148—Northern Piedmont
Elevation: 800 to 1,495 feet
Mean annual precipitation: 36 to 46 inches
Mean annual air temperature: 41 to 62 degrees F
Frost-free period: 130 to 180 days

Map Unit Composition

Urban land: 90 percent
Dissimilar minor components: 10 percent

Description of Urban land

General

Urban land consists of areas covered by pavement, buildings, or other artificial materials.

Minor Components

Udorthents, unstable fill

Percent of map unit: 10 percent
Representative aspect: Southeast
Aspect range: All aspects
Slope range: 8 to 25 percent
Down-slope shape: Linear
Across-slope shape: Linear
Meets hydric soil criteria: No

2229493—Urban land-Penn complex, 8 to 25 percent slopes

Map Unit Setting

Major land resource area (MLRA): 148—Northern Piedmont
Elevation: 200 to 1,000 feet
Mean annual precipitation: 36 to 55 inches
Mean annual air temperature: 44 to 57 degrees F
Frost-free period: 130 to 200 days

Map Unit Composition

Urban land: 65 percent
Penn and similar soils: 25 percent
Dissimilar minor components: 10 percent

Description of Urban Land

General

Urban land consists of areas covered by pavement, buildings, or other artificial materials.

Setting

Landscape: Uplands
Landform: Hills

Description of the Penn Soil

Classification

Fine-loamy, mixed, superactive, mesic Ultic Hapludalfs

Setting

Landscape: Uplands
Landform: Hillslopes
Landform position (two-dimensional): Shoulder and backslope
Landform position (three-dimensional): Nose slope and side slope
Slope range: 8 to 25 percent
Down-slope shape: Linear and convex
Across-slope shape: Linear and convex
Representative aspect: South
Aspect range: All aspects
Soil temperature class: Mesic
Soil temperature regime: Mesic

Properties and Qualities

Runoff: Low
Parent material: Residuum weathered from shale and siltstone

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Restrictive feature(s): Lithic bedrock at a depth of 20 to 40 inches
Frequency of flooding: None
Frequency of ponding: None
Depth to water table: More than 72 inches
Drainage class: Well drained
Shrink-swell potential: Low (about 1.5 LEP)
Salinity maximum: Not saline
Sodicity maximum: Not sodic
Calcium carbonate equivalent (maximum weight percentage): 0
Available water capacity: Low (about 4.1 inches)

Interpretive Groups

Land capability subclass (nonirrigated): 4e
Meets hydric soil criteria: No
Hydrologic soil group: C

Typical Profile

Ap—0 to 8 inches; channery silt loam
Bt—8 to 21 inches; channery silt loam
C—21 to 34 inches; very channery silt loam
R—34 to 44 inches; bedrock

Minor Components

Croton soils

Percent of map unit: 4 percent
Landform: Depressions
Geomorphic position (two-dimensional): Toeslope
Geomorphic position (three-dimensional): Base slope
Representative aspect: South
Aspect range: All aspects
Slope range: 3 to 8 percent
Down-slope shape: Linear and concave
Across-slope shape: Linear and concave
Meets hydric soil criteria: Yes

Readington soils

Percent of map unit: 4 percent
Landform: Red shale, siltstone, and sandstone hillslopes
Geomorphic position (two-dimensional): Backslope and footslope
Geomorphic position (three-dimensional): Side slope, head slope, and base slope
Representative aspect: South
Aspect range: All aspects
Slope range: 0 to 3 percent
Down-slope shape: Linear and concave
Across-slope shape: Linear and concave
Meets hydric soil criteria: No

Reaville soils

Percent of map unit: 2 percent
Landform: Red shale, siltstone, and sandstone hillslopes
Geomorphic position (two-dimensional): Summit and footslope
Geomorphic position (three-dimensional): Base slope and interfluvium
Representative aspect: South
Aspect range: All aspects
Slope range: 3 to 8 percent

Down-slope shape: Linear and concave
Across-slope shape: Linear and concave
Meets hydric soil criteria: No

2229495—Urban land-Udorthents, limestone complex, 8 to 25 percent slopes

Map Unit Setting

Major land resource area (MLRA): 148—Northern Piedmont
Elevation: 295 to 1,000 feet
Mean annual precipitation: 36 to 50 inches
Mean annual air temperature: 46 to 57 degrees F
Frost-free period: 140 to 200 days

Map Unit Composition

Urban land: 80 percent
Udorthents, limestone and similar soils: 15 percent
Dissimilar minor components: 5 percent

Description of Urban Land

General

Urban land consists of areas covered by pavement, buildings, or other artificial materials.

Setting

Landscape: Uplands
Landform: Ridges, valleys, and hills
Landform position (two-dimensional): Summit, shoulder, backslope, and footslope
Landform position (three-dimensional): Nose slope, head slope, interfluve, and side slope

Description of the Udorthents, Limestone

Classification

Udorthents

Setting

Landscape: Uplands
Landform: Ridges, valleys, and hills
Landform position (two-dimensional): Summit, shoulder, backslope, and footslope
Landform position (three-dimensional): Nose slope, head slope, interfluve, and side slope

Slope range: 8 to 25 percent
Down-slope shape: Linear and convex
Across-slope shape: Linear and convex
Representative aspect: South
Aspect range: All aspects
Soil temperature class: Mesic
Soil temperature regime: Mesic
Soil moisture class: Udic

Properties and Qualities

Runoff: Very high
Parent material: Limestone and dolomite in graded areas

Restrictive feature(s): Lithic bedrock at a depth of 20 to 99 inches
Frequency of flooding: None
Frequency of ponding: None
Depth to water table: About 6 to 24 inches (see table 19)
Drainage class: Moderately well drained
Shrink-swell potential: Moderate (about 4.5 LEP)
Salinity maximum: Not saline
Sodicity maximum: Not sodic
Calcium carbonate equivalent (maximum weight percentage): 0
Available water capacity: High (about 10.2 inches)

Interpretive Groups

Land capability subclass (nonirrigated): 7e
Meets hydric soil criteria: No
Hydrologic soil group: C/D

Typical Profile

A/B—0 to 6 inches; clay loam
C—6 to 60 inches; clay

Minor Components

Duffield soils

Percent of map unit: 5 percent
Landform: Hills
Geomorphic position (two-dimensional): Summit
Geomorphic position (three-dimensional): Interfluve
Representative aspect: South
Aspect range: All aspects
Slope range: 3 to 8 percent
Down-slope shape: Linear
Across-slope shape: Linear
Meets hydric soil criteria: No

2229496—Urban land-Udorthents, schist and gneiss complex, 0 to 8 percent slopes

Map Unit Setting

Major land resource area (MLRA): 148—Northern Piedmont
Elevation: 200 to 2,000 feet
Mean annual precipitation: 35 to 55 inches
Mean annual air temperature: 45 to 61 degrees F
Frost-free period: 110 to 235 days

Map Unit Composition

Urban land: 80 percent
Udorthents, schist and gneiss and similar soils: 15 percent
Dissimilar minor components: 5 percent

Description of Urban Land

General

Urban land consists of areas covered by pavement, buildings, or other artificial materials.

Setting

Landscape: Uplands

Landform: Hills

Landform position (two-dimensional): Summit, shoulder, and backslope

Landform position (three-dimensional): Nose slope, side slope, and interfluve

Description of the Udorthents, Schist and Gneiss

Classification

Udorthents

Setting

Landscape: Uplands

Landform: Hills

Landform position (two-dimensional): Summit, shoulder, and backslope

Landform position (three-dimensional): Nose slope, side slope, and interfluve

Slope range: 0 to 8 percent

Down-slope shape: Linear and convex

Across-slope shape: Linear and convex

Representative aspect: South

Aspect range: All aspects

Soil temperature class: Mesic

Soil temperature regime: Mesic

Soil moisture class: Udic

Properties and Qualities

Runoff: Medium

Parent material: Schist and/or gneiss in graded areas

Restrictive feature(s): Paralithic bedrock at a depth of 20 to 70 inches

Frequency of flooding: None

Frequency of ponding: None

Depth to water table: About 60 inches (see table 19)

Drainage class: Well drained

Shrink-swell potential: Moderate (about 4.5 LEP)

Salinity maximum: Not saline

Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 0

Available water capacity: Moderate (about 6.8 inches)

Interpretive Groups

Land capability subclass (nonirrigated): 7s

Meets hydric soil criteria: No

Hydrologic soil group: B

Typical Profile

Ap—0 to 6 inches; loam

C—6 to 40 inches; silty clay loam

R—40 to 60 inches; bedrock

Minor Components

Baile soils

Percent of map unit: 1 percent

Landform: Depressions

Geomorphic position (two-dimensional): Footslope
Geomorphic position (three-dimensional): Base slope
Representative aspect: South
Aspect range: All aspects
Slope range: 0 to 3 percent
Down-slope shape: Concave and linear
Across-slope shape: Linear and concave
Meets hydric soil criteria: Yes

Edgemont soils

Percent of map unit: 1 percent
Landform: Quartzite and shale ridges
Geomorphic position (two-dimensional): Summit
Geomorphic position (three-dimensional): Mountaintop
Representative aspect: South
Aspect range: All aspects
Slope range: 3 to 8 percent
Down-slope shape: Convex and linear
Across-slope shape: Linear and convex
Meets hydric soil criteria: No

Gladstone soils

Percent of map unit: 1 percent
Landform: Hillslopes
Geomorphic position (two-dimensional): Summit and shoulder
Geomorphic position (three-dimensional): Side slope and nose slope
Representative aspect: South
Aspect range: All aspects
Slope range: 3 to 8 percent
Down-slope shape: Convex and linear
Across-slope shape: Linear and convex
Meets hydric soil criteria: No

Glennelg soils

Percent of map unit: 1 percent
Landform: Nearly level to steep dissected hillslopes
Geomorphic position (two-dimensional): Summit, shoulder, and backslope
Geomorphic position (three-dimensional): Nose slope, side slope, and interfluve
Representative aspect: South
Aspect range: All aspects
Slope range: 3 to 8 percent
Down-slope shape: Linear and convex
Across-slope shape: Linear and convex
Meets hydric soil criteria: No

Glenville soils

Percent of map unit: 1 percent
Landform: Hillslopes
Geomorphic position (two-dimensional): Backslope and footslope
Geomorphic position (three-dimensional): Head slope and side slope
Representative aspect: South
Aspect range: All aspects
Slope range: 3 to 8 percent
Down-slope shape: Linear and concave
Across-slope shape: Linear and concave
Meets hydric soil criteria: No

2229498—Urban land-Udorthents, shale and sandstone complex, 0 to 8 percent slopes

Map Unit Setting

Major land resource area (MLRA): 148—Northern Piedmont

Elevation: 245 to 950 feet

Mean annual precipitation: 38 to 48 inches

Mean annual air temperature: 48 to 57 degrees F

Frost-free period: 161 to 215 days

Map Unit Composition

Urban land: 80 percent

Udorthents, shale and sandstone and similar soils: 15 percent

Dissimilar minor components: 5 percent

Description of Urban Land

General

Urban land consists of areas covered by pavement, buildings, or other artificial materials.

Setting

Landscape: Uplands

Landform: Hills

Description of the Udorthents, Shale and Sandstone

Classification

Udorthents

Setting

Landscape: Uplands

Landform: Ridges

Landform position (two-dimensional): Summit, shoulder, and backslope

Landform position (three-dimensional): Interfluve, nose slope, and side slope

Slope range: 0 to 8 percent

Down-slope shape: Linear and convex

Across-slope shape: Linear and convex

Representative aspect: South

Aspect range: All aspects

Soil temperature class: Mesic

Soil temperature regime: Mesic

Soil moisture class: Udic

Properties and Qualities

Runoff: Very low

Parent material: Sandstone and shale in graded areas

Restrictive feature(s): Lithic bedrock at a depth of 20 to 99 inches

Frequency of flooding: None

Frequency of ponding: None

Depth to water table: More than 72 inches

Drainage class: Well drained

Shrink-swell potential: Low (about 1.5 LEP)

Salinity maximum: Not saline

Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 0

Available water capacity: Very low (about 2.9 inches)

Interpretive Groups

Land capability subclass (nonirrigated): 7s

Meets hydric soil criteria: No

Hydrologic soil group: B/D

Typical Profile

A—0 to 6 inches; very channery loam

C—6 to 60 inches; very channery silt loam

Minor Components

Penn soils

Percent of map unit: 5 percent

Landform: Hillslopes

Geomorphic position (two-dimensional): Shoulder and backslope

Geomorphic position (three-dimensional): Nose slope and side slope

Representative aspect: South

Aspect range: All aspects

Slope range: 3 to 8 percent

Down-slope shape: Linear and convex

Across-slope shape: Linear and convex

Meets hydric soil criteria: No

2229499—Urban land-Udorthents, shale and sandstone complex, 8 to 25 percent slopes

Map Unit Setting

Major land resource area (MLRA): 148—Northern Piedmont

Elevation: 245 to 950 feet

Mean annual precipitation: 38 to 48 inches

Mean annual air temperature: 50 to 57 degrees F

Frost-free period: 160 to 200 days

Map Unit Composition

Urban land: 80 percent

Udorthents, shale and sandstone and similar soils: 15 percent

Dissimilar minor components: 5 percent

Description of Urban Land

General

Urban land consists of areas covered by pavement, buildings, or other artificial materials.

Setting

Landscape: Uplands

Landform: Hills

Landform position (two-dimensional): Summit, shoulder, and backslope

Landform position (three-dimensional): Nose slope, side slope, and interfluvium

Description of the Udorthents, Shale and Sandstone

Classification

Udorthents

Setting

Landscape: Uplands

Landform: Hills

Landform position (two-dimensional): Summit, shoulder, and backslope

Landform position (three-dimensional): Nose slope, side slope, and interfluve

Slope range: 8 to 25 percent

Down-slope shape: Linear and convex

Across-slope shape: Linear and convex

Representative aspect: South

Aspect range: All aspects

Soil temperature class: Mesic

Soil temperature regime: Mesic

Soil moisture class: Udic

Properties and Qualities

Runoff: Low

Parent material: Sandstone and shale in graded areas

Restrictive feature(s): Lithic bedrock at a depth of 20 to 99 inches

Frequency of flooding: None

Frequency of ponding: None

Depth to water table: More than 72 inches

Drainage class: Well drained

Shrink-swell potential: Low (about 1.5 LEP)

Salinity maximum: Not saline

Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 0

Available water capacity: Very low (about 2.9 inches)

Interpretive Groups

Land capability subclass (nonirrigated): 7e

Meets hydric soil criteria: No

Hydrologic soil group: B/D

Typical Profile

Ap—0 to 6 inches; very channery loam

C—6 to 60 inches; very channery silty clay loam

Minor Components

Penn soils

Percent of map unit: 5 percent

Landform: Nearly level to steep dissected hillslopes

Geomorphic position (two-dimensional): Summit, shoulder, and backslope

Geomorphic position (three-dimensional): Nose slope, side slope, and interfluve

Representative aspect: South

Aspect range: All aspects

Slope range: 3 to 8 percent

Down-slope shape: Linear and convex

Across-slope shape: Linear and convex

Meets hydric soil criteria: No

2229500—Pits, quarry

Map Unit Setting

Major land resource area (MLRA): 148—Northern Piedmont

Mean annual precipitation: 40 to 46 inches

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Mean annual air temperature: 48 to 57 degrees F

Frost-free period: 161 to 215 days

Map Unit Composition

Pits: 80 percent

Dissimilar minor components: 10 percent

Description of Pits

General

Pits include areas of former quarry and mining activities for limestone, sand and gravel, and copper and iron forges.

Setting

Landscape: Uplands

Landform: Hills

Down-slope shape: Linear and convex

Across-slope shape: Linear and convex

Representative aspect: South

Aspect range: All aspects

Soil temperature class: Mesic

Soil temperature regime: Mesic

Soil moisture class: Udic

Minor Components

Waste areas

Percent of map unit: 10 percent

Representative aspect: South

Aspect range: All aspects

Meets hydric soil criteria: No

2229501—Urban land-Readington complex, 0 to 8 percent slopes

Map Unit Setting

Major land resource area (MLRA): 148—Northern Piedmont

Elevation: 200 to 895 feet

Mean annual precipitation: 36 to 50 inches

Mean annual air temperature: 46 to 57 degrees F

Frost-free period: 160 to 215 days

Map Unit Composition

Urban land: 65 percent

Readington and similar soils: 25 percent

Dissimilar minor components: 5 percent

Description of Urban Land

General

Urban land consists of areas covered by pavement, buildings, or other artificial materials.

Setting

Landscape: Uplands

Landform: Hills

Description of the Readington Soil

Classification

Fine-loamy, mixed, active, mesic Oxyaquic Fragiudalfs

Setting

Landscape: Uplands

Landform: Red shale, siltstone, and sandstone hillslopes

Landform position (two-dimensional): Backslope and footslope

Landform position (three-dimensional): Side slope, head slope, and base slope

Slope range: 0 to 8 percent

Down-slope shape: Linear and concave

Across-slope shape: Linear and concave

Representative aspect: South

Aspect range: All aspects

Soil temperature class: Mesic

Soil temperature regime: Mesic

Properties and Qualities

Runoff: Low

Parent material: Residuum weathered from shale and siltstone

Restrictive feature(s): Fragipan at a depth of 20 to 36 inches; lithic bedrock at a depth of 40 to 70 inches

Frequency of flooding: None

Frequency of ponding: None

Depth to water table: About 18 to 36 inches (see table 19)

Drainage class: Moderately well drained

Shrink-swell potential: Low (about 1.5 LEP)

Salinity maximum: Not saline

Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 0

Available water capacity: Moderate (about 6.3 inches)

Interpretive Groups

Land capability subclass (nonirrigated): 2w

Meets hydric soil criteria: No

Hydrologic soil group: C

Typical Profile

Ap—0 to 8 inches; silt loam

Bt—8 to 29 inches; silt loam

Btx—29 to 58 inches; channery silt loam

R—58 to 68 inches; bedrock

Minor Components

Croton soils

Percent of map unit: 5 percent

Landform: Depressions

Geomorphic position (two-dimensional): Toeslope

Geomorphic position (three-dimensional): Base slope

Representative aspect: South

Aspect range: All aspects

Slope range: 3 to 8 percent

Down-slope shape: Linear and concave

Across-slope shape: Linear and concave

Meets hydric soil criteria: Yes

2230323—Buckingham silt loam, 0 to 3 percent slopes

Map Unit Setting

Major land resource area (MLRA): 148—Northern Piedmont

Elevation: 150 to 950 feet

Mean annual precipitation: 38 to 48 inches

Mean annual air temperature: 46 to 57 degrees F

Frost-free period: 150 to 200 days

Map Unit Composition

Buckingham and similar soils: 80 percent

Dissimilar minor components: 20 percent

Description of the Buckingham Soil

Classification

Fine-loamy, mixed, active, mesic Aeric Fragiaqualfs

Setting

Landform: Drainageways

Landform position (two-dimensional): Toeslope

Landform position (three-dimensional): Head slope

Slope range: 0 to 3 percent

Down-slope shape: Concave and linear

Across-slope shape: Linear and concave

Representative aspect: Southeast

Aspect range: All aspects

Soil temperature class: Mesic

Soil temperature regime: Mesic

Properties and Qualities

Runoff: Very high

Parent material: Fine-loamy colluvium and old alluvium derived from shale and siltstone

Restrictive feature(s): Fragipan at a depth of 20 to 40 inches; lithic bedrock at a depth of 80 to 99 inches

Frequency of flooding: None

Frequency of ponding: None

Water table (depth, kind): About 6 to 18 inches, perched (see table 19)

Drainage class: Somewhat poorly drained

Shrink-swell potential: Low (about 1.5 LEP)

Salinity maximum: Not saline

Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 0

Available water capacity: High (about 10.1 inches)

Interpretive Groups

Land capability subclass (nonirrigated): 3w

Meets hydric soil criteria: No

Hydrologic soil group: C

Typical Profile

A—0 to 16 inches; silt loam

Bt—16 to 40 inches; silt loam

Btx1—40 to 48 inches; silty clay loam

Btx2—48 to 62 inches; gravelly silt loam

Minor Components

Penn soils

Percent of map unit: 13 percent

Landform: Hillslopes

Geomorphic position (two-dimensional): Shoulder and backslope

Geomorphic position (three-dimensional): Nose slope and side slope

Representative aspect: Southeast

Aspect range: All aspects

Slope range: 0 to 3 percent

Down-slope shape: Linear and convex

Across-slope shape: Linear and convex

Meets hydric soil criteria: No

Croton soils

Percent of map unit: 5 percent

Landform: Depressions

Geomorphic position (two-dimensional): Toeslope

Geomorphic position (three-dimensional): Base slope

Representative aspect: South

Aspect range: All aspects

Slope range: 0 to 3 percent

Down-slope shape: Linear and concave

Across-slope shape: Linear and concave

Meets hydric soil criteria: Yes

Knauers soils

Percent of map unit: 2 percent

Landform: Backwater areas on flood plains

Geomorphic position (two-dimensional): Footslope and toeslope

Geomorphic position (three-dimensional): Tread

Representative aspect: South

Aspect range: All aspects

Slope range: 0 to 3 percent

Down-slope shape: Linear and concave

Across-slope shape: Linear and concave

Meets hydric soil criteria: Yes

2230591—Abbottstown silt loam, 3 to 8 percent slopes

Map Unit Setting

Major land resource area (MLRA): 148—Northern Piedmont

Elevation: 200 to 1,295 feet

Mean annual precipitation: 36 to 50 inches

Mean annual air temperature: 46 to 57 degrees F

Frost-free period: 130 to 200 days

Map Unit Composition

Abbottstown and similar soils: 93 percent

Dissimilar minor components: 7 percent

Description of the Abbottstown Soil

Classification

Fine-loamy, mixed, active, mesic Aeric Fragiaqualfs

Setting

Landscape: Red shale valleys

Landform: Hillslopes

Landform position (two-dimensional): Footslope and toeslope

Landform position (three-dimensional): Head slope and base slope

Slope range: 3 to 8 percent

Down-slope shape: Concave and linear

Across-slope shape: Linear and concave

Representative aspect: South

Aspect range: All aspects

Soil temperature class: Mesic

Soil temperature regime: Mesic

Properties and Qualities

Runoff: Very high

Parent material: Acid reddish brown residuum weathered from shale and siltstone

Restrictive feature(s): Fragipan at a depth of 15 to 30 inches; lithic bedrock at a depth of 40 to 60 inches

Frequency of flooding: None

Frequency of ponding: None

Water table (depth, kind): About 6 to 18 inches, perched (see table 19)

Drainage class: Somewhat poorly drained

Shrink-swell potential: Low (about 1.5 LEP)

Salinity maximum: Not saline

Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 0

Available water capacity: Moderate (about 6.0 inches)

Interpretive Groups

Land capability subclass (nonirrigated): 3w

Meets hydric soil criteria: No

Hydrologic soil group: C

Typical Profile

Ap—0 to 10 inches; silt loam

Bt—10 to 20 inches; silt loam

Bx—20 to 39 inches; channery loam

BCg—39 to 48 inches; channery silt loam

R—48 to 49 inches; bedrock

Minor Components

Croton soils

Percent of map unit: 4 percent

Landform: Depressions

Geomorphic position (two-dimensional): Toeslope

Geomorphic position (three-dimensional): Base slope

Representative aspect: South

Aspect range: All aspects

Slope range: 3 to 8 percent

Down-slope shape: Linear and concave

Across-slope shape: Linear and concave

Meets hydric soil criteria: Yes

Penn soils

Percent of map unit: 2 percent

Landform: Nearly level to steep dissected hillslopes

Geomorphic position (two-dimensional): Summit, shoulder, and backslope
Geomorphic position (three-dimensional): Nose slope, side slope, and interfluvium
Representative aspect: South
Aspect range: All aspects
Slope range: 3 to 8 percent
Down-slope shape: Linear and convex
Across-slope shape: Linear and convex
Meets hydric soil criteria: No

Klinesville soils

Percent of map unit: 1 percent
Geomorphic position (two-dimensional): Summit and shoulder
Geomorphic position (three-dimensional): Nose slope and interfluvium
Representative aspect: South
Aspect range: All aspects
Slope range: 3 to 8 percent
Down-slope shape: Convex
Across-slope shape: Convex
Meets hydric soil criteria: No

2232623—Penn-Klinesville channery silt loams, 15 to 25 percent slopes

Map Unit Setting

Major land resource area (MLRA): 148—Northern Piedmont
Elevation: 200 to 1,295 feet
Mean annual precipitation: 36 to 55 inches
Mean annual air temperature: 46 to 57 degrees F
Frost-free period: 130 to 200 days

Map Unit Composition

Penn and similar soils: 47 percent
Klinesville and similar soils: 40 percent
Dissimilar minor components: 13 percent

Description of the Penn Soil

Classification

Fine-loamy, mixed, superactive, mesic Ultic Hapludalfs

Setting

Landscape: Uplands
Landform: Hillslopes
Landform position (two-dimensional): Shoulder and backslope
Landform position (three-dimensional): Nose slope and side slope
Slope range: 15 to 25 percent
Down-slope shape: Linear and convex
Across-slope shape: Linear and convex
Representative aspect: South
Aspect range: All aspects
Soil temperature class: Mesic
Soil temperature regime: Mesic

Properties and Qualities

Runoff: Medium

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Parent material: Residuum weathered from shale and siltstone
Restrictive feature(s): Lithic bedrock at a depth of 20 to 40 inches
Frequency of flooding: None
Frequency of ponding: None
Depth to water table: More than 72 inches
Drainage class: Well drained
Shrink-swell potential: Low (about 1.5 LEP)
Salinity maximum: Not saline
Sodicity maximum: Not sodic
Calcium carbonate equivalent (maximum weight percentage): 0
Available water capacity: Low (about 4.1 inches)

Interpretive Groups

Land capability subclass (nonirrigated): 4e
Meets hydric soil criteria: No
Hydrologic soil group: C

Typical Profile

Ap—0 to 8 inches; channery silt loam
Bt—8 to 21 inches; channery silt loam
C—21 to 34 inches; very channery silt loam
R—34 to 44 inches; bedrock

Description of the Klinesville Soil

Classification

Loamy-skeletal, mixed, active, mesic Lithic Dystrudepts

Setting

Landscape: Valleys
Landform: Shale and siltstone hills
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Side slope
Slope range: 15 to 25 percent
Down-slope shape: Convex and linear
Across-slope shape: Linear and convex
Representative aspect: South
Aspect range: All aspects
Soil temperature class: Mesic
Soil temperature regime: Mesic

Properties and Qualities

Runoff: High
Parent material: Red residuum weathered from shale and siltstone
Restrictive feature(s): Lithic bedrock at a depth of 10 to 20 inches
Frequency of flooding: None
Frequency of ponding: None
Depth to water table: More than 72 inches
Drainage class: Somewhat excessively drained
Shrink-swell potential: Low (about 1.5 LEP)
Salinity maximum: Not saline
Sodicity maximum: Not sodic
Calcium carbonate equivalent (maximum weight percentage): 0
Available water capacity: Very low (about 1.5 inches)

Interpretive Groups

Land capability subclass (nonirrigated): 6e

Meets hydric soil criteria: No

Hydrologic soil group: C

Typical Profile

Ap—0 to 8 inches; channery silt loam

Bw—8 to 14 inches; very channery silt loam

C—14 to 18 inches; extremely channery silt loam

R—18 to 28 inches; bedrock

Minor Components

Croton soils

Percent of map unit: 5 percent

Landform: Depressions

Geomorphic position (two-dimensional): Toeslope

Geomorphic position (three-dimensional): Base slope

Representative aspect: South

Aspect range: All aspects

Slope range: 3 to 8 percent

Down-slope shape: Linear and concave

Across-slope shape: Linear and concave

Meets hydric soil criteria: Yes

Lansdale soils

Percent of map unit: 4 percent

Landform: Rolling hillsides

Geomorphic position (two-dimensional): Summit, shoulder, and backslope

Geomorphic position (three-dimensional): Side slope

Representative aspect: Southeast

Aspect range: All aspects

Slope range: 0 to 3 percent

Down-slope shape: Convex

Across-slope shape: Convex

Meets hydric soil criteria: No

Reaville soils

Percent of map unit: 4 percent

Landform: Red shale, siltstone, and sandstone hillslopes

Geomorphic position (two-dimensional): Summit and footslope

Geomorphic position (three-dimensional): Interfluvium and base slope

Representative aspect: South

Aspect range: All aspects

Slope range: 0 to 3 percent

Down-slope shape: Linear and concave

Across-slope shape: Linear and concave

Meets hydric soil criteria: No

2232624—Raritan silt loam, 3 to 8 percent slopes

Map Unit Setting

Major land resource area (MLRA): 148—Northern Piedmont

Elevation: 150 to 1,200 feet

Mean annual precipitation: 38 to 55 inches

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Mean annual air temperature: 46 to 59 degrees F

Frost-free period: 140 to 200 days

Map Unit Composition

Raritan and similar soils: 90 percent

Dissimilar minor components: 10 percent

Description of the Raritan Soil

Classification

Fine-loamy, mixed, active, mesic Aquic Fragiudults

Setting

Landscape: Uplands

Landform: Red shale and sandstone stream terraces

Landform position (two-dimensional): Footslope and toeslope

Landform position (three-dimensional): Tread

Slope range: 3 to 8 percent

Down-slope shape: Convex and linear

Across-slope shape: Linear and convex

Representative aspect: South

Aspect range: All aspects

Soil temperature class: Mesic

Soil temperature regime: Mesic

Properties and Qualities

Runoff: Medium

Parent material: Reddish alluvium derived from shale and siltstone

Restrictive feature(s): Fragipan at a depth of 20 to 30 inches; lithic bedrock at depth of 60 to 99 inches

Frequency of flooding: None

Frequency of ponding: None

Water table (depth, kind): About 6 to 31 inches, perched (see table 19)

Drainage class: Moderately well drained

Shrink-swell potential: Low (about 1.5 LEP)

Salinity maximum: Not saline

Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 0

Available water capacity: Moderate (about 7.3 inches)

Interpretive Groups

Land capability subclass (nonirrigated): 2e

Meets hydric soil criteria: No

Hydrologic soil group: C

Typical Profile

Ap—0 to 14 inches; silt loam

Bt—14 to 27 inches; clay loam

Bx—27 to 43 inches; clay loam

2C—43 to 60 inches; stratified gravelly loamy sand to silty clay loam

Minor Components

Birdsboro soils

Percent of map unit: 5 percent

Landform: High stream terraces and old alluvial fans

Geomorphic position (two-dimensional): Footslope and toeslope

Geomorphic position (three-dimensional): Tread

Representative aspect: South
Aspect range: All aspects
Slope range: 0 to 3 percent
Down-slope shape: Convex and linear
Across-slope shape: Linear and convex
Meets hydric soil criteria: No

Reaville soils

Percent of map unit: 3 percent
Landform: Red shale, siltstone, and sandstone hillslopes
Geomorphic position (two-dimensional): Summit and footslope
Geomorphic position (three-dimensional): Base slope and interfluvium
Representative aspect: South
Aspect range: All aspects
Slope range: 0 to 3 percent
Down-slope shape: Linear and concave
Across-slope shape: Linear and concave
Meets hydric soil criteria: No

Knauers soils

Percent of map unit: 2 percent
Landform: Backwater areas on flood plains
Geomorphic position (two-dimensional): Footslope and toeslope
Geomorphic position (three-dimensional): Tread
Representative aspect: South
Aspect range: All aspects
Slope range: 0 to 3 percent
Down-slope shape: Linear and concave
Across-slope shape: Linear and concave
Meets hydric soil criteria: Yes

2232625—Readington silt loam, 3 to 8 percent slopes

Map Unit Setting

Major land resource area (MLRA): 148—Northern Piedmont
Elevation: 200 to 1,000 feet
Mean annual precipitation: 36 to 55 inches
Mean annual air temperature: 46 to 57 degrees F
Frost-free period: 160 to 200 days

Map Unit Composition

Readington and similar soils: 80 percent
Dissimilar minor components: 20 percent

Description of the Readington Soil

Classification

Fine-loamy, mixed, active, mesic Oxyaquic Fragiudalfs

Setting

Landscape: Uplands
Landform: Red shale, siltstone, and sandstone hillslopes
Landform position (two-dimensional): Backslope and footslope
Landform position (three-dimensional): Side slope, head slope, and base slope

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Slope range: 3 to 8 percent
Down-slope shape: Linear and concave
Across-slope shape: Linear and concave
Representative aspect: South
Aspect range: All aspects
Soil temperature class: Mesic
Soil temperature regime: Mesic
Soil moisture class: Udic

Properties and Qualities

Runoff: Medium
Parent material: Residuum weathered from shale and siltstone
Restrictive feature(s): Fragipan at a depth of 20 to 36 inches; lithic bedrock at a depth of 40 to 70 inches
Frequency of flooding: None
Frequency of ponding: None
Water table (depth, kind): About 18 to 36 inches, perched (see table 19)
Drainage class: Moderately well drained
Shrink-swell potential: Low (about 1.5 LEP)
Salinity maximum: Not saline
Sodicity maximum: Not sodic
Calcium carbonate equivalent (maximum weight percentage): 0
Available water capacity: Moderate (about 6.3 inches)

Interpretive Groups

Land capability subclass (nonirrigated): 2e
Meets hydric soil criteria: No
Hydrologic soil group: C

Typical Profile

Ap—0 to 8 inches; silt loam
Bt—8 to 29 inches; silt loam
Btx—29 to 58 inches; channery silt loam
R—58 to 68 inches; bedrock

Minor Components

Penn soils

Percent of map unit: 7 percent
Landform: Hillslopes
Geomorphic position (two-dimensional): Shoulder and backslope
Geomorphic position (three-dimensional): Nose slope and side slope
Representative aspect: South
Aspect range: All aspects
Slope range: 3 to 8 percent
Down-slope shape: Linear and convex
Across-slope shape: Linear and convex
Meets hydric soil criteria: No

Reaville soils

Percent of map unit: 7 percent
Landform: Red shale, siltstone, and sandstone hillslopes
Geomorphic position (two-dimensional): Summit and footslope
Geomorphic position (three-dimensional): Interfluvium and base slope
Representative aspect: South
Aspect range: All aspects

Slope range: 0 to 3 percent
Down-slope shape: Linear and concave
Across-slope shape: Linear and concave
Meets hydric soil criteria: No

Croton soils

Percent of map unit: 6 percent
Landform: Depressions
Geomorphic position (two-dimensional): Toeslope
Geomorphic position (three-dimensional): Base slope
Representative aspect: South
Aspect range: All aspects
Slope range: 3 to 8 percent
Down-slope shape: Linear and concave
Across-slope shape: Linear and concave
Meets hydric soil criteria: Yes

2232626—Readington silt loam, 8 to 15 percent slopes

Map Unit Setting

Major land resource area (MLRA): 148—Northern Piedmont
Elevation: 200 to 1,000 feet
Mean annual precipitation: 36 to 55 inches
Mean annual air temperature: 46 to 57 degrees F
Frost-free period: 160 to 200 days

Map Unit Composition

Readington and similar soils: 86 percent
Dissimilar minor components: 14 percent

Description of the Readington Soil

Classification

Fine-loamy, mixed, active, mesic Oxyaquic Fragiudalfs

Setting

Landscape: Uplands
Landform: Red shale, siltstone, and sandstone hillslopes
Landform position (two-dimensional): Backslope and footslope
Landform position (three-dimensional): Side slope, head slope, and base slope
Slope range: 8 to 15 percent
Down-slope shape: Linear and concave
Across-slope shape: Linear and concave
Representative aspect: South
Aspect range: All aspects
Soil temperature class: Mesic
Soil temperature regime: Mesic

Properties and Qualities

Runoff: Medium
Parent material: Residuum weathered from shale and siltstone
Restrictive feature(s): Fragipan at a depth of 20 to 36 inches; lithic bedrock at a depth of 40 to 70 inches
Frequency of flooding: None
Frequency of ponding: None

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Water table (depth, kind): About 18 to 36 inches, perched (see table 19)

Drainage class: Moderately well drained

Shrink-swell potential: Low (about 1.5 LEP)

Salinity maximum: Not saline

Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 0

Available water capacity: Moderate (about 6.6 inches)

Interpretive Groups

Land capability subclass (nonirrigated): 3e

Meets hydric soil criteria: No

Hydrologic soil group: C

Typical Profile

Ap—0 to 11 inches; silt loam

Bt—11 to 29 inches; silt loam

Btx—29 to 58 inches; channery silt loam

R—58 to 68 inches; bedrock

Minor Components

Penn soils

Percent of map unit: 7 percent

Landform: Hillslopes

Geomorphic position (two-dimensional): Shoulder and backslope

Geomorphic position (three-dimensional): Nose slope and side slope

Representative aspect: South

Aspect range: All aspects

Slope range: 8 to 15 percent

Down-slope shape: Linear and convex

Across-slope shape: Linear and convex

Meets hydric soil criteria: No

Reaville soils

Percent of map unit: 5 percent

Landform: Red shale, siltstone, and sandstone hillslopes

Geomorphic position (two-dimensional): Summit and footslope

Geomorphic position (three-dimensional): Interfluvium and base slope

Representative aspect: South

Aspect range: All aspects

Slope range: 0 to 3 percent

Down-slope shape: Linear and concave

Across-slope shape: Linear and concave

Meets hydric soil criteria: No

Croton soils

Percent of map unit: 2 percent

Landform: Depressions

Geomorphic position (two-dimensional): Toeslope

Geomorphic position (three-dimensional): Base slope

Representative aspect: South

Aspect range: All aspects

Slope range: 0 to 3 percent

Down-slope shape: Linear and concave

Across-slope shape: Linear and concave

Meets hydric soil criteria: Yes

2233645—Edgemont channery loam, 3 to 8 percent slopes

Map Unit Setting

Major land resource area (MLRA): 148—Northern Piedmont

Elevation: 495 to 2,400 feet

Mean annual precipitation: 35 to 50 inches

Mean annual air temperature: 46 to 57 degrees F

Frost-free period: 120 to 185 days

Map Unit Composition

Edgemont and similar soils: 93 percent

Dissimilar minor components: 7 percent

Description of the Edgemont Soil

Classification

Fine-loamy, mixed, active, mesic Typic Hapludults

Setting

Landscape: Mountains

Landform: Quartzite and shale ridges

Landform position (two-dimensional): Summit

Landform position (three-dimensional): Mountaintop

Slope range: 3 to 8 percent

Down-slope shape: Convex and linear

Across-slope shape: Linear and convex

Representative aspect: South

Aspect range: All aspects

Soil temperature class: Mesic

Soil temperature regime: Mesic

Properties and Qualities

Runoff: Low

Parent material: Residuum weathered from quartzite and/or residuum weathered from orthoquartzite

Restrictive feature(s): Lithic bedrock at a depth of 42 to 84 inches

Frequency of flooding: None

Frequency of ponding: None

Depth to water table: More than 72 inches

Drainage class: Well drained

Shrink-swell potential: Low (about 1.5 LEP)

Salinity maximum: Not saline

Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 0

Available water capacity: Low (about 5.8 inches)

Interpretive Groups

Land capability subclass (nonirrigated): 2e

Meets hydric soil criteria: No

Hydrologic soil group: B

Typical Profile

Ap—0 to 8 inches; channery loam

Bt—8 to 36 inches; channery fine sandy loam

C—36 to 60 inches; channery sandy loam

Minor Components

Buchanan soils

Percent of map unit: 4 percent

Landform: Very steep terraces

Geomorphic position (two-dimensional): Foothlope

Geomorphic position (three-dimensional): Mountain base

Representative aspect: South

Aspect range: All aspects

Slope range: 3 to 8 percent

Down-slope shape: Linear and concave

Across-slope shape: Linear and concave

Meets hydric soil criteria: No

Andover soils

Percent of map unit: 3 percent

Landform: Drainageways

Geomorphic position (two-dimensional): Foothlope and toeslope

Geomorphic position (three-dimensional): Mountain base

Representative aspect: South

Aspect range: All aspects

Slope range: 3 to 8 percent

Down-slope shape: Linear and concave

Across-slope shape: Linear and concave

Meets hydric soil criteria: Yes

2233646—Edgemont channery loam, 8 to 15 percent slopes

Map Unit Setting

Major land resource area (MLRA): 148—Northern Piedmont

Elevation: 495 to 1,800 feet

Mean annual precipitation: 35 to 50 inches

Mean annual air temperature: 46 to 59 degrees F

Frost-free period: 120 to 185 days

Map Unit Composition

Edgemont and similar soils: 93 percent

Dissimilar minor components: 7 percent

Description of the Edgemont Soil

Classification

Fine-loamy, mixed, active, mesic Typic Hapludults

Setting

Landscape: Mountains

Landform: Quartzite and shale ridges

Landform position (two-dimensional): Shoulder

Landform position (three-dimensional): Upper third of mountain flank

Slope range: 8 to 15 percent

Down-slope shape: Convex and linear

Across-slope shape: Linear and convex

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Representative aspect: South
Aspect range: All aspects
Soil temperature class: Mesic
Soil temperature regime: Mesic

Properties and Qualities

Runoff: Low
Parent material: Residuum weathered from quartzite and/or residuum weathered from orthoquartzite
Restrictive feature(s): Lithic bedrock at a depth of 42 to 84 inches
Frequency of flooding: None
Frequency of ponding: None
Depth to water table: More than 72 inches
Drainage class: Well drained
Shrink-swell potential: Low (about 1.5 LEP)
Salinity maximum: Not saline
Sodicity maximum: Not sodic
Calcium carbonate equivalent (maximum weight percentage): 0
Available water capacity: Low (about 5.8 inches)

Interpretive Groups

Land capability subclass (nonirrigated): 3e
Meets hydric soil criteria: No
Hydrologic soil group: B

Typical Profile

Ap—0 to 8 inches; channery loam
Bt—8 to 36 inches; channery fine sandy loam
C—36 to 60 inches; channery sandy loam

Minor Components

Buchanan soils

Percent of map unit: 4 percent
Landform: Very steep terraces
Geomorphic position (two-dimensional): Footslope
Geomorphic position (three-dimensional): Mountain base
Representative aspect: South
Aspect range: All aspects
Slope range: 3 to 8 percent
Down-slope shape: Linear and concave
Across-slope shape: Linear and concave
Meets hydric soil criteria: No

Andover soils

Percent of map unit: 3 percent
Landform: Drainageways
Geomorphic position (two-dimensional): Footslope and toeslope
Geomorphic position (three-dimensional): Mountain base
Representative aspect: South
Aspect range: All aspects
Slope range: 3 to 8 percent
Down-slope shape: Linear and concave
Across-slope shape: Linear and concave
Meets hydric soil criteria: Yes

2233647—Edgemont channery loam, 15 to 25 percent slopes

Map Unit Setting

Major land resource area (MLRA): 148—Northern Piedmont

Elevation: 495 to 1,800 feet

Mean annual precipitation: 35 to 50 inches

Mean annual air temperature: 46 to 59 degrees F

Frost-free period: 120 to 185 days

Map Unit Composition

Edgemont and similar soils: 93 percent

Dissimilar minor components: 7 percent

Description of the Edgemont Soil

Classification

Fine-loamy, mixed, active, mesic Typic Hapludults

Setting

Landscape: Mountains

Landform: Quartzite and shale ridges

Landform position (two-dimensional): Shoulder

Landform position (three-dimensional): Upper third of mountain flank

Slope range: 15 to 25 percent

Down-slope shape: Convex and linear

Across-slope shape: Linear and convex

Representative aspect: South

Aspect range: All aspects

Soil temperature class: Mesic

Soil temperature regime: Mesic

Properties and Qualities

Runoff: Medium

Parent material: Residuum weathered from quartzite and/or residuum weathered from orthoquartzite

Restrictive feature(s): Lithic bedrock at a depth of 42 to 84 inches

Frequency of flooding: None

Frequency of ponding: None

Depth to water table: More than 72 inches

Drainage class: Well drained

Shrink-swell potential: Low (about 1.5 LEP)

Salinity maximum: Not saline

Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 0

Available water capacity: Low (about 5.8 inches)

Interpretive Groups

Land capability subclass (nonirrigated): 4e

Meets hydric soil criteria: No

Hydrologic soil group: B

Typical Profile

Ap—0 to 8 inches; channery loam

Bt—8 to 36 inches; channery fine sandy loam

C—36 to 60 inches; channery sandy loam

Minor Components

Buchanan soils

Percent of map unit: 4 percent

Landform: Very steep terraces

Geomorphic position (two-dimensional): Foothlope

Geomorphic position (three-dimensional): Mountain base

Representative aspect: South

Aspect range: All aspects

Slope range: 3 to 8 percent

Down-slope shape: Linear and concave

Across-slope shape: Linear and concave

Meets hydric soil criteria: No

Andover soils

Percent of map unit: 3 percent

Landform: Drainageways

Geomorphic position (two-dimensional): Foothlope and toeslope

Geomorphic position (three-dimensional): Mountain base

Representative aspect: South

Aspect range: All aspects

Slope range: 3 to 8 percent

Down-slope shape: Linear and concave

Across-slope shape: Linear and concave

Meets hydric soil criteria: Yes

2233649—Edgemont channery sandy loam, 25 to 60 percent slopes, extremely stony

Map Unit Setting

Major land resource area (MLRA): 148—Northern Piedmont

Elevation: 495 to 2,400 feet

Mean annual precipitation: 35 to 50 inches

Mean annual air temperature: 46 to 57 degrees F

Frost-free period: 120 to 185 days

Map Unit Composition

Edgemont, extremely stony and similar soils: 93 percent

Dissimilar minor components: 7 percent

Description of the Edgemont, Extremely Stony Soil

Classification

Fine-loamy, mixed, active, mesic Typic Hapludults

Setting

Landscape: Mountains

Landform: Quartzite and shale ridges

Landform position (two-dimensional): Backslope

Landform position (three-dimensional): Center third of mountain flank

Slope range: 25 to 60 percent

Down-slope shape: Convex and linear

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Across-slope shape: Linear and convex

Representative aspect: South

Aspect range: All aspects

Soil temperature class: Mesic

Soil temperature regime: Mesic

Properties and Qualities

Runoff: Medium

Parent material: Residuum weathered from quartzite and/or residuum weathered from orthoquartzite

Restrictive feature(s): Lithic bedrock at a depth of 42 to 84 inches

Frequency of flooding: None

Frequency of ponding: None

Depth to water table: More than 72 inches

Drainage class: Well drained

Shrink-swell potential: Low (about 1.5 LEP)

Salinity maximum: Not saline

Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 0

Available water capacity: Low (about 5.8 inches)

Interpretive Groups

Land capability subclass (nonirrigated): 7s

Meets hydric soil criteria: No

Hydrologic soil group: B

Typical Profile

A—0 to 8 inches; channery sandy loam

Bt—8 to 36 inches; channery fine sandy loam

C—36 to 60 inches; channery sandy loam

Minor Components

Buchanan, extremely stony soils

Percent of map unit: 4 percent

Landform: Very steep terraces

Geomorphic position (two-dimensional): Footslope

Geomorphic position (three-dimensional): Mountain base

Representative aspect: South

Aspect range: All aspects

Slope range: 8 to 25 percent

Down-slope shape: Linear and concave

Across-slope shape: Linear and concave

Meets hydric soil criteria: No

Andover, extremely stony soils

Percent of map unit: 3 percent

Landform: Drainageways

Geomorphic position (two-dimensional): Footslope and toeslope

Geomorphic position (three-dimensional): Mountain base

Representative aspect: South

Aspect range: All aspects

Slope range: 0 to 8 percent

Down-slope shape: Linear and concave

Across-slope shape: Linear and concave

Meets hydric soil criteria: Yes

2233698—Lansdale loam, 3 to 8 percent slopes

Map Unit Setting

Major land resource area (MLRA): 148—Northern Piedmont

Elevation: 295 to 1,000 feet

Mean annual precipitation: 40 to 55 inches

Mean annual air temperature: 48 to 55 degrees F

Frost-free period: 160 to 200 days

Map Unit Composition

Lansdale and similar soils: 92 percent

Dissimilar minor components: 8 percent

Description of the Lansdale Soil

Classification

Coarse-loamy, mixed, active, mesic Typic Hapludults

Setting

Landscape: Hills

Landform: Rolling hillsides

Landform position (two-dimensional): Summit, shoulder, and backslope

Landform position (three-dimensional): Side slope

Slope range: 3 to 8 percent

Down-slope shape: Convex

Across-slope shape: Convex

Representative aspect: Southeast

Aspect range: All aspects

Soil temperature class: Mesic

Soil temperature regime: Mesic

Properties and Qualities

Runoff: Medium

Parent material: Residuum weathered from sandstone and/or residuum weathered from conglomerate

Restrictive feature(s): Lithic bedrock at a depth of 42 to 60 inches

Frequency of flooding: None

Frequency of ponding: None

Depth to water table: More than 72 inches

Drainage class: Well drained

Shrink-swell potential: Low (about 1.5 LEP)

Salinity maximum: Not saline

Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 0

Available water capacity: Moderate (about 6.1 inches)

Interpretive Groups

Land capability subclass (nonirrigated): 2e

Meets hydric soil criteria: No

Hydrologic soil group: B

Typical Profile

Ap—0 to 8 inches; loam

Bt—8 to 34 inches; channery sandy loam

C—34 to 46 inches; channery sandy loam

R—46 to 50 inches; bedrock

Minor Components

Reaville soils

Percent of map unit: 8 percent

Landform: Red shale, siltstone, and sandstone hillslopes

Geomorphic position (two-dimensional): Summit and footslope

Geomorphic position (three-dimensional): Interfluvium and base slope

Representative aspect: South

Aspect range: All aspects

Slope range: 0 to 3 percent

Down-slope shape: Linear and concave

Across-slope shape: Linear and concave

Meets hydric soil criteria: No

2233702—Penn-Lansdale complex, 3 to 8 percent slopes

Map Unit Setting

Major land resource area (MLRA): 148—Northern Piedmont

Elevation: 245 to 950 feet

Mean annual precipitation: 36 to 50 inches

Mean annual air temperature: 46 to 57 degrees F

Frost-free period: 160 to 200 days

Map Unit Composition

Penn and similar soils: 69 percent

Lansdale and similar soils: 25 percent

Dissimilar minor components: 6 percent

Description of the Penn Soil

Classification

Fine-loamy, mixed, superactive, mesic Ultic Hapludalfs

Setting

Landscape: Uplands

Landform: Hillslopes

Landform position (two-dimensional): Shoulder and backslope

Landform position (three-dimensional): Nose slope and side slope

Slope range: 3 to 8 percent

Down-slope shape: Linear and convex

Across-slope shape: Linear and convex

Representative aspect: Southeast

Aspect range: All aspects

Soil temperature class: Mesic

Soil temperature regime: Mesic

Properties and Qualities

Runoff: Low

Parent material: Residuum weathered from shale and siltstone

Restrictive feature(s): Lithic bedrock at a depth of 20 to 40 inches

Frequency of flooding: None

Frequency of ponding: None

Depth to water table: More than 72 inches

Drainage class: Well drained

Shrink-swell potential: Low (about 1.5 LEP)

Salinity maximum: Not saline

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Sodicity maximum: Not sodic
Calcium carbonate equivalent (maximum weight percentage): 0
Available water capacity: Low (about 4.1 inches)

Interpretive Groups

Land capability subclass (nonirrigated): 2e
Meets hydric soil criteria: No
Hydrologic soil group: C

Typical Profile

Ap—0 to 10 inches; channery silt loam
Bt—10 to 22 inches; channery silt loam
C—22 to 28 inches; very channery silt loam
R—28 to 48 inches; bedrock

Description of the Lansdale Soil

Classification

Coarse-loamy, mixed, active, mesic Typic Hapludults

Setting

Landscape: Hills
Landform: Rolling hillsides
Landform position (two-dimensional): Summit, shoulder, and backslope
Landform position (three-dimensional): Side slope
Slope range: 3 to 8 percent
Down-slope shape: Convex
Across-slope shape: Convex
Representative aspect: Southeast
Aspect range: All aspects
Soil temperature class: Mesic
Soil temperature regime: Mesic

Properties and Qualities

Runoff: Medium
Parent material: Residuum weathered from sandstone and/or residuum weathered from conglomerate
Restrictive feature(s): Lithic bedrock at a depth of 42 to 60 inches
Frequency of flooding: None
Frequency of ponding: None
Depth to water table: More than 72 inches
Drainage class: Well drained
Shrink-swell potential: Low (about 1.5 LEP)
Salinity maximum: Not saline
Sodicity maximum: Not sodic
Calcium carbonate equivalent (maximum weight percentage): 0
Available water capacity: Low (about 5.6 inches)

Interpretive Groups

Land capability subclass (nonirrigated): 2e
Meets hydric soil criteria: No
Hydrologic soil group: B

Typical Profile

Ap—0 to 10 inches; channery loam
Bt—10 to 30 inches; sandy loam
C—30 to 47 inches; channery loamy sand
R—47 to 57 inches; bedrock

Minor Components

Readington soils

Percent of map unit: 6 percent

Landform: Red shale, siltstone, and sandstone hillslopes

Geomorphic position (two-dimensional): Backslope and footslope

Geomorphic position (three-dimensional): Side slope, head slope, and base slope

Representative aspect: South

Aspect range: All aspects

Slope range: 0 to 3 percent

Down-slope shape: Linear and concave

Across-slope shape: Linear and concave

Meets hydric soil criteria: No

2233703—Penn-Lansdale complex, 8 to 15 percent slopes

Map Unit Setting

Major land resource area (MLRA): 148—Northern Piedmont

Elevation: 245 to 1,295 feet

Mean annual precipitation: 36 to 55 inches

Mean annual air temperature: 46 to 57 degrees F

Frost-free period: 130 to 200 days

Map Unit Composition

Penn and similar soils: 50 percent

Lansdale and similar soils: 40 percent

Dissimilar minor components: 10 percent

Description of the Penn Soil

Classification

Fine-loamy, mixed, superactive, mesic Ultic Hapludalfs

Setting

Landscape: Uplands

Landform: Hillslopes

Landform position (two-dimensional): Shoulder and backslope

Landform position (three-dimensional): Nose slope and side slope

Slope range: 8 to 15 percent

Down-slope shape: Linear and convex

Across-slope shape: Linear and convex

Representative aspect: Southeast

Aspect range: All aspects

Soil temperature class: Mesic

Soil temperature regime: Mesic

Properties and Qualities

Runoff: Low

Parent material: Residuum weathered from shale and siltstone

Restrictive feature(s): Lithic bedrock at a depth of 20 to 40 inches

Frequency of flooding: None

Frequency of ponding: None

Depth to water table: More than 72 inches

Drainage class: Well drained

Shrink-swell potential: Low (about 1.5 LEP)

Salinity maximum: Not saline

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Sodicity maximum: Not sodic
Calcium carbonate equivalent (maximum weight percentage): 0
Available water capacity: Low (about 3.9 inches)

Interpretive Groups

Land capability subclass (nonirrigated): 3e
Meets hydric soil criteria: No
Hydrologic soil group: C

Typical Profile

Ap—0 to 10 inches; channery silt loam
Bt—10 to 22 inches; channery silt loam
C—22 to 28 inches; very channery silt loam
R—28 to 48 inches; bedrock

Description of the Lansdale Soil

Classification

Coarse-loamy, mixed, active, mesic Typic Hapludults

Setting

Landscape: Hills
Landform: Rolling hillsides
Landform position (two-dimensional): Summit, shoulder, and backslope
Landform position (three-dimensional): Side slope
Slope range: 8 to 15 percent
Down-slope shape: Convex
Across-slope shape: Convex
Representative aspect: Southeast
Aspect range: All aspects
Soil temperature class: Mesic
Soil temperature regime: Mesic

Properties and Qualities

Runoff: Medium
Parent material: Residuum weathered from sandstone and/or residuum weathered from conglomerate
Restrictive feature(s): Lithic bedrock at a depth of 42 to 60 inches
Frequency of flooding: None
Frequency of ponding: None
Depth to water table: More than 72 inches
Drainage class: Well drained
Shrink-swell potential: Low (about 1.5 LEP)
Salinity maximum: Not saline
Sodicity maximum: Not sodic
Calcium carbonate equivalent (maximum weight percentage): 0
Available water capacity: Low (about 5.4 inches)

Interpretive Groups

Land capability subclass (nonirrigated): 3e
Meets hydric soil criteria: No
Hydrologic soil group: B

Typical Profile

Ap—0 to 10 inches; channery loam
Bt—10 to 30 inches; sandy loam
C—30 to 47 inches; channery loamy sand
R—47 to 57 inches; bedrock

Minor Components

Klinesville soils

Percent of map unit: 6 percent

Geomorphic position (two-dimensional): Summit and shoulder

Geomorphic position (three-dimensional): Nose slope and interfluve

Representative aspect: South

Aspect range: All aspects

Slope range: 3 to 8 percent

Down-slope shape: Convex

Across-slope shape: Convex

Meets hydric soil criteria: No

Reaville soils

Percent of map unit: 4 percent

Landform: Red shale, siltstone, and sandstone hillslopes

Geomorphic position (two-dimensional): Summit and footslope

Geomorphic position (three-dimensional): Interfluve and base slope

Representative aspect: South

Aspect range: All aspects

Slope range: 0 to 3 percent

Down-slope shape: Linear and concave

Across-slope shape: Linear and concave

Meets hydric soil criteria: No

2233709—Penn silt loam, 3 to 8 percent slopes

Map Unit Setting

Major land resource area (MLRA): 148—Northern Piedmont

Elevation: 245 to 1,295 feet

Mean annual precipitation: 36 to 55 inches

Mean annual air temperature: 46 to 57 degrees F

Frost-free period: 130 to 200 days

Map Unit Composition

Penn and similar soils: 87 percent

Dissimilar minor components: 13 percent

Description of the Penn Soil

Classification

Fine-loamy, mixed, superactive, mesic Ultic Hapludalfs

Setting

Landscape: Uplands

Landform: Nearly level to steep dissected hillslopes

Landform position (two-dimensional): Summit, shoulder, and backslope

Landform position (three-dimensional): Nose slope, side slope, and interfluve

Slope range: 3 to 8 percent

Down-slope shape: Linear and convex

Across-slope shape: Linear and convex

Representative aspect: South

Aspect range: All aspects

Soil temperature class: Mesic

Soil temperature regime: Mesic

Properties and Qualities

Runoff: Low

Parent material: Residuum weathered from shale and siltstone

Restrictive feature(s): Lithic bedrock at a depth of 20 to 40 inches

Frequency of flooding: None

Frequency of ponding: None

Depth to water table: More than 72 inches

Drainage class: Well drained

Shrink-swell potential: Low (about 1.5 LEP)

Salinity maximum: Not saline

Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 0

Available water capacity: Low (about 4.1 inches)

Interpretive Groups

Land capability subclass (nonirrigated): 2e

Meets hydric soil criteria: No

Hydrologic soil group: C

Typical Profile

Ap—0 to 10 inches; silt loam

Bt—10 to 22 inches; channery silt loam

C—22 to 28 inches; very channery silt loam

R—28 to 48 inches; bedrock

Minor Components

Readington soils

Percent of map unit: 5 percent

Landform: Red shale, siltstone, and sandstone hillslopes

Geomorphic position (two-dimensional): Backslope and footslope

Geomorphic position (three-dimensional): Side slope, head slope, and base slope

Representative aspect: South

Aspect range: All aspects

Slope range: 0 to 3 percent

Down-slope shape: Linear and concave

Across-slope shape: Linear and concave

Meets hydric soil criteria: No

Reaville soils

Percent of map unit: 5 percent

Landform: Red shale, siltstone, and sandstone hillslopes

Geomorphic position (two-dimensional): Summit and footslope

Geomorphic position (three-dimensional): Base slope and interfluvium

Representative aspect: South

Aspect range: All aspects

Slope range: 3 to 8 percent

Down-slope shape: Linear and concave

Across-slope shape: Linear and concave

Meets hydric soil criteria: No

Klinesville soils

Percent of map unit: 3 percent

Geomorphic position (two-dimensional): Summit and shoulder

Geomorphic position (three-dimensional): Nose slope and interfluvium

Representative aspect: South

Aspect range: All aspects

Slope range: 8 to 15 percent
Down-slope shape: Convex
Across-slope shape: Convex
Meets hydric soil criteria: No

2233712—Penn silt loam, 8 to 15 percent slopes

Map Unit Setting

Major land resource area (MLRA): 148—Northern Piedmont
Elevation: 245 to 1,295 feet
Mean annual precipitation: 36 to 55 inches
Mean annual air temperature: 46 to 57 degrees F
Frost-free period: 130 to 200 days

Map Unit Composition

Penn and similar soils: 90 percent
Dissimilar minor components: 10 percent

Description of the Penn Soil

Classification

Fine-loamy, mixed, superactive, mesic Ultic Hapludalfs

Setting

Landscape: Uplands
Landform: Nearly level to steep dissected hillslopes
Landform position (two-dimensional): Summit, shoulder, and backslope
Landform position (three-dimensional): Nose slope, side slope, and interfluvium
Slope range: 8 to 15 percent
Down-slope shape: Linear and convex
Across-slope shape: Linear and convex
Representative aspect: South
Aspect range: All aspects
Soil temperature class: Mesic
Soil temperature regime: Mesic

Properties and Qualities

Runoff: Low
Parent material: Residuum weathered from shale and siltstone
Restrictive feature(s): Lithic bedrock at a depth of 20 to 40 inches
Frequency of flooding: None
Frequency of ponding: None
Depth to water table: More than 72 inches
Drainage class: Well drained
Shrink-swell potential: Low (about 1.5 LEP)
Salinity maximum: Not saline
Sodicity maximum: Not sodic
Calcium carbonate equivalent (maximum weight percentage): 0
Available water capacity: Low (about 4.1 inches)

Interpretive Groups

Land capability subclass (nonirrigated): 3e
Meets hydric soil criteria: No
Hydrologic soil group: C

Typical Profile

Ap—0 to 10 inches; silt loam
Bt—10 to 22 inches; channery silt loam
C—22 to 28 inches; very channery silt loam
R—28 to 48 inches; bedrock

Minor Components

Readington soils

Percent of map unit: 4 percent
Landform: Red shale, siltstone, and sandstone hillslopes
Geomorphic position (two-dimensional): Backslope and footslope
Geomorphic position (three-dimensional): Side slope, head slope, and base slope
Representative aspect: South
Aspect range: All aspects
Slope range: 0 to 3 percent
Down-slope shape: Linear and concave
Across-slope shape: Linear and concave
Meets hydric soil criteria: No

Klinesville soils

Percent of map unit: 3 percent
Geomorphic position (two-dimensional): Summit and shoulder
Geomorphic position (three-dimensional): Interfluve and nose slope
Representative aspect: South
Aspect range: All aspects
Slope range: 15 to 25 percent
Down-slope shape: Convex
Across-slope shape: Convex
Meets hydric soil criteria: No

Reaville soils

Percent of map unit: 3 percent
Landform: Red shale, siltstone, and sandstone hillslopes
Geomorphic position (two-dimensional): Summit and footslope
Geomorphic position (three-dimensional): Base slope and interfluve
Representative aspect: South
Aspect range: All aspects
Slope range: 3 to 8 percent
Down-slope shape: Linear and concave
Across-slope shape: Linear and concave
Meets hydric soil criteria: No

2233717—Klinesville channery silt loam, 35 to 60 percent slopes

Map Unit Setting

Major land resource area (MLRA): 148—Northern Piedmont
Elevation: 245 to 1,295 feet
Mean annual precipitation: 36 to 55 inches
Mean annual air temperature: 46 to 57 degrees F
Frost-free period: 130 to 200 days

Map Unit Composition

Klinesville and similar soils: 85 percent
Dissimilar minor components: 15 percent

Description of the Klinesville Soil

Classification

Loamy-skeletal, mixed, active, mesic Lithic Dystrudepts

Setting

Landscape: Hills
Landform: Hillslopes
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Side slope
Slope range: 35 to 60 percent
Down-slope shape: Convex and linear
Across-slope shape: Linear and convex
Representative aspect: Southeast
Aspect range: All aspects
Soil temperature class: Mesic
Soil temperature regime: Mesic

Properties and Qualities

Runoff: High
Parent material: Red residuum weathered from shale and siltstone
Restrictive feature(s): Lithic bedrock at a depth of 10 to 20 inches
Frequency of flooding: None
Frequency of ponding: None
Depth to water table: More than 72 inches
Drainage class: Somewhat excessively drained
Shrink-swell potential: Low (about 1.5 LEP)
Salinity maximum: Not saline
Sodicity maximum: Not sodic
Calcium carbonate equivalent (maximum weight percentage): 0
Available water capacity: Very low (about 1.2 inches)

Interpretive Groups

Land capability subclass (nonirrigated): 7e
Meets hydric soil criteria: No
Hydrologic soil group: C

Typical Profile

Ap—0 to 3 inches; channery silt loam
Bw—3 to 12 inches; very channery silt loam
C—12 to 16 inches; extremely channery silt loam
R—16 to 28 inches; bedrock

Minor Components

Penn soils

Percent of map unit: 10 percent
Landform: Nearly level to steep dissected hillslopes
Geomorphic position (two-dimensional): Summit, shoulder, and backslope
Geomorphic position (three-dimensional): Nose slope, side slope, and interfluvium
Representative aspect: South
Aspect range: All aspects
Slope range: 3 to 8 percent

Down-slope shape: Linear and convex
Across-slope shape: Linear and convex
Meets hydric soil criteria: No

Reaville soils

Percent of map unit: 5 percent
Landform: Red shale, siltstone, and sandstone hillslopes
Geomorphic position (two-dimensional): Summit and footslope
Geomorphic position (three-dimensional): Base slope and interfluvium
Representative aspect: South
Aspect range: All aspects
Slope range: 8 to 15 percent
Down-slope shape: Linear and concave
Across-slope shape: Linear and concave
Meets hydric soil criteria: No

2248203—Lansdale loam, 15 to 25 percent slopes

Map Unit Setting

Major land resource area (MLRA): 148—Northern Piedmont
Elevation: 295 to 1,000 feet
Mean annual precipitation: 40 to 55 inches
Mean annual air temperature: 48 to 55 degrees F
Frost-free period: 160 to 200 days

Map Unit Composition

Lansdale and similar soils: 92 percent
Dissimilar minor components: 8 percent

Description of the Lansdale Soil

Classification

Coarse-loamy, mixed, active, mesic Typic Hapludults

Setting

Landscape: Hills
Landform: Rolling hillsides
Landform position (two-dimensional): Summit, shoulder, and backslope
Landform position (three-dimensional): Side slope
Slope range: 15 to 25 percent
Down-slope shape: Convex
Across-slope shape: Convex
Representative aspect: Southeast
Aspect range: All aspects
Soil temperature class: Mesic
Soil temperature regime: Mesic

Properties and Qualities

Runoff: High
Parent material: Residuum weathered from sandstone and/or residuum weathered from conglomerate
Restrictive feature(s): Lithic bedrock at a depth of 42 to 60 inches
Frequency of flooding: None
Frequency of ponding: None
Depth to water table: More than 72 inches
Drainage class: Well drained

Shrink-swell potential: Low (about 1.5 LEP)
Salinity maximum: Not saline
Sodicity maximum: Not sodic
Calcium carbonate equivalent (maximum weight percentage): 0
Available water capacity: Moderate (about 6.1 inches)

Interpretive Groups

Land capability subclass (nonirrigated): 4e
Meets hydric soil criteria: No
Hydrologic soil group: B

Typical Profile

Ap—0 to 8 inches; loam
Bt—8 to 34 inches; channery sandy loam
C—34 to 46 inches; channery sandy loam
R—46 to 50 inches; bedrock

Minor Components

Reaville soils

Percent of map unit: 8 percent
Landform: Red shale, siltstone, and sandstone hillslopes
Geomorphic position (two-dimensional): Summit and footslope
Geomorphic position (three-dimensional): Interfluvium and base slope
Representative aspect: South
Aspect range: All aspects
Slope range: 0 to 3 percent
Down-slope shape: Linear and concave
Across-slope shape: Linear and concave
Meets hydric soil criteria: No

2249335—Lawrenceville silt loam, 3 to 8 percent slopes

Map Unit Setting

Major land resource area (MLRA): 148—Northern Piedmont
Elevation: 200 to 1,600 feet
Mean annual precipitation: 38 to 48 inches
Mean annual air temperature: 50 to 57 degrees F
Frost-free period: 140 to 200 days

Map Unit Composition

Lawrenceville and similar soils: 83 percent
Dissimilar minor components: 17 percent

Description of the Lawrenceville Soil

Classification

Fine-silty, mixed, active, mesic Oxyaquic Fragiudalfs

Setting

Landform: Upland slopes
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Slope range: 3 to 8 percent
Down-slope shape: Linear and concave
Across-slope shape: Linear and concave
Representative aspect: Southeast

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Aspect range: All aspects
Soil temperature class: Mesic
Soil temperature regime: Mesic

Properties and Qualities

Runoff: Medium
Parent material: Loess over residuum weathered from shale and siltstone
Restrictive feature(s): Fragipan at a depth of 24 to 38 inches; lithic bedrock at a depth of 48 to 99 inches
Frequency of flooding: None
Frequency of ponding: None
Water table (depth, kind): About 18 to 36 inches, perched (see table 19)
Drainage class: Moderately well drained
Shrink-swell potential: Low (about 1.5 LEP)
Salinity maximum: Not saline
Sodicity maximum: Not sodic
Calcium carbonate equivalent (maximum weight percentage): 0
Available water capacity: High (about 11.9 inches)

Interpretive Groups

Land capability subclass (nonirrigated): 2e
Meets hydric soil criteria: No
Hydrologic soil group: C

Typical Profile

Ap—0 to 12 inches; silt loam
Bt—12 to 26 inches; silt loam
Btx—26 to 47 inches; silt loam
C—47 to 75 inches; silt loam

Minor Components

Lansdale soils

Percent of map unit: 12 percent
Landform: Rolling hillsides
Geomorphic position (two-dimensional): Summit, shoulder, and backslope
Geomorphic position (three-dimensional): Side slope
Representative aspect: South
Aspect range: All aspects
Slope range: 3 to 8 percent
Down-slope shape: Convex
Across-slope shape: Convex
Meets hydric soil criteria: No

Doylestown soils

Percent of map unit: 3 percent
Landform: Drainageways
Geomorphic position (two-dimensional): Backslope, footslope, and toeslope
Geomorphic position (three-dimensional): Head slope
Representative aspect: Southeast
Aspect range: All aspects
Slope range: 0 to 3 percent
Down-slope shape: Concave and linear
Across-slope shape: Linear and concave
Meets hydric soil criteria: Yes

Chalfont soils

Percent of map unit: 2 percent

Landform: Upland slopes
Geomorphic position (two-dimensional): Footslope
Geomorphic position (three-dimensional): Side slope
Representative aspect: South
Aspect range: All aspects
Slope range: 0 to 3 percent
Down-slope shape: Linear and concave
Across-slope shape: Linear and concave
Meets hydric soil criteria: No

2379116—Birdsboro silt loam, 3 to 8 percent slopes

Map Unit Setting

Major land resource area (MLRA): 148—Northern Piedmont
Elevation: 200 to 1,200 feet
Mean annual precipitation: 38 to 50 inches
Mean annual air temperature: 46 to 59 degrees F
Frost-free period: 140 to 200 days

Map Unit Composition

Birdsboro and similar soils: 92 percent
Dissimilar minor components: 8 percent

Description of the Birdsboro Soil

Classification

Fine-loamy, mixed, active, mesic Oxyaquic Hapludults

Setting

Landscape: Valleys
Landform: High stream terraces and old alluvial fans
Landform position (two-dimensional): Footslope and toeslope
Landform position (three-dimensional): Tread
Slope range: 3 to 8 percent
Down-slope shape: Convex and linear
Across-slope shape: Linear and convex
Representative aspect: South
Aspect range: All aspects
Soil temperature class: Mesic
Soil temperature regime: Mesic

Properties and Qualities

Runoff: Medium
Parent material: Old reddish alluvium derived from sedimentary rock
Restrictive feature(s): Lithic bedrock at a depth of 72 to 99 inches
Frequency of flooding: None
Frequency of ponding: None
Depth to water table: About 24 to 72 inches (see table 19)
Drainage class: Well drained
Shrink-swell potential: Low (about 1.5 LEP)
Salinity maximum: Not saline
Sodicity maximum: Not sodic
Calcium carbonate equivalent (maximum weight percentage): 0
Available water capacity: High (about 10.2 inches)

Interpretive Groups

Land capability subclass (nonirrigated): 2e

Meets hydric soil criteria: No

Hydrologic soil group: B

Typical Profile

Ap—0 to 9 inches; silt loam

Bt—9 to 49 inches; silt loam

C—49 to 73 inches; very gravelly sandy loam

Minor Components

Penn soils

Percent of map unit: 5 percent

Landform: Nearly level to steep dissected hillslopes

Geomorphic position (two-dimensional): Summit, shoulder, and backslope

Geomorphic position (three-dimensional): Nose slope, side slope, and interfluvium

Representative aspect: South

Aspect range: All aspects

Slope range: 3 to 8 percent

Down-slope shape: Linear and convex

Across-slope shape: Linear and convex

Meets hydric soil criteria: No

Lamington soils

Percent of map unit: 3 percent

Landform: Terraces

Geomorphic position (two-dimensional): Toeslope

Geomorphic position (three-dimensional): Tread

Representative aspect: South

Aspect range: All aspects

Slope range: 0 to 3 percent

Down-slope shape: Linear and concave

Across-slope shape: Linear and concave

Meets hydric soil criteria: Yes

2379949—Duffield silt loam, 3 to 8 percent slopes

Map Unit Setting

Major land resource area (MLRA): 148—Northern Piedmont

Elevation: 200 to 1,495 feet

Mean annual precipitation: 32 to 50 inches

Mean annual air temperature: 46 to 57 degrees F

Frost-free period: 120 to 200 days

Map Unit Composition

Duffield and similar soils: 90 percent

Dissimilar minor components: 10 percent

Description of the Duffield Soil

Classification

Fine-loamy, mixed, active, mesic Ultic Hapludalfs

Setting

Landscape: Limestone valleys

Landform: Hills

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Slope range: 3 to 8 percent
Down-slope shape: Linear
Across-slope shape: Linear
Representative aspect: South
Aspect range: All aspects
Soil temperature class: Mesic
Soil temperature regime: Mesic
Soil moisture class: Udic

Properties and Qualities

Runoff: Medium
Parent material: Residuum weathered from limestone and siltstone
Restrictive feature(s): Lithic bedrock at a depth of 48 to 120 inches
Frequency of flooding: None
Frequency of ponding: None
Depth to water table: More than 72 inches
Drainage class: Well drained
Shrink-swell potential: Moderate (about 4.5 LEP)
Salinity maximum: Not saline
Sodicity maximum: Not sodic
Calcium carbonate equivalent (maximum weight percentage): 0
Available water capacity: Very high (about 12.4 inches)

Interpretive Groups

Land capability subclass (nonirrigated): 2e
Meets hydric soil criteria: No
Hydrologic soil group: B

Typical Profile

Ap—0 to 10 inches; silt loam
Bt—10 to 53 inches; silty clay loam
C—53 to 72 inches; silt loam

Minor Components

Clarksburg soils

Percent of map unit: 5 percent
Landform: Limestone valley flats
Geomorphic position (two-dimensional): Footslope and toeslope
Geomorphic position (three-dimensional): Base slope
Representative aspect: South
Aspect range: All aspects
Slope range: 0 to 3 percent
Down-slope shape: Concave and linear
Across-slope shape: Linear and concave
Meets hydric soil criteria: No

Ryder soils

Percent of map unit: 3 percent
Landform: Hills
Geomorphic position (two-dimensional): Summit, shoulder, and backslope
Geomorphic position (three-dimensional): Interfluve and side slope
Representative aspect: South
Aspect range: All aspects
Slope range: 8 to 15 percent

Down-slope shape: Linear and convex
Across-slope shape: Linear and convex
Meets hydric soil criteria: No

Thorndale soils

Percent of map unit: 2 percent
Landform: Depressions
Geomorphic position (two-dimensional): Foothlope
Geomorphic position (three-dimensional): Base slope
Representative aspect: South
Aspect range: All aspects
Slope range: 0 to 3 percent
Down-slope shape: Concave and linear
Across-slope shape: Linear and concave
Meets hydric soil criteria: Yes

2384072—Glenville silt loam, 3 to 8 percent slopes

Map Unit Setting

Major land resource area (MLRA): 148—Northern Piedmont
Elevation: 200 to 2,000 feet
Mean annual precipitation: 35 to 55 inches
Mean annual air temperature: 45 to 61 degrees F
Frost-free period: 110 to 235 days

Map Unit Composition

Glenville and similar soils: 90 percent
Dissimilar minor components: 10 percent

Description of the Glenville Soil

Classification

Fine-loamy, mixed, active, mesic Aquic Fragiudults

Setting

Landscape: Hills
Landform: Hillslopes
Landform position (two-dimensional): Backslope and foothlope
Landform position (three-dimensional): Head slope and side slope
Slope range: 3 to 8 percent
Down-slope shape: Linear and concave
Across-slope shape: Linear and concave
Representative aspect: South
Aspect range: All aspects
Soil temperature class: Mesic
Soil temperature regime: Mesic

Properties and Qualities

Runoff: Medium
Parent material: Colluvium and/or residuum weathered from mica schist
Restrictive feature(s): Fragipan at a depth of 15 to 30 inches; paralithic bedrock at a depth of 60 to 99 inches
Frequency of flooding: None
Frequency of ponding: None
Water table (depth, kind): About 6 to 36 inches, perched (see table 19)
Drainage class: Moderately well drained

Shrink-swell potential: Low (about 1.5 LEP)
Salinity maximum: Not saline
Sodicity maximum: Not sodic
Calcium carbonate equivalent (maximum weight percentage): 0
Available water capacity: Moderate (about 8.9 inches)

Interpretive Groups

Land capability subclass (nonirrigated): 2e
Meets hydric soil criteria: No
Hydrologic soil group: C

Typical Profile

Ap—0 to 9 inches; silt loam
Bt—9 to 19 inches; silt loam
Bx—19 to 39 inches; silt loam
C—39 to 82 inches; channery loam

Minor Components

Baile soils

Percent of map unit: 5 percent
Landform: Depressions
Geomorphic position (two-dimensional): Footslope
Geomorphic position (three-dimensional): Base slope
Representative aspect: South
Aspect range: All aspects
Slope range: 0 to 3 percent
Down-slope shape: Concave and linear
Across-slope shape: Linear and concave
Meets hydric soil criteria: Yes

Glenelg soils

Percent of map unit: 5 percent
Landform: Nearly level to steep dissected hillslopes
Geomorphic position (two-dimensional): Summit, shoulder, and backslope
Geomorphic position (three-dimensional): Nose slope, side slope, and interfluvium
Representative aspect: South
Aspect range: All aspects
Slope range: 3 to 8 percent
Down-slope shape: Linear and convex
Across-slope shape: Linear and convex
Meets hydric soil criteria: No

2386596—Duffield silt loam, 8 to 15 percent slopes

Map Unit Setting

Major land resource area (MLRA): 148—Northern Piedmont
Elevation: 295 to 1,495 feet
Mean annual precipitation: 34 to 50 inches
Mean annual air temperature: 46 to 57 degrees F
Frost-free period: 120 to 200 days

Map Unit Composition

Duffield and similar soils: 85 percent
Dissimilar minor components: 15 percent

Description of the Duffield Soil

Classification

Fine-loamy, mixed, active, mesic Ultic Hapludalfs

Setting

Landscape: Limestone valleys

Landform: Hills

Landform position (two-dimensional): Shoulder

Landform position (three-dimensional): Interfluve

Slope range: 8 to 15 percent

Down-slope shape: Linear

Across-slope shape: Linear

Representative aspect: South

Aspect range: All aspects

Soil temperature class: Mesic

Soil temperature regime: Mesic

Properties and Qualities

Runoff: Medium

Parent material: Residuum weathered from limestone

Restrictive feature(s): Lithic bedrock at a depth of 60 to 80 inches

Frequency of flooding: None

Frequency of ponding: None

Depth to water table: More than 72 inches

Drainage class: Well drained

Shrink-swell potential: Moderate (about 4.5 LEP)

Salinity maximum: Not saline

Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 0

Available water capacity: High (about 11.2 inches)

Interpretive Groups

Land capability subclass (nonirrigated): 3e

Meets hydric soil criteria: No

Hydrologic soil group: B

Typical Profile

Ap—0 to 10 inches; silt loam

Bt—10 to 56 inches; silt loam

C—56 to 65 inches; channery silt loam

Minor Components

Ryder soils

Percent of map unit: 6 percent

Landform: Hills

Geomorphic position (two-dimensional): Summit, shoulder, and backslope

Geomorphic position (three-dimensional): Interfluve and side slope

Representative aspect: South

Aspect range: All aspects

Slope range: 8 to 15 percent

Down-slope shape: Linear and convex

Across-slope shape: Linear and convex

Meets hydric soil criteria: No

Carbo soils

Percent of map unit: 5 percent

Landform: Ridges

Geomorphic position (two-dimensional): Summit and backslope

Geomorphic position (three-dimensional): Side slope and interfluvium

Representative aspect: South

Aspect range: All aspects

Slope range: 8 to 15 percent

Down-slope shape: Convex and linear

Across-slope shape: Linear and convex

Meets hydric soil criteria: No

Clarksburg soils

Percent of map unit: 2 percent

Landform: Limestone valley flats

Geomorphic position (two-dimensional): Footslope and toeslope

Geomorphic position (three-dimensional): Base slope

Representative aspect: South

Aspect range: All aspects

Slope range: 0 to 3 percent

Down-slope shape: Concave and linear

Across-slope shape: Linear and concave

Meets hydric soil criteria: No

Funkstown soils

Percent of map unit: 2 percent

Landform: Draws

Geomorphic position (two-dimensional): Footslope

Geomorphic position (three-dimensional): Head slope

Representative aspect: South

Aspect range: All aspects

Slope range: 0 to 3 percent

Down-slope shape: Concave and linear

Across-slope shape: Linear and concave

Meets hydric soil criteria: No

2386599—Duffield silt loam, 8 to 15 percent slopes

Map Unit Setting

Major land resource area (MLRA): 148—Northern Piedmont

Elevation: 295 to 1,495 feet

Mean annual precipitation: 34 to 50 inches

Mean annual air temperature: 46 to 57 degrees F

Frost-free period: 120 to 200 days

Map Unit Composition

Duffield and similar soils: 85 percent

Dissimilar minor components: 15 percent

Description of the Duffield Soil

Classification

Fine-loamy, mixed, active, mesic Ultic Hapludalfs

Setting

Landscape: Limestone valleys

Landform: Hills

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Interfluve
Slope range: 8 to 15 percent
Down-slope shape: Linear
Across-slope shape: Linear
Representative aspect: South
Aspect range: All aspects
Soil temperature class: Mesic
Soil temperature regime: Mesic

Properties and Qualities

Runoff: Medium
Parent material: Residuum weathered from limestone
Restrictive feature(s): Lithic bedrock at a depth of 60 to 80 inches
Frequency of flooding: None
Frequency of ponding: None
Depth to water table: More than 72 inches
Drainage class: Well drained
Shrink-swell potential: Moderate (about 4.5 LEP)
Salinity maximum: Not saline
Sodicity maximum: Not sodic
Calcium carbonate equivalent (maximum weight percentage): 0
Available water capacity: High (about 11.2 inches)

Interpretive Groups

Land capability subclass (nonirrigated): 3e
Meets hydric soil criteria: No
Hydrologic soil group: B

Typical Profile

Ap—0 to 10 inches; silt loam
Bt—10 to 56 inches; silt loam
C—56 to 65 inches; channery silt loam

Minor Components

Ryder soils

Percent of map unit: 6 percent
Landform: Hills
Geomorphic position (two-dimensional): Summit, shoulder, and backslope
Geomorphic position (three-dimensional): Interfluve and side slope
Representative aspect: South
Aspect range: All aspects
Slope range: 8 to 15 percent
Down-slope shape: Linear and convex
Across-slope shape: Linear and convex
Meets hydric soil criteria: No

Carbo soils

Percent of map unit: 5 percent
Landform: Ridges
Geomorphic position (two-dimensional): Summit and backslope
Geomorphic position (three-dimensional): Side slope and interfluve
Representative aspect: South
Aspect range: All aspects
Slope range: 8 to 15 percent
Down-slope shape: Convex and linear

Across-slope shape: Linear and convex

Meets hydric soil criteria: No

Clarksburg soils

Percent of map unit: 2 percent

Landform: Limestone valley flats

Geomorphic position (two-dimensional): Foothlope and toeslope

Geomorphic position (three-dimensional): Base slope

Representative aspect: South

Aspect range: All aspects

Slope range: 0 to 3 percent

Down-slope shape: Concave and linear

Across-slope shape: Linear and concave

Meets hydric soil criteria: No

Funkstown soils

Percent of map unit: 2 percent

Landform: Draws

Geomorphic position (two-dimensional): Foothlope

Geomorphic position (three-dimensional): Head slope

Representative aspect: South

Aspect range: All aspects

Slope range: 0 to 3 percent

Down-slope shape: Concave and linear

Across-slope shape: Linear and concave

Meets hydric soil criteria: No

2397950—Bowmansville-Knauers silt loams

Map Unit Setting

Major land resource area (MLRA): 148—Northern Piedmont

Elevation: 150 to 895 feet

Mean annual precipitation: 36 to 50 inches

Mean annual air temperature: 45 to 57 degrees F

Frost-free period: 150 to 210 days

Map Unit Composition

Bowmansville and similar soils: 40 percent

Knauers and similar soils: 40 percent

Dissimilar minor components: 20 percent

Description of the Bowmansville Soil

Classification

Fine-loamy, mixed, active, nonacid, mesic Fluventic Endoaquepts

Setting

Landscape: Uplands

Landform: Nearly level flood plains

Landform position (two-dimensional): Foothlope and toeslope

Landform position (three-dimensional): Head slope

Slope range: 0 to 3 percent

Down-slope shape: Concave and linear

Across-slope shape: Linear and concave

Representative aspect: South

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Aspect range: All aspects
Soil temperature class: Mesic
Soil temperature regime: Mesic

Properties and Qualities

Runoff: Very high
Parent material: Recent alluvial deposits weathered from sandstone and siltstone
Restrictive feature(s): Lithic bedrock at a depth of 72 to 99 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Depth to water table: At the soil surface to 18 inches
Drainage class: Somewhat poorly drained
Shrink-swell potential: Low (about 1.5 LEP)
Salinity maximum: Not saline
Sodicity maximum: Not sodic
Calcium carbonate equivalent (maximum weight percentage): 0
Available water capacity: Moderate (about 8.5 inches)

Interpretive Groups

Land capability subclass (nonirrigated): 3w
Meets hydric soil criteria: No
Hydrologic soil group: B/D

Typical Profile

Ap—0 to 7 inches; silt loam
Bg—7 to 26 inches; silty clay loam
Cg—26 to 43 inches; fine sandy loam
2Cg—43 to 65 inches; stratified gravel to sand

Description of the Knauers Soil

Classification

Fine-loamy over sandy or sandy-skeletal, mixed, active, nonacid, mesic Typic
Fluvaquents

Setting

Landscape: Valleys
Landform: Backwater areas on flood plains
Landform position (two-dimensional): Footslope and toeslope
Landform position (three-dimensional): Tread
Slope range: 0 to 3 percent
Down-slope shape: Linear and concave
Across-slope shape: Linear and concave
Representative aspect: South
Aspect range: All aspects
Soil temperature class: Mesic
Soil temperature regime: Mesic

Properties and Qualities

Runoff: Negligible
Parent material: Recent alluvium derived from sandstone and shale
Restrictive feature(s): Lithic bedrock at a depth of 72 to 99 inches
Frequency of flooding: Occasional
Frequency of ponding: Frequent
Depth to water table: At the soil surface
Drainage class: Poorly drained
Shrink-swell potential: Low (about 1.5 LEP)
Salinity maximum: Not saline

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 0

Available water capacity: Low (about 5.5 inches)

Interpretive Groups

Land capability subclass (nonirrigated): 4w

Meets hydric soil criteria: Yes

Hydrologic soil group: D

Vetgetation

Existing plants: Red maple, sedge, green ash, American witchhazel, and mayapple

Typical Profile

A—0 to 8 inches; silt loam

Bg1—8 to 17 inches; silt loam

Bg2—17 to 24 inches; gravelly sandy loam

2Cg—24 to 60 inches; stratified sand to gravelly sandy loam

Minor Components

Rowland soils

Percent of map unit: 20 percent

Landform: Relatively narrow, nearly level flood plains

Geomorphic position (two-dimensional): Footslope and toeslope

Geomorphic position (three-dimensional): Base slope and head slope

Representative aspect: South

Aspect range: All aspects

Slope range: 0 to 3 percent

Down-slope shape: Linear and concave

Across-slope shape: Linear and concave

Meets hydric soil criteria: No

Use and Management of the Soils

This soil survey is an inventory and evaluation of the soils within Valley Forge National Historical Park, Pennsylvania. It can be used to adjust land uses to the limitations and potentials of natural resources and the environment. Also, it can help to prevent soil-related failures in land uses.

In preparing a soil survey, soil scientists, conservationists, engineers, and others collect extensive field data about the nature and behavioral characteristics of the soils. They collect data on erosion, droughtiness, flooding, and other factors that affect various soil uses and management. Field experience and collected data on soil properties and performance are used as a basis in predicting soil behavior.

Information in this section can be used to plan the use and management of soils as farmland and as sites for buildings, sanitary facilities, highways and other transportation systems, and recreational facilities. It can be used to identify the potentials and limitations of each soil for specific land uses and to help prevent construction failures caused by unfavorable soil properties.

Planners and others using soil survey information can evaluate the effect of specific land uses on productivity and on the environment in all or part of the park. The survey can help planners to maintain or create a land use pattern in harmony with the natural soil.

Contractors can use this survey to locate sources of sand and gravel, roadfill, and topsoil. They can use it to identify areas where bedrock, wetness, or very firm soil layers can cause difficulty in excavation.

Health officials, highway officials, engineers, and others may also find this survey useful. The survey can help them plan the safe disposal of wastes and locate sites for pavements, sidewalks, campgrounds, playgrounds, and trees and shrubs.

Interpretive Ratings

The interpretive tables in this survey rate the soils in the park for various uses. Many of the tables identify the limitations that affect specified uses and indicate the severity of those limitations. The ratings in these tables are both verbal and numerical.

Rating Class Terms

Rating classes are expressed in the tables in terms that indicate the extent to which the soils are limited by all of the soil features that affect a specified use or in terms that indicate the suitability of the soils for the use. Thus, the tables may show limitation classes or suitability classes. Terms for the limitation classes are *not limited*, *slightly limited*, *somewhat limited*, and *very limited*. The suitability ratings are expressed as *well suited*, *moderately well suited*, *poorly suited*, and *unsuited* or as *good*, *fair*, and *poor*.

Numerical Ratings

Numerical ratings in the tables indicate the relative severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.00 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact

on the use and the point at which the soil feature is not a limitation. The limitations appear in order from the most limiting to the least limiting. Thus, if more than one limitation is identified, the most severe limitation is listed first and the least severe one is listed last.

Land Capability Classification

Land capability classification shows, in a general way, the suitability of soils for most kinds of field crops. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. The criteria used in grouping the soils do not include major and generally expensive landforming that would change slope, depth, or other characteristics of the soils, nor do they include possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for rangeland, for forestland, or for engineering purposes.

In the capability system, soils are generally grouped at three levels—capability class, subclass, and unit (USDA-SCS, 1961). Only class and subclass are used in this survey.

Capability classes, the broadest groups, are designated by the numbers 1 through 8. The numbers indicate progressively greater limitations and narrower choices for practical use. The classes are defined as follows:

Class 1 soils have slight limitations that restrict their use.

Class 2 soils have moderate limitations that restrict the choice of plants or that require moderate conservation practices.

Class 3 soils have severe limitations that restrict the choice of plants or that require special conservation practices, or both.

Class 4 soils have very severe limitations that restrict the choice of plants or that require very careful management, or both.

Class 5 soils are subject to little or no erosion but have other limitations, impractical to remove, that restrict their use mainly to pasture, rangeland, forestland, or wildlife habitat.

Class 6 soils have severe limitations that make them generally unsuitable for cultivation and that restrict their use mainly to pasture, rangeland, forestland, or wildlife habitat.

Class 7 soils have very severe limitations that make them unsuitable for cultivation and that restrict their use mainly to grazing, forestland, or wildlife habitat.

Class 8 soils and miscellaneous areas have limitations that preclude commercial plant production and that restrict their use to recreational purposes, wildlife habitat, watershed, or esthetic purposes.

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

In class 1 there are no subclasses because the soils of this class have few limitations. Class 5 contains only the subclasses indicated by *w*, *s*, or *c* because the soils in class 5 are subject to little or no erosion. They have other limitations that restrict their use to pasture, rangeland, forestland, wildlife habitat, or recreation.

The capability classification of map units in this park is given in the section “Detailed Soil Map Units” and in table 2.

Prime and Other Important Farmland

Table 3 lists the map units in the park that are considered important farmlands. Important farmlands consist of prime farmland, unique farmland, and farmland of statewide or local importance. This list does not constitute a recommendation for a particular land use.

In an effort to identify the extent and location of important farmlands, the Natural Resources Conservation Service, in cooperation with other interested Federal, State, and local government organizations, has inventoried land that can be used for the production of the Nation's food supply.

Prime farmland is of major importance in meeting the Nation's short- and long-range needs for food and fiber. Because the supply of high-quality farmland is limited, the U.S. Department of Agriculture recognizes that responsible levels of government, as well as individuals, should encourage and facilitate the wise use of our Nation's prime farmland.

Prime farmland, as defined by the U.S. Department of Agriculture, is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is available for these uses. It could be cultivated land, pastureland, forestland, or other land, but it is not urban or built-up land or water areas. The soil quality, growing season, and moisture supply are those needed for the soil to economically produce sustained high yields of crops when proper management, including water management, and acceptable farming methods are applied. In general, prime farmland has an adequate and dependable supply of moisture from precipitation or irrigation, a favorable temperature and growing season, acceptable acidity or alkalinity, an acceptable salt and sodium content, and few or no rocks. The water supply is dependable and of adequate quality. Prime farmland is permeable to water and air. It is not excessively erodible or saturated with water for long periods, and it either is not frequently flooded during the growing season or is protected from flooding. Slope ranges mainly from 0 to 6 percent. More detailed information about the criteria for prime farmland is available at the local office of the Natural Resources Conservation Service.

For some soils identified as prime farmland, measures that overcome a hazard or limitation, such as flooding, wetness, and droughtiness, are needed. Onsite evaluation is needed to determine whether or not the hazard or limitation has been overcome by corrective measures.

A recent trend in land use in some areas has been the loss of some prime farmland to industrial and urban uses. The loss of prime farmland to other uses puts pressure on marginal lands, which generally are more erodible, droughty, and less productive and cannot be easily cultivated.

Unique farmland is land other than prime farmland that is used for the production of specific high-value food and fiber crops, such as citrus, tree nuts, olives, cranberries, and other fruits and vegetables. It has the special combination of soil quality, growing season, moisture supply, temperature, humidity, air drainage, elevation, and aspect needed for the soil to economically produce sustainable high yields of these crops when properly managed. The water supply is dependable and of adequate quality. Nearness to markets is an additional consideration. Unique farmland is not based on national criteria. It commonly is in areas where there is a special microclimate, such as the wine country in California.

In some areas, land that does not meet the criteria for prime or unique farmland is considered to be *farmland of statewide importance* for the production of food, feed, fiber, forage, and oilseed crops. The criteria for defining and delineating farmland of statewide importance are determined by the appropriate State agencies. Generally, this land includes areas of soils that nearly meet the requirements for prime farmland and that economically produce high yields of crops when treated and managed

according to acceptable farming methods. Some areas may produce as high a yield as prime farmland if conditions are favorable. Farmland of statewide importance may include tracts of land that have been designated for agriculture by State law.

In some areas that are not identified as having national or statewide importance, land is considered to be *farmland of local importance* for the production of food, feed, fiber, forage, and oilseed crops. This farmland is identified by the appropriate local agencies. Farmland of local importance may include tracts of land that have been designated for agriculture by local ordinance.

Hydric Soils

Table 4 lists the map unit components that are rated as hydric soils in the park. This list can help in planning land uses; however, onsite investigation is recommended to determine the hydric soils on a specific site (National Research Council, 1995; USDA-NRCS, 2010).

The three essential characteristics of wetlands are hydrophytic vegetation, hydric soils, and wetland hydrology (Cowardin et al., 1979; U.S. Army Corps of Engineers, 1987; National Research Council, 1995; Tiner, 1985). Criteria for all of the characteristics must be met for areas to be identified as wetlands. Undrained hydric soils that have natural vegetation should support a dominant population of ecological wetland plant species. Hydric soils that have been converted to other uses should be capable of being restored to wetlands.

Hydric soils are defined by the National Technical Committee for Hydric Soils (NTCHS) as soils that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part (Federal Register, 1994). These soils, under natural conditions, are either saturated or inundated long enough during the growing season to support the growth and reproduction of hydrophytic vegetation.

The NTCHS definition identifies general soil properties that are associated with wetness. In order to determine whether a specific soil is a hydric soil or nonhydric soil, however, more specific information, such as information about the depth and duration of the water table, is needed. Thus, criteria that identify those estimated soil properties unique to hydric soils have been established (Federal Register, 2002). These criteria are used to identify map unit components that normally are associated with wetlands. The criteria used are selected estimated soil properties that are described in "Soil Taxonomy" (Soil Survey Staff, 1999) and "Keys to Soil Taxonomy" (Soil Survey Staff, 2010) and in the "Soil Survey Manual" (Soil Survey Division Staff, 1993).

If soils are wet enough for a long enough period of time to be considered hydric, they should exhibit certain properties that can be easily observed in the field. These visible properties are indicators of hydric soils. The indicators used to make onsite determinations of hydric soils are specified in "Field Indicators of Hydric Soils in the United States" (USDA-NRCS, 2010).

Hydric soils are identified by examining and describing the soil to a depth of about 20 inches. This depth may be greater if determination of an appropriate indicator so requires. It is always recommended that soils be excavated and described to the depth necessary for an understanding of the redoximorphic processes. Then, using the completed soil descriptions, soil scientists can compare the soil features required by each indicator and specify which indicators have been matched with the conditions observed in the soil. The soil can be identified as a hydric soil if at least one of the approved indicators is present.

Map units that are dominantly made up of hydric soils may have small areas, or inclusions, of nonhydric soils in the higher positions on the landform, and map units dominantly made up of nonhydric soils may have inclusions of hydric soils in the lower positions on the landform.

The criteria for hydric soils are represented by codes in the table (for example, 2B3). Definitions for the codes are as follows:

1. All Histels except for Folistels and Histosols except for Folists.
2. Soils in Aquic suborders, great groups, or subgroups, Albolls suborder, Historthels great group, Histoturbels great group, Pachic subgroups, or Cumulic subgroups that:
 - A. are somewhat poorly drained and have a water table at the surface (0.0 feet) during the growing season, or
 - B. are poorly drained or very poorly drained and have either:
 - 1) a water table at the surface (0.0 feet) during the growing season if textures are coarse sand, sand, or fine sand in all layers within a depth of 20 inches, or
 - 2) a water table at a depth of 0.5 foot or less during the growing season if saturated hydraulic conductivity (K_{sat}) is equal to or greater than 6.0 in/hr in all layers within a depth of 20 inches, or
 - 3) a water table at a depth of 1.0 foot or less during the growing season if saturated hydraulic conductivity (K_{sat}) is less than 6.0 in/hr in any layer within a depth of 20 inches.
3. Soils that are frequently ponded for periods of long or very long duration during the growing season.
4. Soils that are frequently flooded for periods of long or very long duration during the growing season.

Landscape, Landform, and Parent Material

Table 5 displays information about climate, landscape, landform, and parent material for each soil in the map units.

Percent of the map unit is the extent of the named soil in the map unit.

Slope is the inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance. The table shows the low and high range of slope for the named component or soil.

Elevation is the height of an object or area on the earth's surface in reference to a fixed point, such as mean sea level. The typical low and high range of elevation is displayed for each soil.

MAP is the mean annual precipitation for areas of the soil in the map unit.

Landscape refers to the broad shape of the earth in the area where the soil occurs. Examples are a valley and a mountain.

Landform is a specific shape of the earth in the area where a soil typically occurs. Examples are a mountain summit and a valley bottom.

Parent material is the material in which soils formed. Examples are the underlying geological material (including bedrock), a surficial deposit (such as volcanic ash), and organic material. Soils inherit their chemical and physical properties from the parent material.

Land Management

In table 6, parts I through IV, interpretive ratings are given for various aspects of land management. The ratings are both verbal and numerical.

Some rating class terms indicate the degree to which the soils are suited to a specified land management practice. *Well suited* indicates that the soil has features that are favorable for the specified practice and has no limitations. Good performance can be expected, and little or no maintenance is needed. *Moderately suited* indicates that the soil has features that are moderately favorable for the specified practice. One

or more soil properties are less than desirable, and fair performance can be expected. Some maintenance is needed. *Poorly suited* indicates that the soil has one or more properties that are unfavorable for the specified practice. Overcoming the unfavorable properties requires special design, extra maintenance, and costly alteration. *Unsuited* indicates that the expected performance of the soil is unacceptable for the specified practice or that extreme measures are needed to overcome the undesirable soil properties.

Numerical ratings in the table indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.01 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the specified land management practice (1.00) and the point at which the soil feature is not a limitation (0.00).

Rating class terms for *fire damage* and *seedling mortality* are expressed as low, moderate, and high. Where these terms are used, the numerical ratings indicate gradations between the point at which the potential for fire damage or seedling mortality is highest (1.00) and the point at which the potential is lowest (0.00).

Rating class terms for *hazard of erosion* are expressed as slight, moderate, severe, and very severe. Where these terms are used, the numerical ratings indicate gradations between the point at which the potential for erosion is highest (1.00) and the point at which the potential is lowest (0.00).

The paragraphs that follow indicate the soil properties considered in rating the soils for land management practices.

Planting

Ratings in the columns *suitability for hand planting* and *suitability for mechanical planting* are based on slope, depth to a restrictive layer, content of sand, plasticity index, rock fragments on or below the surface, depth to a water table, and ponding. The soils are described as well suited, moderately suited, poorly suited, or unsuited to these methods of planting. It is assumed that necessary site preparation is completed before seedlings are planted.

Ratings in the column *soil rutting hazard* are based on depth to a water table, rock fragments on or below the surface, the Unified classification, depth to a restrictive layer, and slope. Ruts form as a result of the operation of planting equipment. The hazard is described as slight, moderate, or severe. A rating of *slight* indicates that the soil is subject to little or no rutting, *moderate* indicates that rutting is likely, and *severe* indicates that ruts form readily.

Hazard of Erosion and Suitability for Roads

Ratings in the column *hazard of erosion* are based on slope and on soil erodibility factor K. The soil loss is caused by sheet or rill erosion in areas where 50 to 75 percent of the surface has been exposed by different kinds of disturbance. The hazard is described as slight, moderate, severe, or very severe. A rating of *slight* indicates that erosion is unlikely under ordinary climatic conditions; *moderate* indicates that some erosion is likely and that erosion-control measures may be needed; *severe* indicates that erosion is very likely and that erosion-control measures, including revegetation of bare areas, are advised; and *very severe* indicates that significant erosion is expected, loss of soil productivity and off-site damage are likely, and erosion-control measures are costly and generally impractical.

Ratings in the column *hazard of erosion on roads and trails* are based on the soil erodibility factor K, slope, and content of rock fragments. The ratings apply to unsurfaced roads and trails. The hazard is described as slight, moderate, or severe. A rating of *slight* indicates that little or no erosion is likely; *moderate* indicates that some erosion is likely, that the roads or trails may require occasional maintenance, and that simple erosion-control measures are needed; and *severe* indicates that significant

erosion is expected, that the roads or trails require frequent maintenance, and that costly erosion-control measures are needed.

Ratings in the column *suitability for roads (natural surface)* are based on slope, rock fragments on the surface, plasticity index, content of sand, the Unified classification, depth to a water table, ponding, flooding, and the hazard of soil slippage. The ratings indicate the suitability for using the natural surface of the soil for roads. The soils are described as well suited, moderately suited, or poorly suited to this use.

Site Preparation

Ratings in the column *suitability for mechanical site preparation (deep)* are based on slope, depth to a restrictive layer, rock fragments on or below the surface, depth to a water table, and ponding. The soils are described as well suited, poorly suited, or unsuited to this management activity. The part of the soil from the surface to a depth of about 3 feet is considered in the ratings.

Ratings in the column *suitability for mechanical site preparation (surface)* are based on slope, depth to a restrictive layer, plasticity index, rock fragments on or below the surface, depth to a water table, and ponding. The soils are described as well suited, poorly suited, or unsuited to this management activity. The part of the soil from the surface to a depth of about 1 foot is considered in the ratings.

Site Restoration

Ratings in the column *potential for damage to soil by fire* are based on texture of the surface layer, content of rock fragments and organic matter in the surface layer, thickness of the surface layer, and slope. The soils are described as having a low, moderate, or high potential for this kind of damage. The ratings indicate an evaluation of the potential impact of prescribed fires or wildfires that are intense enough to remove the duff layer and consume organic matter in the surface layer.

Ratings in the column *potential for seedling mortality* are based on flooding, ponding, depth to a water table, content of lime, reaction, salinity, available water capacity, soil moisture regime, soil temperature regime, aspect, and slope. The soils are described as having a low, moderate, or high potential for seedling mortality.

Recreation

The soils of the park are rated in table 7, parts I and II, according to limitations that affect their suitability for recreation. The ratings are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect the recreational uses. *Not limited* indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. *Somewhat limited* indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. *Very limited* indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical ratings in the table indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.01 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use (1.00) and the point at which the soil feature is not a limitation (0.00).

The ratings in the table are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, vegetation, access to water, potential water impoundment sites, and access to public

sewer lines. The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation also are important. Soils that are subject to flooding are limited for recreational uses by the duration and intensity of flooding and the season when flooding occurs. In planning recreational facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

The information in table 7 can be supplemented by other information in this survey, for example, interpretations for building site development, construction materials, and water management.

Camp areas require site preparation, such as shaping and leveling the tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The ratings are based on the soil properties that affect the ease of developing camp areas and the performance of the areas after development. Slope, stoniness, and depth to bedrock or a cemented pan are the main concerns affecting the development of camp areas. The soil properties that affect the performance of the areas after development are those that influence trafficability and promote the growth of vegetation, especially in heavily used areas. For good trafficability, the surface of camp areas should absorb rainfall readily, remain firm under heavy foot traffic, and not be dusty when dry. The soil properties that influence trafficability are texture of the surface layer, depth to a water table, ponding, flooding, permeability, and large stones. The soil properties that affect the growth of plants are depth to bedrock or a cemented pan, permeability, and toxic substances in the soil.

Picnic areas are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The ratings are based on the soil properties that affect the ease of developing picnic areas and that influence trafficability and the growth of vegetation after development. Slope and stoniness are the main concerns affecting the development of picnic areas. For good trafficability, the surface of picnic areas should absorb rainfall readily, remain firm under heavy foot traffic, and not be dusty when dry. The soil properties that influence trafficability are texture of the surface layer, depth to a water table, ponding, flooding, permeability, and large stones. The soil properties that affect the growth of plants are depth to bedrock or a cemented pan, permeability, and toxic substances in the soil.

Foot traffic and equestrian trails for hiking and horseback riding should require little or no slope modification through cutting and filling. The ratings are based on the soil properties that affect trafficability and erodibility. These properties are stoniness, depth to a water table, ponding, flooding, slope, and texture of the surface layer.

Mountain bike and off-road vehicle trails require little or no site preparation. They are not covered with surfacing material or vegetation. Considerable compaction of the soil material is likely. The ratings are based on the soil properties that influence erodibility, trafficability, dustiness, and the ease of revegetation. These properties are stoniness, depth to a water table, ponding, slope, flooding, and texture of the surface layer.

Engineering

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

Information in this section is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil between the surface and a depth of 5 to 7 feet.

Because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

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

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

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about particle-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock within 5 to 7 feet of the surface, soil wetness, depth to a water table, ponding, slope, likelihood of flooding, natural soil structure aggregation, and soil density. Data were collected about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kinds of adsorbed cations. Estimates were made for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, and other behavioral characteristics affecting engineering uses.

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

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

Some of the terms used in this soil survey have a special meaning in soil science and are defined in the Glossary.

Dwellings and Small Commercial Buildings

Soil properties influence the development of building sites, including the selection of the site, the design of the structure, construction, performance after construction, and maintenance. Table 8 shows the degree and kind of soil limitations that affect dwellings and small commercial buildings.

The ratings in the table are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect building site development. *Not limited* indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. *Somewhat limited* indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. *Very limited* indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical ratings in the table indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.01 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use (1.00) and the point at which the soil feature is not a limitation (0.00).

Dwellings are single-family houses of three stories or less. For dwellings without basements, the foundation is assumed to consist of spread footings of reinforced concrete built on undisturbed soil at a depth of 2 feet or at the depth of maximum frost penetration, whichever is deeper. For dwellings with basements, the foundation is assumed to consist of spread footings of reinforced concrete built on undisturbed soil at a depth of about 7 feet. The ratings for dwellings are based on the soil properties that affect the capacity of the soil to support a load without movement and on the properties that affect excavation and construction costs. The properties that affect the load-supporting capacity include depth to a water table, ponding, flooding, subsidence, linear extensibility (shrink-swell potential), and compressibility. Compressibility is inferred from the Unified classification. The properties that affect the ease and amount of excavation include depth to a water table, ponding, flooding, slope, depth to bedrock or a cemented pan, hardness of bedrock or a cemented pan, and the amount and size of rock fragments.

Small commercial buildings are structures that are less than three stories high and do not have basements. The foundation is assumed to consist of spread footings of reinforced concrete built on undisturbed soil at a depth of 2 feet or at the depth of maximum frost penetration, whichever is deeper. The ratings are based on the soil properties that affect the capacity of the soil to support a load without movement and on the properties that affect excavation and construction costs. The properties that affect the load-supporting capacity include depth to a water table, ponding, flooding, subsidence, linear extensibility (shrink-swell potential), and compressibility (which is inferred from the Unified classification). The properties that affect the ease and amount of excavation include flooding, depth to a water table, ponding, slope, depth to bedrock or a cemented pan, hardness of bedrock or a cemented pan, and the amount and size of rock fragments.

Roads and Streets, Shallow Excavations, and Landscaping

Soil properties influence the development of building sites, including the selection of the site, the design of the structure, construction, performance after construction, and maintenance. Table 9 shows the degree and kind of soil limitations that affect local roads and streets, shallow excavations, and landscaping.

The ratings in the table are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect building site development. *Not limited* indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. *Somewhat limited* indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. *Very limited* indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical ratings in the table indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.01 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use (1.00) and the point at which the soil feature is not a limitation (0.00).

Local roads and streets have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material; a base of gravel, crushed rock, or soil material stabilized by lime or cement; and a surface of flexible material (asphalt), rigid material (concrete), or gravel with a binder. The ratings are based on the soil properties that affect the ease of excavation and grading and the traffic-supporting capacity. The properties that affect the ease of excavation and grading are depth to bedrock or a cemented pan, hardness of bedrock or a cemented

pan, depth to a water table, ponding, flooding, the amount of large stones, and slope. The properties that affect the traffic-supporting capacity are soil strength (as inferred from the AASHTO group index number), subsidence, linear extensibility (shrink-swell potential), the potential for frost action, depth to a water table, and ponding.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for graves, utility lines, open ditches, or other purposes. The ratings are based on the soil properties that influence the ease of digging and the resistance to sloughing. Depth to bedrock or a cemented pan, hardness of bedrock or a cemented pan, the amount of large stones, and dense layers influence the ease of digging, filling, and compacting. Depth to the seasonal high water table, flooding, and ponding may restrict the period when excavations can be made. Slope influences the ease of using machinery. Soil texture, depth to the water table, and linear extensibility (shrink-swell potential) influence the resistance to sloughing.

Landscaping requires soils on which turf, trees, and shrubs can be established and maintained. Irrigation is not considered in the ratings. The ratings are based on the soil properties that affect plant growth and trafficability after vegetation is established. The properties that affect plant growth are reaction; depth to a water table; ponding; depth to bedrock or a cemented pan; the available water capacity in the upper 40 inches; the content of salts, sodium, or calcium carbonate; and sulfidic materials. The properties that affect trafficability are flooding, depth to a water table, ponding, slope, stoniness, and the amount of sand, clay, or organic matter in the surface layer.

Sewage Disposal

Table 10 shows the degree and kind of soil limitations that affect septic tank absorption fields and sewage lagoons. The ratings are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect these uses. *Not limited* indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. *Somewhat limited* indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. *Very limited* indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical ratings in the table indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.01 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use (1.00) and the point at which the soil feature is not a limitation (0.00).

Septic tank absorption fields are areas in which effluent from a septic tank is distributed into the soil through subsurface tiles or perforated pipe. Only that part of the soil between depths of 24 and 72 inches or between a depth of 24 inches and a restrictive layer is evaluated. The ratings are based on the soil properties that affect absorption of the effluent, construction and maintenance of the system, and public health. Saturated hydraulic conductivity (K_{sat}), depth to a water table, ponding, depth to bedrock or a cemented pan, and flooding affect absorption of the effluent. Stones and boulders, ice, and bedrock or a cemented pan interfere with installation. Subsidence interferes with installation and maintenance. Excessive slope may cause lateral seepage and surfacing of the effluent in downslope areas.

Some soils are underlain by loose sand and gravel or fractured bedrock at a depth of less than 4 feet below the distribution lines. In these soils the absorption field may not adequately filter the effluent, particularly when the system is new. As a result, the ground water may become contaminated.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons should have a nearly level floor surrounded by cut slopes or embankments of compacted soil. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water. Considered in the ratings are slope, saturated hydraulic conductivity (K_{sat}), depth to a water table, ponding, depth to bedrock or a cemented pan, flooding, large stones, and content of organic matter.

Saturated hydraulic conductivity (K_{sat}) is a critical property affecting the suitability for sewage lagoons. Most porous soils eventually become sealed when they are used as sites for sewage lagoons. Until sealing occurs, however, the hazard of pollution is severe. Soils that have a K_{sat} rate of more than 14 micrometers per second are too porous for the proper functioning of sewage lagoons. In these soils, seepage of the effluent can result in contamination of the ground water. Ground-water contamination is also a hazard if fractured bedrock is within a depth of 40 inches, if the water table is high enough to raise the level of sewage in the lagoon, or if floodwater overtops the lagoon.

A high content of organic matter is detrimental to proper functioning of the lagoon because it inhibits aerobic activity. Slope, bedrock, and cemented pans can cause construction problems, and large stones can hinder compaction of the lagoon floor. If the lagoon is to be uniformly deep throughout, the slope must be gentle enough and the soil material must be thick enough over bedrock or a cemented pan to make land smoothing practical.

Source of Gravel and Sand

Table 11 gives information about the soils as potential sources of gravel and sand. Normal compaction, minor processing, and other standard construction practices are assumed.

Gravel and *sand* are natural aggregates suitable for commercial use with a minimum of processing. They are used in many kinds of construction. Specifications for each use vary widely. Only the likelihood of finding material in suitable quantity is evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material. The properties used to evaluate the soil as a source of sand or gravel are gradation of grain sizes (as indicated by the Unified classification of the soil), the thickness of suitable material, and the content of rock fragments. If the bottom layer of the soil contains sand or gravel, the soil is considered a likely source regardless of thickness. The assumption is that the sand or gravel layer below the depth of observation exceeds the minimum thickness. The ratings are for the whole soil, from the surface to a depth of about 6 feet.

The soils are rated *good*, *fair*, or *poor* as potential sources of sand and gravel. A rating of *good* or *fair* means that the source material is likely to be in or below the soil. The bottom layer and the thickest layer of the soils are assigned numerical ratings. These ratings indicate the likelihood that the layer is a source of sand or gravel. The number 0.00 indicates that the layer is a poor source. The number 1.00 indicates that the layer is a good source. A number between 0.00 and 1.00 indicates the degree to which the layer is a likely source.

Source of Reclamation Material, Roadfill, and Topsoil

Table 12 gives information about the soils as potential sources of reclamation material, roadfill, and topsoil. Normal compaction, minor processing, and other standard construction practices are assumed.

The soils are rated *good*, *fair*, or *poor* as potential sources of reclamation material, roadfill, and topsoil. The features that limit the soils as sources of these materials are specified in the table. Numerical ratings between 0.00 and 0.99 are given after the

specified features. These numbers indicate the degree to which the features limit the soils as sources of topsoil, reclamation material, or roadfill. The lower the number, the greater the limitation.

Reclamation material is used in areas that have been drastically disturbed by surface mining or similar activities. When these areas are reclaimed, layers of soil material or unconsolidated geological material, or both, are replaced in a vertical sequence. The reconstructed soil favors plant growth. The ratings in the table do not apply to quarries and other mined areas that require an offsite source of reconstruction material. The ratings are based on the soil properties that affect erosion and stability of the surface and the productive potential of the reconstructed soil. These properties include the content of sodium, salts, and calcium carbonate; reaction; available water capacity; erodibility; texture; content of rock fragments; and content of organic matter and other features that affect fertility.

Roadfill is soil material that is excavated in one place and used in road embankments in another place. In this table, the soils are rated as a source of roadfill for low embankments, generally less than 6 feet high and less exacting in design than higher embankments. The ratings are for the whole soil, from the surface to a depth of about 5 feet. It is assumed that soil layers will be mixed when the soil material is excavated and spread.

The ratings are based on the amount of suitable material and on soil properties that affect the ease of excavation and the performance of the material after it is in place. The thickness of the suitable material is a major consideration. The ease of excavation is affected by large stones, depth to a water table, and slope. How well the soil performs in place after it has been compacted and drained is determined by its strength (as inferred from the AASHTO classification of the soil) and linear extensibility (shrink-swell potential).

Topsoil is used to cover an area so that vegetation can be established and maintained. The upper 40 inches of a soil is evaluated for use as topsoil. Also evaluated is the reclamation potential of the borrow area. The ratings are based on the soil properties that affect plant growth; the ease of excavating, loading, and spreading the material; and reclamation of the borrow area. Toxic substances, soil reaction, and the properties that are inferred from soil texture, such as available water capacity and fertility, affect plant growth. The ease of excavating, loading, and spreading is affected by rock fragments, slope, depth to a water table, soil texture, and thickness of suitable material. Reclamation of the borrow area is affected by slope, depth to a water table, rock fragments, depth to bedrock or a cemented pan, and toxic material.

The surface layer of most soils is generally preferred for topsoil because of its organic matter content. Organic matter greatly increases the absorption and retention of moisture and nutrients for plant growth.

Ponds and Embankments

Table 13 gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for pond reservoir areas; embankments, dikes, and levees; and aquifer-fed excavated ponds. The ratings are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect these uses. *Not limited* indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. *Somewhat limited* indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. *Very limited* indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or

expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical ratings in the table indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.01 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use (1.00) and the point at which the soil feature is not a limitation (0.00).

Pond reservoir areas hold water behind a dam or embankment. Soils best suited to this use have low seepage potential in the upper 60 inches. The seepage potential is determined by the saturated hydraulic conductivity (K_{sat}) of the soil and the depth to fractured bedrock or other permeable material. Excessive slope can affect the storage capacity of the reservoir area.

Embankments, dikes, and levees are raised structures of soil material, generally less than 20 feet high, constructed to impound water or to protect land against overflow. Embankments that have zoned construction (core and shell) are not considered. In this table, the soils are rated as a source of material for embankment fill. The ratings apply to the soil material below the surface layer to a depth of 5 or 6 feet. It is assumed that soil layers will be uniformly mixed and compacted during construction.

The ratings do not indicate the ability of the natural soil to support an embankment. Soil properties to a depth even greater than the height of the embankment can affect performance and safety of the embankment. Generally, deeper onsite investigation is needed to determine these properties.

Soil material in embankments must be resistant to seepage, piping, and erosion and have favorable compaction characteristics. Unfavorable features include less than 5 feet of suitable material and a high content of stones or boulders, organic matter, or salts or sodium. A high water table affects the amount of usable material. It also affects trafficability.

Aquifer-fed excavated ponds are pits or dugouts that extend to a ground-water aquifer or to a depth below a permanent water table. Excluded are ponds that are fed only by surface runoff and embankment ponds that impound water 3 feet or more above the original surface. Excavated ponds are affected by depth to a permanent water table, K_{sat} of the aquifer, and quality of the water as inferred from the salinity of the soil. Depth to bedrock and the content of large stones affect the ease of excavation.

Soil Properties

Data relating to soil properties are collected during the course of the soil survey.

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

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

The estimates of soil properties are shown in tables. They include engineering properties, physical and chemical properties, and pertinent soil and water features.

Engineering Properties

Table 14 gives the engineering classifications and the range of engineering properties for the layers of each soil in the park.

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

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is 15 percent or more, an appropriate modifier is added, for example, "gravelly."

Classification of the soils is determined according to the Unified soil classification system (ASTM, 2005) and the system adopted by the American Association of State Highway and Transportation Officials (AASHTO, 2004).

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

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

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement,

the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20 or higher for the poorest.

Rock fragments larger than 10 inches in diameter and 3 to 10 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

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

Liquid limit and *plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination.

Physical Soil Properties

Table 15 shows estimates of some physical characteristics and features that affect soil behavior. These estimates are given for the layers of each soil in the park. The estimates are based on field observations and on test data for these and similar soils.

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

Particle size is the effective diameter of a soil particle as measured by sedimentation, sieving, or micrometric methods. Particle sizes are expressed as classes with specific effective diameter class limits. The broad classes are sand, silt, and clay, ranging from the larger to the smaller.

Sand as a soil separate consists of mineral soil particles that are 0.05 millimeter to 2 millimeters in diameter. In this table, the estimated sand content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

Silt as a soil separate consists of mineral soil particles that are 0.002 to 0.05 millimeter in diameter. In this table, the estimated silt content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

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

The content of sand, silt, and clay affects the physical behavior of a soil. Particle size is important for engineering and agronomic interpretations, for determination of soil hydrologic qualities, and for soil classification.

The amount and kind of clay affect the fertility and physical condition of the soil and the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, saturated hydraulic conductivity (K_{sat}), plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earthmoving operations.

Moist bulk density is the weight of soil (oven-dry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at 1/3- or 1/10-bar (33kPa or 10kPa) moisture tension. Weight is determined after the soil is dried at 105 degrees C. In the table, the estimated moist bulk density of each soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute linear extensibility, shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water

and roots. Depending on soil texture, a bulk density of more than 1.4 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Permeability (K_{sat}) refers to the ability of a soil to transmit water or air. The term “permeability,” as used in soil surveys, indicates saturated hydraulic conductivity (K_{sat}). The estimates in the table indicate the rate of water movement, in inches per hour, when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Permeability is considered in the design of soil drainage systems and septic tank absorption fields.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each soil layer. The capacity varies, depending on soil properties that affect retention of water. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Shrink-swell potential is the potential for volume change in a soil with a loss or gain in moisture. Volume change occurs mainly because of the interaction of clay minerals with water and varies with the amount and type of clay minerals in the soil. The size of the load on the soil and the magnitude of the change in soil moisture content influence the amount of swelling of soils in place. Laboratory measurements of swelling of undisturbed clods were made for many soils. For others, swelling was estimated on the basis of the kind and amount of clay minerals in the soil and on the basis of measurements of similar soils.

If the shrink-swell potential is rated moderate to very high, shrinking and swelling can cause damage to buildings, roads, and other structures. Special design is often needed.

Shrink-swell potential classes are based on the change in length of an unconfined clod as moisture content is increased from air-dry to field capacity. The classes are *low*, a change of less than 3 percent; *moderate*, 3 to 6 percent; *high*, 6 to 9 percent; and *very high*, greater than 9 percent.

Organic matter is the plant and animal residue in the soil at various stages of decomposition. In this table, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of organic matter in a soil can be maintained by returning crop residue to the soil. Organic matter has a positive effect on available water capacity, water infiltration, soil organism activity, and tilth. It is a source of nitrogen and other nutrients for crops and soil organisms.

Erosion Properties

Table 16 shows estimates of some erosion factors that affect a soil's potential for different uses. These estimates are given for each layer of every soil for K factors and are given as one rating for the entire soil for the T factor, the wind erodibility group, and the wind erodibility index. Values are reported for each soil in the park. Estimates are based on field observations and on test data for these and similar soils.

Erosion factors are shown in the table as the K factor (K_w and K_f) and the T factor. Soil erosion factors K_w and K_f quantify soil detachment by runoff and raindrop impact. These erosion factors are indexes used to predict the long-term average soil loss from sheet and rill erosion under crop systems and conservation techniques. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) and the Revised Universal Soil Loss Equation (RUSLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter and on soil structure and K_{sat} . Values

of K range from 0.02 to 0.69. Other factors being equal, the higher the value, the more susceptible the soil is to sheet and rill erosion by water.

The procedure for determining the Kf factor is outlined in Agriculture Handbook 703, "Predicting Soil Erosion by Water: A Guide to Conservation Planning with the Revised Universal Soil Loss Equation (RUSLE)," USDA, Agricultural Research Service, 1997.

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

Erosion factor Kw indicates the erodibility of the whole soil. The estimates are modified by the presence of rock fragments. In horizons where total rock fragments are 15 percent or more, by volume, the Kw factor is always less than the Kf factor.

Erosion factor Kf indicates the erodibility of the fine-earth fraction, or the material less than 2 millimeters in size. Soil horizons that do not have rock fragments are assigned equal Kw and Kf factors.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind and/or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

Wind erodibility groups are made up of soils that have similar properties affecting their susceptibility to wind erosion in cultivated areas. The soils assigned to group 1 are the most susceptible to wind erosion, and those assigned to group 8 are the least susceptible. The groups are described in the "National Soil Survey Handbook."

Wind erodibility index is a numerical value indicating the susceptibility of soil to wind erosion, or the tons per acre per year that can be expected to be lost to wind erosion. There is a close correlation between wind erosion and the texture of the surface layer, the size and durability of surface clods, rock fragments, organic matter, and a calcareous reaction. Soil moisture and frozen soil layers also influence wind erosion.

Total Soil Carbon

Table 17 gives estimates of total soil carbon. Soil carbon occurs as organic and inorganic carbon.

Soil organic carbon (SOC) is carbon (C) in soil that originated from a biological source, such as plants, animals, or micro-organisms. SOC is found in both organic and mineral soil layers. The term "soil organic carbon" refers only to the carbon occurring in soil organic matter (SOM). Soil organic carbon makes up about one-half the weight of soil organic matter. The rest of SOM is mostly oxygen, nitrogen, and hydrogen.

Soil inorganic carbon (SIC) is carbon found in soil carbonates, typically as calcium carbonate layers in the soil or as clay-sized fractions throughout the soil. Carbonates in soils are most common in areas where evaporation rates exceed precipitation, as is the case in most desert environments. Typically, the carbonates accumulated from carbonatic dust or from solution during periods of wetter climates. Soil inorganic carbon also occurs in soils that formed in marl in all regions of the country.

The SOC and SIC contents are reported in kilograms per square meter to a depth of 2 meters or to a representative depth of either hard bedrock or a cemented horizon. The SOC and SIC values are on a whole soil basis, corrected for rock fragments.

SOC can be an indicator of overall soil fertility and soil quality that affects ecosystem function. SOM is the main reservoir for most plant nutrients, such as phosphorus and nitrogen. Managing for SOC by managing for SOM increases the content of these elements and improves soil resiliency.

Soil organic matter binds soil particles together and thus increases soil porosity and water infiltration and allows better root penetration and waterflow into the soil. Greater inflow of water reduces the hazard of erosion and the rate of surface water runoff.

Greater SOC levels improve not only soil quality but also the quality of air and water. Soil acts as a filter and improves water quality. Fertile soils that support plant life remove CO₂ from the atmosphere and increase oxygen levels through photosynthesis. Maintaining the level of soil organic carbon reduces C release into the atmosphere and thus can lessen the effects of global warming.

SIC influences the types of plants that will grow. High SIC levels are commonly associated with a higher soil pH, which limits the types of plants that will thrive.

Like SOM, soil carbonates, the source of SIC, also bind soil particles together. They fill voids in the soil and thus can reduce soil porosity. Compacted soil carbonates may restrict root penetration and waterflow into the soil.

Chemical Soil Properties

Table 18 shows estimates of some chemical characteristics and features that affect soil behavior. These estimates are given for the layers of each soil in the park. The estimates are based on field observations and on test data for these and similar soils.

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

Cation-exchange capacity is the total amount of extractable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. Soils having a low cation-exchange capacity hold fewer cations and may require more frequent applications of fertilizer than soils having a high cation-exchange capacity. The ability to retain cations reduces the hazard of ground-water pollution.

Effective cation-exchange capacity refers to the sum of extractable cations plus aluminum expressed in terms of milliequivalents per 100 grams of soil. It is determined for soils that have pH of less than 5.5.

Soil reaction is a measure of acidity or alkalinity. The pH of each soil horizon is based on many field tests. For many soils, values have been verified by laboratory analyses. Soil reaction is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion.

Water Features

Table 19 gives estimates of various soil water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

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

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

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

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

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas.

The *months* in the table indicate the portion of the year in which a water table, ponding, and/or flooding is most likely to be a concern.

Water table refers to a saturated zone in the soil. Table 19 indicates, by month, depth to the top (*upper limit*) and base (*lower limit*) of the saturated zone in most years. Estimates of the upper and lower limits are based mainly on observations of the water table at selected sites and on evidence of a saturated zone, namely grayish colors or mottles (redoximorphic features) in the soil. A saturated zone that lasts for less than a month is not considered a water table.

Ponding is standing water in a closed depression. Unless a drainage system is installed, the water is removed only by percolation, transpiration, or evaporation. The table indicates *surface water depth* and the *duration* and *frequency* of ponding. Duration is expressed as *very brief* if less than 2 days, *brief* if 2 to 7 days, *long* if 7 to 30 days, and *very long* if more than 30 days. Frequency is expressed as none, rare, occasional, and frequent. *None* means that ponding is not probable; *rare* that it is unlikely but possible under unusual weather conditions (the chance of ponding is nearly 0 percent to 5 percent in any year); *occasional* that it occurs, on the average, once or less in 2 years (the chance of ponding is 5 to 50 percent in any year); and *frequent* that it occurs, on the average, more than once in 2 years (the chance of ponding is more than 50 percent in any year).

Flooding is the temporary inundation of an area caused by overflowing streams, by runoff from adjacent slopes, or by tides. Water standing for short periods after rainfall or snowmelt is not considered flooding, and water standing in swamps and marshes is considered ponding rather than flooding.

Duration and *frequency* are estimated. Duration is expressed as *extremely brief* if 0.1 hour to 4 hours, *very brief* if 4 hours to 2 days, *brief* if 2 to 7 days, *long* if 7 to 30 days, and *very long* if more than 30 days. Frequency is expressed as none, very rare, rare, occasional, frequent, and very frequent. *None* means that flooding is not probable; *very rare* that it is very unlikely but possible under extremely unusual weather conditions (the chance of flooding is less than 1 percent in any year); *rare* that it is unlikely but possible under unusual weather conditions (the chance of flooding is 1 to 5 percent in any year); *occasional* that it occurs infrequently under normal weather conditions (the chance of flooding is 5 to 50 percent in any year); *frequent* that it is likely to occur often under normal weather conditions (the chance of flooding is more than 50 percent in any year but is less than 50 percent in all months in any year); and *very frequent* that it is likely to occur very often under normal weather conditions (the chance of flooding is more than 50 percent in all months of any year).

The information is based on evidence in the soil profile, namely thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and little or no horizon development.

Also considered are local information about the extent and levels of flooding and the relation of each soil on the landscape to historic floods. Information on the extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

Soil Features

Table 20 gives estimates of various soil features. The estimates are used in land use planning that involves engineering considerations.

A *restrictive layer* is a nearly continuous layer that has one or more physical, chemical, or thermal properties that significantly impede the movement of water and air through the soil or that restrict roots or otherwise provide an unfavorable root environment. Examples are bedrock, cemented layers, dense layers, and frozen layers. The table indicates the thickness and hardness of the restrictive layer, both of which significantly affect the ease of excavation. *Depth to top* is the vertical distance from the soil surface to the upper boundary of the restrictive layer.

Potential for frost action is the likelihood of upward or lateral expansion of the soil caused by the formation of segregated ice lenses (frost heave) and the subsequent

collapse of the soil and loss of strength on thawing. Frost action occurs when moisture moves into the freezing zone of the soil. Temperature, texture, density, saturated hydraulic conductivity (K_{sat}), content of organic matter, and depth to the water table are the most important factors considered in evaluating the potential for frost action. It is assumed that the soil is not insulated by vegetation or snow and is not artificially drained. Silty and highly structured, clayey soils that have a high water table in winter are the most susceptible to frost action. Well drained, very gravelly, or very sandy soils are the least susceptible. Frost heave and low soil strength during thawing cause damage to pavements and other rigid structures.

Risk of corrosion pertains to potential soil-induced electrochemical or chemical action that corrodes or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors results in a severe hazard of corrosion. The steel or concrete in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than the steel or concrete in installations that are entirely within one kind of soil or within one soil layer.

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

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

Formation and Classification of the Soils

This section relates the soils in Valley Forge National Historical Park to the major factors of soil formation and describes the system of soil classification.

Factors of Soil Formation

By Susan Burlew Southard, Natural Resources Conservation Service.

Soil covers the surface of the earth as a three-dimensional body of varying thickness and is made up of different proportions of organic and mineral material, pore space with gases, and water. Soils differ in their appearance, productivity, and management requirements due to their chemical and physical properties. The characteristics and properties of soils are determined by physical and chemical processes that result from the interaction of five soil-forming factors. These factors of soil formation are interdependent, and few generalizations can be made regarding any one factor unless the effects of the other factors are known. The term “pedogenesis” is often used to connote the processes of soil formation.

The interacting soil-forming factors are parent material, climate, organisms, time, and relief or topography (Jenny, 1941). *Parent material* is the source material in which soils formed. Soils are influenced by the texture and structure of the parent material and its mineralogical and chemical composition. *Climate* is predominantly the temperature and kind and amount of precipitation. It is also seasonal distribution of temperature and precipitation. *Organisms* are the plants and other organisms living in and on the soil, including humans. *Time* refers to how long the soil-forming factors have been operating on a particular landscape. *Relief or topography* is the shape and elevation of the landscape. It affects internal and external soil properties, such as soil drainage, aeration, susceptibility to erosion, and the soil’s exposure to the sun and wind.

The processes of soil formation are a sequence of events, involving biogeochemical reactions that are energized by climate and spatially related to relief or topography (Buol et al., 2011). The physical and chemical properties of a soil are altered by these reactions over time. The influence of any one of these factors varies among all parks and within localities of a particular park. Soils may differ significantly from place to place in a park and within very short distances as a result of complex interaction among the five factors. In some cases, however, parks may have vast stretches of the same type of soil because of uniform soil-forming factors.

Setting of Valley Forge National Historical Park

Understanding the setting of the park helps in understanding the parent materials contributing to the types of soils within it. Understanding the soils of southeastern Pennsylvania also enhances understanding of the unique relationship between soils and the environment. Soil-forming processes are influenced by rock type, topographic expression, and the hydrologic properties of the area. Soil formation influences soil properties and behavior, which are used to determine best management practices.



Figure 1.—Mount Joy (the ridge in the distant background) is underlain by the Harper Formation and is mapped predominantly as Edgemont soils. The foreground is part of the Ledger Formation karst landscape that is mapped as Conestoga and Duffield soils.

Valley Forge National Historical Park (Valley Forge NHP) is within the greater Schuylkill River watershed of southeastern Pennsylvania. It is located in the eastern Piedmont physiographic province, near the Atlantic Coastal Plain (Thornberry-Ehrlich, 2010). The Schuylkill River flows eastward through the northern reaches of the park boundary, and rolling hills dominate the southern park landscape. The North Valley Hills have their terminus at Mount Misery, which lies south of the Horseshoe Trail on the western park boundary. Mount Joy is located east of the confluence of Valley Creek and the Schuylkill River and south of Washington's Headquarters. Other tributaries to the Schuylkill River that flow through the park include Trout Creek, Myer's Run, and Lamb Run. Within the park boundary, elevations range from about 80 feet (25 meters) above sea level along the banks of the Schuylkill River to just over 400 feet (120 meters) above sea level atop Mount Joy (USDI-NPS, 2012).

The park's 3,500 acres contain 5 sedimentary rock formations. The rocks began forming about 580 million years ago during the Proterozoic Eon, when primitive aquatic plants first appeared on earth. The Stockton Formation (sandstone, siltstone, and mudstone) of Triassic age (approximately 200 million years ago) covers the entire portion of the park north of the Schuylkill River and most of the park between Route 23 and the south side of the river. Within the park, Triassic-age red shales lay juxtaposed against Cambrian carbonate-bearing units in an approximately 300-million-year-old unconformity (Thornberry-Ehrlich, 2010).

The topography associated with the Stockton Formation is the low rolling hills north of the river and a north-facing slope south of the river. Along the west side of the park, Mount Misery consists of the Cambrian-age Chickies Formation (quartzite and quartz schist that are very resistant to weathering). Nearby hills associated with Mount Joy (fig. 1) and Wayne's Woods are weathered Cambrian-age Antietam and Harpers Formations (composed of quartzite, schist, and phyllite) which are also fairly erosion-resistant.

The Ledger Formation (dolomite and siliceous dolomite) underlies the park south of Route 23 and east of Mount Joy, Mount Misery, and Wayne's Woods. This area is composed of gently rolling terrain and some karst features, including several sinkholes and karst depressions (Podniesinski et al., 2005). Karst landscapes are produced by processes of chemical erosion and weathering of limestone or dolomite. Dissolution underground creates voids and conduits that develop into a karst network. Evidence of past sinkholes can be found on the Valley Forge Grand Parade grounds. The most notable sinkhole within the park developed during the Great Ice Age, approximately 750,000 years ago. This sinkhole is known as the Port Kennedy Bone Cave (USDI-NPS, 2012). Karst processes and features are important evolutionary factors for the park landscape and the soils that formed from them.

Parent Material

The unconsolidated mass in which soils form is called parent material. Mineral soils are a product of weathering in place of underlying bedrock or the weathering of material that has been transported. Organic soils form in place from the accumulation and decomposition of plant material, such as wood, leaves, and aquatic plants. Weathering refers to the chemical and physical disintegration and decomposition of parent material. Few soils weather entirely from the underlying rocks. More commonly, soils form in materials that have been moved from elsewhere. Soils generally have a dominant kind of parent material but are influenced by other types of parent material. Material may have been moved by gravity (colluvial parent material) or running water (alluvial parent material). Lacustrine deposits are a type of parent material in lakes and ponds. Soils are said to have residual parent material if they formed directly from underlying rocks. Soils that formed in residuum may have the same general chemistry as the original rocks, depending on the degree of weathering that has occurred. Residual soils that formed from the accumulation of plant materials have soil chemistry related to the type of plants from which the soils formed. Eolian parent material, such as windblown sand, is also type of parent material. Windblown loess, which has been blown for long distances, consists mainly of very fine sand and silt-sized particles.

Residuum and Colluvium

All of the soils on hillslopes in Valley Forge NHP have formed, in part, in residuum and colluvium. Soils that weathered from rocks (i.e., residual soils) have also been influenced by colluvium as soil materials eroded and moved down slope. Soils that formed from a combination of residuum and colluvium are Penn and Edgemont soils. Penn soils are silty soils that formed on hillslopes from mixed shale and siltstone, while Edgemont soils formed from quartzite and shale on ridges. Abbottstown and Readington soils also formed from shale siltstone. Clarksburg, Duffield, and Conestoga soils (fig. 2) are derived from limestone, dolostone, and calcareous schist of the Ledger Formation. Soils that formed from the red Triassic sandstones and shales (such as Penn and Birdsboro) have inherited their color from the parent material and are reddish brown.

Some parent materials are soft and break down into smaller rocks easily, while others are much harder and resist weathering processes. Most of the soils in the park formed on resistant gneiss, schist, orthoquartzite, or quartzite. The underlying rock has not weathered to a soft rock contact. Table 20 lists the types of restrictions found in the soils of Valley Forge NHP. Many of these soils have lithic (cemented) bedrock as a restriction but have a low content of rock fragments. In comparison, Catocin and Klinsville soils have lithic bedrock but have a high content of rock fragments. The underlying bedrock is fractured, and the soils have a high content of angular rock fragments (channers) that are inherited from fractured bedrock layers. Channers are indicative of soils that did not form in alluvium because alluvial soils have more rounded and subrounded rocks. Channers in residual soils may show physical



Figure 2.—Conestoga soil is mapped on the top of the knoll where the National Memorial Arch is located. Conestoga soils are derived from limestone. Side slopes are mapped as Duffield soil, which is also derived from limestone.

orientation similar to the underlying bedrock, while channers in colluvial soils display random orientation.

Alluvium

Alluvium is the type of parent material deposited by running water. Alluvium can have different textures, depending on whether the water moves quickly or slowly. The type of rocks occurring in the source region of the streams and rivers also determine the characteristics of the alluvium. Fast-moving water deposits gravel, cobbles, and sand. Slow-moving water leaves fine textured deposits (clay and silt) when sediments in the water settle out. Bowmansville and Knauers soils formed from alluvium on flood plains that was deposited in the backwater areas along major creeks in the park. Reddish alluvium on the higher stream terraces formed the reddish brown Birdsboro soils. Codorus soils formed on nearly level flood plains from alluvium derived from gneiss and mica schist. These soils are easily distinguished from other alluvial soils because they have a high content of mica flakes in the soil matrix that are visible to the naked eye.

Soils of lesser extent in the park that also formed in alluvium include Thorndale, Baile, and Lamington. These soils are hydric soils due to saturation with water at a depth of less than 1 foot. Table 4 lists the hydric soils identified in the park.

Eolian Materials

Two soils in the park may have formed in part from windblown material—Mattapex and Lawrenceville. These soils have a loess cap of silty materials. They are on uplands where a loess deposit may have accumulated. These soils may have some eolian parent materials due to the past glacial and periglacial environments of the park. These environments had strong directional winds, mostly blowing to the southeast. Periglacial refers to conditions, processes, and landforms expected or found in areas adjacent to glaciers.

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Some parent materials favor the development of certain profile characteristics or diagnostic horizons. Abbottstown, Buchanan, Buckingham, Clarksburg, Croton, and Glenville soils in Valley Forge NHP all have a dense horizon called a fragipan. Fragipans are common in this area of Pennsylvania. The fragipan has a low content of organic matter and high bulk density in relation to horizons above it. These soils have restricted water movement due to the fragipan. Restricted water movement can be evidenced in soil profiles by grey colors. It is not known exactly how and why fragipans form but there are some generalizations. Soils with fragipans: 1) show evidence of pedogenesis, usually as clay movement, 2) may have a higher content of silt and/or very fine sand than geographically associated soils without fragipans, and 3) usually formed under forested vegetation (Soil Survey Staff, 1999).

Table 5 lists the dominant landform and parent material for each of the major soils in Valley Forge NHP.



Figure 3.—Inclusions of Baile and Hatboro soils in an area of Codorus silt loam have an aquic (i.e., usually wet) soil moisture regime. View is near the park saw mill.

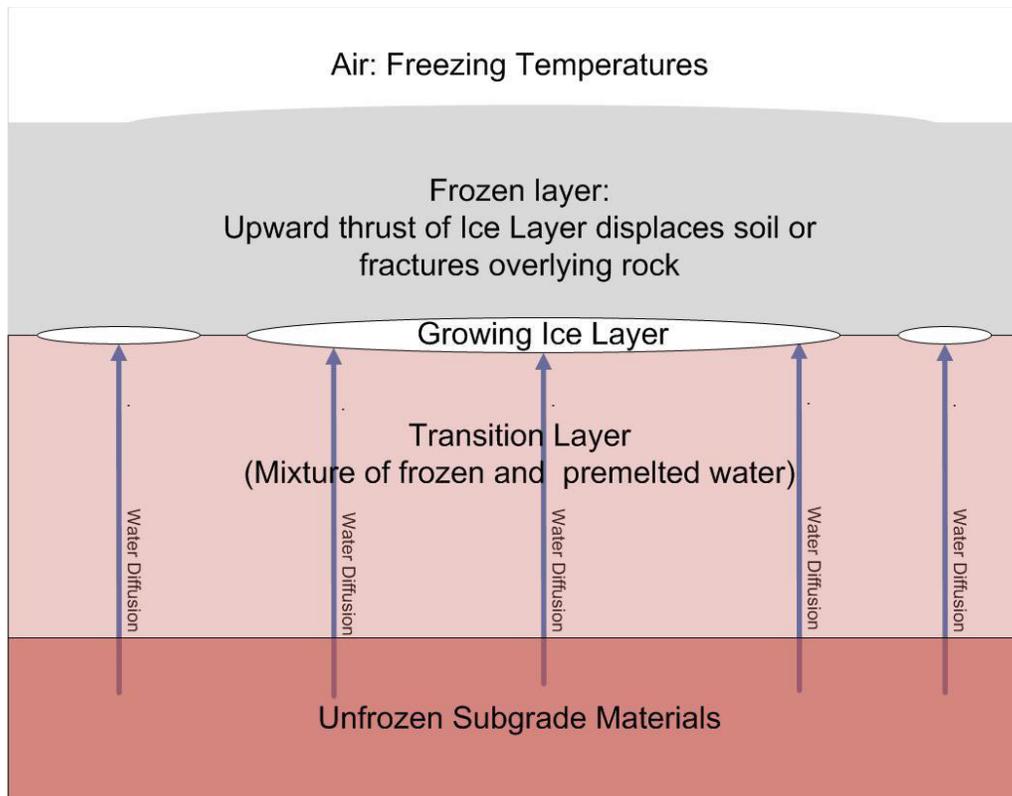


Figure 4.—Diagram illustrating ice lens formation in soils, which results in frost heave or frost action. (Image is from Williamborg [2009].)

Climate

Differences in climate can result in differences in soils. Temperature and moisture influence soil formation and are the two most commonly measured features of climate. Weathering is most active when soils are moist and warm because these conditions are conducive to rapid chemical reactions and increased biological activity in the soil. Cooler temperatures result in slower chemical reactions. While average temperatures and precipitation are important in determining soil properties, the extremes of climate in any given locale also play a major role in soil formation.

The area of Pennsylvania in which the park is located receives about 35 to 45 inches (890 to 1,145 millimeters) of precipitation per year. The rainfall occurs mostly in midsummer, and the rest occurs in autumn and early winter. Precipitation in the winter is either rain or snow. In summer the rainfall occurs during high-intensity storms. The average annual temperature is 44 to 54 degrees F (6 to 12 degrees C). Most soils are usually moist (have an udic soil moisture regime) and have a mesic soil temperature regime. Some soils in low-lying positions, such as Baile, Hatboro, and Knauers, have an aquic (usually wet) soil moisture regime. Both Baile and Hatboro soils occur in drainageways and/or depressions, such as along the lower stream terrace of Valley Creek (fig. 3). Knauers soils are in landscape positions that pond. Baile, Hatboro, and Knauers soils classify as hydric soils. Some soils, such as Croton, also have seasonal wetness due to restricted water movement within the profile.

Climate and Frost Heave

Many of the soils in the park have a moderate or high susceptibility to frost heave. Frost heave is a natural pedogenic process that mixes and breaks up the soil surface.

Table 20 lists the potential for frost heave, or frost action, as low, moderate, or high. Croton, Codorus, Raritan, Glenville, and Gibraltar soils have a high potential for frost action. Silty and loamy soils in mesic soil temperature regimes, such as Croton, are examples of frost-susceptible soils. Many soils of the soils in the park have fragipans that supply the source of water above the pan that can freeze and cause frost action.

Frost heave results from ice forming beneath the surface of soil during atmospheric freezing conditions. The ice grows in the direction of heat loss, which is vertically toward the surface, starting at the freezing boundary in the soil. A water supply is needed to keep the ice crystals growing. The growing ice is restrained by overlying soil, which applies a load that limits its vertical growth and promotes the formation of a lens-shaped area of ice within the soil (fig. 4).

Frost heave can result in road potholes and cracked pavements and foundations. Table 9 indicates which soils have a limitation for roads and streets due to frost action. This limitation results in higher maintenance costs for park roads and parking lots.

During periods of rainfall or snowmelt, water carrying dissolved or suspended solids moves through the soil in a process called leaching. Leaching becomes active with the onset of rainfall or snowmelt. Different temperatures and moisture amounts cause different patterns of weathering and leaching in the soil. Seasonal and daily changes in temperature affect moisture effectiveness, biological activity, rates of chemical reactions, and kinds of vegetation.

Present-day climate variations in the park are the result of topography and relief. Colder temperatures result in less leaching because of decreased microbial growth, decreased vegetation, and possibly frozen soil. Fluctuations in temperature and moisture affect the rate of organic matter production, decomposition, and accumulation and the weathering of minerals.

Organisms

Plants, animals, micro-organisms, and humans affect the formation and shape of soils. Plants capture solar energy via photosynthesis and transfer that energy to the soil, energy that is a fundamental driver of many soil processes. Fungi and bacteria are the primary organisms that decompose organic matter and add nutrients to the soil. Animals and micro-organisms mix soils and form burrows and pores. Plant roots open channels in the soils. Abandoned animal burrows commonly are filled with loose material from the overlying horizons and transmit water more readily than the surrounding undisturbed soil material.

Different types of roots have different effects on soils. Grass roots are fibrous and decompose easily, adding organic matter to the soil. Fine grass roots can extend below the surface for many feet. Plant roots also help to develop soil structure and aggregate stability. Taproots open pathways through dense layers. Vegetation increases soil stability by protecting the surface against wind and water erosion. Micro-organisms affect chemical exchanges between roots and soil. Humans also can mix the soil extensively.

Forests

The large plants of the forested ecosystem or habitat type in Valley Forge NHP affect soil formation. Native forest types in the park include typical hardwood oak forest (second growth and mixed), mixed hardwoods, and pine and spruce groves. Native vegetation depends on climate, topography, and biological factors plus many soil factors, such as soil density, depth, chemistry, temperature, and moisture. All of the forested areas in the park were completely cut over in the past, accelerating soil erosion at the time.

Leaves from plants fall to the surface and decompose on the soil. Organisms decompose these leaves and mix them within the upper part of the soil, resulting in cycling of nutrients and energy back to vegetation. The leaf litter, whether leaves or

needles, helps prevent nutrient loss, conserves soil moisture, reduces raindrop impact, and limits frost penetration.

Trees help break up rocks with their growing roots, resulting in channels that increase water penetration. Trees that are blown down help mix the soil when their roots are exposed. Besides the mechanical breaking of rocks by their large roots, trees capture energy and substance through photosynthesis, by the decomposition of plant residue, and by forming organic-mineral complexes that are recycled many times within the ecosystem (Buol et al., 2011).

The Antietam, Harpers, and Chickies Formations contribute to the development of well drained to excessively well drained soils and are characterized by more drought-tolerant plant communities along the ridges and upper slopes of Mount Joy and Mount Misery. The quartzite and quartz schist that make up Mount Misery result in well drained soils that support drought-tolerant plant community types on the upper slopes (Podnieszinski et al., 2005). The soils on the east slopes of Mount Misery support a mixed oak plant community. The red sandstone and shale formations developed soils that are more suitable for agriculture. These areas today consist of open grasslands, shrublands, croplands, tree plantations, and young successional forests (USDI-NPS, 2012).

The east slopes of Mount Joy and most of Wayne's Woods (fig. 5) have gentler slopes and have soils with a moderate water-holding capacity that likely supported dry oak-heath or dry oak-mixed hardwood forest prior to clearing centuries ago (Podnieszinski et al., 2005). These areas are now mostly stands of planted tuliptree forest with some volunteer oaks and other mixed hardwood species. Mount Misery, which has shallow soils with a low available water-holding capacity and has steep slopes, was likely never farmed, though probably cut for lumber and fuel. The dry oak forest on Mount Misery and portions of Mount Joy are similar to dry oak forests elsewhere in southeastern Pennsylvania (Podnieszinski et al., 2005).

Areas of the Stockton and Ledger Formations have likely been farmed intensively for several hundred years due to the comparative higher fertility of the soils. The soils that weathered from these formations, such as Duffield, are more favorable for agronomic use than soils of the Chickies and Antietam Formations. Soils that weathered from the Ledger Formation have a higher pH that favors nutrient uptake by plant growth. Table 18 shows the distribution of soil pH by horizon for all the major soils in the park.

Successional Areas

This vegetation community typically occurs in agricultural areas that have been abandoned for at least two decades. Without ongoing management, woody plants establish in abandoned agricultural areas. They subsequently develop into dense young forests of early successional hardwoods. In Valley Forge NHS, successional hardwood forests are generally located adjacent to or surrounding old fields. This forest type typically occurs on level or slightly sloping uplands. The species composition of the hardwood forest varies depending on the length of time since agricultural management ended, the original species composition of the agricultural field, the local seed sources, soil moisture, soil pH, soil depth, and past disturbances. The young successional forests contain many exotic and invasive plant species typically associated with soil disturbance and human settlement. Maintenance of extensive grasslands today on soils associated with the Stockton and Ledger Formations is meant to reflect the agricultural use of these areas in the colonial period (USDI-NPS, 2012).

Meadows and Wetlands

Wetlands in Valley Forge NHP are along small streams, such as along French Creek, which is in areas mapped as Lamington silt loam and Croton silt loam. Small



Figure 5.—Wayne's Woods is mapped as Edgemont channery loam, 3 to 8 percent slopes.

areas of Knauers soils, which are mapped as an inclusion in Raritan silt loam, are saturated with water and support wetland vegetation. Raritan soils are mapped at the boat launch near the Betzwood Picnic Area and around the Pawling Farm on the north side of the Schuylkill River. Holly soils are mapped in the southwest corner of the park along Valley Creek and along the Schuylkill River as an inclusion in Gibraltar silt loam. Holly soils have the highest soil organic carbon levels in the park (see table 17). On these soils, deposition of organic material and its subsequent burial by flooding events have sequestered the carbon in the soil. Table 15 displays the levels of soil organic matter throughout the soil profile by horizons or layers. Soil organic matter is approximately 50 percent soil organic carbon. Table 19 shows the water features of the park soils.

The Schuylkill River also has important impacts on the distribution of soils and plant communities within the park. The Schuylkill River flood plain has very deep, loamy soils that formed in alluvium and that support several types of flood-plain forests. The canopy trees on the flood plain are typical of the region, but some areas of the forest floor are heavily infested with invasive and/or exotic species, particularly lesser celandine (*Ranunculus ficaria*) and several vine species (USDI-NPS, 2012). South of the river, some of the flood plain has been altered or filled during the construction of railroad beds. Along the river in the northwest corner of the park, the flood plain has been drastically altered by the construction of a large dike. This dike was constructed as part of a coal silt removal operation in the Schuylkill River. As a result, the active flood plain is very narrow in this area. The area behind the dike is severely altered due to deposition and subsequent removal of coal silt. Shallow excavations north of the dike support open and forested wetlands. Drier areas support grasslands and successional forests (USDI-NPS, 2012). Some open areas with significant remnant coal silt deposits have dry soils with a low water-holding capacity and sparse vegetation. These areas are mapped as Gibraltar soils.

One type of wetland in the park is an open, nonforested type dominated by reed canary grass (*Phalaris arundinacea*) and wetland species such as rice cut-grass

(*Leersia oryzoides*) and burreed (*Sparganium* spp.). This wetland type is called Wet Meadow. The other type of wetland in the park is called Skunk Cabbage Seepage Meadow, which occurs in forested areas with a partial to closed canopy. The herbaceous layer is dominated by skunk cabbage (*Symplocarpus foetidus*) (USDI-NPS, 2012). Many of the soils on the official hydric soils list for Valley Forge NHP (see table 4) have wet meadow vegetation.

Human Influences

Humans, as organisms, have significantly altered the landscape within and surrounding Valley Forge NHP. Land-use practices such as urban development and farming have changed the landscape of the park from its original state. Since American Indians first inhabited the region, humans have come to the survey area to take advantage of the natural resources, including fertile limestone-derived soils suitable for farming. Limestone was also quarried extensively in the area. A small quarry is on Mount Joy, and a deep limestone quarry is located in the southwestern corner of the park.

The ruins of pre-encampment copper mines and iron forges also occur in the park and surrounding area (McCarthy, 1994). Prospectors dug pits and quarries in search of limestone or copper, thus altering the topographic expression of the landscape. Slopes and meadows have been logged and cleared for agricultural use, and dredged river bottom sediments now line riparian zones. Runoff was increased because of erosion down slope of the exposed soil surface horizons. The high density of human occupation, as well as wagon and hoof traffic, compacted the soil.

George Washington chose Valley Forge as the encampment site of the colonial army because of landscape features that were shaped by geologic and soil-forming processes. He was able to maintain the strategic high ground on elevated ridges that had well drained, trafficable soils. This is in contrast to his earlier mistake at Fort Necessity, where he built his fort on a hydric soil (USDA-NRCS and USDI-NPS, 2013).

Building the Valley Forge encampment involved harvesting trees so that huts for 2,000 soldiers could be constructed on the slopes of Mount Joy. It is assumed that Mount Joy was denuded of trees (Bodle and Thibaut, 1982). Soldiers huts were "pointed with clay" according to an National Park Service interpretive film (see cover illustration). Local soils were probably used to fill the cracks between logs. The overall landscape would have been subject to increased surface runoff, flash flooding, and soil erosion.

George Washington's troops dug and built ramparts that altered the soil surface (fig. 6). Creeks and small tributaries were ditched and diverted in attempts to get water nearer the encampment's headquarters and mills. These alterations changed the natural hydrologic cycle in some of the soils of the park (fig. 7). Some soils may be wetter than normal for their natural setting, and some, such those in the creek bottoms, may be drier due to diverted water that would have kept the soils more moist or wet (fig. 8).

Some of the anthropogenic soils in the park contain asbestos as a result of slurry waste that was deposited in the main limestone quarry (Daeschler et al., 2005).

Many of the map units reflect manipulation by humans and are mapped as Urban land, Udorthents, or in complexes with Urban land and Udorthents. Urban land is mostly covered by streets, parking lots, buildings, and other urban structures. Udorthents in this survey represent undeveloped soils that were modified by humans (i.e., anthropogenic soils). Urban land and Udorthents are mapped in the following units:

641605	Udorthents, limestone, 0 to 8 percent slopes
641614	Urban land-Conestoga complex, 0 to 8 percent slopes
1612248	Urban land-Penn complex, 0 to 8 percent slopes
2229473	Udorthents, limestone, 0 to 8 percent slopes



Figure 6.—Duffield and Thorndale soils on ridge summits were scraped and modified to build ramparts.

- 2229474 Udorthents, limestone, 8 to 25 percent slopes
- 2229478 Udorthents, shale and sandstone, 0 to 8 percent slopes
- 2229480 Urban land, 0 to 8 percent slopes
- 2229481 Urban land, 8 to 25 percent slopes
- 2229493 Urban land-Penn complex, 8 to 25 percent slopes
- 2229495 Urban land-Udorthents, limestone complex, 8 to 25 percent slopes
- 2229496 Urban land-Udorthents, schist and gneiss complex, 0 to 8 percent slopes
- 2229498 Urban land-Udorthents, shale and sandstone complex, 0 to 8 percent slopes
- 2229499 Urban land-Udorthents, shale and sandstone complex, 8 to 25 percent slopes
- 2229500 Pits, quarry
- 2229501 Urban land-Readington complex, 0 to 8 percent slopes

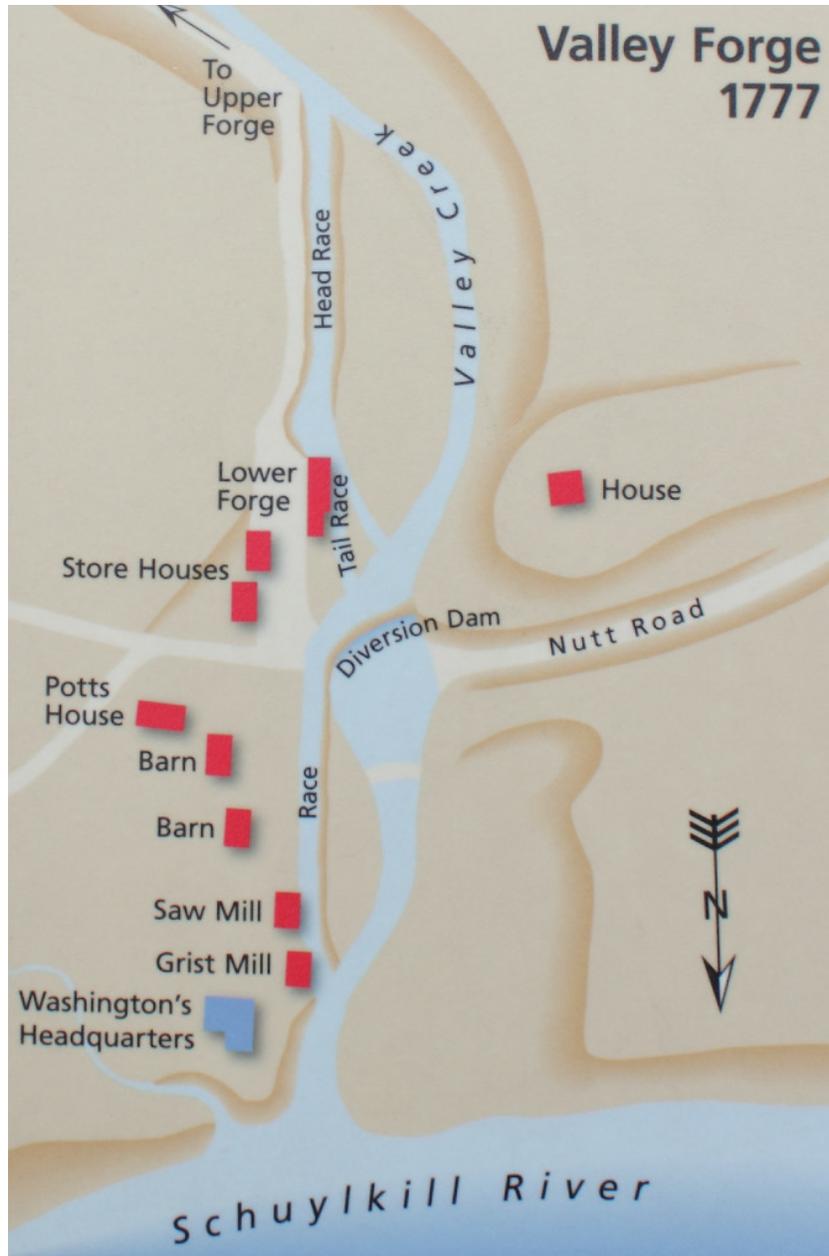


Figure 7.—This park interpretive sign illustrates the altered riparian landscape. A diversion dam and a series of races were cut through lower stream terraces of Valley Creek and diverted water to the mills.

Time

Time for parent material, climate, organisms, and topography to interact is also a soil-forming factor. Over time, soils exhibit features that reflect the interaction of other soil-forming factors. Recently deposited material, such as material deposited by a flood, exhibits no features from soil development activities and its properties are mostly inherited from the new material. The previous soil surface and underlying horizons become buried. The time clock resets for these soils. The different horizons in a soil profile and the degree of development can be directly related to time. However, it is difficult to separate the concept of time from landscape stability, intensity of weathering



Figure 8.—Soils in the mill race show sequential deposition of materials of different size. This area is mapped as Codorus silt loam. It occasionally floods and is mostly moderately well drained.

(due to climate and/or resistance of parent materials), or churning by animals. An example of the concept of time as a soil-forming factor associated with landscape stability is the terraces above the active flood plain. While similar in origin to the flood plain, the terraces are older land surfaces of abandoned flood plains and thus have soils with more horizon development.

A model of how time has acted as a soil-forming factor and the resultant degree of horizonation in the soils can be developed by looking at specific soils, such as Gibraltar, which are the least developed soils in the park and could be considered the “youngest.” The profile horizonation in Gibraltar soils is minimal. These soils have what soil scientists term an A and C profile; the surface A horizon lies directly over C horizons. The A horizon is a mineral horizon that has a higher organic matter content than underlying horizons but a lower content than overlying O horizons, if they occur. The A horizon may be the surface layer if there is no O horizon. The O horizon



Figure 9.—View looking northeast from the ranger station on North Gulph Road. This area is mapped as Duffield silt loam, 3 to 8 percent slopes. Duffield soils formed from residuum and colluvium derived from siltstone and limestone and are classified as Alfisols.

consists of decomposing organic materials. The C horizon is typically in the bottom part of a soil profile and has properties similar to the parent material. C horizons can be at the surface in some undeveloped soils. The C horizon is relatively unchanged by soil-forming processes since it consists of new sediments (such as coal washings) that were deposited on top. Gibraltar soils have buried A and B horizons that were covered by coal silt deposits.

The next group of soils in the park, in terms of time or increasing soil development, are Catoclin, Hatboro, Holly, and Klinesville soils. These soils have minimal soil horization and different parent materials. Klinesville soils formed in residuum and colluvium on hillslopes, while Holly soils formed in alluvium on flood plains. Because of the landscape positions, the soils are not strongly developed. Klinesville and Holly soils have a simple A-B-C profile. The B horizon is a subsoil zone of accumulation of materials moved from O, A, or E horizons or of soil material formed in place. Color is important in distinguishing B horizons. The B horizon is the horizon of maximum accumulation of dissolved or suspended materials, such as iron, clay, or calcium carbonate. Not all soils have a B horizon. The B horizon shows some color change and weak structure. Catoclin, Hatboro, Holly, and Klinesville soils are classified as Inceptisols.

The next group of soils, in terms of soil development as an indicator of soil age, include Penn, Lehigh, and Lawrenceville. These soils have A-B-C horization and greater development than the Inceptisols mentioned above. They differ in having stronger structure and a zone of clay accumulation in the B horizon. These soils are classified as Alfisols. They formed in limestone, dolomite, or dolostone. Clarksburg, Duffield, and Conestoga soils are classified as Alfisols because the parent material contains calcium carbonate or calcium magnesium carbonates (the chemical requirements for classification as an Alfisol are easier to meet when the parent material contains these carbonates) (fig. 9).

The most developed soils in the park, in terms of profile development, are Lamington, Edgemont, Lansdale, and Raritan. These soils have subsoil chemistry that differs from that of the Alfisols because of leaching or lack of initial leachable carbonates. They may be more developed due to a surface that is more stable than that of the Alfisols or, in some cases, are the most developed because of parent material differences (due to its chemistry, the parent material may have had less to leach initially than the parent materials of the Alfisols). The oldest, or most developed or weathered, soils in the park are classified as Ultisols.

Topography and Relief

Topography refers to the shape of the landscape, and relief refers to differences in elevation. The overall landscape in a park, whether it consists of level terraces, rolling hills, or river valleys, is the result of erosion and depositional processes. These processes may have occurred in response to changes in climate, fluctuating sea levels, and/or tectonic activities. Cyclic periods of landscape stability and instability influence the types of soils that form on the landscape.

Slope and aspect of the overall landscape can affect the moisture and temperature of the soil. Steep slopes facing the sun are warmer. Steep soils may be eroded and lose their surface horizons as they form. As a result, these soils may be thinner than the nearly level ones that receive deposits from areas upslope. Deeper, darker soils may commonly occur on the bottom land where deposits accumulate. Soil-forming factors continue to affect soils even on stable landscapes. Materials are deposited on the soil surface, and materials are blown or washed away from the surface. Additions, removals, and alterations are slow or rapid, depending on climate, landscape position, and biological activity.

The weatherability of underlying rock formations influences the topography of the park. Different landscape positions affect the type of soils that develop on them. For example, soil types vary by slope. In Valley Forge NHP, soils in areas of steep slopes are typically shallow or moderately deep, have a higher rock content than the soils in flatter areas, and are weakly developed with a high erosion potential whereas soils on gentle slopes or flat ground are generally very deep and rock free. Very deep, rock-free soils with a high water-holding capacity are commonly classified as prime farmland (see table 3) and commonly occur on level to gently rolling topography. Glenville silt loam is in gently sloping areas, and this contributes to the soil's properties and qualities that are favorable for agriculture (figs. 10 and 11). Steep areas are not as favorable for agricultural purposes.

Classification of the Soils

Soils are named and classified on the basis of physical and chemical properties in their horizons (layers). Color, texture, structure, and other properties of the soil to a depth of 2 meters are used to key the soil into a classification system. This system helps people to use soil information and also provides a common language for scientists.

Soils and their horizons differ from one another, depending on how and when they formed. Soil scientists use the five soil-forming factors to help predict where different soils may occur. The degree and expression of the soil horizons reflect the extent of interaction of the soil-forming factors with one or more of the soil-forming processes (Simonson, 1959).

When mapping soils, a soil scientist looks for areas with similar soil-forming factors to find similar soils. The properties of the soils are described. Soils with the same kind of properties are given taxonomic names. Soils are classified, mapped, and interpreted on the basis of various kinds of soil horizons and their arrangement. The distribution of



Figure 10.—Washington's Headquarters are situated in an area of Glenville silt loam, 3 to 8 percent slopes, that is considered prime farmland. This map unit has inclusions of Baile soils in depressions. Baile soils are hydric and poorly drained.

soil orders corresponds with the general patterns of the soil-forming factors within the park.

The system of soil classification used by the National Cooperative Soil Survey has six categories (Soil Survey Staff, 1999 and 2010). Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or from laboratory measurements. The categories are defined in the following paragraphs.

ORDER. Soil taxonomy at the highest hierarchical level identifies 12 soil orders. The names for the orders and taxonomic soil properties relate to Greek, Latin, or other root words that reveal something about the soil. The differences among orders reflect the dominant soil-forming processes and the degree of soil formation. Each order is identified by a word ending in *sol*. An example is Alfisol.

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SUBORDER. Each order is divided into suborders primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. Sixty-four suborders are recognized at the next level of classification. The last syllable in the name of a suborder indicates the order. An example is Udalf (*Ud* meaning humid, plus *alf*, from Alfisol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; type of saturation; and base status. There are about 300 great groups. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Hapludalfs (*Hapl*, meaning minimal horizonation, plus *Udalf*, the suborder of the Alfisols that has a udic moisture regime).

SUBGROUP. There are more than 2,400 subgroups. Each great group has a typic subgroup. The typic subgroup is the central concept of the great group; it is not necessarily the most extensive. Other subgroups are intergrades or extragrades. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other taxonomic class. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective *Typic* identifies the subgroup that typifies the great group. An example is Typic Hapludalfs.

FAMILY. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Generally, the properties for family placement are those of horizons below a traditional agronomic plow depth. Among the properties and characteristics considered are particle-size



Figure 11.—The Valley Creek terrace escarpment is visible near Washington’s Headquarters. The escarpment delineates Codorus silt loam (foreground) from Glenville silt loam, 3 to 8 percent slopes (upper right of photo on top of escarpment). The lower landscape position has a higher flooding frequency than the landscape position above the tree line.

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class, mineralogy class, cation-exchange activity class, soil temperature regime, soil depth, and reaction class. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is fine-loamy, mixed, active, mesic Typic Hapludalfs.

SERIES. The soil series is the lowest category in the soil classification system. The series consists of soils within a family that have horizons similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile. An example is the Conestoga series, which is classified as fine-loamy, mixed, active, mesic Typic Hapludalfs. This series consists of very deep and well drained soils.

Most parks are mapped to the series level. The names of soil series are selected by the soil scientists during the course of mapping. The series names are commonly geographic place names or are coined. Because of access limitations and soil variability, soils in some remote areas are classified at the great group or subgroup level.

Table 21 indicates the order, suborder, great group, subgroup, and family of the soil series in the park. Table 22 displays the classification as a key sorted by order.

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Glossary

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

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

Alkali (sodic) soil. A soil having so high a degree of alkalinity (pH 8.5 or higher) or so high a percentage of exchangeable sodium (15 percent or more of the total exchangeable bases), or both, that plant growth is restricted.

Alluvial fan. The fanlike deposit of a stream where it issues from a gorge upon a plain or of a tributary stream near or at its junction with its main stream.

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

Alpha,alpha-dipyridyl. A dye that when dissolved in 1N ammonium acetate is used to detect the presence of reduced iron (Fe II) in the soil. A positive reaction indicates a type of redoximorphic feature.

Aquic conditions. Current soil wetness characterized by saturation, reduction, and redoximorphic features.

Argillic horizon. A subsoil horizon characterized by an accumulation of illuvial clay.

Aspect. The direction in which a slope faces.

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

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

Base saturation. The degree to which material having cation-exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, and K), expressed as a percentage of the total cation-exchange capacity.

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

Canopy. The leafy crown of trees or shrubs. (See Crown.)

Cation. An ion carrying a positive charge of electricity. The common soil cations are calcium, potassium, magnesium, sodium, and hydrogen.

Cation-exchange capacity. The total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. The term, as applied to soils, is synonymous with base-exchange capacity but is more precise in meaning.

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

- Claypan.** A slowly permeable soil horizon that contains much more clay than the horizons above it. A claypan is commonly hard when dry and plastic or stiff when wet.
- Climax plant community.** The stabilized plant community on a particular site. The plant cover reproduces itself and does not change so long as the environment remains the same.
- Coarse textured soil.** Sand or loamy sand.
- Colluvium.** Soil material or rock fragments, or both, moved by creep, slide, or local wash and deposited at the base of steep slopes.
- Complex, soil.** A map unit of two or more kinds of soil or miscellaneous areas in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas.
- Control section.** The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.
- Corrosion.** Soil-induced electrochemical or chemical action that dissolves or weakens concrete or uncoated steel.
- Crown.** The upper part of a tree or shrub, including the living branches and their foliage.
- Culmination of the mean annual increment (CMAI).** The average annual increase per acre in the volume of a stand. Computed by dividing the total volume of the stand by its age. As the stand increases in age, the mean annual increment continues to increase until mortality begins to reduce the rate of increase. The point where the stand reaches its maximum annual rate of growth is called the culmination of the mean annual increment.
- Depth, soil.** Generally, the thickness of the soil over bedrock. Very deep soils are more than 60 inches deep over bedrock; deep soils, 40 to 60 inches; moderately deep, 20 to 40 inches; shallow, 10 to 20 inches; and very shallow, less than 10 inches.
- Drainage class (natural).** Refers to the frequency and duration of wet periods under conditions similar to those under which the soil formed. Alterations of the water regime by human activities, either through drainage or irrigation, are not a consideration unless they have significantly changed the morphology of the soil. Seven classes of natural soil drainage are recognized—*excessively drained, somewhat excessively drained, well drained, moderately well drained, somewhat poorly drained, poorly drained, and very poorly drained*. These classes are defined in the “Soil Survey Manual.”
- Drainage, surface.** Runoff, or surface flow of water, from an area.
- Ecological site.** An area where climate, soil, and relief are sufficiently uniform to produce a distinct natural plant community. An ecological site is the product of all the environmental factors responsible for its development. It is typified by an association of species that differ from those on other ecological sites in kind and/or proportion of species or in total production.
- Eluviation.** The movement of material in true solution or colloidal suspension from one place to another within the soil. Soil horizons that have lost material through eluviation are eluvial; those that have received material are illuvial.
- Eolian soil material.** Earthy parent material accumulated through wind action; commonly refers to sandy material in dunes or to loess in blankets on the surface.
- Erosion.** The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.
Erosion (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building

up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of human or animal activities or of a catastrophe in nature, such as a fire, that exposes the surface.

Escarpment. A relatively continuous and steep slope or cliff breaking the general continuity of more gently sloping land surfaces and resulting from erosion or faulting. Synonym: scarp.

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

Fill slope. A sloping surface consisting of excavated soil material from a road cut. It commonly is on the downhill side of the road.

Fine textured soil. Sandy clay, silty clay, or clay.

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

Fluvial. Of or pertaining to rivers; produced by river action, as a fluvial plain.

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

Forest cover. All trees and other woody plants (underbrush) covering the ground in a forest.

Forest type. A stand of trees similar in composition and development because of given physical and biological factors by which it may be differentiated from other stands.

Gravel. Rounded or angular fragments of rock as much as 3 inches (2 millimeters to 7.6 centimeters) in diameter. An individual piece is a pebble.

Gravelly soil material. Material that has 15 to 35 percent, by volume, rounded or angular rock fragments, not prominently flattened, as much as 3 inches (7.6 centimeters) in diameter.

Ground water. Water filling all the unblocked pores of the material below the water table.

Hard bedrock. Bedrock that cannot be excavated except by blasting or by the use of special equipment that is not commonly used in construction.

Hill. A natural elevation of the land surface, rising as much as 1,000 feet above surrounding lowlands, commonly of limited summit area and having a well defined outline; hillsides generally have slopes of more than 15 percent. The distinction between a hill and a mountain is arbitrary and is dependent on local usage.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an uppercase letter represents the major horizons. Numbers or lowercase letters that follow represent subdivisions of the major horizons. An explanation of the subdivisions is given in the "Soil Survey Manual." The major horizons of mineral soil are as follows:

O horizon.—An organic layer of fresh and decaying plant residue.

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

E horizon.—The mineral horizon in which the main feature is loss of silicate clay, iron, aluminum, or some combination of these.

B horizon.—The mineral horizon below an A horizon. The B horizon is in part a layer of transition from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics, such as (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) prismatic or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the overlying soil material. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, an Arabic numeral, commonly a 2, precedes the letter C.

Cr horizon.—Soft, consolidated bedrock beneath the soil.

R layer.—Consolidated bedrock beneath the soil. The bedrock commonly underlies a C horizon, but it can be directly below an A or a B horizon.

Hydrologic soil groups. Refers to soils grouped according to their runoff potential.

The soil properties that influence this potential are those that affect the minimum rate of water infiltration on a bare soil during periods after prolonged wetting when the soil is not frozen. These properties are depth to a seasonal high water table, the infiltration rate and permeability after prolonged wetting, and depth to a very slowly permeable layer. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff.

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

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

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

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

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

Less than 0.2	very low
0.2 to 0.4	low
0.4 to 0.75	moderately low
0.75 to 1.25	moderate
1.25 to 1.75	moderately high
1.75 to 2.5	high
More than 2.5	very high

K_{sat} . Saturated hydraulic conductivity. (See Permeability.)

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

LEP. See Linear extensibility percent.

Linear extensibility (LE). Refers to the change in length of an unconfined clod as moisture content is decreased from a moist to a dry state. Linear extensibility is used to determine the shrink-swell potential of soils. It is an expression of the volume change between the water content of the clod at $1/3$ - or $1/10$ -bar tension (33kPa or 10kPa tension) and oven dryness. Volume change is influenced by the amount and type of clay minerals in the soil. The volume change is the percent change for the whole soil. If it is expressed as a fraction, the resulting value is COLE, coefficient of linear extensibility.

Linear extensibility percent. Refers to the percent change in linear extensibility.

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

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

Loess. Fine grained material, dominantly of silt-sized particles, deposited by wind.

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

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

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

Miscellaneous area. An area that has little or no natural soil and supports little or no vegetation.

Moderately coarse textured soil. Coarse sandy loam, sandy loam, or fine sandy loam.

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

Neutral soil. A soil having a pH value of 6.6 to 7.3. (See Reaction, soil.)

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

Organic matter. Plant and animal residue in the soil in various stages of decomposition. The content of organic matter in the surface layer is described as follows:

Very low	less than 0.5 percent
Low	0.5 to 1.0 percent
Moderately low.....	1.0 to 2.0 percent
Moderate.....	2.0 to 4.0 percent
High	4.0 to 8.0 percent
Very high.....	more than 8.0 percent

Pan. A compact, dense layer in a soil that impedes the movement of water and the growth of roots. For example, *hardpan*, *fragipan*, *claypan*, *plowpan*, and *traffic pan*.

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

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percolation. The movement of water through the soil.

Permeability. The quality of the soil that enables water or air to move downward through the profile. The rate at which a saturated soil transmits water is accepted as a measure of this quality. In soil physics, the rate is referred to as "saturated hydraulic conductivity," which is defined in the "Soil Survey Manual." In line with conventional usage in the engineering profession and with traditional usage in published soil surveys, this rate of flow continues to be expressed as "permeability." Terms describing permeability, measured in inches per hour, are as follows:

Extremely slow.....	0.0 to 0.01 inch
Very slow	0.01 to 0.06 inch
Slow	0.06 to 0.2 inch
Moderately slow.....	0.2 to 0.6 inch
Moderate.....	0.6 inch to 2.0 inches
Moderately rapid.....	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
Very rapid.....	more than 20 inches

Phase, soil. A subdivision of a soil series based on features that affect its use and management, such as slope, stoniness, and flooding.

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

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

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

- Plowpan.** A compacted layer formed in the soil directly below the plowed layer.
- Ponding.** Standing water on soils in closed depressions. Unless the soils are artificially drained, the water can be removed only by percolation or evapotranspiration.
- Poorly graded.** Refers to a coarse grained soil or soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.
- Potential native plant community.** See Climax plant community.
- Potential rooting depth (effective rooting depth).** Depth to which roots could penetrate if the content of moisture in the soil were adequate. The soil has no properties restricting the penetration of roots to this depth.
- Productivity, soil.** The capability of a soil for producing a specified plant or sequence of plants under specific management.
- Profile, soil.** A vertical section of the soil extending through all its horizons and into the parent material.
- Rangeland.** Land on which the potential natural vegetation is predominantly grasses, grasslike plants, forbs, or shrubs suitable for grazing or browsing. It includes natural grasslands, savannas, many wetlands, some deserts, tundras, and areas that support certain forb and shrub communities.
- Reaction, soil.** A measure of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degrees of acidity or alkalinity, expressed as pH values, are:

Ultra acid.....	less than 3.5
Extremely acid	3.5 to 4.4
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Moderately acid	5.6 to 6.0
Slightly acid.....	6.1 to 6.5
Neutral	6.6 to 7.3
Slightly alkaline.....	7.4 to 7.8
Moderately alkaline.....	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline.....	9.1 and higher

- Redoximorphic concentrations.** Nodules, concretions, soft masses, pore linings, and other features resulting from the accumulation of iron or manganese oxide. An indication of chemical reduction and oxidation resulting from saturation.
- Redoximorphic depletions.** Low-chroma zones from which iron and manganese oxide or a combination of iron and manganese oxide and clay has been removed. These zones are indications of the chemical reduction of iron resulting from saturation.
- Redoximorphic features.** Redoximorphic concentrations, redoximorphic depletions, reduced matrices, a positive reaction to alpha,alpha-dipyridyl, and other features indicating the chemical reduction and oxidation of iron and manganese compounds resulting from saturation.
- Relief.** The elevations or inequalities of a land surface, considered collectively.
- Residuum (residual soil material).** Unconsolidated, weathered or partly weathered mineral material that accumulated as consolidated rock disintegrated in place.
- Rock fragments.** Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.
- Root zone.** The part of the soil that can be penetrated by plant roots.
- Runoff.** The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.
- Saline soil.** A soil containing soluble salts in an amount that impairs growth of plants. A saline soil does not contain excess exchangeable sodium.

- Sand.** As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.
- Sandstone.** Sedimentary rock containing dominantly sand-sized particles.
- Saprolite.** Unconsolidated residual material underlying the soil and grading to hard bedrock below.
- Saturation.** Wetness characterized by zero or positive pressure of the soil water. Under conditions of saturation, the water will flow from the soil matrix into an unlined auger hole.
- Sedimentary rock.** Rock made up of particles deposited from suspension in water. The chief kinds of sedimentary rock are conglomerate, formed from gravel; sandstone, formed from sand; shale, formed from clay; and limestone, formed from soft masses of calcium carbonate. There are many intermediate types. Some wind-deposited sand is consolidated into sandstone.
- Series, soil.** A group of soils that have profiles that are almost alike. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.
- Shale.** Sedimentary rock formed by the hardening of a clay deposit.
- Silt.** As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.
- Siltstone.** Sedimentary rock made up of dominantly silt-sized particles.
- Similar soils.** Soils that share limits of diagnostic criteria, behave and perform in a similar manner, and have similar conservation needs or management requirements for the major land uses in the survey area.
- Site index.** A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75.
- Slope.** The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance.
- Sodic (alkali) soil.** A soil having so high a degree of alkalinity (pH 8.5 or higher) or so high a percentage of exchangeable sodium (15 percent or more of the total exchangeable bases), or both, that plant growth is restricted.
- Sodicity.** The degree to which a soil is affected by exchangeable sodium. Sodicity is expressed as a sodium adsorption ratio (SAR) of a saturation extract, or the ratio of Na^+ to $\text{Ca}^{++} + \text{Mg}^{++}$. The degrees of sodicity and their respective ratios are:
- | | |
|---------------|----------------|
| Slight..... | less than 13:1 |
| Moderate..... | 13-30:1 |
| Strong | more than 30:1 |
- Sodium adsorption ratio (SAR).** A measure of the amount of sodium (Na) relative to calcium (Ca) and magnesium (Mg) in the water extract from saturated soil paste. It is the ratio of the Na concentration divided by the square root of one-half of the Ca + Mg concentration.
- Soft bedrock.** Bedrock that can be excavated with trenching machines, backhoes, small rippers, and other equipment commonly used in construction.
- Soil.** A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.
- Soil separates.** Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes, in millimeters, of separates recognized in the United States are as follows:

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

- Solum.** The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A, E, and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the material below the solum. The living roots and plant and animal activities are largely confined to the solum.
- Stone line.** A concentration of coarse fragments in a soil. Generally, it is indicative of an old weathered surface. In a cross section, the line may be one fragment or more thick. It generally overlies material that weathered in place and is overlain by recent sediment of variable thickness.
- Stones.** Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter if rounded or 15 to 24 inches (38 to 60 centimeters) in length if flat.
- Stony.** Refers to a soil containing stones in numbers that interfere with or prevent tillage.
- Structure, soil.** The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grained* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).
- Subsoil.** Technically, the B horizon; roughly, the part of the solum below plow depth.
- Substratum.** The part of the soil below the solum.
- Subsurface layer.** Any surface soil horizon (A, E, AB, or EB) below the surface layer.
- Surface layer.** The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the “plow layer,” or the “Ap horizon.”
- Surface soil.** The A, E, AB, and EB horizons, considered collectively. It includes all subdivisions of these horizons.
- Terrace.** An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that water soaks into the soil or flows slowly to a prepared outlet. A terrace in a field generally is built so that the field can be farmed. A terrace intended mainly for drainage has a deep channel that is maintained in permanent sod.
- Terrace (geologic).** An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea.
- Texture, soil.** The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand*, *loamy sand*, *sandy loam*, *loam*, *silt loam*, *silt*, *sandy clay loam*, *clay loam*, *silty clay loam*, *sandy clay*, *silty clay*, and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying “coarse,” “fine,” or “very fine.”
- Tilth, soil.** The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.
- Topsoil.** The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.
- Upland.** Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Weathering. All physical and chemical changes produced in rocks or other deposits at or near the earth's surface by atmospheric agents. These changes result in disintegration and decomposition of the material.

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

Tables

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Table 1.—Soil Legend

Map unit symbol and map unit name	Components in map unit	Percent of map unit
541148: Birdsboro silt loam, 0 to 3 percent slopes-----	Birdsboro	97
	Lamington	3
541159: Brecknock channery silt loam, 8 to 25 percent slopes, extremely stony----	Brecknock, extremely stony	94
	Lehigh, extremely stony	6
541164: Codorus silt loam-----	Codorus	85
	Hatboro	8
	Glenville	4
	Baile	3
541165: Croton silt loam, 0 to 3 percent slopes-----	Croton	82
	Readington	18
541194: Lawrenceville silt loam, 0 to 3 percent slopes-----	Lawrenceville	81
	Lansdale	13
	Doylestown	4
	Chalfont	2
541245: Raritan silt loam, 0 to 3 percent slopes-----	Raritan	96
	Knauers	2
	Reaville	2
541247: Readington silt loam, 0 to 3 percent slopes-----	Readington	85
	Penn	8
	Reaville	4
	Croton	3
541254: Rowland silt loam, terrace-----	Rowland	82
	Knauers	8
	Abbottstown	6
541256: Rowland silt loam, 0 to 3 percent slopes-----	Rowland	95
	Knauers	5

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Table 1.—Soil Legend—Continued

Map unit symbol and map unit name	Components in map unit	Percent of map unit
541257: Rowland silt loam, 3 to 8 percent slopes-----	Rowland	90
	Abbottstown	5
	Knauers	5
641312: Duffield silt loam, 3 to 8 percent slopes-----	Duffield	90
	Clarksburg	5
	Ryder	3
	Thorndale	2
641350: Edgemont channery loam, 3 to 8 percent slopes-----	Edgemont	93
	Buchanan	4
	Andover	3
641351: Edgemont channery loam, 8 to 15 percent slopes-----	Edgemont	93
	Buchanan	4
	Andover	3
641352: Edgemont channery loam, 15 to 25 percent slopes-----	Edgemont	93
	Buchanan	4
	Andover	3
641353: Edgemont channery sandy loam, 0 to 8 percent slopes, extremely stony----	Edgemont, extremely stony	90
	Buchanan, extremely stony	4
	Andover, extremely stony	3
641354: Edgemont channery sandy loam, 8 to 25 percent slopes, extremely stony----	Edgemont, extremely stony	93
	Buchanan, extremely stony	4
	Andover, extremely stony	3

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Table 1.—Soil Legend—Continued

Map unit symbol and map unit name	Components in map unit	Percent of map unit
641355: Edgemont channery sandy loam, 25 to 60 percent slopes, extremely stony---	Edgemont, extremely stony	93
	Buchanan, extremely stony	4
	Andover, extremely stony	3
641418: Codorus silt loam-----	Codorus	85
	Hatboro	8
	Glenville	4
	Baile	3
641481: Conestoga silt loam, 0 to 3 percent slopes-----	Conestoga	90
	Clarksburg	5
	Duffield	1
	Hollinger	1
	Letort	1
	Penlaw	1
	Pequea	1
641483: Conestoga silt loam, 3 to 8 percent slopes-----	Conestoga	90
	Clarksburg	5
	Duffield	1
	Hollinger	1
	Letort	1
	Penlaw	1
	Pequea	1
641484: Conestoga silt loam, 8 to 15 percent slopes-----	Conestoga	90
	Clarksburg	5
	Duffield	1
	Hollinger	1
	Letort	1
	Pequea	1

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Table 1.—Soil Legend—Continued

Map unit symbol and map unit name	Components in map unit	Percent of map unit
641523: Glenville silt loam, 3 to 8 percent slopes-----	Glenville	90
	Baile	5
	Glenelg	5
641543: Lindside silt loam-----	Lindside	85
	Holly	12
	Elk	1
	Newark	1
	Nolin	1
641583: Penn silt loam, 3 to 8 percent slopes-----	Penn	87
	Readington	5
	Reaville	5
	Klinesville	3
641584: Penn silt loam, 8 to 15 percent slopes-----	Penn	90
	Readington	4
	Klinesville	3
	Reaville	3
641586: Penn silt loam, 15 to 25 percent slopes-----	Penn	90
	Readington	3
641605: Udorthents, limestone, 0 to 8 percent slopes-----	Udorthents, limestone	100
641614: Urban land-Conestoga complex, 0 to 8 percent slopes-----	Urban land	50
	Conestoga	35
	Catoctin	5
	Clarksburg	5
	Hagerstown	3
	Penlaw	2
641641: Water-----	Water	100

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Table 1.—Soil Legend—Continued

Map unit symbol and map unit name	Components in map unit	Percent of map unit
810899: Mattapex silt loam, 0 to 3 percent slopes-----	Mattapex	95
	Hatboro	1
	Othello	1
810907: Clarksburg silt loam, 3 to 8 percent slopes-----	Clarksburg	90
	Thorndale	5
1482148: Croton silt loam, 3 to 8 percent slopes-----	Croton	90
	Readington	5
1486423: Lawrenceville silt loam, 3 to 8 percent slopes-----	Lawrenceville	83
	Lansdale	12
	Doylestown	3
	Chalfont	2
1539365: Gibraltar silt loam-----	Gibraltar	95
	Holly	5
1602815: Holly silt loam-----	Holly	90
	Brinkerton	2
	Gibraltar	2
	Linden	2
1612216: Penn silt loam, 25 to 35 percent slopes-----	Penn	90
	Readington	3
1612248: Urban land-Penn complex, 0 to 8 percent slopes-----	Urban land	65
	Penn	25
	Croton	4
	Readington	4
	Reaville	2
2229473: Udorthents, limestone, 0 to 8 percent slopes-----	Udorthents, limestone	100
2229474: Udorthents, limestone, 8 to 25 percent slopes-----	Udorthents, limestone	100

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Table 1.—Soil Legend—Continued

Map unit symbol and map unit name	Components in map unit	Percent of map unit
2229478: Udorthents, shale and sandstone, 0 to 8 percent slopes-----	Udorthents, shale and sandstone	85
	Penn	5
	Abbottstown	2
	Bowmansville	2
	Readington	2
	Reaville	2
	Berks	1
	Croton	1
2229480: Urban land, 0 to 8 percent slopes-----	Urban land	90
	Udorthents, unstable fill	10
2229481: Urban land, 8 to 25 percent slopes-----	Urban land	90
	Udorthents, unstable fill	10
2229493: Urban land-Penn complex, 8 to 25 percent slopes-----	Urban land	65
	Penn	25
	Croton	4
	Readington	4
	Reaville	2
2229495: Urban land-Udorthents, limestone complex, 8 to 25 percent slopes-----	Urban land	80
	Udorthents, limestone	15
	Duffield	5

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Table 1.—Soil Legend—Continued

Map unit symbol and map unit name	Components in map unit	Percent of map unit
2229496: Urban land-Udorthents, schist and gneiss complex, 0 to 8 percent slopes--	Urban land	80
	Udorthents, schist and gneiss	15
	Baile	1
	Edgemont	1
	Gladstone	1
	Glenelg	1
	Glenville	1
2229498: Urban land-Udorthents, shale and sandstone complex, 0 to 8 percent slopes	Urban land	80
	Udorthents, shale and sandstone	15
	Penn	5
2229499: Urban land-Udorthents, shale and sandstone complex, 8 to 25 percent slopes-----	Urban land	80
	Udorthents, shale and sandstone	15
	Penn	5
2229500: Pits, quarry-----	Pits, quarries	80
	Waste areas	10
2229501: Urban land-Readington complex, 0 to 8 percent slopes-----	Urban land	65
	Readington	25
	Croton	5
2230323: Buckingham silt loam, 0 to 3 percent slopes-----	Buckingham	80
	Penn	13
	Croton	5
	Knauers	2
2230591: Abbottstown silt loam, 3 to 8 percent slopes-----	Abbottstown	93
	Croton	4
	Penn	2
	Klinesville	1

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Table 1.—Soil Legend—Continued

Map unit symbol and map unit name	Components in map unit	Percent of map unit
2232623: Penn-Klinesville channery silt loams, 15 to 25 percent slopes-----	Penn	47
	Klinesville	40
	Croton	5
	Lansdale	4
	Reaville	4
2232624: Raritan silt loam, 3 to 8 percent slopes-----	Raritan	90
	Birdsboro	5
	Reaville	3
	Knauers	2
2232625: Readington silt loam, 3 to 8 percent slopes-----	Readington	80
	Penn	7
	Reaville	7
	Croton	6
2232626: Readington silt loam, 8 to 15 percent slopes-----	Readington	86
	Penn	7
	Reaville	5
	Croton	2
2233645: Edgemont channery loam, 3 to 8 percent slopes-----	Edgemont	93
	Buchanan	4
	Andover	3
2233646: Edgemont channery loam, 8 to 15 percent slopes-----	Edgemont	93
	Buchanan	4
	Andover	3
2233647: Edgemont channery loam, 15 to 25 percent slopes-----	Edgemont	93
	Buchanan	4
	Andover	3

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Table 1.—Soil Legend—Continued

Map unit symbol and map unit name	Components in map unit	Percent of map unit
2233649: Edgemont channery sandy loam, 25 to 60 percent slopes, extremely stony---	Edgemont, extremely stony	93
	Buchanan, extremely stony	4
	Andover, extremely stony	3
2233698: Lansdale loam, 3 to 8 percent slopes-----	Lansdale	92
	Reaville	8
2233702: Penn-Lansdale complex, 3 to 8 percent slopes-----	Penn	69
	Lansdale	25
	Readington	6
2233703: Penn-Lansdale complex, 8 to 15 percent slopes-----	Penn	50
	Lansdale	40
	Klinesville	6
	Reaville	4
2233709: Penn silt loam, 3 to 8 percent slopes-----	Penn	87
	Readington	5
	Reaville	5
	Klinesville	3
2233712: Penn silt loam, 8 to 15 percent slopes-----	Penn	90
	Readington	4
	Klinesville	3
	Reaville	3
2233717: Klinesville channery silt loam, 35 to 60 percent slopes-----	Klinesville	85
	Penn	10
	Reaville	5
2248203: Lansdale loam, 15 to 25 percent slopes-----	Lansdale	92
	Reaville	8

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Table 1.—Soil Legend—Continued

Map unit symbol and map unit name	Components in map unit	Percent of map unit
2249335: Lawrenceville silt loam, 3 to 8 percent slopes-----	Lawrenceville	83
	Lansdale	12
	Doylestown	3
	Chalfont	2
2379116: Birdsboro silt loam, 3 to 8 percent slopes-----	Birdsboro	92
	Penn	5
	Lamington	3
2379949: Duffield silt loam, 3 to 8 percent slopes-----	Duffield	90
	Clarksburg	5
	Ryder	3
	Thorndale	2
2384072: Glenville silt loam, 3 to 8 percent slopes-----	Glenville	90
	Baile	5
	Glenelg	5
2386596: Duffield silt loam, 8 to 15 percent slopes-----	Duffield	85
	Ryder	6
	Carbo	5
	Clarksburg	2
	Funkstown	2
2386599: Duffield silt loam, 8 to 15 percent slopes-----	Duffield	85
	Ryder	6
	Carbo	5
	Clarksburg	2
	Funkstown	2
2397950: Bowmansville-Knauers silt loams-----	Bowmansville	40
	Knauers	40
	Rowland	20

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Table 2.—Land Capability Classification

(Land capability classification is a system of grouping soils primarily on the basis of their capability to produce common cultivated crops and pasture plants without deteriorating over a long period of time. Only the soils suitable for cultivation are listed. Classification is for irrigated areas)

Map unit symbol and component name	Land capability
541148: Birdsboro-----	1
541159: Brecknock, extremely stony-----	7s
541164: Codorus-----	2w
541165: Croton-----	4w
541194: Lawrenceville-----	2w
541245: Raritan-----	2w
541247: Readington-----	2w
541254: Rowland-----	2w
541256: Rowland-----	2w
541257: Rowland-----	2w
641312: Duffield-----	2e
641350: Edgemont-----	2e
641351: Edgemont-----	3e
641352: Edgemont-----	4e
641353: Edgemont, extremely stony-----	7s
641354: Edgemont, extremely stony-----	7s
641355: Edgemont, extremely stony-----	7s
641418: Codorus-----	2w
641481: Conestoga-----	1

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Table 2.-Land Capability Classification-Continued

Map unit symbol and component name	Land capability
641483: Conestoga-----	2e
641484: Conestoga-----	3e
641523: Glenville-----	2e
641543: Lindsay-----	2w
641583: Penn-----	2e
641584: Penn-----	3e
641586: Penn-----	4e
641605: Udorthents, limestone-----	7s
641614: Conestoga-----	2e
810899: Mattapex-----	2w
810907: Clarksburg-----	2e
1482148: Croton-----	4w
1486423: Lawrenceville-----	2e
1539365: Gibraltar-----	2w
1602815: Holly-----	3w
1612216: Penn-----	4e
1612248: Penn-----	2e
2229473: Udorthents, limestone-----	7s
2229474: Udorthents, limestone-----	7e
2229478: Udorthents, shale and sandstone-----	7s
2229493: Penn-----	4e

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Table 2.-Land Capability Classification-Continued

Map unit symbol and component name	Land capability
2229495: Udorthents, limestone-----	7e
2229496: Udorthents, schist and gneiss-----	7s
2229498: Udorthents, shale and sandstone-----	7s
2229499: Udorthents, shale and sandstone-----	7e
2229501: Readington-----	2w
2230323: Buckingham-----	3w
2230591: Abbottstown-----	3w
2232623: Penn-----	4e
Klinesville-----	6e
2232624: Raritan-----	2e
2232625: Readington-----	2e
2232626: Readington-----	3e
2233645: Edgemont-----	2e
2233646: Edgemont-----	3e
2233647: Edgemont-----	4e
2233649: Edgemont, extremely stony-----	7s
2233698: Lansdale-----	2e
2233702: Penn-----	2e
Lansdale-----	2e
2233703: Penn-----	3e
Lansdale-----	3e
2233709: Penn-----	2e

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Table 2.-Land Capability Classification-Continued

Map unit symbol and component name	Land capability
2233712: Penn-----	3e
2233717: Klinesville-----	7e
2248203: Lansdale-----	4e
2249335: Lawrenceville-----	2e
2379116: Birdsboro-----	2e
2379949: Duffield-----	2e
2384072: Glenville-----	2e
2386596: Duffield-----	3e
2386599: Duffield-----	3e
2397950: Bowmansville-----	3w
Knauers-----	4w

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Table 3.—Prime and Other Important Farmland

(Only the soils considered prime or important farmland are listed. Urban or built-up areas of the soils listed are not considered prime or important farmland)

Map unit symbol	Map unit name	Farmland classification
541148	Birdsboro silt loam, 0 to 3 percent slopes	All areas are prime farmland
541164	Codorus silt loam	All areas are prime farmland
541194	Lawrenceville silt loam, 0 to 3 percent slopes	All areas are prime farmland
541245	Raritan silt loam, 0 to 3 percent slopes	All areas are prime farmland
541247	Readington silt loam, 0 to 3 percent slopes	All areas are prime farmland
541254	Rowland silt loam, terrace	All areas are prime farmland
541256	Rowland silt loam, 0 to 3 percent slopes	All areas are prime farmland
541257	Rowland silt loam, 3 to 8 percent slopes	All areas are prime farmland
641312	Duffield silt loam, 3 to 8 percent slopes	All areas are prime farmland
641350	Edgemont channery loam, 3 to 8 percent slopes	All areas are prime farmland
641351	Edgemont channery loam, 8 to 15 percent slopes	Farmland of statewide importance
641418	Codorus silt loam	All areas are prime farmland
641481	Conestoga silt loam, 0 to 3 percent slopes	All areas are prime farmland
641483	Conestoga silt loam, 3 to 8 percent slopes	All areas are prime farmland
641484	Conestoga silt loam, 8 to 15 percent slopes	Farmland of statewide importance
641523	Glenville silt loam, 3 to 8 percent slopes	All areas are prime farmland
641543	Lindside silt loam	All areas are prime farmland
641583	Penn silt loam, 3 to 8 percent slopes	All areas are prime farmland
641584	Penn silt loam, 8 to 15 percent slopes	Farmland of statewide importance
810899	Mattapex silt loam, 0 to 3 percent slopes	All areas are prime farmland
810907	Clarksburg silt loam, 3 to 8 percent slopes	All areas are prime farmland
1486423	Lawrenceville silt loam, 3 to 8 percent slopes	Farmland of statewide importance
1539365	Gibraltar silt loam	Farmland of statewide importance
1602815	Holly silt loam	Farmland of statewide importance
2230323	Buckingham silt loam, 0 to 3 percent slopes	Farmland of statewide importance
2230591	Abbottstown silt loam, 3 to 8 percent slopes	Farmland of statewide importance
2232624	Raritan silt loam, 3 to 8 percent slopes	All areas are prime farmland
2232625	Readington silt loam, 3 to 8 percent slopes	Farmland of statewide importance
2232626	Readington silt loam, 8 to 15 percent slopes	Farmland of statewide importance
2233645	Edgemont channery loam, 3 to 8 percent slopes	All areas are prime farmland
2233646	Edgemont channery loam, 8 to 15 percent slopes	Farmland of statewide importance
2233698	Lansdale loam, 3 to 8 percent slopes	All areas are prime farmland
2233702	Penn-Lansdale complex, 3 to 8 percent slopes	All areas are prime farmland
2233703	Penn-Lansdale complex, 8 to 15 percent slopes	Farmland of statewide importance
2233709	Penn silt loam, 3 to 8 percent slopes	All areas are prime farmland
2233712	Penn silt loam, 8 to 15 percent slopes	Farmland of statewide importance
2249335	Lawrenceville silt loam, 3 to 8 percent slopes	Farmland of statewide importance
2379116	Birdsboro silt loam, 3 to 8 percent slopes	All areas are prime farmland
2379949	Duffield silt loam, 3 to 8 percent slopes	All areas are prime farmland
2384072	Glenville silt loam, 3 to 8 percent slopes	All areas are prime farmland
2386596	Duffield silt loam, 8 to 15 percent slopes	Farmland of statewide importance
2386599	Duffield silt loam, 8 to 15 percent slopes	Farmland of statewide importance

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Table 4.—Hydric Soils

(This report lists only those map unit components that are rated as hydric. Definitions of hydric criteria codes are included at the bottom of the report)

Map unit symbol and map unit name	Component	Percent of map unit	Landform	Hydric soils criteria			
				Hydric criteria code	Meets saturation criteria	Meets flooding criteria	Meets ponding criteria
541148: Birdsboro silt loam, 0 to 3 percent slopes	Lamington	3	terraces, depressions	2B3	Yes	No	No
541164: Codorus silt loam	Hatboro	8	flood plains	2B3	Yes	No	No
	Baile	3	depressions	2B3	Yes	No	No
541165: Croton silt loam, 0 to 3 percent slopes	Croton	82	depressions	2B3	Yes	No	No
541194: Lawrenceville silt loam, 0 to 3 percent slopes	Doylestown	4	drainageways	2B3	Yes	No	No
541245: Raritan silt loam, 0 to 3 percent slopes	Knauers	2	backwater area, flood plains	2B3, 3	Yes	No	Yes
541247: Readington silt loam, 0 to 3 percent slopes	Croton	3	depressions	2B3	Yes	No	No
541254: Rowland silt loam, terrace	Knauers	8	backwater area, flood plains	3, 2B3	Yes	No	Yes
541256: Rowland silt loam, 0 to 3 percent slopes	Knauers	5	backwater area, flood plains	3, 2B3	Yes	No	Yes
541257: Rowland silt loam, 3 to 8 percent slopes	Knauers	5	backwater area, flood plains	3, 2B3	Yes	No	Yes
641312: Duffield silt loam, 3 to 8 percent slopes	Thorndale	2	depressions	2B3	Yes	No	No
641350: Edgemont channery loam, 3 to 8 percent slopes	Andover	3	drainageways	2B3	Yes	No	No
641351: Edgemont channery loam, 8 to 15 percent slopes	Andover	3	drainageways	2B3	Yes	No	No
641352: Edgemont channery loam, 15 to 25 percent slopes	Andover	3	drainageways	2B3	Yes	No	No

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Table 4.—Hydric Soils—Continued

Map unit symbol and map unit name	Component	Percent of map unit	Landform	Hydric soils criteria			
				Hydric criteria code	Meets saturation criteria	Meets flooding criteria	Meets ponding criteria
641353: Edgemont channery sandy loam, 0 to 8 percent slopes, extremely stony	Andover, extremely stony	3	drainageways	2B3	Yes	No	No
641354: Edgemont channery sandy loam, 8 to 25 percent slopes, extremely stony	Andover, extremely stony	3	drainageways	2B3	Yes	No	No
641355: Edgemont channery sandy loam, 25 to 60 percent slopes, extremely stony	Andover, extremely stony	3	drainageways	2B3	Yes	No	No
641418: Codorus silt loam	Hatboro	8	flood plains	2B3	Yes	No	No
	Baile	3	depressions	2B3	Yes	No	No
641523: Glenville silt loam, 3 to 8 percent slopes	Baile	5	depressions	2B3	Yes	No	No
641543: Lindside silt loam	Holly	12	flood plains	2B3	Yes	No	No
810899: Mattapex silt loam, 0 to 3 percent slopes	Hatboro	1	flood plains	2B3	Yes	No	No
	Othello	1	marine terraces	2B3	Yes	No	No
810907: Clarksburg silt loam, 3 to 8 percent slopes	Thorndale	5	depressions	2B3	Yes	No	No
1482148: Croton silt loam, 3 to 8 percent slopes	Croton	90	depressions	2B3	Yes	No	No
1486423: Lawrenceville silt loam, 3 to 8 percent slopes	Doylestown	3	drainageways	2B3	Yes	No	No
1539365: Gibraltar silt loam	Holly	5	flood plains	2B3, 4	Yes	Yes	No
1602815: Holly silt loam	Holly	90	flood plains	4, 2B3	Yes	Yes	No
	Brinkerton	2	depressions	2B3	Yes	No	No
1612248: Urban land-Penn complex, 0 to 8 percent slopes	Croton	4	depressions	2B3	Yes	No	No

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Table 4.—Hydric Soils—Continued

Map unit symbol and map unit name	Component	Percent of map unit	Landform	Hydric soils criteria			
				Hydric criteria code	Meets saturation criteria	Meets flooding criteria	Meets ponding criteria
2229478: Udorthents, shale and sandstone, 0 to 8 percent slopes	Croton	1	depressions	2B3	Yes	No	No
2229493: Urban land-Penn complex, 8 to 25 percent slopes	Croton	4	depressions	2B3	Yes	No	No
2229496: Urban land-Udorthents, schist and gneiss complex, 0 to 8 percent slopes	Baile	1	depressions	2B3	Yes	No	No
2229501: Urban land-Readington complex, 0 to 8 percent slopes	Croton	5	depressions	2B3	Yes	No	No
2230323: Buckingham silt loam, 0 to 3 percent slopes	Croton	5	depressions	2B3	Yes	No	No
	Knauers	2	backwater area, flood plains	2B3, 3	Yes	No	Yes
2230591: Abbottstown silt loam, 3 to 8 percent slopes	Croton	6	depressions	2B3	Yes	No	No
2232623: Penn-Klinesville channery silt loams, 15 to 25 percent slopes	Croton	5	depressions	2B3	Yes	No	No
2232624: Raritan silt loam, 3 to 8 percent slopes	Knauers	2	backwater area, flood plains	3, 2B3	Yes	No	Yes
2232625: Readington silt loam, 3 to 8 percent slopes	Croton	6	depressions	2B3	Yes	No	No
2232626: Readington silt loam, 8 to 15 percent slopes	Croton	2	depressions	2B3	Yes	No	No
2233645: Edgemont channery loam, 3 to 8 percent slopes	Andover	3	drainageways	2B3	Yes	No	No
2233646: Edgemont channery loam, 8 to 15 percent slopes	Andover	3	drainageways	2B3	Yes	No	No

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Table 4.—Hydric Soils—Continued

Map unit symbol and map unit name	Component	Percent of map unit	Landform	Hydric soils criteria			
				Hydric criteria code	Meets saturation criteria	Meets flooding criteria	Meets ponding criteria
2233647: Edgemont channery loam, 15 to 25 percent slopes	Andover	3	drainageways	2B3	Yes	No	No
2233649: Edgemont channery sandy loam, 25 to 60 percent slopes, extremely stony	Andover, extremely stony	3	drainageways	2B3	Yes	No	No
2249335: Lawrenceville silt loam, 3 to 8 percent slopes	Doylestown	3	drainageways	2B3	Yes	No	No
2379116: Birdsboro silt loam, 3 to 8 percent slopes	Lamington	3	terraces, depressions	2B3	Yes	No	No
2379949: Duffield silt loam, 3 to 8 percent slopes	Thorndale	2	depressions	2B3	Yes	No	No
2384072: Glenville silt loam, 3 to 8 percent slopes	Baile	5	depressions	2B3	Yes	No	No
2397950: Bowmansville-Knauers silt loams	Knauers	40	backwater area, flood plains	3, 2B3	Yes	No	Yes

Explanation of hydric criteria codes:

1. All Histels (except for Folistels), and Histosols (except for Folists), which are, by definition, saturated.
2. Soils in Aquic suborders, great groups, or subgroups, Albolls suborder, Historthels great group, Histoturbels great group, Pachic subgroups, or Cumulic subgroups that:
 - A. are somewhat poorly drained and have a water table at the surface (0.0 feet) during the growing season, or
 - B. are poorly drained or very poorly drained and have either:
 - 1.) a water table at the surface (0.0 feet) during the growing season if textures are coarse sand, sand, or fine sand in all layers within a depth of 20 inches, or
 - 2.) a water table at a depth of 0.5 foot or less during the growing season if permeability is equal to or greater than 6.0 in/hr in all layers within a depth of 20 inches, or
 - 3.) a water table at a depth of 1.0 foot or less during the growing season if permeability is less than 6.0 in/hr in any layer within a depth of 20 inches.
3. Soils that are frequently ponded for periods of long or very long duration during the growing season.
4. Soils that are frequently flooded for periods of long or very long duration during the growing season.

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Table 5.—Landscape, Landform, and Parent Material

(Only major components are displayed in this report. Miscellaneous nonsoil components may not be included. Component percents may not add up to 100. MAP is the mean annual precipitation)

Map unit symbol and soil name	Percent of map unit	Slope	Elevation	MAP	Landscape	Landform	Parent material
	Pct	Pct	Ft	In			
541148: Birdsboro-----	97	0-3	200-1201	38-46	Valley	Old alluvial fan and high stream terrace	Old reddish alluvium derived from sedimentary rock
541159: Brecknock, extremely stony---	94	8-25	249-1001	40-48	Upland	Nearly level to very steep hill and low ridge	Residuum weathered from porcellanite and/or red metamorphosed residuum weathered from sandstone and shale
541164: Codorus-----	85	0-3	200-600	38-46	Upland	Nearly level flood plain	Alluvium derived from gneiss and/or alluvium derived from mica schist
541165: Croton-----	82	0-3	None assigned	40-48	Upland	Depression	Residuum weathered from sandstone and shale
541194: Lawrenceville-----	81	0-3	299-1499	40-46	None assigned	Upland slope	Loess over residuum weathered from shale and siltstone
541245: Raritan-----	96	0-3	200-1001	38-46	Upland	Red shale and sandstone stream terrace	Reddish alluvium derived from shale and siltstone
541247: Readington-----	85	0-3	299-899	36-50	Upland	Red shale, siltstone, and sandstone hillslope	Residuum weathered from shale and siltstone
541254: Rowland-----	82	0-3	299-600	36-50	Upland	Relatively narrow, nearly level flood plain	Alluvium derived from sandstone and shale
541256: Rowland-----	95	0-3	299-899	36-50	Upland	Relatively narrow, nearly level flood plain	Alluvium derived from sandstone and shale

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Table 5.—Landscape, Landform, and Parent Material—Continued

Map unit symbol and soil name	Percent of map unit	Slope	Elevation	MAP	Landscape	Landform	Parent material
	Pct	Pct	Ft	In			
541257: Rowland-----	90	3-8	299-899	36-50	Upland	Relatively narrow, nearly level flood plain	Alluvium derived from sandstone and shale
641312: Duffield-----	90	3-8	299-1001	36-50	Limestone valley	Hill	Residuum weathered from limestone and siltstone
641350: Edgemont-----	93	3-8	499-1499	35-48	Mountains	Quartzite and shale ridge	Residuum weathered from quartzite and/or residuum weathered from orthoquartzite
641351: Edgemont-----	93	8-15	499-1499	35-48	Mountains	Quartzite and shale ridge	Residuum weathered from quartzite and/or residuum weathered from orthoquartzite
641352: Edgemont-----	93	15-25	499-1499	35-48	Mountains	Quartzite and shale ridge	Residuum weathered from quartzite and/or residuum weathered from orthoquartzite
641353: Edgemont, extremely stony---	90	0-8	499-1499	35-48	Mountains	Quartzite and shale ridge	Residuum weathered from quartzite and/or residuum weathered from orthoquartzite
641354: Edgemont, extremely stony---	93	8-25	499-1499	35-48	Mountains	Quartzite and shale ridge	Residuum weathered from quartzite and/or residuum weathered from orthoquartzite
641355: Edgemont, extremely stony---	93	25-60	499-1499	35-48	Mountains	Quartzite and shale ridge	Residuum weathered from quartzite and/or residuum weathered from orthoquartzite

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Table 5.—Landscape, Landform, and Parent Material—Continued

Map unit symbol and soil name	Percent of map unit	Slope	Elevation	MAP	Landscape	Landform	Parent material
	Pct	Pct	Ft	In			
641418: Codorus-----	85	0-3	200-600	38-46	Upland	Nearly level flood plain	Alluvium derived from gneiss and/or alluvium derived from mica schist
641481: Conestoga-----	90	0-3	400-1601	40-46	Hills	Hillside	Residuum weathered from schist and/or residuum weathered from limestone
641483: Conestoga-----	90	3-8	400-1601	40-46	Hills	Hillside	Residuum weathered from limestone and/or residuum weathered from schist
641484: Conestoga-----	90	8-15	400-1601	40-46	Hills	Hillside	Residuum weathered from limestone and/or residuum weathered from schist
641523: Glenville-----	90	3-8	200-801	40-50	Hills	Hillslope	Colluvium and/or residuum weathered from mica schist
641543: Lindside-----	85	0-3	299-1499	35-55	Upland	Drainageway, nearly level flood plain, and valley	Alluvium derived from limestone
641583: Penn-----	87	3-8	249-951	38-48	Upland	Nearly level to steep dissected hillslope	Residuum weathered from shale and siltstone
641584: Penn-----	90	8-15	249-951	38-48	Upland	Nearly level to steep dissected hillslope	Residuum weathered from shale and siltstone
641586: Penn-----	90	15-25	249-951	38-48	Upland	Nearly level to steep dissected hillslope	Residuum weathered from shale and siltstone
641605: Udorthents, limestone-----	100	0-8	299-899	42-48	Upland	Hill	Argillaceous limestone in graded areas

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Table 5.—Landscape, Landform, and Parent Material—Continued

Map unit symbol and soil name	Percent of map unit	Slope	Elevation	MAP	Landscape	Landform	Parent material
	Pct	Pct	Ft	In			
641614: Urban land.							
Conestoga-----	35	0-8	400-1601	40-46	Hills	Hillside	Residuum weathered from schist and/or residuum weathered from limestone
641641. Water							
810899: Mattapex-----	95	0-3	7-118	42-48	Upland	Terrace (outwash or marine)	Eolian deposits over marine deposits
810907: Clarksburg-----	90	3-8	299-1499	34-45	Upland	Limestone valley flat	Residuum weathered from limestone
1482148: Croton-----	90	3-8	200-600	40-48	Upland	Depression	Residuum weathered from sandstone and shale
1486423: Lawrenceville-----	83	3-8	299-1499	40-46	None assigned	Upland slope	Loess over residuum weathered from shale and siltstone
1539365: Gibraltar-----	95	0-2	98-801	40-50	Sandstone hills	Alluvial flood plain and levee	Coal overwash over alluvium derived from shale and siltstone
1602815: Holly-----	90	0-3	801-840	30-40	Sandstone and shale hills	Flood plain	Alluvium derived from sandstone and shale
1612216: Penn-----	90	25-35	249-951	38-48	Upland	Nearly level to steep dissected hillslope	Residuum weathered from shale and siltstone
1612248: Urban land.							
Penn-----	25	0-8	249-951	38-48	Upland	Hillslope	Residuum weathered from shale and siltstone
2229473: Udorthents, limestone-----	100	0-8	299-899	42-48	Upland	Hill	Argillaceous limestone in graded areas

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Table 5.—Landscape, Landform, and Parent Material—Continued

Map unit symbol and soil name	Percent of map unit	Slope	Elevation	MAP	Landscape	Landform	Parent material
	Pct	Pct	Ft	In			
2229474: Udorthents, limestone-----	100	8-25	299-899	42-48	Upland	Hill	Argillaceous limestone in graded areas
2229478: Udorthents, shale and sandstone-----	85	0-8	299-899	42-48	Upland	Ridge	Shale and siltstone or sandstone and shale in graded areas
2229480. Urban land							
2229481. Urban land							
2229493: Urban land. Penn-----	25	8-25	249-951	38-48	Upland	Hillslope	Residuum weathered from shale and siltstone
2229495: Urban land. Udorthents, limestone-----	15	8-25	299-899	42-48	Upland	Hill, ridge, and valley	Limestone and dolomite in graded areas
2229496: Urban land. Udorthents, schist and gneiss-----	15	0-8	299-899	42-48	Upland	Hill	Schist and/or gneiss in graded areas
2229498: Urban land. Udorthents, shale and sandstone-----	15	0-8	None assigned	44-48	Upland	Ridge	Sandstone and shale in graded areas
2229499: Urban land. Udorthents, shale and sandstone-----	15	8-25	None assigned	42-48	Upland	Hill	Sandstone and shale in graded areas
2229500. Pits							

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Table 5.—Landscape, Landform, and Parent Material—Continued

Map unit symbol and soil name	Percent of map unit	Slope	Elevation	MAP	Landscape	Landform	Parent material
	<u>Pct</u>	<u>Pct</u>	<u>Ft</u>	<u>In</u>			
2229501: Urban land.							
Readington-----	25	0-8	299-899	36-50	Upland	Red shale, siltstone, and sandstone hillslope	Residuum weathered from shale and siltstone
2230323: Buckingham-----	80	0-3	200-400	42-45	None assigned	Drainageway	Fine-loamy colluvium and old alluvium derived from shale and siltstone
2230591: Abbottstown-----	93	3-8	299-1001	40-44	Red shale valley	Hillslope	Acid reddish brown residuum weathered from shale and siltstone
2232623: Penn-----	47	15-25	249-951	38-48	Upland	Hillslope	Residuum weathered from shale and siltstone
Klinesville-----	40	15-25	299-1299	36-50	Valley	Shale and siltstone hill	Red residuum weathered from shale and siltstone
2232624: Raritan-----	90	3-8	200-1001	38-46	Upland	Red shale and sandstone stream terrace	Reddish alluvium derived from shale and siltstone
2232625: Readington-----	80	3-8	299-899	36-50	Upland	Red shale, siltstone, and sandstone hillslope	Residuum weathered from shale and siltstone
2232626: Readington-----	86	8-15	299-899	36-50	Upland	Red shale, siltstone, and sandstone hillslope	Residuum weathered from shale and siltstone
2233645: Edgemont-----	93	3-8	499-1499	35-48	Mountains	Quartzite and shale ridge	Residuum weathered from quartzite and/or residuum weathered from orthoquartzite
2233646: Edgemont-----	93	8-15	499-1499	35-48	Mountains	Quartzite and shale ridge	Residuum weathered from quartzite and/or residuum weathered from orthoquartzite

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Table 5.—Landscape, Landform, and Parent Material—Continued

Map unit symbol and soil name	Percent of map unit	Slope	Elevation	MAP	Landscape	Landform	Parent material
	Pct	Pct	Ft	In			
2233647: Edgemont-----	93	15-25	499-1499	35-48	Mountains	Quartzite and shale ridge	Residuum weathered from quartzite and/or residuum weathered from orthoquartzite
2233649: Edgemont, extremely stony---	93	25-60	499-1499	35-48	Mountains	Quartzite and shale ridge	Residuum weathered from quartzite and/or residuum weathered from orthoquartzite
2233698: Lansdale-----	92	3-8	None assigned	40-48	Hills	Rolling hillside	Residuum weathered from sandstone and/or residuum weathered from conglomerate
2233702: Penn-----	69	3-8	249-951	38-48	Upland	Hillslope	Residuum weathered from shale and siltstone
Lansdale-----	25	3-8	None assigned	40-48	Hills	Rolling hillside	Residuum weathered from sandstone and/or residuum weathered from conglomerate
2233703: Penn-----	50	8-15	249-951	38-48	Upland	Hillslope	Residuum weathered from shale and siltstone
Lansdale-----	40	8-15	None assigned	40-48	Hills	Rolling hillside	Residuum weathered from sandstone and/or residuum weathered from conglomerate
2233709: Penn-----	87	3-8	249-951	38-48	Upland	Nearly level to steep dissected hillslope	Residuum weathered from shale and siltstone
2233712: Penn-----	90	8-15	249-951	38-48	Upland	Nearly level to steep dissected hillslope	Residuum weathered from shale and siltstone
2233717: Klinesville-----	85	35-60	299-1299	36-50	Hills	Hillslope	Red residuum weathered from shale and siltstone

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Table 5.—Landscape, Landform, and Parent Material—Continued

Map unit symbol and soil name	Percent of map unit	Slope	Elevation	MAP	Landscape	Landform	Parent material
	Pct	Pct	Ft	In			
2248203: Lansdale-----	92	15-25	None assigned	40-48	Hills	Rolling hillside	Residuum weathered from sandstone and/or residuum weathered from conglomerate
2249335: Lawrenceville-----	83	3-8	299-1499	40-46	None assigned	Upland slope	Loess over residuum weathered from shale and siltstone
2379116: Birdsboro-----	92	3-8	200-1201	38-46	Valley	Old alluvial fan and high stream terrace	Old reddish alluvium derived from sedimentary rock
2379949: Duffield-----	90	3-8	299-1001	36-50	Limestone valley	Hill	Residuum weathered from limestone and siltstone
2384072: Glenville-----	90	3-8	200-801	40-50	Hills	Hillslope	Colluvium and/or residuum weathered from mica schist
2386596: Duffield-----	85	8-15	299-1001	36-50	Limestone valley	Hill	Residuum weathered from limestone
2386599: Duffield-----	85	8-15	299-1001	36-50	Limestone valley	Hill	Residuum weathered from limestone
2397950: Bowmansville-----	40	0-3	200-899	42-48	Upland	Nearly level flood plain	Recent alluvial deposits weathered from sandstone and siltstone
Knauers-----	40	0-3	151-449	38-48	Valley	Backwater area on flood plain	Recent alluvium derived from sandstone and shale

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Table 6.-Land Management, Part I (Planting)

(Onsite investigation may be needed to validate the interpretations in this table and to confirm the identity of the soil on a given site. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table)

Map unit symbol and soil name	Pct. of map unit	Suitability for hand planting		Suitability for mechanical planting		Soil rutting hazard	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
541148: Birdsboro-----	97	Well suited		Well suited		Severe Low strength	1.00
541159: Brecknock, extremely stony----	94	Moderately suited Rock fragments	0.50	Poorly suited Slope Rock fragments	0.75 0.75	Severe Low strength	1.00
541164: Codorus-----	85	Well suited		Well suited		Severe Low strength	1.00
541165: Croton-----	82	Well suited		Well suited		Severe Low strength	1.00
541194: Lawrenceville-----	81	Well suited		Well suited		Severe Low strength	1.00
541245: Raritan-----	96	Well suited		Well suited		Severe Low strength	1.00
541247: Readington-----	85	Well suited		Well suited		Severe Low strength	1.00
541254: Rowland-----	82	Well suited		Well suited		Severe Low strength	1.00
541256: Rowland-----	95	Well suited		Well suited		Severe Low strength	1.00
541257: Rowland-----	90	Well suited		Moderately suited Slope	0.50	Severe Low strength	1.00
641312: Duffield-----	90	Well suited		Moderately suited Slope	0.50	Severe Low strength	1.00
641350: Edgemont-----	93	Well suited		Moderately suited Rock fragments Slope	0.50 0.50	Moderate Low strength	0.50
641351: Edgemont-----	93	Well suited		Moderately suited Slope Rock fragments	0.50 0.50	Moderate Low strength	0.50

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Table 6.-Land Management, Part I (Planting)-Continued

Map unit symbol and soil name	Pct. of map unit	Suitability for hand planting		Suitability for mechanical planting		Soil rutting hazard	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
641352: Edgemont-----	93	Well suited		Poorly suited Slope Rock fragments	0.75 0.50	Moderate Low strength	0.50
641353: Edgemont, extremely stony-----	90	Moderately suited Rock fragments	0.50	Poorly suited Rock fragments	0.75	Moderate Low strength	0.50
641354: Edgemont, extremely stony-----	93	Moderately suited Rock fragments	0.50	Poorly suited Slope Rock fragments	0.75 0.75	Moderate Low strength	0.50
641355: Edgemont, extremely stony-----	93	Moderately suited Rock fragments Slope	0.50 0.50	Unsuited Slope Rock fragments	1.00 0.75	Moderate Low strength	0.50
641418: Codorus-----	85	Well suited		Well suited		Severe Low strength	1.00
641481: Conestoga-----	90	Moderately suited Stickiness; high plasticity index	0.50	Moderately suited Stickiness; high plasticity index	0.50	Severe Low strength	1.00
641483: Conestoga-----	90	Moderately suited Stickiness; high plasticity index	0.50	Moderately suited Slope Stickiness; high plasticity index	0.50 0.50	Severe Low strength	1.00
641484: Conestoga-----	90	Moderately suited Stickiness; high plasticity index	0.50	Moderately suited Slope Stickiness; high plasticity index	0.50 0.50	Severe Low strength	1.00
641523: Glenville-----	90	Well suited		Moderately suited Slope	0.50	Severe Low strength	1.00
641543: Lindside-----	85	Well suited		Well suited		Severe Low strength	1.00
641583: Penn-----	87	Well suited		Moderately suited Slope	0.50	Severe Low strength	1.00
641584: Penn-----	90	Well suited		Moderately suited Slope	0.50	Severe Low strength	1.00

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Table 6.-Land Management, Part I (Planting)-Continued

Map unit symbol and soil name	Pct. of map unit	Suitability for hand planting		Suitability for mechanical planting		Soil rutting hazard	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
641586: Penn-----	90	Well suited		Poorly suited Slope	0.75	Severe Low strength	1.00
641605: Udorthents, limestone-----	100	Moderately suited Stickiness; high plasticity index	0.50	Moderately suited Stickiness; high plasticity index	0.50	Severe Low strength	1.00
641614: Urban land-----	50	Not rated		Not rated		Not rated	
Conestoga-----	35	Moderately suited Stickiness; high plasticity index	0.50	Moderately suited Stickiness; high plasticity index	0.50	Severe Low strength	1.00
641641: Water-----	100	Not rated		Not rated		Not rated	
810899: Mattapex-----	95	Well suited		Well suited		Severe Low strength	1.00
810907: Clarksburg-----	90	Well suited		Moderately suited Slope	0.50	Severe Low strength	1.00
1482148: Croton-----	90	Well suited		Moderately suited Slope	0.50	Severe Low strength	1.00
1486423: Lawrenceville-----	83	Well suited		Moderately suited Slope	0.50	Severe Low strength	1.00
1539365: Gibraltar-----	95	Well suited		Well suited		Severe Low strength	1.00
1602815: Holly-----	90	Poorly suited Wetness	0.75	Poorly suited Wetness	0.75	Severe Low strength	1.00
1612216: Penn-----	90	Well suited		Unsuited Slope	1.00	Severe Low strength	1.00
1612248: Urban land-----	65	Not rated		Not rated		Not rated	
Penn-----	25	Well suited		Well suited		Severe Low strength	1.00
2229473: Udorthents, limestone-----	100	Moderately suited Stickiness; high plasticity index	0.50	Moderately suited Stickiness; high plasticity index	0.50	Severe Low strength	1.00

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Table 6.-Land Management, Part I (Planting)-Continued

Map unit symbol and soil name	Pct. of map unit	Suitability for hand planting		Suitability for mechanical planting		Soil rutting hazard	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
2229474: Udorthents, limestone-----	100	Moderately suited Stickiness; high plasticity index	0.50	Poorly suited Slope Stickiness; high plasticity index	0.75 0.50	Severe Low strength	1.00
2229478: Udorthents, shale and sandstone-----	85	Well suited		Well suited		Severe Low strength	1.00
2229480: Urban land-----	90	Not rated		Not rated		Not rated	
2229481: Urban land-----	90	Not rated		Not rated		Not rated	
2229493: Urban land-----	65	Not rated		Not rated		Not rated	
Penn-----	25	Well suited		Poorly suited Slope	0.75	Severe Low strength	1.00
2229495: Urban land-----	80	Not rated		Not rated		Not rated	
Udorthents, limestone-----	15	Moderately suited Stickiness; high plasticity index	0.50	Poorly suited Slope Stickiness; high plasticity index	0.75 0.50	Severe Low strength	1.00
2229496: Urban land-----	80	Not rated		Not rated		Not rated	
Udorthents, schist and gneiss-----	15	Well suited		Well suited		Severe Low strength	1.00
2229498: Urban land-----	80	Not rated		Not rated		Not rated	
Udorthents, shale and sandstone-----	15	Well suited		Moderately suited Rock fragments	0.50	Slight Strength	0.10
2229499: Urban land-----	80	Not rated		Not rated		Not rated	
Udorthents, shale and sandstone-----	15	Well suited		Poorly suited Slope Rock fragments	0.75 0.50	Slight Strength	0.10
2229500: Pits, quarries-----	80	Not rated		Not rated		Not rated	

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Table 6.-Land Management, Part I (Planting)-Continued

Map unit symbol and soil name	Pct. of map unit	Suitability for hand planting		Suitability for mechanical planting		Soil rutting hazard	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
2229501: Urban land-----	65	Not rated		Not rated		Not rated	
Readington-----	25	Well suited		Well suited		Severe Low strength	1.00
2230323: Buckingham-----	80	Well suited		Well suited		Severe Low strength	1.00
2230591: Abbottstown-----	93	Well suited		Moderately suited Slope	0.50	Severe Low strength	1.00
2232623: Penn-----	47	Well suited		Poorly suited Slope	0.75	Severe Low strength	1.00
Klinesville-----	40	Well suited		Poorly suited Slope Rock fragments	0.75 0.50	Moderate Low strength	0.50
2232624: Raritan-----	90	Well suited		Moderately suited Slope	0.50	Severe Low strength	1.00
2232625: Readington-----	80	Well suited		Moderately suited Slope	0.50	Severe Low strength	1.00
2232626: Readington-----	86	Well suited		Moderately suited Slope	0.50	Severe Low strength	1.00
2233645: Edgemont-----	93	Well suited		Moderately suited Rock fragments Slope	0.50 0.50	Moderate Low strength	0.50
2233646: Edgemont-----	93	Well suited		Moderately suited Slope Rock fragments	0.50 0.50	Moderate Low strength	0.50
2233647: Edgemont-----	93	Well suited		Poorly suited Slope Rock fragments	0.75 0.50	Moderate Low strength	0.50
2233649: Edgemont, extremely stony-----	93	Moderately suited Rock fragments Slope	0.50 0.50	Unsuited Slope Rock fragments	1.00 0.75	Moderate Low strength	0.50
2233698: Lansdale-----	92	Well suited		Moderately suited Slope	0.50	Severe Low strength	1.00

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Table 6.-Land Management, Part I (Planting)-Continued

Map unit symbol and soil name	Pct. of map unit	Suitability for hand planting		Suitability for mechanical planting		Soil rutting hazard	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
2233702: Penn-----	69	Well suited		Moderately suited Slope	0.50	Severe Low strength	1.00
Lansdale-----	25	Well suited		Moderately suited Slope	0.50	Moderate Low strength	0.50
2233703: Penn-----	50	Well suited		Moderately suited Slope	0.50	Severe Low strength	1.00
Lansdale-----	40	Well suited		Moderately suited Slope	0.50	Severe Low strength	1.00
2233709: Penn-----	87	Well suited		Moderately suited Slope	0.50	Severe Low strength	1.00
2233712: Penn-----	90	Well suited		Moderately suited Slope	0.50	Severe Low strength	1.00
2233717: Klinesville-----	85	Moderately suited Slope Rock fragments	0.50 0.50	Unsuited Slope Rock fragments	1.00 0.75	Moderate Low strength	0.50
2248203: Lansdale-----	92	Well suited		Poorly suited Slope	0.75	Severe Low strength	1.00
2249335: Lawrenceville-----	83	Well suited		Moderately suited Slope	0.50	Severe Low strength	1.00
2379116: Birdsboro-----	92	Well suited		Moderately suited Slope	0.50	Severe Low strength	1.00
2379949: Duffield-----	90	Well suited		Moderately suited Slope	0.50	Severe Low strength	1.00
2384072: Glenville-----	90	Well suited		Moderately suited Slope	0.50	Severe Low strength	1.00
2386596: Duffield-----	85	Well suited		Moderately suited Slope	0.50	Severe Low strength	1.00
2386599: Duffield-----		Well suited		Moderately suited Slope	0.50	Severe Low strength	1.00
2397950: Bowmansville-----	40	Moderately suited Stickiness; high plasticity index	0.50	Moderately suited Stickiness; high plasticity index	0.50	Severe Low strength	1.00
Knauers-----	40	Well suited		Well suited		Severe Low strength	1.00

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Table 6.—Land Management, Part II (Hazard of Erosion and Suitability for Roads)

(Onsite investigation may be needed to validate the interpretations in this table and to confirm the identity of the soil on a given site. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table)

Map unit symbol and soil name	Pct. of map unit	Hazard of erosion		Hazard of erosion on roads and trails		Suitability for roads (natural surface)	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
541148: Birdsboro-----	97	Slight		Slight		Moderately suited Low strength	0.50
541159: Brecknock, extremely stony----	94	Moderate Slope/erodibility	0.50	Severe Slope/erodibility	0.95	Poorly suited Slope Low strength Rock fragments	1.00 0.50 0.50
541164: Codorus-----	85	Slight		Slight		Poorly suited Flooding Low strength	1.00 0.50
541165: Croton-----	82	Slight		Slight		Poorly suited Ponding Wetness Low strength	1.00 1.00 0.50
541194: Lawrenceville-----	81	Slight		Slight		Moderately suited Low strength	0.50
541245: Raritan-----	96	Slight		Slight		Moderately suited Wetness Low strength	0.50 0.50
541247: Readington-----	85	Slight		Slight		Moderately suited Low strength	0.50
541254: Rowland-----	82	Slight		Slight		Moderately suited Low strength Flooding	0.50 0.50
541256: Rowland-----	95	Slight		Slight		Poorly suited Flooding Low strength	1.00 0.50
541257: Rowland-----	90	Slight		Moderate Slope/erodibility	0.50	Poorly suited Flooding Low strength Slope	1.00 0.50 0.50
641312: Duffield-----	90	Slight		Moderate Slope/erodibility	0.50	Moderately suited Low strength Slope	0.50 0.50

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Table 6.—Land Management, Part II (Hazard of Erosion and Suitability for Roads)—Continued

Map unit symbol and soil name	Pct. of map unit	Hazard of erosion		Hazard of erosion on roads and trails		Suitability for roads (natural surface)	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
641350: Edgemont-----	93	Slight		Moderate Slope/erodibility	0.50	Moderately suited Slope	0.50
641351: Edgemont-----	93	Slight		Moderate Slope/erodibility	0.50	Moderately suited Slope	0.50
641352: Edgemont-----	93	Moderate Slope/erodibility	0.50	Severe Slope/erodibility	0.95	Poorly suited Slope	1.00
641353: Edgemont, extremely stony-----	90	Slight		Slight		Moderately suited Rock fragments	0.50
641354: Edgemont, extremely stony-----	93	Moderate Slope/erodibility	0.50	Severe Slope/erodibility	0.95	Poorly suited Slope Rock fragments	1.00 0.50
641355: Edgemont, extremely stony-----	93	Severe Slope/erodibility	0.75	Severe Slope/erodibility	0.95	Poorly suited Slope Rock fragments	1.00 0.50
641418: Codorus-----	85	Slight		Slight		Poorly suited Flooding Low strength	1.00 0.50
641481: Conestoga-----	90	Slight		Slight		Moderately suited Low strength	0.50
641483: Conestoga-----	90	Slight		Moderate Slope/erodibility	0.50	Moderately suited Low strength Slope	0.50 0.50
641484: Conestoga-----	90	Slight		Severe Slope/erodibility	0.95	Moderately suited Slope Low strength	0.50 0.50
641523: Glenville-----	90	Slight		Moderate Slope/erodibility	0.50	Moderately suited Wetness Low strength Slope	0.50 0.50 0.50
641543: Lindside-----	85	Slight		Slight		Moderately suited Low strength Flooding	0.50 0.50

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Table 6.—Land Management, Part II (Hazard of Erosion and Suitability for Roads)—Continued

Map unit symbol and soil name	Pct. of map unit	Hazard of erosion		Hazard of erosion on roads and trails		Suitability for roads (natural surface)	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
641583: Penn-----	87	Slight		Moderate Slope/erodibility	0.50	Moderately suited Low strength Slope	0.50 0.50
641584: Penn-----	90	Slight		Severe Slope/erodibility	0.95	Moderately suited Slope Low strength	0.50 0.50
641586: Penn-----	90	Moderate Slope/erodibility	0.50	Severe Slope/erodibility	0.95	Poorly suited Slope Low strength	1.00 0.50
641605: Udorthents, limestone-----	100	Slight		Moderate Slope/erodibility	0.50	Moderately suited Low strength	0.50
641614: Urban land-----	50	Not rated		Not rated		Not rated	
Conestoga-----	35	Slight		Moderate Slope/erodibility	0.50	Moderately suited Low strength	0.50
641641: Water-----	100	Not rated		Not rated		Not rated	
810899: Mattapex-----	95	Slight		Slight		Moderately suited Low strength	0.50
810907: Clarksburg-----	90	Slight		Moderate Slope/erodibility	0.50	Moderately suited Low strength Slope	0.50 0.50
1482148: Croton-----	90	Slight		Moderate Slope/erodibility	0.50	Poorly suited Ponding Wetness Low strength Slope	1.00 1.00 0.50 0.50
1486423: Lawrenceville-----	83	Slight		Moderate Slope/erodibility	0.50	Moderately suited Low strength Slope	0.50 0.50
1539365: Gibraltar-----	95	Slight		Slight		Moderately suited Low strength	0.50
1602815: Holly-----	90	Slight		Slight		Poorly suited Ponding Flooding Wetness Low strength	1.00 1.00 1.00 0.50

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Table 6.—Land Management, Part II (Hazard of Erosion and Suitability for Roads)—Continued

Map unit symbol and soil name	Pct. of map unit	Hazard of erosion		Hazard of erosion on roads and trails		Suitability for roads (natural surface)	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
1612216: Penn-----	90	Moderate Slope/erodibility	0.50	Severe Slope/erodibility	0.95	Poorly suited Slope Low strength	1.00 0.50
1612248: Urban land-----	65	Not rated		Not rated		Not rated	
Penn-----	25	Slight		Moderate Slope/erodibility	0.50	Moderately suited Low strength	0.50
2229473: Udorthents, limestone-----	100	Slight		Moderate Slope/erodibility	0.50	Moderately suited Low strength	0.50
2229474: Udorthents, limestone-----	100	Moderate Slope/erodibility	0.50	Severe Slope/erodibility	0.95	Poorly suited Slope Low strength	1.00 0.50
2229478: Udorthents, shale and sandstone-----	85	Slight		Moderate Slope/erodibility	0.50	Moderately suited Low strength	0.50
2229480: Urban land-----	90	Not rated		Not rated		Not rated	
2229481: Urban land-----	90	Not rated		Not rated		Not rated	
2229493: Urban land-----	65	Not rated		Not rated		Not rated	
Penn-----	25	Moderate Slope/erodibility	0.50	Severe Slope/erodibility	0.95	Poorly suited Slope Low strength	1.00 0.50
2229495: Urban land-----	80	Not rated		Not rated		Not rated	
Udorthents, limestone-----	15	Moderate Slope/erodibility	0.50	Severe Slope/erodibility	0.95	Poorly suited Slope Wetness Low strength	1.00 0.50 0.50
2229496: Urban land-----	80	Not rated		Not rated		Not rated	
Udorthents, schist and gneiss-----	15	Slight		Moderate Slope/erodibility	0.50	Moderately suited Low strength	0.50
2229498: Urban land-----	80	Not rated		Not rated		Not rated	
Udorthents, shale and sandstone-----	15	Slight		Slight		Well suited	

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Table 6.—Land Management, Part II (Hazard of Erosion and Suitability for Roads)—Continued

Map unit symbol and soil name	Pct. of map unit	Hazard of erosion		Hazard of erosion on roads and trails		Suitability for roads (natural surface)	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
2229499: Urban land-----	80	Not rated		Not rated		Not rated	
Udorthents, shale and sandstone-----	15	Moderate Slope/erodibility	0.50	Severe Slope/erodibility	0.95	Poorly suited Slope	1.00
2229500: Pits, quarries-----	80	Not rated		Not rated		Not rated	
2229501: Urban land-----	65	Not rated		Not rated		Not rated	
Readington-----	25	Slight		Moderate Slope/erodibility	0.50	Moderately suited Low strength	0.50
2230323: Buckingham-----	80	Slight		Slight		Moderately suited Wetness Low strength	0.50 0.50
2230591: Abbottstown-----	93	Slight		Moderate Slope/erodibility	0.50	Moderately suited Wetness Low strength Slope	0.50 0.50 0.50
2232623: Penn-----	47	Moderate Slope/erodibility	0.50	Severe Slope/erodibility	0.95	Poorly suited Slope Low strength	1.00 0.50
Klinesville-----	40	Moderate Slope/erodibility	0.50	Severe Slope/erodibility	0.95	Poorly suited Slope	1.00
2232624: Raritan-----	90	Slight		Moderate Slope/erodibility	0.50	Moderately suited Wetness Low strength Slope	0.50 0.50 0.50
2232625: Readington-----	80	Slight		Moderate Slope/erodibility	0.50	Moderately suited Low strength Slope	0.50 0.50
2232626: Readington-----	86	Moderate Slope/erodibility	0.50	Severe Slope/erodibility	0.95	Moderately suited Slope Low strength	0.50 0.50
2233645: Edgemont-----	93	Slight		Moderate Slope/erodibility	0.50	Moderately suited Slope	0.50
2233646: Edgemont-----	93	Slight		Moderate Slope/erodibility	0.50	Moderately suited Slope	0.50
2233647: Edgemont-----	93	Moderate Slope/erodibility	0.50	Severe Slope/erodibility	0.95	Poorly suited Slope	1.00

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Table 6.—Land Management, Part II (Hazard of Erosion and Suitability for Roads)—Continued

Map unit symbol and soil name	Pct. of map unit	Hazard of erosion		Hazard of erosion on roads and trails		Suitability for roads (natural surface)	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
2233649: Edgemont, extremely stony-----	93	Severe Slope/erodibility	0.75	Severe Slope/erodibility	0.95	Poorly suited Slope Rock fragments	1.00 0.50
2233698: Lansdale-----	92	Slight		Moderate Slope/erodibility	0.50	Moderately suited Low strength Slope	0.50 0.50
2233702: Penn-----	69	Slight		Moderate Slope/erodibility	0.50	Moderately suited Low strength Slope	0.50 0.50
Lansdale-----	25	Slight		Moderate Slope/erodibility	0.50	Moderately suited Slope	0.50
2233703: Penn-----	50	Slight		Severe Slope/erodibility	0.95	Moderately suited Slope Low strength	0.50 0.50
Lansdale-----	40	Slight		Severe Slope/erodibility	0.95	Moderately suited Slope Low strength	0.50 0.50
2233709: Penn-----	87	Slight		Moderate Slope/erodibility	0.50	Moderately suited Low strength Slope	0.50 0.50
2233712: Penn-----	90	Slight		Severe Slope/erodibility	0.95	Moderately suited Slope Low strength	0.50 0.50
2233717: Klinesville-----	85	Severe Slope/erodibility	0.75	Severe Slope/erodibility	0.95	Poorly suited Slope	1.00
2248203: Lansdale-----	92	Moderate Slope/erodibility	0.50	Severe Slope/erodibility	0.95	Poorly suited Slope Low strength	1.00 0.50
2249335: Lawrenceville-----	83	Slight		Moderate Slope/erodibility	0.50	Moderately suited Low strength Slope	0.50 0.50
2379116: Birdsboro-----	92	Slight		Moderate Slope/erodibility	0.50	Moderately suited Low strength Slope	0.50 0.50
2379949: Duffield-----	90	Slight		Moderate Slope/erodibility	0.50	Moderately suited Low strength Slope	0.50 0.50

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Table 6.—Land Management, Part II (Hazard of Erosion and Suitability for Roads)—Continued

Map unit symbol and soil name	Pct. of map unit	Hazard of erosion		Hazard of erosion on roads and trails		Suitability for roads (natural surface)	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
2384072: Glenville-----	90	Slight		Moderate Slope/erodibility	0.50	Moderately suited Wetness Low strength Slope	0.50 0.50 0.50
2386596: Duffield-----	85	Moderate Slope/erodibility	0.50	Severe Slope/erodibility	0.95	Moderately suited Slope Low strength	0.50 0.50
2386599: Duffield-----		Moderate Slope/erodibility	0.50	Severe Slope/erodibility	0.95	Moderately suited Slope Low strength	0.50 0.50
2397950: Bowmansville-----	40	Slight		Slight		Poorly suited Flooding Wetness Low strength	1.00 1.00 0.50
Knauers-----	40	Slight		Slight		Poorly suited Ponding Flooding Wetness Low strength	1.00 1.00 1.00 0.50

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Table 6.—Land Management, Part III (Site Preparation)

(Onsite investigation may be needed to validate the interpretations in this table and to confirm the identity of the soil on a given site. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table)

Map unit symbol and soil name	Pct. of map unit	Suitability for mechanical site preparation (deep)		Suitability for mechanical site preparation (surface)	
		Rating class and limiting features	Value	Rating class and limiting features	Value
541148: Birdsboro-----	97	Well suited		Well suited	
541159: Brecknock, extremely stony----	94	Poorly suited Slope Rock fragments	0.50 0.50	Poorly suited Slope Rock fragments	0.50 0.50
541164: Codorus-----	85	Well suited		Well suited	
541165: Croton-----	82	Well suited		Well suited	
541194: Lawrenceville-----	81	Well suited		Well suited	
541245: Raritan-----	96	Well suited		Well suited	
541247: Readington-----	85	Well suited		Well suited	
541254: Rowland-----	82	Well suited		Well suited	
541256: Rowland-----	95	Well suited		Well suited	
541257: Rowland-----	90	Well suited		Well suited	
641312: Duffield-----	90	Well suited		Well suited	
641350: Edgemont-----	93	Well suited		Well suited	
641351: Edgemont-----	93	Well suited		Well suited	
641352: Edgemont-----	93	Poorly suited Slope	0.50	Poorly suited Slope	0.50
641353: Edgemont, extremely stony-----	90	Poorly suited Rock fragments	0.50	Poorly suited Rock fragments	0.50

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Table 6.—Land Management, Part III (Site Preparation)—Continued

Map unit symbol and soil name	Pct. of map unit	Suitability for mechanical site preparation (deep)		Suitability for mechanical site preparation (surface)	
		Rating class and limiting features	Value	Rating class and limiting features	Value
641354: Edgemont, extremely stony-----	93	Poorly suited Rock fragments Slope	0.50 0.50	Poorly suited Rock fragments Slope	0.50 0.50
641355: Edgemont, extremely stony-----	93	Unsuited Slope Rock fragments	1.00 0.50	Unsuited Slope Rock fragments	1.00 0.50
641418: Codorus-----	85	Well suited		Well suited	
641481: Conestoga-----	90	Well suited		Well suited	
641483: Conestoga-----	90	Well suited		Well suited	
641484: Conestoga-----	90	Well suited		Well suited	
641523: Glenville-----	90	Well suited		Well suited	
641543: Lindside-----	85	Well suited		Well suited	
641583: Penn-----	87	Unsuited Restrictive layer	1.00	Well suited	
641584: Penn-----	90	Unsuited Restrictive layer	1.00	Well suited	
641586: Penn-----	90	Poorly suited Slope	0.50	Poorly suited Slope	0.50
641605: Udorthents, limestone-----	100	Well suited		Well suited	
641614: Urban land-----	50	Not rated		Not rated	
Conestoga-----	35	Well suited		Well suited	
641641: Water-----	100	Not rated		Not rated	
810899: Mattapex-----	95	Well suited		Well suited	
810907: Clarksburg-----	90	Well suited		Well suited	

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Table 6.—Land Management, Part III (Site Preparation)—Continued

Map unit symbol and soil name	Pct. of map unit	Suitability for mechanical site preparation (deep)		Suitability for mechanical site preparation (surface)	
		Rating class and limiting features	Value	Rating class and limiting features	Value
1482148: Croton-----	90	Well suited		Well suited	
1486423: Lawrenceville-----	83	Well suited		Well suited	
1539365: Gibraltar-----	95	Well suited		Well suited	
1602815: Holly-----	90	Unsuited Wetness	0.75	Poorly suited Wetness	0.75
1612216: Penn-----	90	Unsuited Restrictive layer Slope	1.00 0.50	Poorly suited Slope	0.50
1612248: Urban land-----	65	Not rated		Not rated	
Penn-----	25	Unsuited Restrictive layer	1.00	Well suited	
2229473: Udorthents, limestone-----	100	Well suited		Well suited	
2229474: Udorthents, limestone-----	100	Poorly suited Slope	0.50	Poorly suited Slope	0.50
2229478: Udorthents, shale and sandstone-----	85	Well suited		Well suited	
2229480: Urban land-----	90	Not rated		Not rated	
2229481: Urban land-----	90	Not rated		Not rated	
2229493: Urban land-----	65	Not rated		Not rated	
Penn-----	25	Unsuited Restrictive layer Slope	1.00 0.50	Poorly suited Slope	0.50
2229495: Urban land-----	80	Not rated		Not rated	
Udorthents, limestone-----	15	Poorly suited Slope	0.50	Poorly suited Slope	0.50

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Table 6.—Land Management, Part III (Site Preparation)—Continued

Map unit symbol and soil name	Pct. of map unit	Suitability for mechanical site preparation (deep)		Suitability for mechanical site preparation (surface)	
		Rating class and limiting features	Value	Rating class and limiting features	Value
2229496: Urban land-----	80	Not rated		Not rated	
Udorthents, schist and gneiss-----	15	Well suited		Well suited	
2229498: Urban land-----	80	Not rated		Not rated	
Udorthents, shale and sandstone-----	15	Well suited		Well suited	
2229499: Urban land-----	80	Not rated		Not rated	
Udorthents, shale and sandstone-----	15	Poorly suited Slope	0.50	Poorly suited Slope	0.50
2229500: Pits, quarries-----	80	Not rated		Not rated	
2229501: Urban land-----	65	Not rated		Not rated	
Readington-----	25	Well suited		Well suited	
2230323: Buckingham-----	80	Well suited		Well suited	
2230591: Abbottstown-----	93	Well suited		Well suited	
2232623: Penn-----	47	Unsuited Restrictive layer Slope	1.00 0.50	Poorly suited Slope	0.50
Klinesville-----	40	Unsuited Restrictive layer Slope	1.00 0.50	Poorly suited Slope	0.50
2232624: Raritan-----	90	Well suited		Well suited	
2232625: Readington-----	80	Well suited		Well suited	
2232626: Readington-----	86	Well suited		Well suited	
2233645: Edgemont-----	93	Well suited		Well suited	
2233646: Edgemont-----	93	Well suited		Well suited	
2233647: Edgemont-----	93	Poorly suited Slope	0.50	Poorly suited Slope	0.50

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Table 6.—Land Management, Part III (Site Preparation)—Continued

Map unit symbol and soil name	Pct. of map unit	Suitability for mechanical site preparation (deep)		Suitability for mechanical site preparation (surface)	
		Rating class and limiting features	Value	Rating class and limiting features	Value
2233649: Edgemont, extremely stony-----	93	Unsuited Slope Rock fragments	1.00 0.50	Unsuited Slope Rock fragments	1.00 0.50
2233698: Lansdale-----	92	Well suited		Well suited	
2233702: Penn-----	69	Unsuited Restrictive layer	1.00	Well suited	
Lansdale-----	25	Well suited		Well suited	
2233703: Penn-----	50	Unsuited Restrictive layer	1.00	Well suited	
Lansdale-----	40	Well suited		Well suited	
2233709: Penn-----	87	Unsuited Restrictive layer	1.00	Well suited	
2233712: Penn-----	90	Unsuited Restrictive layer	1.00	Well suited	
2233717: Klinesville-----	85	Unsuited Restrictive layer Slope	1.00 1.00	Unsuited Slope Rock fragments	1.00 0.50
2248203: Lansdale-----	92	Poorly suited Slope	0.50	Poorly suited Slope	0.50
2249335: Lawrenceville-----	83	Well suited		Well suited	
2379116: Birdsboro-----	92	Well suited		Well suited	
2379949: Duffield-----	90	Well suited		Well suited	
2384072: Glenville-----	90	Well suited		Well suited	
2386596: Duffield-----	85	Well suited		Well suited	
2386599: Duffield-----		Well suited		Well suited	
2397950: Bowmansville-----	40	Well suited		Well suited	
Knauers-----	40	Well suited		Well suited	

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Table 6.-Land Management, Part IV (Site Restoration)

(Onsite investigation may be needed to validate the interpretations in this table and to confirm the identity of the soil on a given site. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table)

Map unit symbol and soil name	Pct. of map unit	Potential for damage to soil by fire		Potential for seedling mortality	
		Rating class and limiting features	Value	Rating class and limiting features	Value
541148: Birdsboro-----	97	Low Texture/rock fragments	0.10	Low	
541159: Brecknock, extremely stony----	94	Low Texture/rock fragments	0.10	Low	
541164: Codorus-----	85	Low Texture/rock fragments	0.10	Low	
541165: Croton-----	82	Low Texture/rock fragments	0.10	High Wetness	1.00
541194: Lawrenceville-----	81	Low Texture/rock fragments	0.10	Low	
541245: Raritan-----	96	Low Texture/rock fragments	0.10	Low	
541247: Readington-----	85	Low Texture/rock fragments	0.10	Low	
541254: Rowland-----	82	Low Texture/rock fragments	0.10	Low	
541256: Rowland-----	95	Low Texture/rock fragments	0.10	Low	
541257: Rowland-----	90	Low Texture/rock fragments	0.10	Low	
641312: Duffield-----	90	Low Texture/rock fragments	0.10	Low	

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Table 6.-Land Management, Part IV (Site Restoration)-Continued

Map unit symbol and soil name	Pct. of map unit	Potential for damage to soil by fire		Potential for seedling mortality	
		Rating class and limiting features	Value	Rating class and limiting features	Value
641350: Edgemont-----	93	Low Texture/rock fragments	0.10	Low	
641351: Edgemont-----	93	Low Texture/rock fragments	0.10	Low	
641352: Edgemont-----	93	Low Texture/rock fragments	0.10	Low	
641353: Edgemont, extremely stony-----	90	Low Texture/rock fragments	0.10	Low	
641354: Edgemont, extremely stony-----	93	Low Texture/rock fragments	0.10	Moderate Soil reaction	0.50
641355: Edgemont, extremely stony-----	93	Low		Moderate Soil reaction	0.50
641418: Codorus-----	85	Low Texture/rock fragments	0.10	Low	
641481: Conestoga-----	90	Low Texture/rock fragments	0.10	Low	
641483: Conestoga-----	90	Low Texture/rock fragments	0.10	Low	
641484: Conestoga-----	90	Low Texture/rock fragments	0.10	Low	
641523: Glenville-----	90	Low Texture/rock fragments	0.10	Low	
641543: Lindside-----	85	Low Texture/rock fragments	0.10	Low	

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Table 6.-Land Management, Part IV (Site Restoration)-Continued

Map unit symbol and soil name	Pct. of map unit	Potential for damage to soil by fire		Potential for seedling mortality	
		Rating class and limiting features	Value	Rating class and limiting features	Value
641583: Penn-----	87	Low Texture/rock fragments	0.10	Low	
641584: Penn-----	90	Low Texture/rock fragments	0.10	Low	
641586: Penn-----	90	Low Texture/rock fragments	0.10	Low	
641605: Udorthents, limestone-----	100	Low		Low	
641614: Urban land-----	50	Not rated		Not rated	
Conestoga-----	35	Low Texture/rock fragments	0.10	Low	
641641: Water-----	100	Not rated		Not rated	
810899: Mattapex-----	95	Moderate Texture/rock fragments	0.50	Low	
810907: Clarksburg-----	90	Low Texture/rock fragments	0.10	Low	
1482148: Croton-----	90	Low Texture/rock fragments	0.10	High Wetness	1.00
1486423: Lawrenceville-----	83	Low Texture/rock fragments	0.10	Low	
1539365: Gibraltar-----	95	Moderate Texture/surface layer thickness/rock fragments	0.50	Low	
1602815: Holly-----	90	Low Texture/rock fragments	0.10	High Wetness	1.00

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Table 6.-Land Management, Part IV (Site Restoration)-Continued

Map unit symbol and soil name	Pct. of map unit	Potential for damage to soil by fire		Potential for seedling mortality	
		Rating class and limiting features	Value	Rating class and limiting features	Value
1612216: Penn-----	90	Low		Low	
1612248: Urban land-----	65	Not rated		Not rated	
Penn-----	25	Low Texture/rock fragments	0.10	Low	
2229473: Udorthents, limestone-----	100	Low		Low	
2229474: Udorthents, limestone-----	100	Moderate Texture/rock fragments	0.50	Moderate Available water	0.50
2229478: Udorthents, shale and sandstone-----	85	Low Texture/rock fragments	0.10	Moderate Available water	0.50
2229480: Urban land-----	90	Not rated		Not rated	
2229481: Urban land-----	90	Not rated		Not rated	
2229493: Urban land-----	65	Not rated		Not rated	
Penn-----	25	Low Texture/rock fragments	0.10	Low	
2229495: Urban land-----	80	Not rated		Not rated	
Udorthents, limestone-----	15	Low		Moderate Available water	0.50
2229496: Urban land-----	80	Not rated		Not rated	
Udorthents, schist and gneiss-----	15	Moderate Texture/rock fragments	0.50	Low	
2229498: Urban land-----	80	Not rated		Not rated	
Udorthents, shale and sandstone-----	15	Moderate Texture/rock fragments	0.50	Moderate Available water	0.50

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Table 6.-Land Management, Part IV (Site Restoration)-Continued

Map unit symbol and soil name	Pct. of map unit	Potential for damage to	Potential for seedling		
		soil by fire	mortality		
		Rating class and limiting features	Rating class and limiting features		
		Value	Value		
2229499: Urban land-----	80	Not rated	Not rated		
Udorthents, shale and sandstone-----	15	Moderate Texture/rock fragments	High Available water	0.50	1.00
2229500: Pits, quarries-----	80	Not rated	Not rated		
2229501: Urban land-----	65	Not rated	Not rated		
Readington-----	25	Low Texture/rock fragments	Low	0.10	
2230323: Buckingham-----	80	Low Texture/rock fragments	High Wetness	0.10	1.00
2230591: Abbottstown-----	93	Low Texture/rock fragments	High Wetness	0.10	1.00
2232623: Penn-----	47	Low Texture/rock fragments	Low	0.10	
Klinesville-----	40	Moderate Texture/rock fragments	Low	0.50	
2232624: Raritan-----	90	Low Texture/rock fragments	Low	0.10	
2232625: Readington-----	80	Low Texture/rock fragments	Low	0.10	
2232626: Readington-----	86	Low Texture/rock fragments	Low	0.10	
2233645: Edgemont-----	93	Low Texture/rock fragments	Low	0.10	
2233646: Edgemont-----	93	Low Texture/rock fragments	Low	0.10	

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Table 6.-Land Management, Part IV (Site Restoration)-Continued

Map unit symbol and soil name	Pct. of map unit	Potential for damage to soil by fire		Potential for seedling mortality	
		Rating class and limiting features	Value	Rating class and limiting features	Value
2233647: Edgemont-----	93	Low Texture/rock fragments	0.10	Low	
2233649: Edgemont, extremely stony-----	93	Low		Moderate Soil reaction	0.50
2233698: Lansdale-----	92	Low Texture/rock fragments	0.10	Low	
2233702: Penn-----	69	Low Texture/rock fragments	0.10	Low	
Lansdale-----	25	Low Texture/rock fragments	0.10	Low	
2233703: Penn-----	50	Low Texture/rock fragments	0.10	Low	
Lansdale-----	40	Low Texture/rock fragments	0.10	Low	
2233709: Penn-----	87	Low Texture/rock fragments	0.10	Low	
2233712: Penn-----	90	Low Texture/rock fragments	0.10	Low	
2233717: Klinesville-----	85	High Texture/slope/ surface layer thickness/rock fragments	1.00	Low	
2248203: Lansdale-----	92	Low Texture/rock fragments	0.10	Low	
2249335: Lawrenceville-----	83	Low Texture/rock fragments	0.10	Low	

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Table 6.-Land Management, Part IV (Site Restoration)-Continued

Map unit symbol and soil name	Pct. of map unit	Potential for damage to soil by fire		Potential for seedling mortality	
		Rating class and limiting features	Value	Rating class and limiting features	Value
2379116: Birdsboro-----	92	Low Texture/rock fragments	0.10	Low	
2379949: Duffield-----	90	Low Texture/rock fragments	0.10	Low	
2384072: Glenville-----	90	Low Texture/rock fragments	0.10	Low	
2386596: Duffield-----	85	Low Texture/rock fragments	0.10	Low	
2386599: Duffield-----		Low Texture/rock fragments	0.10	Low	
2397950: Bowmansville-----	40	Low Texture/rock fragments	0.10	High Wetness	1.00
Knauers-----	40	Low Texture/rock fragments	0.10	High Wetness	1.00

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Table 7.—Recreation, Part I (Camp and Picnic Areas)

(Onsite investigation may be needed to validate the interpretations in this table and to confirm the identity of the soil on a given site. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table)

Map unit symbol and soil name	Pct. of map unit	Camp areas		Picnic areas	
		Rating class and limiting features	Value	Rating class and limiting features	Value
541148: Birdsboro-----	97	Somewhat limited Dusty	0.06	Somewhat limited Dusty	0.06
541159: Brecknock, extremely stony----	94	Very limited Large stones content Slope Dusty	1.00 1.00 0.05	Very limited Large stones content Slope Dusty	1.00 1.00 0.05
541164: Codorus-----	85	Very limited Flooding Dusty Depth to saturated zone	1.00 0.08 0.07	Somewhat limited Dusty Depth to saturated zone	0.08 0.04
541165: Croton-----	82	Very limited Depth to saturated zone Ponding Slow water movement Dusty	1.00 1.00 0.22 0.05	Very limited Ponding Depth to saturated zone Slow water movement Dusty	1.00 1.00 0.22 0.05
541194: Lawrenceville-----	81	Somewhat limited Depth to saturated zone Dusty	0.07 0.06	Somewhat limited Dusty Depth to saturated zone	0.06 0.04
541245: Raritan-----	96	Somewhat limited Depth to saturated zone Dusty	0.81 0.05	Somewhat limited Depth to saturated zone Dusty	0.48 0.05
541247: Readington-----	85	Somewhat limited Depth to saturated zone Dusty	0.07 0.04	Somewhat limited Dusty Depth to saturated zone	0.04 0.04
541254: Rowland-----	82	Very limited Flooding Depth to saturated zone Dusty	1.00 0.39 0.05	Somewhat limited Depth to saturated zone Dusty	0.19 0.05

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Table 7.—Recreation, Part I (Camp and Picnic Areas)—Continued

Map unit symbol and soil name	Pct. of map unit	Camp areas		Picnic areas	
		Rating class and limiting features	Value	Rating class and limiting features	Value
541256: Rowland-----	95	Very limited		Somewhat limited	
		Flooding	1.00	Flooding	0.40
		Slow water movement	0.22	Slow water movement	0.22
		Depth to saturated zone	0.07	Dusty	0.04
		Dusty	0.04	Depth to saturated zone	0.04
541257: Rowland-----	90	Very limited		Somewhat limited	
		Flooding	1.00	Flooding	0.40
		Depth to saturated zone	0.07	Dusty	0.04
		Dusty	0.04	Depth to saturated zone	0.04
641312: Duffield-----	90	Somewhat limited		Somewhat limited	
		Dusty	0.04	Dusty	0.04
641350: Edgemont-----	93	Somewhat limited		Somewhat limited	
		Large stones content	0.02	Large stones content	0.02
		Dusty	0.01	Dusty	0.01
641351: Edgemont-----	93	Somewhat limited		Somewhat limited	
		Slope	0.63	Slope	0.63
		Large stones content	0.02	Large stones content	0.02
		Dusty	0.01	Dusty	0.01
641352: Edgemont-----	93	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Large stones content	0.02	Large stones content	0.02
		Dusty	0.01	Dusty	0.01
641353: Edgemont, extremely stony-----	90	Very limited		Very limited	
		Large stones content	1.00	Large stones content	1.00
		Dusty	0.01	Dusty	0.01
641354: Edgemont, extremely stony-----	93	Very limited		Very limited	
		Large stones content	1.00	Large stones content	1.00
		Slope	1.00	Slope	1.00
641355: Edgemont, extremely stony-----	93	Very limited		Very limited	
		Slope	1.00	Large stones content	1.00
		Large stones content	1.00	Slope	1.00

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Table 7.—Recreation, Part I (Camp and Picnic Areas)—Continued

Map unit symbol and soil name	Pct. of map unit	Camp areas		Picnic areas	
		Rating class and limiting features	Value	Rating class and limiting features	Value
641418: Codorus-----	85	Very limited Flooding Dusty Depth to saturated zone	1.00 0.08 0.07	Somewhat limited Dusty Depth to saturated zone	0.08 0.04
641481: Conestoga-----	90	Somewhat limited Dusty	0.06	Somewhat limited Dusty	0.06
641483: Conestoga-----	90	Somewhat limited Dusty	0.06	Somewhat limited Dusty	0.06
641484: Conestoga-----	90	Somewhat limited Slope Dusty	0.63 0.06	Somewhat limited Slope Dusty	0.63 0.06
641523: Glenville-----	90	Somewhat limited Depth to saturated zone Dusty	0.81 0.04	Somewhat limited Depth to saturated zone Dusty	0.48 0.04
641543: Lindside-----	85	Very limited Flooding Depth to saturated zone Dusty	1.00 0.07 0.03	Somewhat limited Depth to saturated zone Dusty	0.04 0.03
641583: Penn-----	87	Somewhat limited Dusty	0.05	Somewhat limited Dusty	0.05
641584: Penn-----	90	Somewhat limited Slope Dusty	0.63 0.05	Somewhat limited Slope Dusty	0.63 0.05
641586: Penn-----	90	Very limited Slope Dusty	1.00 0.05	Very limited Slope Dusty	1.00 0.05
641605: Udorthents, limestone-----	100	Somewhat limited Slow water movement Dusty	0.96 0.04	Somewhat limited Slow water movement Dusty	0.96 0.04
641614: Urban land-----	50	Not rated		Not rated	
Conestoga-----	35	Somewhat limited Dusty	0.06	Somewhat limited Dusty	0.06

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Table 7.—Recreation, Part I (Camp and Picnic Areas)—Continued

Map unit symbol and soil name	Pct. of map unit	Camp areas		Picnic areas	
		Rating class and limiting features	Value	Rating class and limiting features	Value
641641: Water-----	100	Not rated		Not rated	
810899: Mattapex-----	95	Somewhat limited Depth to saturated zone Dusty	0.07 0.07	Somewhat limited Dusty Depth to saturated zone	0.07 0.04
810907: Clarksburg-----	90	Somewhat limited Depth to saturated zone Dusty	0.07 0.07	Somewhat limited Dusty Depth to saturated zone	0.07 0.04
1482148: Croton-----	90	Very limited Depth to saturated zone Ponding Slow water movement Dusty	1.00 1.00 0.22 0.05	Very limited Ponding Depth to saturated zone Slow water movement Dusty	1.00 1.00 0.22 0.05
1486423: Lawrenceville-----	83	Somewhat limited Depth to saturated zone Dusty	0.07 0.06	Somewhat limited Dusty Depth to saturated zone	0.06 0.04
1539365: Gibraltar-----	95	Very limited Flooding Dusty	1.00 0.03	Somewhat limited Dusty	0.03
1602815: Holly-----	90	Very limited Depth to saturated zone Flooding Ponding Dusty	1.00 1.00 1.00 0.09	Very limited Ponding Depth to saturated zone Flooding Dusty	1.00 1.00 0.40 0.09
1612216: Penn-----	90	Very limited Slope Dusty	1.00 0.05	Very limited Slope Dusty	1.00 0.05
1612248: Urban land-----	65	Not rated		Not rated	
Penn-----	25	Somewhat limited Gravel Dusty	0.22 0.05	Somewhat limited Gravel content Dusty	0.22 0.05
2229473: Udorthents, limestone-----	100	Somewhat limited Slow water movement Dusty	0.96 0.04	Somewhat limited Slow water movement Dusty	0.96 0.04

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Table 7.—Recreation, Part I (Camp and Picnic Areas)—Continued

Map unit symbol and soil name	Pct. of map unit	Camp areas		Picnic areas	
		Rating class and limiting features	Value	Rating class and limiting features	Value
2229474: Udorthents, limestone-----	100	Very limited Slope Slow water movement Dusty	1.00 0.96 0.04	Very limited Slope Slow water movement Dusty	1.00 0.96 0.04
2229478: Udorthents, shale and sandstone-----	85	Somewhat limited Dusty	0.05	Somewhat limited Dusty	0.05
2229480: Urban land-----	90	Not rated		Not rated	
2229481: Urban land-----	90	Not rated		Not rated	
2229493: Urban land-----	65	Not rated		Not rated	
Penn-----	25	Very limited Slope Gravel Dusty	1.00 0.22 0.05	Very limited Slope Gravel content Dusty	1.00 0.22 0.05
2229495: Urban land-----	80	Not rated		Not rated	
Udorthents, limestone-----	15	Very limited Slope Slow water movement Depth to saturated zone Dusty	1.00 0.96 0.81 0.04	Very limited Slope Slow water movement Depth to saturated zone Dusty	1.00 0.96 0.48 0.04
2229496: Urban land-----	80	Not rated		Not rated	
Udorthents, schist and gneiss-----	15	Somewhat limited Slow water movement Dusty	0.96 0.04	Somewhat limited Slow water movement Dusty	0.96 0.04
2229498: Urban land-----	80	Not rated		Not rated	
Udorthents, shale and sandstone-----	15	Somewhat limited Gravel Dusty	0.92 0.03	Somewhat limited Gravel content Dusty	0.92 0.03
2229499: Urban land-----	80	Not rated		Not rated	
Udorthents, shale and sandstone-----	15	Not rated		Not rated	

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Table 7.—Recreation, Part I (Camp and Picnic Areas)—Continued

Map unit symbol and soil name	Pct. of map unit	Camp areas		Picnic areas	
		Rating class and limiting features	Value	Rating class and limiting features	Value
2229500: Pits, quarries-----	80	Not rated		Not rated	
2229501: Urban land-----	65	Not rated		Not rated	
Readington-----	25	Somewhat limited Depth to saturated zone Dusty	0.07 0.04	Somewhat limited Dusty Depth to saturated zone	0.04 0.04
2230323: Buckingham-----	80	Very limited Depth to saturated zone Dusty	1.00 0.03	Somewhat limited Depth to saturated zone Dusty	0.99 0.03
2230591: Abbottstown-----	93	Very limited Depth to saturated zone Dusty	1.00 0.06	Somewhat limited Depth to saturated zone Dusty	0.94 0.06
2232623: Penn-----	47	Very limited Slope Gravel Dusty	1.00 0.22 0.05	Very limited Slope Gravel content Dusty	1.00 0.22 0.05
Klinesville-----	40	Very limited Slope Depth to bedrock Gravel Dusty	1.00 1.00 0.92 0.03	Very limited Slope Depth to bedrock Gravel content Dusty	1.00 1.00 0.92 0.03
2232624: Raritan-----	90	Somewhat limited Depth to saturated zone Dusty	0.81 0.05	Somewhat limited Depth to saturated zone Dusty	0.48 0.05
2232625: Readington-----	80	Somewhat limited Depth to saturated zone Dusty	0.07 0.04	Somewhat limited Dusty Depth to saturated zone	0.04 0.04
2232626: Readington-----	86	Somewhat limited Slope Depth to saturated zone Dusty	0.63 0.07 0.04	Somewhat limited Slope Dusty Depth to saturated zone	0.63 0.04 0.04
2233645: Edgemont-----	93	Somewhat limited Large stones content Dusty	0.02 0.01	Somewhat limited Large stones content Dusty	0.02 0.01

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Table 7.-Recreation, Part I (Camp and Picnic Areas)-Continued

Map unit symbol and soil name	Pct. of map unit	Camp areas		Picnic areas	
		Rating class and limiting features	Value	Rating class and limiting features	Value
2233646: Edgemont-----	93	Somewhat limited		Somewhat limited	
		Slope	0.63	Slope	0.63
		Large stones content	0.02	Large stones content	0.02
		Dusty	0.01	Dusty	0.01
2233647: Edgemont-----	93	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Large stones content	0.02	Large stones content	0.02
		Dusty	0.01	Dusty	0.01
2233649: Edgemont, extremely stony-----	93	Very limited		Very limited	
		Slope	1.00	Large stones	1.00
		Large stones content	1.00	content	1.00
				Slope	1.00
2233698: Lansdale-----	92	Somewhat limited		Somewhat limited	
		Dusty	0.01	Dusty	0.01
2233702: Penn-----	69	Somewhat limited		Somewhat limited	
		Dusty	0.05	Dusty	0.05
Lansdale-----	25	Somewhat limited		Somewhat limited	
		Dusty	0.01	Dusty	0.01
2233703: Penn-----	50	Somewhat limited		Somewhat limited	
		Slope	0.63	Slope	0.63
		Gravel	0.22	Gravel content	0.22
		Dusty	0.05	Dusty	0.05
Lansdale-----	40	Somewhat limited		Somewhat limited	
		Slope	0.63	Slope	0.63
		Dusty	0.01	Dusty	0.01
2233709: Penn-----	87	Somewhat limited		Somewhat limited	
		Dusty	0.05	Dusty	0.05
2233712: Penn-----	90	Somewhat limited		Somewhat limited	
		Slope	0.63	Slope	0.63
		Dusty	0.05	Dusty	0.05
2233717: Klinesville-----	85	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Depth to bedrock	1.00	Depth to bedrock	1.00
		Gravel	0.92	Gravel content	0.92
		Dusty	0.03	Dusty	0.03
2248203: Lansdale-----	92	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Dusty	0.01	Dusty	0.01

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Table 7.—Recreation, Part I (Camp and Picnic Areas)—Continued

Map unit symbol and soil name	Pct. of map unit	Camp areas		Picnic areas	
		Rating class and limiting features	Value	Rating class and limiting features	Value
2249335: Lawrenceville-----	83	Somewhat limited Depth to saturated zone Dusty	0.07 0.06	Somewhat limited Dusty Depth to saturated zone	0.06 0.04
2379116: Birdsboro-----	92	Somewhat limited Dusty	0.06	Somewhat limited Dusty	0.06
2379949: Duffield-----	90	Somewhat limited Dusty	0.04	Somewhat limited Dusty	0.04
2384072: Glenville-----	90	Somewhat limited Depth to saturated zone Dusty	0.81 0.04	Somewhat limited Depth to saturated zone Dusty	0.48 0.04
2386596: Duffield-----	85	Somewhat limited Slope Dusty	0.63 0.04	Somewhat limited Slope Dusty	0.63 0.04
2386599: Duffield-----		Somewhat limited Slope Dusty	0.63 0.04	Somewhat limited Slope Dusty	0.63 0.04
2397950: Bowmansville-----	40	Very limited Depth to saturated zone Flooding Slow water movement Dusty	1.00 1.00 0.22 0.02	Very limited Depth to saturated zone Slow water movement Dusty	1.00 0.22 0.02
Knauers-----	40	Very limited Depth to saturated zone Flooding Ponding Slow water movement Dusty	1.00 1.00 1.00 0.22 0.04	Very limited Ponding Depth to saturated zone Slow water movement Dusty	1.00 1.00 0.22 0.04

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Table 7.-Recreation, Part II (Trail Management)

(Onsite investigation may be needed to validate the interpretations in this table and to confirm the identity of the soil on a given site. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table)

Map unit symbol and soil name	Pct. of map unit	Foot traffic and equestrian trails		Mountain bike and off-road vehicle trails	
		Rating class and limiting features	Value	Rating class and limiting features	Value
541148: Birdsboro-----	97	Not limited		Not limited	
541159: Brecknock, extremely stony----	94	Very limited Large stones content Slope	1.00 0.08	Very limited Large stones content	1.00
541164: Codorus-----	85	Not limited		Not limited	
541165: Croton-----	82	Very limited Depth to saturated zone Ponding	1.00 1.00	Very limited Depth to saturated zone Ponding	1.00 1.00
541194: Lawrenceville-----	81	Not limited		Not limited	
541245: Raritan-----	96	Somewhat limited Depth to saturated zone	0.11	Somewhat limited Depth to saturated zone	0.11
541247: Readington-----	85	Not limited		Not limited	
541254: Rowland-----	82	Not limited		Not limited	
541256: Rowland-----	95	Somewhat limited Flooding	0.40	Somewhat limited Flooding	0.40
541257: Rowland-----	90	Somewhat limited Flooding	0.40	Somewhat limited Flooding	0.40
641312: Duffield-----	90	Not limited		Not limited	
641350: Edgemont-----	93	Somewhat limited Large stones content	0.02	Somewhat limited Large stones content	0.02
641351: Edgemont-----	93	Somewhat limited Large stones content	0.02	Somewhat limited Large stones content	0.02

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Table 7.-Recreation, Part II (Trail Management)-Continued

Map unit symbol and soil name	Pct. of map unit	Foot traffic and equestrian trails		Mountain bike and off-road vehicle trails	
		Rating class and limiting features	Value	Rating class and limiting features	Value
641352: Edgemont-----	93	Somewhat limited Slope Large stones content	0.50 0.02	Somewhat limited Large stones content	0.02
641353: Edgemont, extremely stony-----	90	Very limited Large stones content	1.00	Very limited Large stones content	1.00
641354: Edgemont, extremely stony-----	93	Very limited Large stones content Slope	1.00 0.08	Very limited Large stones content	1.00
641355: Edgemont, extremely stony-----	93	Very limited Large stones content Slope	1.00 1.00	Very limited Large stones content Slope	1.00 1.00
641418: Codorus-----	85	Not limited		Not limited	
641481: Conestoga-----	90	Not limited		Not limited	
641483: Conestoga-----	90	Not limited		Not limited	
641484: Conestoga-----	90	Not limited		Not limited	
641523: Glenville-----	90	Somewhat limited Depth to saturated zone	0.11	Somewhat limited Depth to saturated zone	0.11
641543: Lindside-----	85	Not limited		Not limited	
641583: Penn-----	87	Not limited		Not limited	
641584: Penn-----	90	Not limited		Not limited	
641586: Penn-----	90	Somewhat limited Slope	0.50	Not limited	
641605: Udorthents, limestone-----	100	Not limited		Not limited	

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Table 7.-Recreation, Part II (Trail Management)-Continued

Map unit symbol and soil name	Pct. of map unit	Foot traffic and equestrian trails		Mountain bike and off-road vehicle trails	
		Rating class and limiting features	Value	Rating class and limiting features	Value
641614: Urban land-----	50	Not rated		Not rated	
Conestoga-----	35	Not limited		Not limited	
641641: Water-----	100	Not rated		Not rated	
810899: Mattapex-----	95	Not limited		Not limited	
810907: Clarksburg-----	90	Not limited		Not limited	
1482148: Croton-----	90	Very limited Depth to saturated zone Ponding	1.00 1.00	Very limited Depth to saturated zone Ponding	1.00 1.00
1486423: Lawrenceville-----	83	Not limited		Not limited	
1539365: Gibraltar-----	95	Not limited		Not limited	
1602815: Holly-----	90	Very limited Depth to saturated zone Ponding Flooding	1.00 1.00 0.40	Very limited Depth to saturated zone Ponding Flooding	1.00 1.00 0.40
1612216: Penn-----	90	Very limited Slope	1.00	Somewhat limited Slope	0.22
1612248: Urban land-----	65	Not rated		Not rated	
Penn-----	25	Not limited		Not limited	
2229473: Udorthents, limestone-----	100	Not limited		Not limited	
2229474: Udorthents, limestone-----	100	Somewhat limited Slope	0.18	Not limited	
2229478: Udorthents, shale and sandstone-----	85	Not limited		Not limited	
2229480: Urban land-----	90	Not rated		Not rated	
2229481: Urban land-----	90	Not rated		Not rated	

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Table 7.-Recreation, Part II (Trail Management)-Continued

Map unit symbol and soil name	Pct. of map unit	Foot traffic and equestrian trails		Mountain bike and off-road vehicle trails	
		Rating class and limiting features	Value	Rating class and limiting features	Value
2229493: Urban land-----	65	Not rated		Not rated	
Penn-----	25	Somewhat limited Slope	0.08	Not limited	
2229495: Urban land-----	80	Not rated		Not rated	
Udorthents, limestone-----	15	Somewhat limited Depth to saturated zone Slope	0.11 0.08	Somewhat limited Depth to saturated zone	0.11
2229496: Urban land-----	80	Not rated		Not rated	
Udorthents, schist and gneiss-----	15	Not limited		Not limited	
2229498: Urban land-----	80	Not rated		Not rated	
Udorthents, shale and sandstone-----	15	Not limited		Not limited	
2229499: Urban land-----	80	Not rated		Not rated	
Udorthents, shale and sandstone-----	15	Not rated		Not rated	
2229500: Pits, quarries-----	80	Not rated		Not rated	
2229501: Urban land-----	65	Not rated		Not rated	
Readington-----	25	Not limited		Not limited	
2230323: Buckingham-----	80	Somewhat limited Depth to saturated zone	0.99	Somewhat limited Depth to saturated zone	0.99
2230591: Abbottstown-----	93	Somewhat limited Depth to saturated zone	0.86	Somewhat limited Depth to saturated zone	0.86
2232623: Penn-----	47	Somewhat limited Slope	0.50	Not limited	
Klinesville-----	40	Somewhat limited Slope	0.50	Not limited	
2232624: Raritan-----	90	Somewhat limited Depth to saturated zone	0.11	Somewhat limited Depth to saturated zone	0.11

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Table 7.-Recreation, Part II (Trail Management)-Continued

Map unit symbol and soil name	Pct. of map unit	Foot traffic and equestrian trails		Mountain bike and off-road vehicle trails	
		Rating class and limiting features	Value	Rating class and limiting features	Value
2232625: Readington-----	80	Not limited		Not limited	
2232626: Readington-----	86	Very limited Water erosion	1.00	Very limited Water erosion	1.00
2233645: Edgemont-----	93	Somewhat limited Large stones content	0.02	Somewhat limited Large stones content	0.02
2233646: Edgemont-----	93	Somewhat limited Large stones content	0.02	Somewhat limited Large stones content	0.02
2233647: Edgemont-----	93	Somewhat limited Slope Large stones content	0.50 0.02	Somewhat limited Large stones content	0.02
2233649: Edgemont, extremely stony-----	93	Very limited Large stones content Slope	1.00 1.00	Very limited Large stones content Slope	1.00 1.00
2233698: Lansdale-----	92	Not limited		Not limited	
2233702: Penn-----	69	Not limited		Not limited	
Lansdale-----	25	Not limited		Not limited	
2233703: Penn-----	50	Not limited		Not limited	
Lansdale-----	40	Not limited		Not limited	
2233709: Penn-----	87	Not limited		Not limited	
2233712: Penn-----	90	Not limited		Not limited	
2233717: Klinesville-----	85	Very limited Slope	1.00	Very limited Slope	1.00
2248203: Lansdale-----	92	Somewhat limited Slope	0.50	Not limited	
2249335: Lawrenceville-----	83	Not limited		Not limited	

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Table 7.-Recreation, Part II (Trail Management)-Continued

Map unit symbol and soil name	Pct. of map unit	Foot traffic and equestrian trails		Mountain bike and off-road vehicle trails	
		Rating class and limiting features	Value	Rating class and limiting features	Value
2379116: Birdsboro-----	92	Not limited		Not limited	
2379949: Duffield-----	90	Not limited		Not limited	
2384072: Glenville-----	90	Somewhat limited Depth to saturated zone	0.11	Somewhat limited Depth to saturated zone	0.11
2386596: Duffield-----	85	Very limited Water erosion	1.00	Very limited Water erosion	1.00
2386599: Duffield-----		Very limited Water erosion	1.00	Very limited Water erosion	1.00
2397950: Bowmansville-----	40	Very limited Depth to saturated zone	1.00	Very limited Depth to saturated zone	1.00
Knauers-----	40	Very limited Depth to saturated zone Ponding	1.00 1.00	Very limited Depth to saturated zone Ponding	1.00 1.00

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Table 8.—Dwellings and Small Commercial Buildings

(Onsite investigation may be needed to validate the interpretations in this table and to confirm the identity of the soil on a given site. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table)

Map unit symbol and soil name	Pct. of map unit	Dwellings without basements		Dwellings with basements		Small commercial buildings	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
541148: Birdsboro-----	97	Not limited		Somewhat limited Depth to saturated zone	0.61	Not limited	
541159: Brecknock, extremely stony----	94	Very limited Slope	1.00	Very limited Slope Depth to hard bedrock	1.00 0.99	Very limited Slope	1.00
541164: Codorus-----	85	Very limited Flooding Depth to saturated zone	1.00 0.07	Very limited Flooding Depth to saturated zone	1.00 1.00	Very limited Flooding Depth to saturated zone	1.00 0.07
541165: Croton-----	82	Very limited Ponding Depth to saturated zone Depth to thin cemented pan	1.00 1.00 0.50	Very limited Ponding Depth to saturated zone Depth to hard bedrock	1.00 1.00 0.88	Very limited Ponding Depth to saturated zone	1.00 1.00
541194: Lawrenceville-----	81	Somewhat limited Depth to thin cemented pan Depth to saturated zone	0.50 0.07	Very limited Depth to saturated zone	1.00	Somewhat limited Depth to saturated zone	0.07
541245: Raritan-----	96	Somewhat limited Depth to saturated zone Depth to thin cemented pan	0.81 0.50	Very limited Depth to saturated zone	1.00	Somewhat limited Depth to saturated zone	0.81
541247: Readington-----	85	Somewhat limited Depth to thin cemented pan Depth to saturated zone	0.50 0.07	Very limited Depth to saturated zone Depth to hard bedrock	1.00 0.01	Somewhat limited Depth to saturated zone	0.07
541254: Rowland-----	82	Very limited Flooding Depth to saturated zone	1.00 0.39	Very limited Flooding Depth to saturated zone	1.00 1.00	Very limited Flooding Depth to saturated zone	1.00 0.39

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Table 8.—Dwellings and Small Commercial Buildings—Continued

Map unit symbol and soil name	Pct. of map unit	Dwellings without basements		Dwellings with basements		Small commercial buildings	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
541256: Rowland-----	95	Very limited Flooding Depth to saturated zone	1.00 0.07	Very limited Flooding Depth to saturated zone	1.00 1.00	Very limited Flooding Depth to saturated zone	1.00 0.07
541257: Rowland-----	90	Very limited Flooding Depth to saturated zone	1.00 0.07	Very limited Flooding Depth to saturated zone	1.00 1.00	Very limited Flooding Slope Depth to saturated zone	1.00 0.50 10.07
641312: Duffield-----	90	Somewhat limited Shrink-swell	0.50	Somewhat limited Shrink-swell	0.50	Somewhat limited Slope Shrink-swell	0.50 0.50
641350: Edgemont-----	93	Not limited		Not limited		Somewhat limited Slope	0.50
641351: Edgemont-----	93	Somewhat limited Slope	0.63	Somewhat limited Slope	0.63	Very limited Slope	1.00
641352: Edgemont-----	93	Very limited Slope	1.00	Very limited Slope	1.00	Very limited Slope	1.00
641353: Edgemont, extremely stony-----	90	Not limited		Not limited		Not limited	
641354: Edgemont, extremely stony-----	93	Very limited Slope	1.00	Very limited Slope	1.00	Very limited Slope	1.00
641355: Edgemont, extremely stony-----	93	Very limited Slope	1.00	Very limited Slope	1.00	Very limited Slope	1.00
641418: Codorus-----	85	Very limited Flooding Depth to saturated zone	1.00 0.07	Very limited Flooding Depth to saturated zone	1.00 1.00	Very limited Flooding Depth to saturated zone	1.00 0.07
641481: Conestoga-----	90	Not limited		Not limited		Not limited	
641483: Conestoga-----	90	Not limited		Not limited		Somewhat limited Slope	0.50
641484: Conestoga-----	90	Somewhat limited Slope	0.63	Somewhat limited Slope	0.63	Very limited Slope	1.00

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Table 8.—Dwellings and Small Commercial Buildings—Continued

Map unit symbol and soil name	Pct. of map unit	Dwellings without basements		Dwellings with basements		Small commercial buildings	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
641523: Glenville-----	90	Somewhat limited Depth to saturated zone Depth to thin cemented pan	0.81 0.50	Very limited Depth to saturated zone	1.00	Somewhat limited Depth to saturated zone Slope	0.81 0.50
641543: Lindside-----	85	Very limited Flooding Depth to saturated zone	1.00 0.07	Very limited Flooding Depth to saturated zone	1.00 1.00	Very limited Flooding Depth to saturated zone	1.00 1.00 0.07
641583: Penn-----	87	Somewhat limited Depth to hard bedrock	0.64	Very limited Depth to hard bedrock	1.00	Somewhat limited Depth to hard bedrock Slope	0.64 0.50
641584: Penn-----	90	Somewhat limited Depth to hard bedrock Slope	0.64 0.63	Very limited Depth to hard bedrock Slope	1.00 0.63	Very limited Slope Depth to hard bedrock	1.00 0.64
641586: Penn-----	90	Very limited Slope Depth to hard bedrock	1.00 0.06	Very limited Slope Depth to hard bedrock	1.00 1.00	Very limited Slope Depth to hard bedrock	1.00 1.00 0.06
641605: Udorthents, limestone-----	100	Somewhat limited Shrink-swell	0.50	Somewhat limited Shrink-swell Depth to saturated zone	0.50 0.16	Somewhat limited Shrink-swell	0.50
641614: Urban land-----	50	Not rated		Not rated		Not rated	
Conestoga-----	35	Not limited		Not limited		Not limited	
641641: Water-----	100	Not rated		Not rated		Not rated	
810899: Mattapex-----	95	Somewhat limited Depth to saturated zone	0.07	Very limited Depth to saturated zone	1.00	Somewhat limited Depth to saturated zone	0.07
810907: Clarksburg-----	90	Somewhat limited Shrink-swell Depth to thin cemented pan Depth to saturated zone	0.50 0.50 0.07	Very limited Depth to saturated zone Shrink-swell	1.00 0.23	Somewhat limited Slope Shrink-swell Depth to saturated zone	0.50 0.50 0.07

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Table 8.—Dwellings and Small Commercial Buildings—Continued

Map unit symbol and soil name	Pct. of map unit	Dwellings without basements		Dwellings with basements		Small commercial buildings	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
1482148: Croton-----	90	Very limited Ponding Depth to saturated zone Depth to thin cemented pan	1.00 1.00 0.50	Very limited Ponding Depth to saturated zone	1.00 1.00	Very limited Ponding Depth to saturated zone Slope	1.00 1.00 0.50
1486423: Lawrenceville-----	83	Somewhat limited Depth to thin cemented pan Depth to saturated zone	0.50 0.07	Very limited Depth to saturated zone	1.00	Somewhat limited Slope Depth to saturated zone	0.50 0.07
1539365: Gibraltar-----	95	Very limited Flooding	1.00	Very limited Flooding Depth to saturated zone	1.00 0.61	Very limited Flooding	1.00
1602815: Holly-----	90	Very limited Ponding Flooding Depth to saturated zone	1.00 1.00 1.00	Very limited Ponding Flooding Depth to saturated zone	1.00 1.00 1.00	Very limited Ponding Flooding Depth to saturated zone	1.00 1.00 1.00
1612216: Penn-----	90	Very limited Slope Depth to hard bedrock	1.00 0.20	Very limited Slope Depth to hard bedrock	1.00 1.00	Very limited Slope Depth to hard bedrock	1.00 0.20
1612248: Urban land-----	65	Not rated		Not rated		Not rated	
Penn-----	25	Somewhat limited Depth to hard bedrock	0.16	Very limited Depth to hard bedrock	1.00	Somewhat limited Depth to hard bedrock	0.16
2229473: Udorthents, limestone-----	100	Somewhat limited Shrink-swell	0.50	Somewhat limited Shrink-swell Depth to saturated zone	0.50 0.16	Somewhat limited Shrink-swell	0.50
2229474: Udorthents, limestone-----	100	Very limited Slope Shrink-swell	1.00 0.50	Very limited Slope Shrink-swell Depth to saturated zone	1.00 0.50 0.16	Very limited Slope Shrink-swell	1.00 0.50
2229478: Udorthents, shale and sandstone-----	85	Not limited		Somewhat limited Depth to saturated zone	0.16	Not limited	

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Table 8.—Dwellings and Small Commercial Buildings—Continued

Map unit symbol and soil name	Pct. of map unit	Dwellings without basements		Dwellings with basements		Small commercial buildings	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
2229480: Urban land-----	90	Not rated		Not rated		Not rated	
2229481: Urban land-----	90	Not rated		Not rated		Not rated	
2229493: Urban land-----	65	Not rated		Not rated		Not rated	
Penn-----	25	Very limited Slope Depth to hard bedrock	1.00 0.16	Very limited Depth to hard bedrock Slope	1.00 1.00	Very limited Slope Depth to hard bedrock	1.00 0.16
2229495: Urban land-----	80	Not rated		Not rated		Not rated	
Udorthents, limestone-----	15	Very limited Slope Depth to saturated zone Shrink-swell	1.00 0.81 0.50	Very limited Depth to saturated zone Slope Shrink-swell	1.00 1.00 0.50	Very limited Slope Depth to saturated zone Shrink-swell	1.00 0.81 0.50
2229496: Urban land-----	80	Not rated		Not rated		Not rated	
Udorthents, schist and gneiss-----	15	Somewhat limited Shrink-swell	0.50	Somewhat limited Shrink-swell Depth to saturated zone	0.50 0.16	Somewhat limited Shrink-swell	0.50
2229498: Urban land-----	80	Not rated		Not rated		Not rated	
Udorthents, shale and sandstone-----	15	Not limited		Not limited		Not limited	
2229499: Urban land-----	80	Not rated		Not rated		Not rated	
Udorthents, shale and sandstone-----	15	Not rated		Not rated		Not rated	
2229500: Pits, quarries-----	80	Not rated		Not rated		Not rated	
2229501: Urban land-----	65	Not rated		Not rated		Not rated	
Readington-----	25	Somewhat limited Depth to thin cemented pan Depth to saturated zone	0.50 0.07	Very limited Depth to saturated zone Depth to hard bedrock	1.00 0.01	Somewhat limited Depth to saturated zone	0.07

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Table 8.—Dwellings and Small Commercial Buildings—Continued

Map unit symbol and soil name	Pct. of map unit	Dwellings without basements		Dwellings with basements		Small commercial buildings	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
2230323: Buckingham-----	80	Very limited Depth to saturated zone Depth to thin cemented pan	1.00 0.50	Very limited Depth to saturated zone	1.00	Very limited Depth to saturated zone	1.00
2230591: Abbottstown-----	93	Very limited Depth to saturated zone Depth to thin cemented pan	1.00 0.50	Very limited Depth to saturated zone Depth to hard bedrock	1.00 0.61	Very limited Depth to saturated zone Slope	1.00 0.50
2232623: Penn-----	47	Very limited Slope Depth to hard bedrock	1.00 0.16	Very limited Slope Depth to hard bedrock	1.00 1.00	Very limited Slope Depth to hard bedrock	1.00 0.16
Klinesville-----	40	Very limited Slope Depth to hard bedrock	1.00 1.00	Very limited Slope Depth to hard bedrock	1.00 1.00	Very limited Slope Depth to hard bedrock	1.00 1.00
2232624: Raritan-----	90	Somewhat limited Depth to saturated zone Depth to thin cemented pan	0.81 0.50	Very limited Depth to saturated zone	1.00	Somewhat limited Depth to saturated zone Slope	0.81 0.50
2232625: Readington-----	80	Somewhat limited Depth to thin cemented pan Depth to saturated zone	0.50 0.07	Very limited Depth to saturated zone Depth to hard bedrock	1.00 0.01	Somewhat limited Slope Depth to saturated zone	0.50 0.07
2232626: Readington-----	86	Somewhat limited Slope Depth to thin cemented pan Depth to saturated zone	0.63 0.50 0.07	Very limited Depth to saturated zone Slope Depth to hard bedrock	1.00 0.63 0.01	Very limited Slope Depth to saturated zone	1.00 0.07
2233645: Edgemont-----	93	Not limited		Not limited		Somewhat limited Slope	0.50
2233646: Edgemont-----	93	Somewhat limited Slope	0.63	Somewhat limited Slope	0.63	Very limited Slope	1.00
2233647: Edgemont-----	93	Very limited Slope	1.00	Very limited Slope	1.00	Very limited Slope	1.00

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Table 8.—Dwellings and Small Commercial Buildings—Continued

Map unit symbol and soil name	Pct. of map unit	Dwellings without basements		Dwellings with basements		Small commercial buildings	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
2233649: Edgemont, extremely stony-----	93	Very limited Slope	1.00	Very limited Slope	1.00	Very limited Slope	1.00
2233698: Lansdale-----	92	Not limited		Somewhat limited Depth to hard bedrock	0.77	Somewhat limited Slope	0.50
2233702: Penn-----	69	Somewhat limited Depth to hard bedrock	0.64	Very limited Depth to hard bedrock	1.00	Somewhat limited Depth to hard bedrock Slope	0.64 0.50
Lansdale-----	25	Not limited		Somewhat limited Depth to hard bedrock	0.71	Somewhat limited Slope	0.50
2233703: Penn-----	50	Somewhat limited Depth to hard bedrock Slope	0.64 0.63	Very limited Depth to hard bedrock Slope	1.00 0.63	Very limited Slope Depth to hard bedrock	1.00 0.64
Lansdale-----	40	Somewhat limited Slope	0.63	Somewhat limited Depth to hard bedrock Slope	0.71 0.63	Very limited Slope	1.00
2233709: Penn-----	87	Somewhat limited Depth to hard bedrock	0.64	Very limited Depth to hard bedrock	1.00	Somewhat limited Depth to hard bedrock Slope	0.64 0.50
2233712: Penn-----	90	Somewhat limited Depth to hard bedrock Slope	0.64 0.63	Very limited Depth to hard bedrock Slope	1.00 0.63	Very limited Slope Depth to hard bedrock	1.00 0.64
2233717: Klinesville-----	85	Very limited Slope Depth to hard bedrock	1.00 1.00	Very limited Slope Depth to hard bedrock	1.00 1.00	Very limited Slope Depth to hard bedrock	1.00 1.00
2248203: Lansdale-----	92	Very limited Slope	1.00	Very limited Slope Depth to hard bedrock	1.00 0.77	Very limited Slope	1.00
2249335: Lawrenceville-----	83	Somewhat limited Depth to thin cemented pan Depth to saturated zone	0.50 0.07	Very limited Depth to saturated zone	1.00	Somewhat limited Slope Depth to saturated zone	0.50 0.07

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Table 8.—Dwellings and Small Commercial Buildings—Continued

Map unit symbol and soil name	Pct. of map unit	Dwellings without basements		Dwellings with basements		Small commercial buildings	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
2379116: Birdsboro-----	92	Not limited		Somewhat limited Depth to saturated zone	0.61	Somewhat limited Slope	0.50
2379949: Duffield-----	90	Somewhat limited Shrink-swell	0.50	Somewhat limited Shrink-swell	0.50	Somewhat limited Slope Shrink-swell	0.50 0.50
2384072: Glennville-----	90	Somewhat limited Depth to saturated zone Depth to thin cemented pan	0.81 0.50	Very limited Depth to saturated zone	1.00	Somewhat limited Depth to saturated zone Slope	0.81 0.50
2386596: Duffield-----	85	Somewhat limited Slope Shrink-swell	0.63 0.50	Somewhat limited Slope Shrink-swell	0.63 0.50	Very limited Slope Shrink-swell	1.00 0.50
2386599: Duffield-----	85	Somewhat limited Slope Shrink-swell	0.63 0.50	Somewhat limited Slope Shrink-swell	0.63 0.50	Very limited Slope Shrink-swell	1.00 0.50
2397950: Bowmansville-----	40	Very limited Flooding Depth to saturated zone	1.00 1.00	Very limited Flooding Depth to saturated zone	1.00 1.00	Very limited Flooding Depth to saturated zone	1.00 1.00
Knauers-----	40	Very limited Ponding Flooding Depth to saturated zone	1.00 1.00 1.00	Very limited Ponding Flooding Depth to saturated zone	1.00 1.00 1.00	Very limited Ponding Flooding Depth to saturated zone	1.00 1.00 1.00

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Table 9.—Roads and Streets, Shallow Excavations, and Landscaping

(Onsite investigation may be needed to validate the interpretations in this table and to confirm the identity of the soil on a given site. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table)

Map unit symbol and soil name	Pct. of map unit	Local roads and streets		Shallow excavations		Landscaping	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
541148: Birdsboro-----	97	Somewhat limited Frost action	0.50	Very limited Unstable excavation walls Depth to saturated zone	1.00 0.61	Not limited	
541159: Brecknock, extremely stony----	94	Very limited Slope Frost action	1.00 0.50	Very limited Slope Depth to hard bedrock Unstable excavation walls	1.00 0.99 0.10	Very limited Large stones Slope	1.00 1.00
541164: Codorus-----	85	Very limited Frost action Flooding Depth to saturated zone	1.00 1.00 0.04	Very limited Depth to saturated zone Flooding Unstable excavation walls	1.00 1.00 0.60 0.10	Somewhat limited Flooding Depth to saturated zone	0.60 0.04
541165: Croton-----	82	Very limited Ponding Depth to saturated zone Frost action	1.00 1.00 1.00	Very limited Ponding Depth to saturated zone Depth to hard bedrock Unstable excavation walls	1.00 1.00 1.00 0.88 0.10	Very limited Ponding Depth to saturated zone	1.00 1.00
541194: Lawrenceville-----	81	Somewhat limited Frost action Depth to saturated zone	0.50 0.04	Very limited Depth to saturated zone Unstable excavation walls	1.00 1.00 0.10	Somewhat limited Depth to saturated zone	0.04
541245: Raritan-----	96	Very limited Frost action Depth to saturated zone	1.00 0.48	Very limited Depth to saturated zone Unstable excavation walls	1.00 1.00 1.00	Somewhat limited Depth to saturated zone	0.48
541247: Readington-----	85	Somewhat limited Frost action Depth to saturated zone	0.50 0.04	Very limited Depth to saturated zone Unstable excavation walls Depth to hard bedrock	1.00 1.00 0.10 0.01	Somewhat limited Depth to saturated zone	0.04

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Table 9.—Roads and Streets, Shallow Excavations, and Landscaping—Continued

Map unit symbol and soil name	Pct. of map unit	Local roads and streets		Shallow excavations		Landscaping	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
541254: Rowland-----	82	Very limited Frost action Flooding Depth to saturated zone	1.00 1.00 0.19	Very limited Depth to saturated zone Unstable excavation walls Flooding	1.00 1.00 1.00 0.60	Somewhat limited Flooding Depth to saturated zone	0.60 0.19
541256: Rowland-----	95	Very limited Flooding Frost action Depth to saturated zone	1.00 0.50 0.04	Very limited Depth to saturated zone Unstable excavation walls Flooding	1.00 1.00 1.00 0.80	Very limited Flooding Depth to saturated zone	1.00 0.04
541257: Rowland-----	90	Very limited Flooding Frost action Depth to saturated zone	1.00 0.50 0.04	Very limited Depth to saturated zone Unstable excavation walls Flooding	1.00 1.00 1.00 0.80	Very limited Flooding Depth to saturated zone	1.00 0.04
641312: Duffield-----	90	Somewhat limited Shrink-swell Frost action	0.50 0.50	Somewhat limited Unstable excavation walls	0.10	Not limited	
641350: Edgemont-----	93	Somewhat limited Frost action	0.50	Somewhat limited Unstable excavation walls	0.10	Very limited Large stones	1.00
641351: Edgemont-----	93	Somewhat limited Slope Frost action	0.63 0.50	Somewhat limited Slope Unstable excavation walls	0.63 0.10	Very limited Large stones Slope	1.00 0.63
641352: Edgemont-----	93	Very limited Slope Frost action	1.00 0.50	Very limited Slope Unstable excavation walls	1.00 0.10	Very limited Slope Large stones	1.00 1.00
641353: Edgemont, extremely stony-----	90	Somewhat limited Frost action	0.50	Somewhat limited Unstable excavation walls	0.10	Very limited Large stones	1.00
641354: Edgemont, extremely stony-----	93	Very limited Slope Frost action	1.00 0.50	Very limited Slope Unstable excavation walls	1.00 0.10	Very limited Large stones Slope	1.00 1.00

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Table 9.—Roads and Streets, Shallow Excavations, and Landscaping—Continued

Map unit symbol and soil name	Pct. of map unit	Local roads and streets		Shallow excavations		Landscaping	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
641355: Edgemont, extremely stony-----	93	Very limited Slope Frost action	1.00 0.50	Very limited Slope Unstable excavation walls	1.00 0.10	Very limited Slope Large stones	1.00 1.00
641418: Codorus-----	85	Very limited Frost action Flooding Depth to saturated zone	1.00 1.00 0.04	Very limited Depth to saturated zone Flooding Unstable excavation walls	1.00 1.00 0.60 0.10	Somewhat limited Flooding Depth to saturated zone	0.60 10.04
641481: Conestoga-----	90	Very limited Low strength Frost action	1.00 0.50	Somewhat limited Unstable excavation walls	0.10	Not limited	
641483: Conestoga-----	90	Very limited Low strength Frost action	1.00 0.50	Somewhat limited Unstable excavation walls	0.10	Not limited	
641484: Conestoga-----	90	Very limited Low strength Slope Frost action	1.00 0.63 0.50	Somewhat limited Slope Unstable excavation walls	0.63 0.10	Somewhat limited Slope	0.63
641523: Glenville-----	90	Very limited Frost action Depth to saturated zone	1.00 0.48	Very limited Depth to saturated zone Unstable excavation walls	1.00 1.00 0.10	Somewhat limited Depth to saturated zone	0.48
641543: Lindside-----	85	Very limited Frost action Flooding Low strength Depth to saturated zone	1.00 1.00 1.00 0.04	Very limited Depth to saturated zone Flooding Unstable excavation walls	1.00 1.00 0.60 0.10	Somewhat limited Flooding Depth to saturated zone	0.60 10.04
641583: Penn-----	87	Somewhat limited Depth to hard bedrock Frost action	0.64 0.50	Very limited Depth to hard bedrock Unstable excavation walls	1.00 0.10	Somewhat limited Depth to bedrock	0.65
641584: Penn-----	90	Somewhat limited Depth to hard bedrock Slope Frost action	0.64 0.63 0.50	Very limited Depth to hard bedrock Slope Unstable excavation walls	1.00 0.63 0.10	Somewhat limited Depth to bedrock Slope	0.65 0.63

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Table 9.—Roads and Streets, Shallow Excavations, and Landscaping—Continued

Map unit symbol and soil name	Pct. of map unit	Local roads and streets		Shallow excavations		Landscaping	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
641586: Penn-----	90	Very limited Slope Frost action Depth to hard bedrock	1.00 0.50 0.06	Very limited Depth to hard bedrock Slope Unstable excavation walls	1.00 1.00 0.10	Very limited Slope Depth to bedrock	1.00 0.07
641605: Udorthents, limestone-----	100	Somewhat limited Shrink-swell Frost action	0.50 0.50	Somewhat limited Depth to saturated zone Unstable excavation walls Too clayey	0.16 0.10 0.03	Not limited	
641614: Urban land-----	50	Not rated		Not rated		Not rated	
Conestoga-----	35	Somewhat limited Frost action	0.50	Somewhat limited Unstable excavation walls	0.10	Not limited	
641641: Water-----	100	Not rated		Not rated		Not rated	
810899: Mattapex-----	95	Somewhat limited Frost action Depth to saturated zone	0.50 0.04	Very limited Depth to saturated zone Unstable excavation walls	1.00 0.10	Somewhat limited Depth to saturated zone	0.04
810907: Clarksburg-----	90	Somewhat limited Shrink-swell Frost action Depth to saturated zone	0.50 0.50 0.04	Very limited Depth to saturated zone Unstable excavation walls	1.00 0.10	Somewhat limited Depth to saturated zone	0.04
1482148: Croton-----	90	Very limited Ponding Depth to saturated zone Frost action	1.00 1.00 1.00	Very limited Ponding Depth to saturated zone Unstable excavation walls	1.00 1.00 0.10	Very limited Ponding Depth to saturated zone	1.00 1.00
1486423: Lawrenceville-----	83	Somewhat limited Frost action Depth to saturated zone	0.50 0.04	Very limited Depth to saturated zone Unstable excavation walls	1.00 0.10	Somewhat limited Depth to saturated zone	0.04
1539365: Gibraltar-----	95	Very limited Frost action Flooding	1.00 0.40	Somewhat limited Depth to saturated zone Unstable excavation walls	0.61 0.10	Not limited	

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Table 9.—Roads and Streets, Shallow Excavations, and Landscaping—Continued

Map unit symbol and soil name	Pct. of map unit	Local roads and streets		Shallow excavations		Landscaping	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
1539370: Water-----	100	Not rated		Not rated		Not rated	
1602815: Holly-----	90	Very limited Ponding Depth to saturated zone Frost action Flooding	 1.00 1.00 1.00 1.00	Very limited Ponding Depth to saturated zone Unstable excavation walls Flooding	 1.00 1.00 1.00 0.80	Very limited Ponding Flooding Depth to saturated zone	 1.00 1.00 1.00
1612216: Penn-----	90	Very limited Slope Frost action Depth to hard bedrock	 1.00 0.50 0.20	Very limited Depth to hard bedrock Slope Unstable excavation walls	 1.00 1.00 0.10	Very limited Slope Depth to bedrock	 1.00 0.21
1612248: Urban land-----	65	Not rated		Not rated		Not rated	
Penn-----	25	Somewhat limited Frost action Depth to hard bedrock	 0.50 0.16	Very limited Depth to hard bedrock Unstable excavation walls	 1.00 0.10	Somewhat limited Gravel Depth to bedrock	 0.22 0.16
2229473: Udorthents, limestone-----	100	Somewhat limited Shrink-swell Frost action	 0.50 0.50	Somewhat limited Depth to saturated zone Unstable excavation walls Too clayey	 0.16 0.10 0.03	Not limited	
2229474: Udorthents, limestone-----	100	Very limited Slope Shrink-swell Frost action	 1.00 0.50 0.50	Very limited Slope Depth to saturated zone Unstable excavation walls Too clayey	 1.00 0.16 0.10 0.03	Very limited Slope	 1.00
2229478: Udorthents, shale and sandstone-----	85	Not limited		Somewhat limited Depth to saturated zone Unstable excavation walls	 0.16 0.10	Very limited Droughty	 1.00
2229480: Urban land-----	90	Not rated		Not rated		Not rated	
2229481: Urban land-----	90	Not rated		Not rated		Not rated	

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Table 9.—Roads and Streets, Shallow Excavations, and Landscaping—Continued

Map unit symbol and soil name	Pct. of map unit	Local roads and streets		Shallow excavations		Landscaping	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
2229493: Urban land-----	65	Not rated		Not rated		Not rated	
Penn-----	25	Very limited Slope Frost action Depth to hard bedrock	1.00 0.50 0.16	Very limited Depth to hard bedrock Slope Unstable excavation walls	1.00 1.00 1.00 0.10	Very limited Slope Gravel Depth to bedrock	1.00 0.22 0.16
2229495: Urban land-----	80	Not rated		Not rated		Not rated	
Udorthents, limestone-----	15	Very limited Slope Shrink-swell Frost action Depth to saturated zone	1.00 0.50 0.50 0.48	Very limited Depth to saturated zone Slope Unstable excavation walls Too clayey	1.00 1.00 1.00 0.10 0.03	Very limited Slope Depth to saturated zone	1.00 0.48
2229496: Urban land-----	80	Not rated		Not rated		Not rated	
Udorthents, schist and gneiss-----	15	Somewhat limited Shrink-swell Frost action	0.50 0.50	Somewhat limited Depth to saturated zone Unstable excavation walls	0.16 0.10	Not limited	
2229498: Urban land-----	80	Not rated		Not rated		Not rated	
Udorthents, shale and sandstone-----	15	Not limited		Somewhat limited Unstable excavation walls	0.10	Very limited Droughty Gravel Large stones	1.00 0.92 0.08
2229499: Urban land-----	80	Not rated		Not rated		Not rated	
Udorthents, shale and sandstone-----	15	Not rated		Not rated		Not rated	
2229500: Pits, quarries-----	80	Not rated		Not rated		Not rated	
2229501: Urban land-----	65	Not rated		Not rated		Not rated	
Readington-----	25	Somewhat limited Frost action Depth to saturated zone	0.50 0.04	Very limited Depth to saturated zone Unstable excavation walls Depth to hard bedrock	1.00 1.00 0.10 0.01	Somewhat limited Depth to saturated zone	0.04

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Table 9.—Roads and Streets, Shallow Excavations, and Landscaping—Continued

Map unit symbol and soil name	Pct. of map unit	Local roads and streets		Shallow excavations		Landscaping	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
2230323: Buckingham-----	80	Very limited Frost action Depth to saturated zone	1.00 0.99	Very limited Depth to saturated zone Unstable excavation walls	1.00 1.00 1.00	Somewhat limited Depth to saturated zone	0.99
2230591: Abbottstown-----	93	Very limited Frost action Depth to saturated zone	1.00 0.94	Very limited Depth to saturated zone Depth to hard bedrock Unstable excavation walls	1.00 1.00 0.61 0.10	Somewhat limited Depth to saturated zone	0.94
2232623: Penn-----	47	Very limited Slope Frost action Depth to hard bedrock	1.00 0.50 0.16	Very limited Depth to hard bedrock Slope Unstable excavation walls	1.00 1.00 1.00 0.10	Very limited Slope Gravel Depth to bedrock	1.00 0.22 0.16
Klinesville-----	40	Very limited Depth to hard bedrock Slope Frost action	1.00 1.00 0.50	Very limited Depth to hard bedrock Slope Unstable excavation walls	1.00 1.00 1.00 0.10	Very limited Slope Droughty Depth to bedrock Gravel	1.00 1.00 1.00 0.92
2232624: Raritan-----	90	Very limited Frost action Depth to saturated zone	1.00 0.48	Very limited Depth to saturated zone Unstable excavation walls	1.00 1.00 1.00	Somewhat limited Depth to saturated zone	0.48
2232625: Readington-----	80	Somewhat limited Frost action Depth to saturated zone	0.50 0.04	Very limited Depth to saturated zone Unstable excavation walls Depth to hard bedrock	1.00 1.00 0.10 0.01	Somewhat limited Depth to saturated zone	0.04
2232626: Readington-----	86	Somewhat limited Slope Frost action Depth to saturated zone	0.63 0.50 0.04	Very limited Depth to saturated zone Slope Unstable excavation walls Depth to hard bedrock	1.00 1.00 0.63 0.10 0.01	Somewhat limited Slope Depth to saturated zone	0.63 0.04
2233645: Edgemont-----	93	Somewhat limited Frost action	0.50	Somewhat limited Unstable excavation walls	0.10	Very limited Large stones	1.00

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Table 9.—Roads and Streets, Shallow Excavations, and Landscaping—Continued

Map unit symbol and soil name	Pct. of map unit	Local roads and streets		Shallow excavations		Landscaping	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
2233646: Edgemont-----	93	Somewhat limited Slope Frost action	0.63 0.50	Somewhat limited Slope Unstable excavation walls	0.63 0.10	Very limited Large stones Slope	1.00 0.63
2233647: Edgemont-----	93	Very limited Slope Frost action	1.00 0.50	Very limited Slope Unstable excavation walls	1.00 0.10	Very limited Slope Large stones	1.00 1.00
2233649: Edgemont, extremely stony-----	93	Very limited Slope Frost action	1.00 0.50	Very limited Slope Unstable excavation walls	1.00 0.10	Very limited Slope Large stones	1.00 1.00
2233698: Lansdale-----	92	Somewhat limited Frost action	0.50	Somewhat limited Depth to hard bedrock Unstable excavation walls	0.77 0.10	Not limited	
2233702: Penn-----	69	Somewhat limited Depth to hard bedrock Frost action	0.64 0.50	Very limited Depth to hard bedrock Unstable excavation walls	1.00 0.10	Somewhat limited Depth to bedrock	0.65
Lansdale-----	25	Somewhat limited Frost action	0.50	Very limited Unstable excavation walls Depth to hard bedrock	1.00 0.71	Not limited	
2233703: Penn-----	50	Somewhat limited Depth to hard bedrock Slope Frost action	0.64 0.63 0.50	Very limited Depth to hard bedrock Slope Unstable excavation walls	1.00 0.63 0.10	Somewhat limited Depth to bedrock Slope Gravel Droughty	0.65 0.63 0.22 0.01
Lansdale-----	40	Somewhat limited Slope Frost action	0.63 0.50	Very limited Unstable excavation walls Depth to hard bedrock Slope	1.00 0.71 0.63	Somewhat limited Slope	0.63
2233709: Penn-----	87	Somewhat limited Depth to hard bedrock Frost action	0.64 0.50	Very limited Depth to hard bedrock Unstable excavation walls	1.00 0.10	Somewhat limited Depth to bedrock	0.65

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Table 9.—Roads and Streets, Shallow Excavations, and Landscaping—Continued

Map unit symbol and soil name	Pct. of map unit	Local roads and streets		Shallow excavations		Landscaping	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
2233712: Penn-----	90	Somewhat limited		Very limited		Somewhat limited	
		Depth to hard bedrock	0.64	Depth to hard bedrock	1.00	Depth to bedrock	0.65
		Slope	0.63	Slope	0.63	Slope	0.63
		Frost action	0.50	Unstable excavation walls	0.10		
2233717: Klinesville-----	85	Very limited		Very limited		Very limited	
		Depth to hard bedrock	1.00	Depth to hard bedrock	1.00	Slope	1.00
		Slope	1.00	Slope	1.00	Droughty	1.00
		Frost action	0.50	Unstable excavation walls	0.10	Depth to bedrock	1.00
						Gravel	0.92
2248203: Lansdale-----	92	Very limited		Very limited		Very limited	
		Slope	1.00	Slope	1.00	Slope	1.00
		Frost action	0.50	Depth to hard bedrock	0.77		
				Unstable excavation walls	0.10		
2249335: Lawrenceville-----	83	Somewhat limited		Very limited		Somewhat limited	
		Frost action	0.50	Depth to saturated zone	1.00	Depth to saturated zone	0.04
		Depth to saturated zone	0.04	Unstable excavation walls	0.10		
2379116: Birdsboro-----	92	Somewhat limited		Very limited		Not limited	
		Frost action	0.50	Unstable excavation walls	1.00		
				Depth to saturated zone	0.61		
2379949: Duffield-----	90	Somewhat limited		Somewhat limited		Not limited	
		Shrink-swell	0.50	Unstable	0.10		
		Frost action	0.50	excavation walls			
2384072: Glenville-----	90	Very limited		Very limited		Somewhat limited	
		Frost action	1.00	Depth to saturated zone	1.00	Depth to saturated zone	0.48
		Depth to saturated zone	0.48	Unstable excavation walls	0.10		
2386596: Duffield-----	85	Very limited		Somewhat limited		Somewhat limited	
		Low strength	1.00	Slope	0.63	Slope	0.63
		Slope	0.63	Unstable	0.10		
		Shrink-swell	0.50	excavation walls			
		Frost action	0.50				

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Table 9.—Roads and Streets, Shallow Excavations, and Landscaping—Continued

Map unit symbol and soil name	Pct. of map unit	Local roads and streets		Shallow excavations		Landscaping	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
2386599: Duffield-----		Very limited Low strength Slope Shrink-swell Frost action	 1.00 0.63 0.50 0.50	Somewhat limited Slope Unstable excavation walls	 0.63 0.10	Somewhat limited Slope	 0.63
2397950: Bowmansville-----	40	Very limited Depth to saturated zone Frost action Flooding	 1.00 1.00 1.00	Very limited Depth to saturated zone Unstable excavation walls Flooding	 1.00 1.00 1.00 0.60	Very limited Depth to saturated zone Flooding	 1.00 0.60
Knauers-----	40	Very limited Ponding Depth to saturated zone Frost action Flooding	 1.00 1.00 1.00 1.00	Very limited Ponding Depth to saturated zone Unstable excavation walls Flooding	 1.00 1.00 1.00 1.00 0.60	Very limited Ponding Depth to saturated zone Flooding	 1.00 1.00 0.60

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Table 10.—Sewage Disposal

(Onsite investigation may be needed to validate the interpretations in this table and to confirm the identity of the soil on a given site. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table)

Map unit symbol and soil name	Pct. of map unit	Septic tank absorption fields		Sewage lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value
541148: Birdsboro-----	97	Very limited Seepage, bottom layer Depth to saturated zone Slow water movement	1.00 0.99 0.47	Very limited Seepage Depth to saturated zone	1.00 0.72
541159: Brecknock, extremely stony----	94	Very limited Slope Depth to bedrock Slow water movement	1.00 0.99 0.47	Very limited Slope Seepage Depth to hard bedrock	1.00 1.00 0.99
541164: Codorus-----	85	Very limited Flooding Depth to saturated zone Seepage, bottom layer Slow water movement	1.00 1.00 1.00 0.47	Very limited Flooding Seepage Depth to saturated zone	1.00 1.00 1.00
541165: Croton-----	82	Very limited Ponding Depth to saturated zone Slow water movement Depth to bedrock	1.00 1.00 1.00 0.96	Very limited Ponding Depth to saturated zone Depth to hard bedrock Seepage	1.00 1.00 0.88 0.27
541194: Lawrenceville-----	81	Very limited Depth to saturated zone Slow water movement	1.00 1.00	Somewhat limited Seepage Depth to saturated zone	0.53 0.44
541245: Raritan-----	96	Very limited Depth to saturated zone Slow water movement Seepage, bottom layer	1.00 1.00 1.00	Very limited Seepage Depth to saturated zone	1.00 0.94

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Table 10.—Sewage Disposal—Continued

Map unit symbol and soil name	Pct. of map unit	Septic tank absorption fields		Sewage lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value
541247: Readington-----	85	Very limited		Somewhat limited	
		Depth to saturated zone	1.00	Seepage	0.53
		Slow water movement	1.00	Depth to saturated zone	0.44
		Depth to bedrock	0.34	Depth to hard bedrock	0.01
541254: Rowland-----	82	Very limited		Very limited	
		Flooding	1.00	Flooding	1.00
		Depth to saturated zone	1.00	Seepage	1.00
		Seepage, bottom layer	1.00	Depth to saturated zone	1.00
		Slow water movement	0.72		
541256: Rowland-----	95	Very limited		Very limited	
		Flooding	1.00	Flooding	1.00
		Depth to saturated zone	1.00	Seepage	0.53
		Slow water movement	1.00	Depth to saturated zone	0.44
541257: Rowland-----	90	Very limited		Very limited	
		Flooding	1.00	Flooding	1.00
		Depth to saturated zone	1.00	Slope	0.92
		Slow water movement	1.00	Seepage	0.53
				Depth to saturated zone	0.44
641312: Duffield-----	90	Somewhat limited		Somewhat limited	
		Slow water movement	0.47	Slope	0.92
				Seepage	0.53
641350: Edgemont-----	93	Very limited		Very limited	
		Seepage, bottom layer	1.00	Seepage	1.00
		Depth to bedrock	0.15	Slope	0.92
641351: Edgemont-----	93	Very limited		Very limited	
		Seepage, bottom layer	1.00	Slope	1.00
		Slope	0.63	Seepage	1.00
		Depth to bedrock	0.15		
641352: Edgemont-----	93	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
		Depth to bedrock	0.15		

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Table 10.—Sewage Disposal—Continued

Map unit symbol and soil name	Pct. of map unit	Septic tank absorption fields		Sewage lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value
641353: Edgemont, extremely stony-----	90	Very limited Seepage, bottom layer Depth to bedrock	1.00 0.15	Very limited Seepage Slope	1.00 0.32
641354: Edgemont, extremely stony-----	93	Very limited Slope Seepage, bottom layer Depth to bedrock	1.00 1.00 0.15	Very limited Slope Seepage	1.00 1.00
641355: Edgemont, extremely stony-----	93	Very limited Slope Seepage, bottom layer Depth to bedrock	1.00 1.00 0.15	Very limited Slope Seepage	1.00 1.00
641418: Codorus-----	85	Very limited Flooding Depth to saturated zone Seepage, bottom layer Slow water movement	1.00 1.00 1.00 0.47	Very limited Flooding Seepage Depth to saturated zone	1.00 1.00 1.00
641481: Conestoga-----	90	Somewhat limited Slow water movement	0.47	Somewhat limited Seepage	0.53
641483: Conestoga-----	90	Somewhat limited Slow water movement	0.47	Somewhat limited Slope Seepage	0.92 0.53
641484: Conestoga-----	90	Somewhat limited Slope Slow water movement	0.63 0.47	Very limited Slope Seepage	1.00 0.53
641523: Glenville-----	90	Very limited Depth to saturated zone Slow water movement	1.00 1.00	Somewhat limited Depth to saturated zone Slope Seepage	0.94 0.92 0.53

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Table 10.—Sewage Disposal—Continued

Map unit symbol and soil name	Pct. of map unit	Septic tank absorption fields		Sewage lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value
641543: Lindsay-----	85	Very limited		Very limited	
		Flooding	1.00	Flooding	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
		Slow water movement	0.72		
641583: Penn-----	87	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to hard bedrock	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
				Slope	0.92
641584: Penn-----	90	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to hard bedrock	1.00
		Seepage, bottom layer	1.00	Slope	1.00
		Slope	0.63	Seepage	1.00
641586: Penn-----	90	Very limited		Very limited	
		Slope	1.00	Depth to hard bedrock	1.00
		Depth to bedrock	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
641605: Udorthents, limestone-----	100	Very limited		Somewhat limited	
		Slow water movement	1.00	Slope	0.32
		Depth to saturated zone	0.43		
		Depth to bedrock	0.01		
641614: Urban land-----	50	Not rated		Not rated	
Conestoga-----	35	Somewhat limited		Somewhat limited	
		Slow water movement	0.47	Seepage	0.53
				Slope	0.32
641641: Water-----	100	Not rated		Not rated	
810899: Mattapex-----	95	Very limited		Very limited	
		Depth to saturated zone	1.00	Seepage	1.00
		Seepage, bottom layer	1.00	Depth to saturated zone	1.00
		Slow water movement	0.72		

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Table 10.—Sewage Disposal—Continued

Map unit symbol and soil name	Pct. of map unit	Septic tank absorption fields		Sewage lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value
810907: Clarksburg-----	90	Very limited		Somewhat limited	
		Depth to saturated zone	1.00	Slope	0.92
		Slow water movement	1.00	Seepage	0.53
				Depth to saturated zone	0.44
1482148: Croton-----	90	Very limited		Very limited	
		Ponding	1.00	Ponding	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Slow water movement	1.00	Slope	0.92
1486423: Lawrenceville-----	83	Very limited		Somewhat limited	
		Depth to saturated zone	1.00	Slope	0.92
		Slow water movement	1.00	Seepage	0.53
				Depth to saturated zone	0.44
1539365: Gibraltar-----	95	Somewhat limited		Somewhat limited	
		Depth to saturated zone	0.99	Depth to saturated zone	0.72
		Slow water movement	0.72	Seepage	0.53
		Flooding	0.40	Flooding	0.40
		Depth to bedrock	0.05		
1602815: Holly-----	90	Very limited		Very limited	
		Flooding	1.00	Ponding	1.00
		Ponding	1.00	Flooding	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
		Slow water movement	0.72		
1612216: Penn-----	90	Very limited		Very limited	
		Slope	1.00	Depth to hard bedrock	1.00
		Depth to bedrock	1.00	Slope	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
1612248: Urban land-----	65	Not rated		Not rated	
Penn-----	25	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to hard bedrock	1.00
		Seepage, bottom layer	1.00	Seepage	1.00
				Slope	0.32

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Table 10.—Sewage Disposal—Continued

Map unit symbol and soil name	Pct. of map unit	Septic tank absorption fields		Sewage lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value
2229473: Udorthents, limestone-----	100	Very limited Slow water movement Depth to saturated zone Depth to bedrock	1.00 0.43 0.01	Somewhat limited Slope	0.32
2229474: Udorthents, limestone-----	100	Very limited Slow water movement Slope Depth to saturated zone Depth to bedrock	1.00 1.00 0.43 0.01	Very limited Slope	1.00
2229478: Udorthents, shale and sandstone-----	85	Very limited Filtering capacity Seepage, bottom layer Depth to saturated zone Depth to bedrock	1.00 1.00 0.43 0.01	Very limited Seepage Slope	1.00 0.32
2229480: Urban land-----	90	Not rated		Not rated	
2229481: Urban land-----	90	Not rated		Not rated	
2229493: Urban land-----	65	Not rated		Not rated	
Penn-----	25	Very limited Depth to bedrock Slope Seepage, bottom layer	1.00 1.00 1.00	Very limited Depth to hard bedrock Slope Seepage	1.00 1.00 1.00
2229495: Urban land-----	80	Not rated		Not rated	
Udorthents, limestone-----	15	Very limited Depth to saturated zone Slow water movement Slope Depth to bedrock	1.00 1.00 1.00 0.01	Very limited Slope Depth to saturated zone	1.00 1.00

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Table 10.—Sewage Disposal—Continued

Map unit symbol and soil name	Pct. of map unit	Septic tank absorption fields		Sewage lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value
2229496: Urban land-----	80	Not rated		Not rated	
Udorthents, schist and gneiss-----	15	Very limited		Somewhat limited	
		Slow water movement	1.00	Depth to soft bedrock	0.99
		Depth to bedrock	0.99	Slope	0.32
		Depth to saturated zone	0.43		
2229498: Urban land-----	80	Not rated		Not rated	
Udorthents, shale and sandstone-----	15	Very limited		Very limited	
		Filtering capacity	1.00	Seepage	1.00
		Seepage, bottom layer	1.00	Slope	0.32
		Depth to bedrock	0.01		
2229499: Urban land-----	80	Not rated		Not rated	
Udorthents, shale and sandstone-----	15	Not rated		Not rated	
2229500: Pits, quarries-----	80	Not rated		Not rated	
2229501: Urban land-----	65	Not rated		Not rated	
Readington-----	25	Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Slow water movement	1.00	Seepage	0.53
		Depth to bedrock	0.34	Slope	0.32
				Depth to hard bedrock	0.01
2230323: Buckingham-----	80	Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Slow water movement	1.00	Seepage	0.53
2230591: Abbottstown-----	93	Very limited		Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Slow water movement	1.00	Slope	0.92
		Depth to bedrock	0.85	Depth to hard bedrock	0.61
				Seepage	0.53

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Table 10.—Sewage Disposal—Continued

Map unit symbol and soil name	Pct. of map unit	Septic tank absorption fields		Sewage lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value
2232623: Penn-----	47	Very limited Slope Depth to bedrock Seepage, bottom layer	1.00 1.00 1.00	Very limited Depth to hard bedrock Slope Seepage	1.00 1.00 1.00 1.00
Klinesville-----	40	Very limited Depth to bedrock Slope Seepage, bottom layer	1.00 1.00 1.00	Very limited Depth to hard bedrock Slope Seepage	1.00 1.00 1.00 1.00
2232624: Raritan-----	90	Very limited Depth to saturated zone Slow water movement Seepage, bottom layer	1.00 1.00 1.00	Very limited Seepage Depth to saturated zone Slope	1.00 0.94 0.92
2232625: Readington-----	80	Very limited Depth to saturated zone Slow water movement Depth to bedrock	1.00 1.00 1.00 0.34	Somewhat limited Slope Seepage Depth to saturated zone Depth to hard bedrock	0.92 0.53 0.44 0.01
2232626: Readington-----	86	Very limited Depth to saturated zone Slow water movement Slope Depth to bedrock	1.00 1.00 1.00 0.63 0.34	Very limited Slope Seepage Depth to saturated zone Depth to hard bedrock	1.00 0.53 0.44 0.01
2233645: Edgemont-----	93	Very limited Seepage, bottom layer Depth to bedrock	1.00 0.15	Very limited Seepage Slope	1.00 0.92
2233646: Edgemont-----	93	Very limited Seepage, bottom layer Slope Depth to bedrock	1.00 0.63 0.15	Very limited Slope Seepage	1.00 1.00
2233647: Edgemont-----	93	Very limited Slope Seepage, bottom layer Depth to bedrock	1.00 1.00 0.15	Very limited Slope Seepage	1.00 1.00

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Table 10.—Sewage Disposal—Continued

Map unit symbol and soil name	Pct. of map unit	Septic tank absorption fields		Sewage lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value
2233649: Edgemont, extremely stony-----	93	Very limited Slope Seepage, bottom layer Depth to bedrock	1.00 1.00 0.15	Very limited Slope Seepage	1.00 1.00
2233698: Lansdale-----	92	Very limited Seepage, bottom layer Depth to bedrock	1.00 0.91	Very limited Seepage Slope Depth to hard bedrock	1.00 0.92 0.77
2233702: Penn-----	69	Very limited Depth to bedrock Seepage, bottom layer	1.00 1.00	Very limited Depth to hard bedrock Seepage Slope	1.00 1.00 0.92
Lansdale-----	25	Very limited Seepage, bottom layer Depth to bedrock	1.00 0.89	Very limited Seepage Slope Depth to hard bedrock	1.00 0.92 0.71
2233703: Penn-----	50	Very limited Depth to bedrock Seepage, bottom layer Slope	1.00 1.00 0.63	Very limited Depth to hard bedrock Slope Seepage	1.00 1.00 1.00
Lansdale-----	40	Very limited Seepage, bottom layer Depth to bedrock Slope	1.00 0.89 0.63	Very limited Slope Seepage Depth to hard bedrock	1.00 1.00 0.71
2233709: Penn-----	87	Very limited Depth to bedrock Seepage, bottom layer	1.00 1.00	Very limited Depth to hard bedrock Seepage Slope	1.00 1.00 0.92
2233712: Penn-----	90	Very limited Depth to bedrock Seepage, bottom layer Slope	1.00 1.00 0.63	Very limited Depth to hard bedrock Slope Seepage	1.00 1.00 1.00
2233717: Klinesville-----	85	Very limited Depth to bedrock Slope Seepage, bottom layer	1.00 1.00 1.00	Very limited Depth to hard bedrock Slope Seepage	1.00 1.00 1.00

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Table 10.—Sewage Disposal—Continued

Map unit symbol and soil name	Pct. of map unit	Septic tank absorption fields		Sewage lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value
2248203: Lansdale-----	92	Very limited Slope Seepage, bottom layer Depth to bedrock	 1.00 1.00 0.91	Very limited Slope Seepage Depth to hard bedrock	 1.00 1.00 0.77
2249335: Lawrenceville-----	83	Very limited Depth to saturated zone Slow water movement	 1.00 1.00	Somewhat limited Slope Seepage Depth to saturated zone	 0.92 0.53 0.44
2379116: Birdsboro-----	92	Very limited Seepage, bottom layer Depth to saturated zone Slow water movement	 1.00 0.99 0.47	Very limited Seepage Slope Depth to saturated zone	 1.00 0.92 0.72
2379949: Duffield-----	90	Somewhat limited Slow water movement	 0.47	Somewhat limited Slope Seepage	 0.92 0.53
2384072: Glenville-----	90	Very limited Depth to saturated zone Slow water movement	 1.00 1.00	Somewhat limited Depth to saturated zone Slope Seepage	 0.94 0.92 0.53
2386596: Duffield-----	85	Somewhat limited Slope Slow water movement Depth to bedrock	 0.63 0.47 0.01	Very limited Slope Seepage	 1.00 0.53
2386599: Duffield-----		Somewhat limited Slope Slow water movement Depth to bedrock	 0.63 0.47 0.01	Very limited Slope Seepage	 1.00 0.53
2397950: Bowmansville-----	40	Very limited Flooding Depth to saturated zone Seepage, bottom layer Slow water movement	 1.00 1.00 1.00 1.00	Very limited Flooding Seepage Depth to saturated zone	 1.00 1.00 1.00

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Table 10.—Sewage Disposal—Continued

Map unit symbol and soil name	Pct. of map unit	Septic tank absorption fields		Sewage lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value
2397950: Knauers-----	40	Very limited		Very limited	
		Flooding	1.00	Ponding	1.00
		Ponding	1.00	Flooding	1.00
		Depth to saturated zone	1.00	Seepage	1.00
		Seepage, bottom layer	1.00	Depth to saturated zone	1.00
		Slow water movement	0.47		

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Table 11.—Source of Gravel and Sand

(Onsite investigation may be needed to validate the interpretations in this table and to confirm the identity of the soil on a given site. The ratings given for the thickest layer are for the thickest layer above and excluding the bottom layer. The numbers in the value columns range from 0.00 to 0.99. The greater the value, the greater the likelihood that the bottom layer or thickest layer of the soil is a source of sand or gravel. See text for further explanation of ratings in this table)

Map unit symbol and soil name	Pct. of map unit	Gravel source		Sand source	
		Rating class and limiting features	Value	Rating class and limiting features	Value
541148: Birdsboro-----	97	Poor		Fair	
		Thickest layer	0.00	Thickest layer	0.00
		Bottom layer	0.00	Bottom layer	0.04
541159: Brecknock, extremely stony----	94	Poor		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
541164: Codorus-----	85	Poor		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
541165: Croton-----	82	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
541194: Lawrenceville-----	81	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
541245: Raritan-----	96	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
541247: Readington-----	85	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
541254: Rowland-----	82	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
541256: Rowland-----	95	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
541257: Rowland-----	90	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Table 11.—Source of Gravel and Sand—Continued

Map unit symbol and soil name	Pct. of map unit	Gravel source		Sand source	
		Rating class and limiting features	Value	Rating class and limiting features	Value
641312: Duffield-----	90	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
641350: Edgemont-----	93	Poor		Fair	
		Thickest layer	0.00	Thickest layer	0.02
		Bottom layer	0.00	Bottom layer	0.03
641351: Edgemont-----	93	Poor		Fair	
		Thickest layer	0.00	Thickest layer	0.02
		Bottom layer	0.00	Bottom layer	0.03
641352: Edgemont-----	93	Poor		Fair	
		Thickest layer	0.00	Thickest layer	0.02
		Bottom layer	0.00	Bottom layer	0.03
641353: Edgemont, extremely stony-----	90	Poor		Fair	
		Thickest layer	0.00	Thickest layer	0.01
		Bottom layer	0.00	Bottom layer	0.04
641354: Edgemont, extremely stony-----	93	Poor		Fair	
		Thickest layer	0.00	Thickest layer	0.02
		Bottom layer	0.00	Bottom layer	0.03
641355: Edgemont, extremely stony-----	93	Poor		Fair	
		Thickest layer	0.00	Thickest layer	0.02
		Bottom layer	0.00	Bottom layer	0.03
641418: Codorus-----	85	Poor		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
641481: Conestoga-----	90	Poor		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
641483: Conestoga-----	90	Poor		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
641484: Conestoga-----	90	Poor		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
641523: Glenville-----	90	Poor		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Table 11.—Source of Gravel and Sand—Continued

Map unit symbol and soil name	Pct. of map unit	Gravel source		Sand source	
		Rating class and limiting features	Value	Rating class and limiting features	Value
641543: Lindside-----	85	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
641583: Penn-----	87	Poor		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
641584: Penn-----	90	Poor		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
641586: Penn-----	90	Poor		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
641605: Udorthents, limestone-----	100	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
641614: Urban land-----	50	Not rated		Not rated	
Conestoga-----	35	Poor		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
641641: Water-----	100	Not rated		Not rated	
810899: Mattapex-----	95	Poor		Fair	
		Bottom layer	0.00	Thickest layer	0.00
		Thickest layer	0.00	Bottom layer	0.02
810907: Clarksburg-----	90	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
1482148: Croton-----	90	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
1486423: Lawrenceville-----	83	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
1539365: Gibraltar-----	95	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00

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Table 11.—Source of Gravel and Sand—Continued

Map unit symbol and soil name	Pct. of map unit	Gravel source		Sand source	
		Rating class and limiting features	Value	Rating class and limiting features	Value
1602815: Holly-----	90	Poor		Fair	
		Bottom layer	0.00	Thickest layer	0.00
		Thickest layer	0.00	Bottom layer	0.10
1612216: Penn-----	90	Poor		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
1612248: Urban land-----	65	Not rated		Not rated	
Penn-----	25	Poor		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
2229473: Udorthents, limestone-----	100	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
2229474: Udorthents, limestone-----	100	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
2229478: Udorthents, shale and sandstone-----	85	Poor		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
2229480: Urban land-----	90	Not rated		Not rated	
2229481: Urban land-----	90	Not rated		Not rated	
2229493: Urban land-----	65	Not rated		Not rated	
Penn-----	25	Poor		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
2229495: Urban land-----	80	Not rated		Not rated	
Udorthents, limestone-----	15	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
2229496: Urban land-----	80	Not rated		Not rated	
Udorthents, schist and gneiss-----	15	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00

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Table 11.—Source of Gravel and Sand—Continued

Map unit symbol and soil name	Pct. of map unit	Gravel source		Sand source	
		Rating class and limiting features	Value	Rating class and limiting features	Value
2229498: Urban land-----	80	Not rated		Not rated	
Udorthents, shale and sandstone-----	15	Poor		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
2229499: Urban land-----	80	Not rated		Not rated	
Udorthents, shale and sandstone-----	15	Not rated		Not rated	
2229500: Pits, quarries-----	80	Not rated		Not rated	
2229501: Urban land-----	65	Not rated		Not rated	
Readington-----	25	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
2230323: Buckingham-----	80	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
2230591: Abbottstown-----	93	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
2232623: Penn-----	47	Poor		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
Klinesville-----	40	Fair		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.31	Thickest layer	0.00
2232624: Raritan-----	90	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
2232625: Readington-----	80	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
2232626: Readington-----	86	Poor		Poor	
		Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
2233645: Edgemont-----	93	Poor		Fair	
		Thickest layer	0.00	Thickest layer	0.02
		Bottom layer	0.00	Bottom layer	0.03

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Table 11.—Source of Gravel and Sand—Continued

Map unit symbol and soil name	Pct. of map unit	Gravel source		Sand source	
		Rating class and limiting features	Value	Rating class and limiting features	Value
2233646: Edgemont-----	93	Poor		Fair	
		Thickest layer	0.00	Thickest layer	0.02
		Bottom layer	0.00	Bottom layer	0.03
2233647: Edgemont-----	93	Poor		Fair	
		Thickest layer	0.00	Thickest layer	0.02
		Bottom layer	0.00	Bottom layer	0.03
2233649: Edgemont, extremely stony-----	93	Poor		Fair	
		Thickest layer	0.00	Thickest layer	0.02
		Bottom layer	0.00	Bottom layer	0.03
2233698: Lansdale-----	92	Poor		Fair	
		Bottom layer	0.00	Bottom layer	0.03
		Thickest layer	0.00	Thickest layer	0.03
2233702: Penn-----	69	Poor		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
Lansdale-----	25	Poor		Fair	
		Bottom layer	0.00	Thickest layer	0.04
		Thickest layer	0.00	Bottom layer	0.12
2233703: Penn-----	50	Poor		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
Lansdale-----	40	Poor		Fair	
		Bottom layer	0.00	Thickest layer	0.04
		Thickest layer	0.00	Bottom layer	0.12
2233709: Penn-----	87	Poor		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
2233712: Penn-----	90	Poor		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
2233717 Klinesville-----	85	Fair		Poor	
		Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.31	Thickest layer	0.00
2248203: Lansdale-----	92	Poor		Fair	
		Bottom layer	0.00	Bottom layer	0.03
		Thickest layer	0.00	Thickest layer	0.03

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Table 11.—Source of Gravel and Sand—Continued

Map unit symbol and soil name	Pct. of map unit	Gravel source		Sand source	
		Rating class and limiting features	Value	Rating class and limiting features	Value
2249335: Lawrenceville-----	83	Poor Bottom layer Thickest layer	 0.00 0.00	Poor Bottom layer Thickest layer	 0.00 0.00
2379116: Birdsboro-----	92	Poor Thickest layer Bottom layer	 0.00 0.00	Fair Thickest layer Bottom layer	 0.00 0.04
2379949: Duffield-----	90	Poor Bottom layer Thickest layer	 0.00 0.00	Poor Bottom layer Thickest layer	 0.00 0.00
2384072: Glenville-----	90	Poor Thickest layer Bottom layer	 0.00 0.00	Poor Bottom layer Thickest layer	 0.00 0.00
2386596: Duffield-----	85	Poor Bottom layer Thickest layer	 0.00 0.00	Poor Bottom layer Thickest layer	 0.00 0.00
2386599: Duffield-----		Poor Bottom layer Thickest layer	 0.00 0.00	Poor Bottom layer Thickest layer	 0.00 0.00
2397950: Bowmansville-----	40	Poor Thickest layer Bottom layer	 0.00 0.00	Poor Bottom layer Thickest layer	 0.00 0.00
Knauers-----	40	Poor Thickest layer Bottom layer	 0.00 0.00	Poor Bottom layer Thickest layer	 0.00 0.00

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Table 12.—Source of Reclamation Material, Roadfill, and Topsoil

(Onsite investigation may be needed to validate the interpretations in this table and to confirm the identity of the soil on a given site. The numbers in the value columns range from 0.00 to 0.99. The smaller the value, the greater the limitation. See text for further explanation of ratings in this table)

Map unit symbol and soil name	Pct. of map unit	Source of reclamation material		Roadfill source		Topsoil source	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
541148: Birdsboro-----	97	Fair		Good		Poor	
		Low content of organic matter	0.13			Hard to reclaim (rock fragments)	0.00
		Too acid	0.84			Rock fragments	0.72
		Water erosion	0.99				
541159: Brecknock, extremely stony----	94	Fair		Fair		Poor	
		Low content of organic matter	0.13	Depth to bedrock Slope	0.01 0.92	Hard to reclaim (rock fragments)	0.00
		Droughty	0.51			Slope	0.00
		Too acid	0.68			Rock fragments	0.03
541164: Codorus-----	85	Fair		Fair		Fair	
		Low content of organic matter	0.13	Wetness	0.76	Wetness	0.76
		Too acid	0.54			Rock fragments	0.97
		Water erosion	0.99				
541165: Croton-----	82	Fair		Poor		Poor	
		Low content of organic matter	0.13	Wetness	0.00	Wetness	0.00
		Too clayey	0.50	Depth to bedrock	0.12	Too clayey	0.47
		Too acid	0.54			Hard to reclaim (rock fragments)	0.68
541194: Lawrenceville-----	81	Poor		Fair		Fair	
		Low content of organic matter	0.00	Wetness	0.76	Wetness	0.76
		Too acid	0.54				
		Water erosion	0.68				
541245: Raritan-----	96	Fair		Fair		Fair	
		Low content of organic matter	0.13	Wetness	0.29	Wetness	0.29
		Too acid	0.74			Hard to reclaim (rock fragments)	0.68
		Water erosion	0.99			Rock fragments	0.97
541247: Readington-----	85	Fair		Fair		Fair	
		Low content of organic matter	0.13	Wetness	0.76	Hard to reclaim (rock fragments)	0.68
		Too acid	0.68	Depth to bedrock	0.99	Wetness	0.76
		Water erosion	0.90			Rock fragments	0.88
541254: Rowland-----	82	Fair		Fair		Poor	
		Too acid	0.84	Wetness	0.53	Hard to reclaim (rock fragments)	0.00
		Low content of organic matter	0.88			Wetness	0.53
		Water erosion	0.90				

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Table 12.—Source of Reclamation Material, Roadfill, and Topsoil—Continued

Map unit symbol and soil name	Pct. of map unit	Source of reclamation material		Roadfill source		Topsoil source	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
541256: Rowland-----	95	Fair		Fair		Fair	
		Too acid	0.68	Wetness	0.76	Hard to reclaim (rock fragments)	0.68
		Low content of organic matter	0.88			Wetness	0.76
		Water erosion	0.90			Rock fragments	0.88
541257: Rowland-----	90	Fair		Fair		Fair	
		Low content of organic matter	0.88	Wetness	0.76	Hard to reclaim (rock fragments)	0.68
		Water erosion	0.90			Wetness	0.76
		Too acid	0.92			Rock fragments	0.88
641312: Duffield-----	90	Fair		Fair		Fair	
		Low content of organic matter	0.13	Shrink-swell	0.87	Rock fragments	0.50
		Too clayey	0.92			Too clayey	0.53
		Too acid	0.97				
641350: Edgemont-----	93	Fair		Good		Poor	
		Low content of organic matter	0.13			Rock fragments	0.00
		Too acid	0.50			Hard to reclaim (rock fragments)	0.08
		Droughty	0.99			Too acid	0.60
641351: Edgemont-----	93	Fair		Good		Poor	
		Low content of organic matter	0.13			Rock fragments	0.00
		Too acid	0.50			Hard to reclaim (rock fragments)	0.08
		Droughty	0.99			Slope	0.37
641352: Edgemont-----	93	Fair		Fair		Poor	
		Low content of organic matter	0.13	Slope	0.50	Slope	0.00
		Too acid	0.50			Rock fragments	0.00
		Droughty	0.99			Hard to reclaim (rock fragments)	0.08
641353: Edgemont, extremely stony-----	90	Fair		Good		Poor	
		Low content of organic matter	0.13			Rock fragments	0.00
		Too acid	0.50			Hard to reclaim (rock fragments)	0.08
		Droughty	0.99			Too acid	0.60
641354: Edgemont, extremely stony-----	93	Fair		Fair		Poor	
		Low content of organic matter	0.13	Slope	0.92	Rock fragments	0.00
		Too acid	0.50			Slope	0.00
		Droughty	0.99			Hard to reclaim (rock fragments)	0.08

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Table 12.—Source of Reclamation Material, Roadfill, and Topsoil—Continued

Map unit symbol and soil name	Pct. of map unit	Source of reclamation material		Roadfill source		Topsoil source	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
641355: Edgemont, extremely stony-----	93	Fair Low content of organic matter Too acid Droughty	0.13 0.50 0.99	Poor Slope	0.00	Poor Slope Rock fragments Hard to reclaim (rock fragments)	0.00 0.00 0.08
641418: Codorus-----	85	Fair Low content of organic matter Too acid Water erosion	0.13 0.54 0.99	Fair Wetness	0.76	Fair Wetness Rock fragments	0.76 0.97
641481: Conestoga-----	90	Fair Low content of organic matter Too acid	0.05 0.50	Fair Low strength	0.78	Fair Hard to reclaim (rock fragments) Rock fragments Too acid	0.32 0.72 0.88
641483: Conestoga-----	90	Fair Low content of organic matter Too acid	0.05 0.50	Fair Low strength	0.78	Fair Hard to reclaim (rock fragments) Rock fragments Too acid	0.32 0.72 0.88
641484: Conestoga-----	90	Fair Low content of organic matter Too acid	0.05 0.50	Fair Low strength	0.78	Fair Hard to reclaim (rock fragments) Slope Rock fragments	0.32 0.37 0.72
641523: Glenville-----	90	Fair Low content of organic matter Too acid	0.13 0.50	Fair Wetness	0.29	Fair Hard to reclaim (rock fragments) Wetness Rock fragments	0.08 0.29 0.50
641543: Lindside-----	85	Fair Low content of organic matter Water erosion	0.88 0.99	Poor Low strength Wetness	0.00 0.76	Fair Wetness	0.76
641583: Penn-----	87	Fair Low content of organic matter Droughty Depth to bedrock	0.13 0.29 0.35	Poor Depth to bedrock	0.00	Fair Rock fragments Depth to bedrock	0.13 0.35
641584: Penn-----	90	Fair Low content of organic matter Droughty Depth to bedrock	0.13 0.29 0.35	Poor Depth to bedrock	0.00	Fair Rock fragments Depth to bedrock Slope	0.13 0.35 0.37

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Table 12.—Source of Reclamation Material, Roadfill, and Topsoil—Continued

Map unit symbol and soil name	Pct. of map unit	Source of reclamation material		Roadfill source		Topsoil source	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
641586: Penn-----	90	Fair		Poor		Poor	
		Low content of organic matter	0.13	Depth to bedrock	0.00	Slope	0.00
		Too acid	0.50	Slope	0.50	Rock fragments	0.13
		Depth to bedrock	0.93			Too acid	0.76
641605: Udorthents, limestone-----	100	Poor		Fair		Poor	
		Too clayey	0.00	Shrink-swell	0.87	Too clayey	0.00
		Low content of organic matter	0.50				
		Too acid	0.84				
641614: Urban land-----	50	Not rated		Not rated		Not rated	
Conestoga-----	35	Fair		Good		Good	
		Low content of organic matter	0.13				
		Too acid	0.89				
641641: Water-----	100	Not rated		Not rated		Not rated	
810899: Mattapex-----	95	Fair		Fair		Fair	
		Too acid	0.12	Wetness	0.76	Too acid	0.60
		Low content of organic matter	0.13			Wetness	0.76
		Water erosion	0.90				
810907: Clarksburg-----	90	Fair		Fair		Fair	
		Low content of organic matter	0.13	Wetness	0.76	Rock fragments	0.72
		Too acid	0.84	Shrink-swell	0.87	Wetness	0.76
		Water erosion	0.99			Hard to reclaim (rock fragments)	0.92
1482148: Croton-----	90	Fair		Poor		Poor	
		Low content of organic matter	0.13	Wetness	0.00	Wetness	0.00
		Too acid	0.54			Too acid	0.98
		Water erosion	0.90			Hard to reclaim (rock fragments)	0.98
1486423: Lawrenceville-----	83	Poor		Fair		Fair	
		Low content of organic matter	0.00	Wetness	0.76	Wetness	0.76
		Too acid	0.54				
		Water erosion	0.68				
1539365: Gibraltar-----	95	Fair		Good		Good	
		Low content of organic matter	0.88				
		Water erosion	0.90				
		Too acid	0.95				

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Table 12.—Source of Reclamation Material, Roadfill, and Topsoil—Continued

Map unit symbol and soil name	Pct. of map unit	Source of reclamation material		Roadfill source		Topsoil source	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
1602815: Holly-----	90	Fair Too acid	0.97	Poor Wetness	0.00	Poor Wetness Rock fragments	0.00 0.97
1612216: Penn-----	90	Fair Low content of organic matter Droughty Too acid	0.13 0.36 0.50	Poor Slope Depth to bedrock	0.00 0.00	Poor Slope Rock fragments Depth to bedrock	0.00 0.00 0.79
1612248: Urban land-----	65	Not rated		Not rated		Not rated	
Penn-----	25	Fair Low content of organic matter Droughty Too acid	0.13 0.31 0.61	Poor Depth to bedrock	0.00	Fair Rock fragments Depth to bedrock	0.13 0.84
2229473: Udorthents, limestone-----	100	Poor Too clayey Low content of organic matter Too acid	0.00 0.50 0.84	Fair Shrink-swell	0.87	Poor Too clayey	0.00
2229474: Udorthents, limestone-----	100	Poor Too clayey Low content of organic matter Too acid	0.00 0.50 0.84	Fair Slope Shrink-swell	0.82 0.87	Poor Too clayey Slope	0.00 0.00
2229478: Udorthents, shale and sandstone-----	85	Poor Droughty Low content of organic matter Water erosion	0.00 0.13 0.90	Good		Good	
2229480: Urban land-----	90	Not rated		Not rated		Not rated	
2229481: Urban land-----	90	Not rated		Not rated		Not rated	
2229493: Urban land-----	65	Not rated		Not rated		Not rated	
Penn-----	25	Fair Low content of organic matter Droughty Too acid	0.13 0.31 0.61	Poor Depth to bedrock Slope	0.00 0.92	Poor Slope Rock fragments Depth to bedrock	0.00 0.13 0.84

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Table 12.—Source of Reclamation Material, Roadfill, and Topsoil—Continued

Map unit symbol and soil name	Pct. of map unit	Source of reclamation material		Roadfill source		Topsoil source	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
2229495: Urban land-----	80	Not rated		Not rated		Not rated	
Udorthents, limestone-----	15	Poor		Fair		Poor	
		Too clayey	0.00	Wetness	0.29	Too clayey	0.00
		Too acid	0.84	Shrink-swell	0.87	Slope	0.00
				Slope	0.92	Wetness	0.29
2229496: Urban land-----	80	Not rated		Not rated		Not rated	
Udorthents, schist and gneiss-----	15	Fair		Fair		Good	
		Too acid	0.84	Depth to bedrock	0.01		
		Water erosion	0.99	Shrink-swell	0.87		
2229498: Urban land-----	80	Not rated		Not rated		Not rated	
Udorthents, shale and sandstone-----	15	Poor		Good		Fair	
		Droughty	0.00			Rock fragments	0.99
		Low content of organic matter	0.13				
2229499: Urban land-----	80	Not rated		Not rated		Not rated	
Udorthents, shale and sandstone-----	15	Not rated		Not rated		Poor	
						Hard to reclaim (rock fragments)	0.00
						Rock fragments	0.00
						Slope	0.00
2229500: Pits, quarries-----	80	Not rated		Not rated		Not rated	
2229501: Urban land-----	65	Not rated		Not rated		Not rated	
Readington-----	25	Fair		Fair		Fair	
		Low content of organic matter	0.13	Wetness	0.76	Hard to reclaim (rock fragments)	0.68
		Too acid	0.68	Depth to bedrock	0.99	Wetness	0.76
		Water erosion	0.90			Rock fragments	0.88
2230323: Buckingham-----	80	Fair		Fair		Fair	
		Low content of organic matter	0.13	Wetness	0.01	Wetness	0.01
		Water erosion	0.90			Hard to reclaim (rock fragments)	0.98
		Too acid	0.95				
2230591: Abbottstown-----	93	Fair		Fair		Fair	
		Low content of organic matter	0.13	Wetness	0.04	Wetness	0.04
		Too acid	0.68	Depth to bedrock	0.39	Rock fragments	0.13
		Water erosion	0.90			Hard to reclaim (rock fragments)	0.82

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Table 12.—Source of Reclamation Material, Roadfill, and Topsoil—Continued

Map unit symbol and soil name	Pct. of map unit	Source of reclamation material		Roadfill source		Topsoil source	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
2232623: Penn-----	47	Fair		Poor		Poor	
		Low content of organic matter	0.13	Depth to bedrock	0.00	Slope	0.00
		Droughty	0.31	Slope	0.50	Rock fragments	0.13
		Too acid	0.74			Depth to bedrock	0.84
Klinesville-----	40	Poor		Poor		Poor	
		Droughty	0.00	Depth to bedrock	0.00	Rock fragments	0.00
		Depth to bedrock	0.00	Slope	0.50	Slope	0.00
		Too acid	0.54			Depth to bedrock	0.00
2232624: Raritan-----	90	Fair		Fair		Fair	
		Low content of organic matter	0.13	Wetness	0.29	Wetness	0.29
		Too acid	0.74			Hard to reclaim (rock fragments)	0.68
		Water erosion	0.99			Rock fragments	0.72
2232625: Readington-----	80	Fair		Fair		Fair	
		Low content of organic matter	0.13	Wetness	0.76	Hard to reclaim (rock fragments)	0.68
		Too acid	0.68	Depth to bedrock	0.99	Wetness	0.76
		Water erosion	0.90			Rock fragments	0.88
2232626: Readington-----	86	Fair		Fair		Fair	
		Low content of organic matter	0.13	Wetness	0.76	Slope	0.37
		Too acid	0.68	Depth to bedrock	0.99	Hard to reclaim (rock fragments)	0.68
		Water erosion	0.90			Wetness	0.76
2233645: Edgemont-----	93	Fair		Good		Poor	
		Low content of organic matter	0.13			Rock fragments	0.00
		Too acid	0.50			Hard to reclaim (rock fragments)	0.08
		Droughty	0.99			Too acid	0.60
2233646: Edgemont-----	93	Fair		Good		Poor	
		Low content of organic matter	0.13			Rock fragments	0.00
		Too acid	0.50			Hard to reclaim (rock fragments)	0.08
		Droughty	0.99			Slope	0.37
2233647: Edgemont-----	93	Fair		Fair		Poor	
		Low content of organic matter	0.13	Slope	0.50	Slope	0.00
		Too acid	0.50			Rock fragments	0.00
		Droughty	0.99			Hard to reclaim (rock fragments)	0.08
2233649: Edgemont, extremely stony-----	93	Fair		Poor		Poor	
		Low content of organic matter	0.13	Slope	0.00	Slope	0.00
		Too acid	0.50			Rock fragments	0.00
		Droughty	0.99			Hard to reclaim (rock fragments)	0.08

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Table 12.—Source of Reclamation Material, Roadfill, and Topsoil—Continued

Map unit symbol and soil name	Pct. of map unit	Source of reclamation material		Roadfill source		Topsoil source	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
2233698: Lansdale-----	92	Fair		Fair		Poor	
		Low content of organic matter	0.32	Depth to bedrock	0.23	Rock fragments	0.00
		Too acid	0.50			Hard to reclaim (rock fragments)	0.32
						Too acid	0.76
2233702: Penn-----	69	Fair		Poor		Fair	
		Low content of organic matter	0.13	Depth to bedrock	0.00	Rock fragments	0.13
		Droughty	0.29			Depth to bedrock	0.35
		Depth to bedrock	0.35				
Lansdale-----	25	Fair		Fair		Fair	
		Too acid	0.50	Depth to bedrock	0.29	Hard to reclaim (rock fragments)	0.32
		Low content of organic matter	0.88			Rock fragments	0.50
		Droughty	0.98			Too acid	0.76
2233703: Penn-----	50	Fair		Poor		Fair	
		Low content of organic matter	0.13	Depth to bedrock	0.00	Rock fragments	0.13
		Droughty	0.20			Depth to bedrock	0.35
		Depth to bedrock	0.35			Slope	0.37
Lansdale-----	40	Fair		Fair		Fair	
		Too acid	0.50	Depth to bedrock	0.29	Hard to reclaim (rock fragments)	0.32
		Low content of organic matter	0.88			Slope	0.37
		Droughty	0.95			Rock fragments	0.50
2233709: Penn-----	87	Fair		Poor		Fair	
		Low content of organic matter	0.13	Depth to bedrock	0.00	Rock fragments	0.13
		Droughty	0.29			Depth to bedrock	0.35
		Depth to bedrock	0.35				
2233712: Penn-----	90	Fair		Poor		Fair	
		Low content of organic matter	0.13	Depth to bedrock	0.00	Rock fragments	0.13
		Droughty	0.29			Depth to bedrock	0.35
		Depth to bedrock	0.35			Slope	0.37
2233717: Klinesville-----	85	Poor		Poor		Poor	
		Droughty	0.00	Depth to bedrock	0.00	Rock fragments	0.00
		Depth to bedrock	0.00	Slope	0.00	Slope	0.00
		Low content of organic matter	0.13			Depth to bedrock	0.00
2248203: Lansdale-----	92	Fair		Fair		Poor	
		Low content of organic matter	0.32	Depth to bedrock	0.23	Slope	0.00
		Too acid	0.50	Slope	0.50	Rock fragments	0.00
						Hard to reclaim (rock fragments)	0.32

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Table 12.—Source of Reclamation Material, Roadfill, and Topsoil—Continued

Map unit symbol and soil name	Pct. of map unit	Source of reclamation material		Roadfill source		Topsoil source	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
2249335: Lawrenceville-----	83	Poor Low content of organic matter Too acid Water erosion	0.00 0.54 0.68	Fair Wetness	0.76	Fair Wetness	0.76
2379116: Birdsboro-----	92	Fair Low content of organic matter Too acid Water erosion	0.13 0.84 0.99	Good		Poor Hard to reclaim (rock fragments) Rock fragments	0.00 0.72
2379949: Duffield-----	90	Fair Low content of organic matter Too clayey Too acid	0.13 0.92 0.97	Fair Shrink-swell	0.87	Fair Rock fragments Too clayey	0.50 0.53
2384072: Glenville-----	90	Fair Low content of organic matter Too acid	0.13 0.50	Fair Wetness	0.29	Fair Hard to reclaim (rock fragments) Wetness Rock fragments	0.08 0.29 0.50
2386596: Duffield-----	85	Fair Low content of organic matter Too acid Water erosion	0.13 0.97 0.99	Poor Low strength Shrink-swell	0.00 0.87	Fair Slope Rock fragments	0.37 0.88
2386599: Duffield-----		Fair Low content of organic matter Too acid Water erosion	0.13 0.97 0.99	Poor Low strength Shrink-swell	0.00 0.87	Fair Slope Rock fragments	0.37 0.88
2397950: Bowmansville-----	40	Fair Low content of organic matter Too acid	0.13 0.84	Poor Wetness	0.00	Poor Wetness Hard to reclaim (rock fragments)	0.00 0.32
Knauers-----	40	Fair Low content of organic matter Too acid Droughty	0.13 0.84 0.96	Poor Wetness	0.00	Poor Wetness Hard to reclaim (rock fragments) Rock fragments	0.00 0.00 0.00

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Table 13.—Ponds and Embankments

(Onsite investigation may be needed to validate the interpretations in this table and to confirm the identity of the soil on a given site. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table)

Map unit symbol and soil name	Pct. of map unit	Pond reservoir areas		Embankments, dikes, and levees		Aquifer-fed excavated ponds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
541148: Birdsboro-----	97	Very limited Seepage	1.00	Somewhat limited Piping	0.70	Very limited Unstable excavation walls Depth to saturated zone	1.00 0.81
541159: Brecknock, extremely stony----	94	Very limited Slope Seepage Depth to bedrock	1.00 1.00 0.42	Somewhat limited Piping Thin layer	0.49 0.42	Very limited Depth to water	1.00
541164: Codorus-----	85	Very limited Seepage	1.00	Somewhat limited Depth to saturated zone Piping	0.95 0.60	Somewhat limited Unstable excavation walls Depth to saturated zone	10.10 10.02
541165: Croton-----	82	Somewhat limited Seepage Depth to bedrock	0.53 0.29	Very limited Ponding Depth to saturated zone Piping Thin layer	1.00 1.00 0.88 0.29	Very limited Depth to water	1.00
541194: Lawrenceville-----	81	Somewhat limited Seepage	0.72	Somewhat limited Depth to saturated zone Piping	0.95 0.55	Very limited Depth to water	1.00
541245: Raritan-----	96	Very limited Seepage	1.00	Very limited Depth to saturated zone Piping	1.00 0.79	Very limited Depth to water	1.00
541247: Readington-----	85	Somewhat limited Seepage Depth to bedrock	0.72 0.01	Somewhat limited Depth to saturated zone Piping Thin layer	0.95 0.24 0.01	Very limited Depth to water	1.00
541254: Rowland-----	82	Very limited Seepage	1.00	Somewhat limited Depth to saturated zone Piping	0.99 0.77	Very limited Unstable excavation walls	1.00

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Table 13.—Ponds and Embankments—Continued

Map unit symbol and soil name	Pct. of map unit	Pond reservoir areas		Embankments, dikes, and levees		Aquifer-fed excavated ponds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
541256: Rowland-----	95	Somewhat limited Seepage	0.72	Very limited Piping Depth to saturated zone	1.00 0.95	Very limited Depth to water	1.00
541257: Rowland-----	90	Somewhat limited Seepage Slope	0.72 0.68	Very limited Piping Depth to saturated zone	1.00 0.95	Very limited Depth to water	1.00
641312: Duffield-----	90	Somewhat limited Seepage Slope	0.72 0.68	Somewhat limited Piping	0.37	Very limited Depth to water	1.00
641350: Edgemont-----	93	Very limited Seepage Slope	1.00 0.68	Somewhat limited Seepage	0.50	Very limited Depth to water	1.00
641351: Edgemont-----	93	Very limited Slope Seepage	1.00 1.00	Somewhat limited Seepage	0.50	Very limited Depth to water	1.00
641352: Edgemont-----	93	Very limited Slope Seepage	1.00 1.00	Somewhat limited Seepage	0.50	Very limited Depth to water	1.00
641353: Edgemont, extremely stony-----	90	Very limited Seepage Slope	1.00 0.08	Somewhat limited Seepage	0.50	Very limited Depth to water	1.00
641354: Edgemont, extremely stony-----	93	Very limited Slope Seepage	1.00 1.00	Somewhat limited Seepage	0.50	Very limited Depth to water	1.00
641355: Edgemont, extremely stony-----	93	Very limited Slope Seepage	1.00 1.00	Somewhat limited Seepage	0.50	Very limited Depth to water	1.00
641418: Codorus-----	85	Very limited Seepage	1.00	Somewhat limited Depth to saturated zone Piping	0.95 0.60	Somewhat limited Unstable excavation walls Depth to saturated zone	0.10 0.02
641481: Conestoga-----	90	Somewhat limited Seepage	0.72	Somewhat limited Piping	0.15	Very limited Depth to water	1.00

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Table 13.—Ponds and Embankments—Continued

Map unit symbol and soil name	Pct. of map unit	Pond reservoir areas		Embankments, dikes, and levees		Aquifer-fed excavated ponds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
641483: Conestoga-----	90	Somewhat limited Seepage Slope	0.72 0.68	Somewhat limited Piping	0.15	Very limited Depth to water	1.00
641484: Conestoga-----	90	Very limited Slope Seepage	1.00 0.72	Somewhat limited Piping	0.15	Very limited Depth to water	1.00
641523: Glenville-----	90	Somewhat limited Slope Seepage	0.68 0.04	Very limited Depth to saturated zone	1.00	Very limited Depth to water	1.00
641543: Lindside-----	85	Very limited Seepage	1.00	Somewhat limited Piping Depth to saturated zone	0.99 0.95	Somewhat limited Unstable excavation walls Depth to saturated zone	0.10 0.02
641583: Penn-----	87	Very limited Seepage Depth to bedrock Slope	1.00 0.91 0.68	Somewhat limited Thin layer Piping	0.91 0.75	Very limited Depth to water	1.00
641584: Penn-----	90	Very limited Slope Seepage Depth to bedrock	1.00 1.00 0.91	Somewhat limited Thin layer Piping	0.91 0.75	Very limited Depth to water	1.00
641586: Penn-----	90	Very limited Slope Seepage Depth to bedrock	1.00 1.00 0.66	Very limited Piping Thin layer	1.00 0.66	Very limited Depth to water	1.00
641605: Udorthents, limestone-----	100	Somewhat limited Slope	0.08	Not limited		Very limited Depth to water	1.00
641614: Urban land-----	50	Not rated		Not rated		Not rated	
Conestoga-----	35	Somewhat limited Seepage Slope	0.72 0.08	Somewhat limited Piping	0.11	Very limited Depth to water	1.00
641641: Water-----	100	Not rated		Not rated		Not rated	
810899: Mattapex-----	95	Very limited Seepage	1.00	Very limited Piping Depth to saturated zone	1.00 0.95	Somewhat limited Unstable excavation walls Depth to saturated zone	0.10 0.02

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Table 13.—Ponds and Embankments—Continued

Map unit symbol and soil name	Pct. of map unit	Pond reservoir areas		Embankments, dikes, and levees		Aquifer-fed excavated ponds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
810907: Clarksburg-----	90	Somewhat limited Seepage Slope	0.72 0.68	Somewhat limited Depth to saturated zone Piping	0.95 0.87	Very limited Depth to water	1.00
1482148: Croton-----	90	Somewhat limited Slope	0.68	Very limited Ponding Depth to saturated zone Piping	1.00 1.00 0.89	Very limited Depth to water	1.00
1486423: Lawrenceville-----	83	Somewhat limited Seepage Slope	0.72 0.68	Somewhat limited Depth to saturated zone Piping	0.95 0.55	Very limited Depth to water	1.00
1539365: Gibraltar-----	95	Somewhat limited Seepage	0.72	Very limited Piping	1.00	Somewhat limited Depth to saturated zone Slow refill Unstable excavation walls	0.81 0.46 0.10
1602815: Holly-----	90	Very limited Seepage	1.00	Very limited Ponding Depth to saturated zone Piping	1.00 1.00 1.00	Very limited Unstable excavation walls	1.00
1612216: Penn-----	90	Very limited Slope Seepage Depth to bedrock	1.00 1.00 0.77	Very limited Piping Thin layer	1.00 0.77	Very limited Depth to water	1.00
1612248: Urban land-----	65	Not rated		Not rated		Not rated	
Penn-----	25	Very limited Seepage Depth to bedrock Slope	1.00 0.74 0.08	Somewhat limited Thin layer	0.74	Very limited Depth to water	1.00
2229473: Udorthents, limestone-----	100	Somewhat limited Slope	0.08	Not limited		Very limited Depth to water	1.00
2229474: Udorthents, limestone-----	100	Very limited Slope	1.00	Not limited		Very limited Depth to water	1.00

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Table 13.—Ponds and Embankments—Continued

Map unit symbol and soil name	Pct. of map unit	Pond reservoir areas		Embankments, dikes, and levees		Aquifer-fed excavated ponds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
2229478: Udorthents, shale and sandstone-----	85	Very limited Seepage Slope	1.00 0.08	Very limited Seepage	1.00	Very limited Depth to water	1.00
2229480: Urban land-----	90	Not rated		Not rated		Not rated	
2229481: Urban land-----	90	Not rated		Not rated		Not rated	
2229493: Urban land-----	65	Not rated		Not rated		Not rated	
Penn-----	25	Very limited Slope Seepage Depth to bedrock	1.00 1.00 0.74	Somewhat limited Thin layer	0.74	Very limited Depth to water	1.00
2229495: Urban land-----	80	Not rated		Not rated		Not rated	
Udorthents, limestone-----	15	Very limited Slope	1.00	Very limited Depth to saturated zone	1.00	Very limited Slow refill Unstable excavation walls	1.00 0.10
2229496: Urban land-----	80	Not rated		Not rated		Not rated	
Udorthents, schist and gneiss-----	15	Somewhat limited Slope Depth to bedrock	0.08 0.01	Somewhat limited Piping Thin layer	0.94 0.46	Very limited Depth to water	1.00
2229498: Urban land-----	80	Not rated		Not rated		Not rated	
Udorthents, shale and sandstone-----	15	Very limited Seepage Slope	1.00 0.08	Very limited Seepage	1.00	Very limited Depth to water	1.00
2229499: Urban land-----	80	Not rated		Not rated		Not rated	
Udorthents, shale and sandstone-----	15	Very limited Slope Seepage	1.00 1.00	Not rated		Not rated	
2229500: Pits, quarries-----	80	Not rated		Not rated		Not rated	

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Table 13.—Ponds and Embankments—Continued

Map unit symbol and soil name	Pct. of map unit	Pond reservoir areas		Embankments, dikes, and levees		Aquifer-fed excavated ponds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
2229501: Urban land-----	65	Not rated		Not rated		Not rated	
Readington-----	25	Somewhat limited		Somewhat limited		Somewhat limited	
		Seepage	0.72	Depth to saturated zone	0.95	Unstable excavation walls	0.50
		Slope	0.08	Piping	0.29	Slow refill	0.28
		Depth to bedrock	0.01	Thin layer	0.01	Depth to saturated zone	0.02
						Depth to hard bedrock	0.01
2230323: Buckingham-----	80	Somewhat limited		Very limited		Very limited	
		Seepage	0.72	Depth to saturated zone	1.00	Depth to water	1.00
				Piping	1.00		
2230591: Abbottstown-----	93	Somewhat limited		Very limited		Somewhat limited	
		Seepage	0.72	Depth to saturated zone	1.00	Depth to hard bedrock	0.61
		Slope	0.68	Piping	1.00	Unstable excavation walls	0.50
		Depth to bedrock	0.16	Thin layer	0.16	Slow refill	0.28
2232623: Penn-----	47	Very limited		Somewhat limited		Very limited	
		Slope	1.00	Thin layer	0.74	Depth to water	1.00
		Seepage	1.00				
		Depth to bedrock	0.74				
Klinesville-----	40	Very limited		Very limited		Very limited	
		Slope	1.00	Seepage	1.00	Depth to water	1.00
		Depth to bedrock	1.00	Thin layer	1.00		
		Seepage	0.54				
2232624: Raritan-----	90	Very limited		Very limited		Very limited	
		Seepage	1.00	Depth to saturated zone	1.00	Depth to water	1.00
		Slope	0.68	Piping	0.83		
2232625: Readington-----	80	Somewhat limited		Somewhat limited		Very limited	
		Seepage	0.72	Depth to saturated zone	0.95	Depth to water	1.00
		Slope	0.68	Piping	0.24		
		Depth to bedrock	0.01	Thin layer	0.01		
2232626: Readington-----	86	Very limited		Somewhat limited		Very limited	
		Slope	1.00	Depth to saturated zone	0.95	Depth to water	1.00
		Seepage	0.72	Piping	0.29		
		Depth to bedrock	0.01	Thin layer	0.01		
2233645: Edgemont-----	93	Very limited		Somewhat limited		Very limited	
		Seepage	1.00	Seepage	0.50	Depth to water	1.00
		Slope	0.68				

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Table 13.—Ponds and Embankments—Continued

Map unit symbol and soil name	Pct. of map unit	Pond reservoir areas		Embankments, dikes, and levees		Aquifer-fed excavated ponds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
2233646: Edgemont-----	93	Very limited Slope Seepage	1.00 1.00	Somewhat limited Seepage	0.50	Very limited Depth to water	1.00
2233647: Edgemont-----	93	Very limited Slope Seepage	1.00 1.00	Somewhat limited Seepage	0.50	Very limited Depth to water	1.00
2233649: Edgemont, extremely stony-----	93	Very limited Slope Seepage	1.00 1.00	Somewhat limited Seepage	0.50	Very limited Depth to water	1.00
2233698: Lansdale-----	92	Very limited Seepage Slope Depth to bedrock	1.00 0.68 0.22	Somewhat limited Thin layer	0.22	Very limited Depth to water	1.00
2233702: Penn-----	69	Very limited Seepage Depth to bedrock Slope	1.00 0.91 0.68	Somewhat limited Thin layer Piping	0.91 0.75	Very limited Depth to water	1.00
Lansdale-----	25	Very limited Seepage Slope Depth to bedrock	1.00 0.68 0.19	Somewhat limited Seepage Thin layer	0.46 0.19	Very limited Depth to water	1.00
2233703: Penn-----	50	Very limited Slope Seepage Depth to bedrock	1.00 1.00 0.91	Somewhat limited Thin layer Piping	0.91 0.75	Very limited Depth to water	1.00
Lansdale-----	40	Very limited Seepage Slope Depth to bedrock	1.00 1.00 0.19	Somewhat limited Seepage Thin layer	0.46 0.19	Very limited Depth to water	1.00
2233709: Penn-----	87	Very limited Seepage Depth to bedrock Slope	1.00 0.91 0.68	Somewhat limited Thin layer Piping	0.91 0.75	Very limited Depth to water	1.00
2233712: Penn-----	90	Very limited Slope Seepage Depth to bedrock	1.00 1.00 0.91	Somewhat limited Thin layer Piping	0.91 0.75	Very limited Depth to water	1.00
2233717: Klinesville-----	85	Very limited Slope Depth to bedrock Seepage	1.00 1.00 0.54	Very limited Seepage Thin layer	1.00 1.00	Very limited Depth to water	1.00

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Table 13.—Ponds and Embankments—Continued

Map unit symbol and soil name	Pct. of map unit	Pond reservoir areas		Embankments, dikes, and levees		Aquifer-fed excavated ponds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
2248203: Lansdale-----	92	Very limited Seepage Slope Depth to bedrock	1.00 1.00 0.22	Somewhat limited Thin layer	0.22	Very limited Depth to water	1.00
2249335: Lawrenceville-----	83	Somewhat limited Seepage Slope	0.72 0.68	Somewhat limited Depth to saturated zone Piping	0.95 0.55	Very limited Depth to water	1.00
2379116: Birdsboro-----	92	Very limited Seepage Slope	1.00 0.68	Somewhat limited Piping	0.70	Very limited Unstable excavation walls Depth to saturated zone	1.00 0.81
2379949: Duffield-----	90	Somewhat limited Seepage Slope	0.72 0.68	Somewhat limited Piping	0.37	Very limited Depth to water	1.00
2384072: Glenville-----	90	Somewhat limited Slope Seepage	0.68 0.04	Very limited Depth to saturated zone	1.00	Very limited Depth to water	1.00
2386596: Duffield-----	85	Very limited Slope Seepage	1.00 0.72	Somewhat limited Piping	0.47	Very limited Depth to water	1.00
2386599: Duffield-----		Very limited Slope Seepage	1.00 0.72	Somewhat limited Piping	0.47	Very limited Depth to water	1.00
2397950: Bowmansville-----	40	Very limited Seepage	1.00	Very limited Depth to saturated zone Piping	1.00 0.99	Very limited Unstable excavation walls	1.00
Knauers-----	40	Very limited Seepage	1.00	Very limited Ponding Depth to saturated zone Seepage	1.00 1.00 1.00	Very limited Unstable excavation walls	1.00

Table 14.-Engineering Properties

(Absence of an entry indicates that data were not estimated)

Map unit symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10	3-10	4	10	40	200		
					in	in						
	In				Pct	Pct					Pct	
541148: Birdsboro-----	0-9	Silt loam	ML, CL-ML, CL	A-6, A-4	0	0	95-100	85-100	80-100	65-90	22-43	6-18
	9-49	Silt loam, sandy clay loam, gravelly clay loam	ML, SM, CL, GM	A-6, A-4	0	0-5	70-100	65-100	60-100	45-95	29-44	13-25
	49-73	Very gravelly sandy loam, very gravelly loam	SM, SC, ML, GM, GW-GM	A-4, A-2-6, A-1, A-2	0-2	0-20	40-100	20-100	15-70	10-55	16-40	2-21
541159: Brecknock, extremely stony	0-10	Channery silt loam	GM, ML, CL, GC	A-6, A-4	5-20	15-20	65-100	50-100	45-95	40-85	25-37	6-13
	10-32	Channery silt loam, clay loam	SM, CL, GM, ML	A-6, A-4, A-2	0-1	0-15	65-100	50-95	40-85	30-85	26-42	11-22
	32-41	Very channery silt loam, channery loam, very channery loam	SM, GC, ML, GM, GP-GM	A-4, A-6, A-1, A-2	0-1	0-20	20-90	15-90	10-85	10-75	26-42	11-22
	41-51	Bedrock	---	---	---	---	---	---	---	---	---	---
541164: Codorus-----	0-12	Silt loam	ML, CL-ML, CL	A-6, A-4	0	0	80-100	70-100	65-100	55-95	29-43	9-17
	12-48	Silt loam, loam, silty clay loam	ML, CL-ML, CL	A-6, A-4	0	0	80-100	75-100	65-100	55-85	27-44	12-25
	48-60	Silt loam, loam, stratified sand to silt loam	SM, SC-SM, GM, ML	A-4, A-2, A-1	0	0	25-100	20-100	20-85	15-65	16-25	2-7
541165: Croton-----	0-11	Silt loam	ML, CL-ML, CL	A-6, A-4	0	0-1	80-100	75-100	70-100	70-95	20-35	3-20
	11-19	Silt loam, silty clay loam, channery silt loam	ML, CL	A-6, A-4	0	0-10	90-100	70-100	70-100	50-95	30-40	5-20
	19-30	Channery silty clay loam, silt loam, silty clay loam, channery silt loam	ML, CL-ML, CL	A-6, A-4	0	0-10	90-100	70-100	70-100	60-90	15-30	3-20
	30-44	Channery silt loam, channery silty clay loam, channery clay loam	ML, CL-ML, CL	A-6, A-4	0	0-10	75-95	50-80	50-80	40-75	20-35	3-20
	44-64	Bedrock	---	---	---	---	---	---	---	---	---	---

Table 14.—Engineering Properties—Continued

Map unit symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10	3-10	4	10	40	200		
					in	in						
	<u>In</u>				<u>Pct</u>	<u>Pct</u>					<u>Pct</u>	
541194:												
Lawrenceville---	0-12	Silt loam	CL, ML	A-6, A-4	0	0	95-100	95-100	90-100	75-95	25-43	6-17
	12-26	Silt loam, silty clay loam	CL, ML	A-6, A-4	0	0	90-100	90-100	85-100	70-95	27-42	12-22
	26-47	Silt loam, loam	CL, ML, CL-ML	A-6, A-4	0	0	80-100	80-100	75-100	70-90	27-36	12-19
	47-75	Silt loam, channery loam, channery silt loam	SM, CL, ML, CL-ML, GM	A-6, A-4	0-2	0-10	55-100	50-100	45-100	40-100	27-36	12-19
541245:												
Raritan-----	0-9	Silt loam	CL, SM, ML	A-4	0	0	85-100	75-90	60-90	45-80	25-39	6-13
	9-27	Clay loam, loam, silt loam	ML, CL	A-6, A-4	0	0-5	90-100	80-95	70-90	50-70	27-43	12-24
	27-43	Clay loam, loam, silt loam	ML, CL	A-6, A-4	0	0-5	90-100	80-95	70-90	50-70	27-43	12-24
	43-60	Stratified gravelly sand to silt loam	SM, SC-SM, ML, GM, GW-GM	A-4, A-2, A-1	0-1	0-10	60-100	40-90	20-90	10-85	16-27	2-10
541247:												
Readington-----	0-8	Silt loam	CL, ML	A-6, A-4	0	0-5	90-100	80-100	80-100	65-100	27-37	9-13
	8-29	Silt loam, channery silt loam, silty clay loam	ML, CL-ML, CL	A-6, A-4	0	0-10	80-100	70-100	65-100	55-95	27-44	12-25
	29-58	Channery silt loam, channery loam	SM, SC-SM, SC, CL, GM, ML	A-6, A-4, A-2	0	0-10	60-95	40-90	30-85	25-55	29-40	13-21
	58-68	Bedrock	---	---	---	---	---	---	---	---	---	---
541254:												
Rowland-----	0-12	Silt loam	CL, SM, ML	A-4	0	0-5	95-100	95-100	75-100	35-95	25-39	6-13
	12-34	Silty clay loam, loam, sandy clay loam	CL, SM, ML	A-7, A-6, A-4	0	0-5	95-100	95-100	75-100	35-95	26-43	9-22
	34-46	Silty clay loam, silt loam, gravelly silty clay loam	CL, SM, ML	A-7, A-6, A-4	0	0-10	90-100	70-100	65-100	35-95	26-43	9-22
	46-61	Stratified gravel to sand	SM, SC-SM, SC, GC, GM	A-1-b, A-2, A-1	0-1	0-15	55-80	30-70	20-40	15-30	0-26	NP-7
541256:												
Rowland-----	0-6	Silt loam	ML	A-4	0	0-5	90-100	80-100	80-100	65-100	25-45	5-20
	6-29	Loam, gravelly silt loam, silty clay loam	ML, CL-ML, CL	A-6, A-4	0	0-10	80-100	70-100	65-100	55-95	25-39	5-12
	29-54	Silt loam, channery loam, gravelly silt loam	SM, SC-SM, ML, CL, GM	A-6, A-4, A-2	0	0-10	60-95	40-90	30-85	25-55	20-35	NP-12

Table 14.—Engineering Properties—Continued

Map unit symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10	3-10	4	10	40	200		
					in	in						
				Pct	Pct					Pct		
541257: Rowland-----	0-7	Silt loam	ML	A-4	0	0-5	90-100	80-100	80-100	65-100	25-45	5-20
	7-40	Loam, gravelly silt loam, silty clay loam	ML, CL-ML, CL	A-6, A-4	0	0-10	80-100	70-100	65-100	55-95	25-39	5-12
	40-52	Silt loam, channery loam, gravelly silt loam	SM, SC-SM, ML, CL, GM	A-6, A-4, A-2	0	0-10	60-95	40-90	30-85	25-55	20-35	NP-12
641312: Duffield-----	0-10	Silt loam	ML, CL-ML, CL	A-7, A-6, A-4	0	0	85-100	85-100	80-100	70-95	20-50	5-20
	10-53	Silty clay loam, silty clay, channery loam	CH, CL, MH, ML	A-7, A-7-6, A-4, A-6	0	0-10	65-100	60-100	55-100	55-95	30-55	8-22
	53-72	Silt loam, loam, clay	ML, SM, GM, MH	A-7-5, A-7, A-5	0	0-20	65-100	50-100	45-90	40-90	40-60	9-29
641350: Edgemont-----	0-8	Channery loam, channery sandy loam	SM, SC-SM, GM, ML	A-4, A-2	5-15	15-25	55-100	50-95	35-90	15-80	20-39	2-13
	8-36	Channery fine sandy loam, channery sandy clay loam, gravelly clay loam	SP-SM, SC-SM, SC, GM, GP-GM, SM	A-4, A-2-4, A-1, A-2	0-3	0-15	55-95	50-90	30-65	10-40	20-40	6-21
	36-60	Channery sandy loam, channery loamy sand, very gravelly clay loam	SP-SM, GC, SM, GM, GP-GM	A-4, A-2-4, A-3, A-1, A-2	1-3	0-25	35-75	10-70	10-65	5-45	16-40	2-21
641351: Edgemont-----	0-8	Channery loam, channery sandy loam	SM, SC-SM, GM, ML	A-4, A-2	5-15	15-25	55-100	50-95	35-90	15-80	20-39	2-13
	8-36	Channery fine sandy loam, channery sandy clay loam, gravelly clay loam	SP-SM, SC-SM, SC, GM, GP-GM, SM	A-4, A-2-4, A-1, A-2	0-3	0-15	55-95	50-90	30-65	10-40	16-40	2-21
	36-60	Channery sandy loam, channery loamy sand, very gravelly clay loam	SP-SM, GC, SM, GM, GP-GM	A-4, A-2-4, A-3, A-1, A-2	1-3	0-25	35-75	10-70	10-65	5-45	16-40	2-21
641352: Edgemont-----	0-8	Channery loam, channery sandy loam	SM, SC-SM, GM, ML	A-4, A-2	5-15	15-25	55-100	50-95	35-90	15-80	20-39	2-13
	8-36	Channery fine sandy loam, channery sandy clay loam, gravelly clay loam	SP-SM, SC-SM, SC, GM, GP-GM, SM	A-4, A-2-4, A-1, A-2	0-3	0-15	55-95	50-90	30-65	10-40	16-40	2-21
	36-60	Channery sandy loam, channery loamy sand, very gravelly clay loam	SP-SM, GC, SM, GM, GP-GM	A-4, A-2-4, A-3, A-1, A-2	1-3	0-25	35-75	10-70	10-65	5-45	16-40	2-21

Table 14.—Engineering Properties—Continued

Map unit symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10	3-10	4	10	40	200		
					in	in						
	<u>In</u>				<u>Pct</u>	<u>Pct</u>					<u>Pct</u>	
641353: Edgemont, extremely stony	0-8	Channery sandy loam	SM, SC, GM, ML	A-4, A-2	5-15	15-25	55-100	50-95	35-90	15-80	10-20	NP-6
	8-36	Channery fine sandy loam, channery sandy clay loam, gravelly clay loam	SP-SM, SC-SM, SM, GM, GP-GM	A-4, A-2, A-1	0-3	0-15	55-95	50-90	30-65	10-40	15-31	NP-8
	36-60	Channery sandy loam, channery loamy sand, very gravelly clay loam	SM, SP-SM, GM, GP-GM	A-3, A-4, A-1, A-2	1-3	5-25	35-75	10-70	10-65	5-45	15-31	NP-6
641354: Edgemont, extremely stony	0-8	Channery sandy loam	SM, SC, GM, ML	A-4, A-2	5-15	15-25	55-100	50-95	35-90	15-80	20-39	2-13
	8-36	Channery fine sandy loam, channery sandy clay loam, gravelly clay loam	SP-SM, SC-SM, SC, GM, GP-GM, SM	A-4, A-2-4, A-1, A-2	0-3	0-15	55-95	50-90	30-65	10-40	16-40	2-21
	36-60	Channery sandy loam, channery loamy sand, very gravelly clay loam	SP-SM, GC, SM, GM, GP-GM	A-4, A-2-4, A-3, A-1, A-2	1-3	5-25	35-75	10-70	10-65	5-45	16-40	2-21
641355: Edgemont, extremely stony	0-8	Channery sandy loam	SM, SC, GM, ML	A-4, A-2	5-15	15-25	55-100	50-95	35-90	15-80	20-39	2-13
	8-36	Channery fine sandy loam, channery sandy clay loam, gravelly clay loam	SP-SM, SC-SM, SC, GM, GP-GM, SM	A-4, A-2-4, A-1, A-2	0-3	0-15	55-95	50-90	30-65	10-40	16-40	2-21
	36-60	Channery sandy loam, channery loamy sand, very gravelly clay loam	SP-SM, GC, SM, GM, GP-GM	A-4, A-2-4, A-3, A-1, A-2	1-3	5-25	35-75	10-70	10-65	5-45	16-40	2-21
641418: Codorus-----	0-12	Silt loam	ML, CL-ML, CL	A-6, A-4	0	0	80-100	70-100	65-100	55-95	29-43	9-17
	12-48	Silt loam, loam, silty clay loam	ML, CL-ML, CL	A-6, A-4	0	0	80-100	75-100	65-100	55-85	27-44	12-25
	48-60	Silt loam, loam, stratified sand to silt loam	SM, SC-SM, GM, ML	A-4, A-2, A-1	0	0	25-100	20-100	20-85	15-65	16-25	2-7

Table 14.—Engineering Properties—Continued

Map unit symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 in	3-10 in	4	10	40	200		
	In				Pct	Pct					Pct	
641481: Conestoga-----	0-10	Silt loam	ML	A-4	0	0-5	90-100	85-100	80-100	70-90	20-30	NP-6
	10-38	Silt loam, silty clay loam, channery silt loam	MH, CL, CH	A-7, A-6	0	0-10	70-100	65-100	60-100	55-95	35-60	14-30
	38-75	Channery silt loam, channery loam, channery sandy loam	ML, SM, GM, MH	A-7, A-6, A-2	0	0-15	35-90	35-85	30-80	25-75	35-60	10-25
641483: Conestoga-----	0-10	Silt loam	ML	A-4	0	0-5	90-100	85-100	80-100	70-90	20-30	NP-6
	10-38	Silt loam, silty clay loam, channery silt loam	MH, CL, CH	A-7, A-6	0	0-10	70-100	65-100	60-100	55-95	35-60	14-30
	38-75	Channery silt loam, channery loam, channery sandy loam	ML, SM, GM, MH	A-7, A-6, A-2	0	0-15	35-90	35-85	30-80	25-75	35-60	10-25
641484: Conestoga-----	0-10	Silt loam	ML	A-4	0	0-5	90-100	85-100	80-100	70-90	20-30	NP-6
	10-38	Silt loam, silty clay loam, channery silt loam	MH, CL, CH	A-7, A-6	0	0-10	70-100	65-100	60-100	55-95	35-60	14-30
	38-75	Channery silt loam, channery loam, channery sandy loam	ML, SM, GM, MH	A-7, A-6, A-2	0	0-15	35-90	35-85	30-80	25-75	35-60	10-25
641523: Glenville-----	0-9	Silt loam	SM, ML	A-4	0	0	85-100	85-100	70-95	45-80	25-35	3-10
	9-19	Silt loam, channery loam, channery silty clay loam	SC, ML, GM, CL, CL-ML	A-6, A-4	0	0-10	70-100	60-100	60-95	45-80	25-40	5-13
	19-39	Silt loam, channery loam, silty clay loam	SC, ML, GM, CL, CL-ML	A-6, A-4	0	0-10	65-100	60-100	55-95	45-80	25-40	5-13
	39-82	Channery loam, very channery sandy loam	SM, GC, SC, CL-ML, GM, ML	A-4, A-2-4, A-1, A-2	0	0-20	45-90	20-75	10-75	5-65	25-35	5-10
641543: Lindside-----	0-10	Silt loam	ML, CL-ML, CL	A-6, A-4	0	0	100	95-100	80-100	55-90	20-35	2-15
	10-50	Silty clay loam, silt loam, very fine sandy loam	ML, CL-ML, CL	A-6, A-4	0	0	100	95-100	90-100	70-95	25-40	4-18
	50-60	Stratified gravelly sandy loam to silty clay loam	SC, SM, CL, ML	A-6, A-4, A-2	0-1	0	60-100	55-100	45-100	30-95	20-40	4-18

Table 14.—Engineering Properties—Continued

Map unit symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 in	3-10 in	4	10	40	200		
	In				Pct	Pct					Pct	
641583: Penn-----	0-10	Silt loam	CL, ML	A-4	0	0-5	95-100	85-100	85-95	60-85	22-37	6-13
	10-22	Channery silt loam, channery loam, channery silty clay loam	SM, CL, GM, ML	A-6, A-4, A-2	0	0-10	55-100	50-100	45-95	30-75	27-42	12-22
	22-28	Very channery silt loam, very channery loam	SM, GC-GM, GC, CL, GM, ML	A-4, A-6, A-1, A-2	0	0-15	35-100	20-100	15-95	15-70	27-36	12-17
	28-48	Bedrock	---	---	---	---	---	---	---	---	---	---
641584: Penn-----	0-10	Silt loam	CL, ML	A-4	0	0-5	95-100	85-100	85-95	60-85	22-37	6-13
	10-22	Channery silt loam, channery loam, channery silty clay loam	SM, CL, GM, ML	A-6, A-4, A-2	0	0-10	55-100	50-100	45-95	30-75	27-42	12-22
	22-28	Very channery silt loam, very channery loam	SM, GC-GM, GC, CL, GM, ML	A-4, A-6, A-1, A-2	0	0-15	35-100	20-100	15-95	15-70	27-36	12-17
	28-48	Bedrock	---	---	---	---	---	---	---	---	---	---
641586: Penn-----	0-8	Silt loam	ML	A-4	0	0-5	95-100	80-100	85-95	60-85	0-14	6-13
	8-20	Channery silt loam, channery loam, channery silty clay loam	SM, ML, GM	A-4, A-2	0	0-10	55-100	50-100	45-95	30-75	20-37	1-10
	20-33	Channery silt loam, channery loam, channery silty clay loam	SM, ML, GM	A-4, A-2	0	0-10	55-100	50-100	45-95	30-75	20-37	1-10
	33-36	Very channery silt loam, very channery fine sandy loam	SM, GC-GM, ML, CL, GM	A-4, A-2, A-1	0	0-15	35-100	20-100	15-95	15-70	20-35	3-10
	36-37	Bedrock	---	---	---	---	---	---	---	---	---	---
641605: Udorthents, limestone-----	0-6	Silty clay loam, clay loam	CL	A-6	0	0-5	90-100	80-100	80-100	60-90	25-35	10-15
	6-60	Silty clay loam, silty clay, clay	CL, CH	A-7-6, A-7	0	0-5	90-100	85-100	75-100	65-95	40-55	15-30

Table 14.—Engineering Properties—Continued

Map unit symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10	3-10	4	10	40	200		
					in	in						
	In				Pct	Pct					Pct	
641614: Conestoga-----	0-9	Silt loam	ML	A-4	0	0-5	90-100	85-100	80-100	70-90	20-30	NP-6
	9-40	Silt loam, silty clay loam, channery silt loam	MH, CL, CH	A-7, A-6	0	0-10	70-100	65-100	60-100	55-95	35-60	14-30
	40-60	Loam, channery silt loam, channery loam, channery sandy loam	ML, SM, GM, MH	A-7, A-6, A-2	0	0-15	35-95	35-90	30-80	25-75	35-60	10-25
810899: Mattapex-----	0-9	Silt loam	CL-ML, CL	A-4	0	0	95-100	90-100	80-100	80-100	15-30	5-15
	9-42	Silty clay loam, silt loam	CL-ML, CL	A-7, A-6, A-4	0	0	100	100	90-100	85-95	24-45	7-21
	42-45	Sandy loam, silt loam, loamy sand	SC, SM, CL, ML	A-6, A-4, A-2	0	0	95-100	90-100	45-95	15-75	0-40	NP-18
	45-70	Sandy loam, gravelly loamy coarse sand, loamy sand	SP-SM, SM	A-2	0	0	95-100	90-100	43-85	5-30	0-10	NP
810907: Clarksburg-----	0-8	Silt loam	ML, CL	A-6, A-4	0	0-5	90-100	85-100	80-95	75-90	25-35	2-11
	8-27	Silt loam, channery silty clay loam, gravelly silt loam	ML, CL-ML, CL	A-7, A-6, A-4	0	0-10	80-100	65-100	60-95	55-85	25-45	6-20
	27-51	Silt loam, channery loam, gravelly silt loam	SC, SC-SM, CL, CL-ML	A-7, A-6, A-4	0	0-15	75-100	55-100	50-95	45-90	20-45	4-20
	51-84	Silt loam, channery loam, silty clay loam	CL, GC, SC-SM, CH	A-6, A-7, A-2, A-4	0	0-10	50-100	20-100	15-95	15-90	20-52	4-25
1482148: Croton-----	0-6	Silt loam	CL-ML, CL	A-6, A-4	0	0-1	90-100	90-100	85-95	75-90	25-40	5-15
	6-19	Silty clay loam, channery silt loam	CL	A-6	0	0-10	90-100	85-95	80-90	70-85	30-40	10-15
	19-49	Silt loam, silty clay loam, channery silt loam	CL	A-6	0	0-10	90-100	85-95	80-90	70-85	30-40	10-15
	49-78	Silt loam, channery silty clay loam, channery clay loam	CL	A-6	0	0-10	75-95	65-80	60-75	50-70	30-40	10-15
	78-90	Extremely channery loam, silt loam, channery silty clay loam, channery clay loam	CL	A-6	0	0-30	50-95	30-75	60-75	50-70	30-40	10-15
	90-99	Bedrock	---	---	---	---	---	---	---	---	---	---

Table 14.—Engineering Properties—Continued

Map unit symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10	3-10	4	10	40	200		
					in	in						
	<u>In</u>				<u>Pct</u>	<u>Pct</u>					<u>Pct</u>	
1486423: Lawrenceville---	0-12	Silt loam	CL, ML	A-6, A-4	0	0	95-100	95-100	90-100	75-95	25-43	6-17
	12-26	Silt loam, silty clay loam	CL, ML	A-6, A-4	0	0	90-100	90-100	85-100	70-95	27-42	12-22
	26-47	Silt loam, loam	CL, ML, CL-ML	A-6, A-4	0	0	80-100	80-100	75-100	70-90	27-36	12-19
	47-75	Silt loam, channery loam, channery silt loam	SM, CL, ML, CL-ML, GM	A-6, A-4	0-2	0-10	55-100	50-100	45-100	40-100	27-36	12-19
1539365: Gibraltar-----	0-4	Silt loam	SM, SC-SM, ML	A-4	0	0	90-100	90-100	75-95	35-90	20-30	NP-5
	4-24	Silt loam, loam, sandy loam	SM, ML	A-4	0	0	90-100	90-100	75-95	35-90	20-30	NP-5
	24-30	Sandy loam, loam	SM, ML	A-4	0	0	90-100	90-100	75-95	35-90	20-30	NP-5
	30-62	Silt loam, loam, silty clay loam	ML, SM, CL, CL-ML	A-6, A-4	0	0-1	90-100	70-100	65-95	50-90	25-35	5-15
1602815: Holly-----	0-7	Silt loam	ML	A-4	0	0	90-100	85-100	80-100	70-90	25-35	3-10
	7-26	Silty clay loam, loam, sandy loam	SM, ML	A-6, A-4	0	0	85-100	75-100	70-95	45-85	20-40	NP-14
	26-44	Silty clay loam, loam, sandy loam	SM, ML	A-4, A-2	0	0	85-100	75-100	50-95	25-80	20-40	NP-10
	44-62	Gravelly loamy sand	SP-SM, SM, ML	A-4, A-2, A-1-b	0	0-5	70-100	65-100	40-90	10-70	20-40	NP-10
1612216: Penn-----	0-7	Silt loam	ML	A-4	0	0-5	95-100	80-100	85-95	60-85	0-14	6-13
	7-13	Channery silt loam, channery loam, channery silty clay loam	SM, ML, GM	A-4, A-2	0	0-10	55-100	50-100	45-95	30-75	20-37	1-10
	13-21	Channery silt loam, channery loam, channery silty clay loam	SM, ML, GM	A-4, A-2	0	0-10	55-100	50-100	45-95	30-75	20-37	1-10
	21-33	Very channery silt loam, very channery fine sandy loam	SM, GC-GM, ML, CL, GM	A-4, A-2, A-1	0	0-15	35-100	20-100	15-95	15-70	20-35	3-10
	33-37	Bedrock	---	---	---	---	---	---	---	---	---	---

Table 14.-Engineering Properties-Continued

Map unit symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 in	3-10 in	4	10	40	200		
	In				Pct	Pct					Pct	
1612248: Penn-----	0-8	Channery silt loam	CL, ML, GM	A-4	0	0-10	60-90	50-80	45-75	40-65	22-37	6-13
	8-21	Channery silt loam, channery loam, channery silty clay loam	SM, CL, GM, ML	A-6, A-4, A-2	0	0-10	55-100	50-100	45-95	30-75	27-42	12-22
	21-34	Very channery silt loam, very channery loam	SM, GC-GM, GC, CL, GM, ML	A-4, A-6, A-1, A-2	0	0-15	35-100	20-100	15-95	15-70	27-36	12-17
	34-44	Bedrock	---	---	---	---	---	---	---	---	---	---
2229473: Udorthents, limestone-----	0-6	Silty clay loam, clay loam	CL	A-6	0	0-5	90-100	80-100	80-100	60-90	25-35	10-15
	6-60	Silty clay loam, silty clay, clay	CL, CH	A-7-6, A-7	0	0-5	90-100	85-100	75-100	65-95	40-55	15-30
2229474: Udorthents, limestone-----	0-6	Silty clay loam, clay loam	CL	A-6	0	0-5	90-100	80-100	80-100	60-90	25-35	10-15
	6-60	Silty clay loam, silty clay, clay	CL, CH	A-7-6, A-7	0	0-5	90-100	85-100	75-100	65-95	40-55	15-30
2229478: Udorthents, shale and sandstone-----	0-6	Silt loam	SM, CL, ML, SC-SM	A-6, A-4	0-1	0-1	80-100	80-90	70-85	60-75	15-25	8-15
	6-60	Silt loam, very channery silt loam, very channery loam, channery silt loam	SC-SM, SC, GW-GM, GC, GM	A-2-4, A-2, A-1	0-2	0-45	25-95	20-95	10-30	5-30	15-40	NP-15
2229493: Penn-----	0-8	Channery silt loam	CL, ML, GM	A-4	0	0-10	60-90	50-80	45-75	40-65	22-37	6-13
	8-21	Channery silt loam, channery loam, channery silty clay loam	SM, CL, GM, ML	A-6, A-4, A-2	0	0-10	55-100	50-100	45-95	30-75	27-42	12-22
	21-34	Very channery silt loam, very channery loam	SM, GC-GM, GC, CL, GM, ML	A-4, A-6, A-1, A-2	0	0-15	35-100	20-100	15-95	15-70	27-36	12-17
	34-44	Bedrock	---	---	---	---	---	---	---	---	---	---

Table 14.--Engineering Properties--Continued

Map unit symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 in	3-10 in	4	10	40	200		
	In				Pct	Pct					Pct	
2229495: Udorthents, limestone-----	0-6	Clay loam	CL	A-6	0	0-5	90-100	80-100	80-100	60-90	25-35	10-15
	6-60	Silty clay loam, silty clay, clay	CL, CH	A-7-6, A-7	0	0-5	90-100	85-100	75-100	65-95	40-55	15-30
2229496: Udorthents, schist and gneiss-----	0-6	Loam	ML, CL-ML, CL	A-4	0	0-5	85-100	80-100	70-95	50-75	25-35	5-10
	6-40	Loam, silty clay loam, clay loam	ML	A-7-6, A-6	0	0-5	90-100	80-100	70-100	55-95	35-45	10-15
	40-60	Bedrock	---	---	---	---	---	---	---	---	---	---
2229498: Udorthents, shale and sandstone-----	0-6	Very channery loam	SC-SM, GC-GM, GM, CL, GC	A-4, A-2, A-1	0	0-20	40-80	30-70	20-65	15-60	15-25	NP-10
	6-60	Silt loam, very channery silt loam, very channery sandy loam, channery loam	SC-SM, SC, GW-GM, GC, GM	A-2-4, A-2, A-1	0-2	0-45	25-95	20-95	10-30	5-30	15-40	NP-15
2229499: Udorthents, shale and sandstone-----	0-6	Very channery loam	SC-SM, GC-GM, GM, CL, GC	A-4, A-2, A-1	---	0-20	40-80	30-70	20-65	15-60	15-25	NP-10
	6-60	Very channery silty clay loam, very channery sandy loam, channery loam	GW-GM, SC-SM, GC, GM	A-2-4, A-2, A-1	---	0-45	25-80	20-50	10-30	5-30	15-40	NP-15
2229501: Readington-----	0-8	Silt loam	CL, ML	A-6, A-4	0	0-5	90-100	80-100	80-100	65-100	27-37	9-13
	8-29	Silt loam, loam, channery silt loam, silty clay loam	ML, CL-ML, CL	A-6, A-4	0	0-10	80-100	70-100	65-100	55-95	27-44	12-25
	29-58	Silt loam, channery loam, channery silt loam	ML, SM, SC, SC-SM, CL, GM	A-6, A-4, A-2	0	0-10	60-95	40-90	30-85	25-55	29-40	13-21
	58-68	Bedrock	---	---	---	---	---	---	---	---	---	---

Table 14.—Engineering Properties—Continued

Map unit symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 in	3-10 in	4	10	40	200		
	In				Pct	Pct					Pct	
2230323:												
Buckingham-----	0-16	Silt loam	CL-ML, CL	A-6, A-4	0	0-5	90-100	80-100	75-100	55-90	20-35	5-15
	16-40	Silt loam, loam, silty clay loam	CL-ML, CL	A-6, A-4	0	0-5	90-100	80-100	75-95	55-85	20-35	5-15
	40-48	Silt loam, loam, silty clay loam	CL-ML, CL	A-6, A-4	0-1	0-5	85-100	75-100	70-90	50-80	20-35	5-15
	48-62	Gravelly silt loam, gravelly loam	SC, GC, CL	A-6, A-4	0-2	0-10	70-100	60-85	55-80	40-80	20-35	5-15
2230591:												
Abbottstown-----	0-10	Silt loam	CL-ML, CL	A-6, A-4	0	0-5	90-100	80-100	75-100	55-90	20-35	5-15
	10-20	Silt loam, loam, silty clay loam	CL-ML, CL	A-6, A-4	0	0-5	90-100	80-100	75-95	55-85	20-35	5-15
	20-39	Channery loam, loam, silty clay loam	SC, CL-ML, CL	A-6, A-4	0	0-10	75-100	65-90	60-90	40-85	20-35	5-15
	39-48	Channery silt loam, loam, silty clay loam	SC, CL-ML, CL	A-6, A-4	0	0-20	75-100	45-90	40-90	40-85	20-35	5-15
	48-49	Bedrock	---	---	---	---	---	---	---	---	---	---
2232623:												
Penn-----	0-8	Channery silt loam	CL, ML, GM	A-4	0	0-10	60-90	50-80	45-75	40-65	22-37	6-13
	8-21	Channery silt loam, channery loam, channery silty clay loam	SM, CL, GM, ML	A-6, A-4, A-2	0	0-10	55-100	50-100	45-95	30-75	27-42	12-22
	21-34	Very channery silt loam, very channery loam	SM, GC, ML, CL, GM	A-4, A-6, A-1, A-2	0	0-15	35-100	20-100	15-95	15-70	27-36	12-17
	34-44	Bedrock	---	---	---	---	---	---	---	---	---	---
Klinesville-----	0-8	Channery silt loam	SC, SM, GM	A-2, A-2-6, A-2-4, A-4	0	0-10	55-85	45-60	35-50	25-40	21-39	6-17
	8-14	Very channery silt loam	SP, GC, SM, GM, GP	A-1, A-2-6, A-4, A-1-b, A-2	0	0-10	25-75	15-55	10-50	4-40	20-32	6-13
	14-18	Extremely channery silt loam, very channery silt loam	SP, GC, SM, GM, GP	A-1, A-2-4, A-1-b, A-2	0	0-20	15-60	10-50	10-40	4-30	20-32	6-13
	18-28	Bedrock	---	---	---	---	---	---	---	---	---	---

Table 14.—Engineering Properties—Continued

Map unit symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 in	3-10 in	4	10	40	200		
	In				Pct	Pct					Pct	
2232624:												
Raritan-----	0-14	Silt loam	CL, SM, ML	A-4	0	0	85-100	75-90	60-90	45-80	25-39	6-13
	14-27	Clay loam, loam, silt loam	ML, CL	A-6, A-4	0	0-5	90-100	80-95	70-90	50-70	27-43	12-24
	27-43	Clay loam, loam, silt loam	ML, CL	A-6, A-4	0	0-5	90-100	80-95	70-90	50-70	27-43	12-24
	43-60	Stratified gravelly loamy sand to silty clay loam	SM, SC-SM, ML, GM, GW-GM	A-4, A-2, A-1	0-1	0-10	60-100	40-90	20-90	10-85	16-40	2-21
2232625:												
Readington-----	0-8	Silt loam	CL, ML	A-6, A-4	0	0-5	90-100	80-100	80-100	65-100	27-37	9-13
	8-29	Silt loam, channery silt loam, silty clay loam	ML, CL-ML, CL	A-6, A-4	0	0-10	80-100	70-100	65-100	55-95	27-44	12-25
	29-58	Channery silt loam, channery loam	SM, SC-SM, SC, CL, GM, ML	A-6, A-4, A-2	0	0-10	60-95	40-90	30-85	25-55	29-40	13-21
	58-68	Bedrock	---	---	---	---	---	---	---	---	---	---
2232626:												
Readington-----	0-11	Silt loam	CL, ML	A-6, A-4	0	0-5	90-100	80-100	80-100	65-100	27-37	9-13
	11-29	Silt loam, loam, channery silt loam, channery silty clay loam	ML, CL-ML, CL	A-6, A-4	0	0-10	80-100	70-100	65-100	55-95	27-44	12-25
	29-58	Silt loam, channery loam, channery silt loam	SM, SC-SM, SC, CL, GM, ML	A-6, A-4, A-2	0	0-10	60-95	40-90	30-85	25-55	29-40	13-21
	58-68	Bedrock	---	---	---	---	---	---	---	---	---	---
2233645:												
Edgemont-----	0-8	Channery loam, channery sandy loam	SM, SC-SM, GM, ML	A-4, A-2	5-15	15-25	55-100	50-95	35-90	15-80	20-39	2-13
	8-36	Channery fine sandy loam, channery sandy clay loam, gravelly clay loam	SP-SM, SC-SM, SC, GM, GP-GM, SM	A-4, A-2-4, A-1, A-2	0-3	0-15	55-95	50-90	30-65	10-40	20-40	6-21
	36-60	Channery sandy loam, channery loamy sand, very gravelly clay loam	SP-SM, GC, SM, GM, GP-GM	A-4, A-2-4, A-3, A-1, A-2	1-3	0-25	35-75	10-70	10-65	5-45	16-40	2-21

Table 14.-Engineering Properties-Continued

Map unit symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 in	3-10 in	4	10	40	200		
	In				Pct	Pct					Pct	
2233646: Edgemont-----	0-8	Channery loam, channery sandy loam	SM, SC-SM, GM, ML	A-4, A-2	5-15	15-25	55-100	50-95	35-90	15-80	20-39	2-13
	8-36	Channery fine sandy loam, channery sandy clay loam, gravelly clay loam	SP-SM, SC-SM, SC, GM, GP-GM, SM	A-4, A-2-4, A-1, A-2	0-3	0-15	55-95	50-90	30-65	10-40	16-40	2-21
	36-60	Channery sandy loam, channery loamy sand, very gravelly clay loam	SP-SM, GC, SM, GM, GP-GM	A-4, A-2-4, A-3, A-1, A-2	1-3	0-25	35-75	10-70	10-65	5-45	16-40	2-21
2233647: Edgemont-----	0-8	Channery loam, channery sandy loam	SM, SC-SM, GM, ML	A-4, A-2	5-15	15-25	55-100	50-95	35-90	15-80	20-39	2-13
	8-36	Channery fine sandy loam, channery sandy clay loam, gravelly clay loam	SP-SM, SC-SM, SC, GM, GP-GM, SM	A-4, A-2-4, A-1, A-2	0-3	0-15	55-95	50-90	30-65	10-40	16-40	2-21
	36-60	Channery sandy loam, channery loamy sand, very gravelly clay loam	SP-SM, GC, SM, GM, GP-GM	A-4, A-2-4, A-3, A-1, A-2	1-3	0-25	35-75	10-70	10-65	5-45	16-40	2-21
2233649: Edgemont, extremely stony	0-8	Channery sandy loam	SM, SC, GM, ML	A-4, A-2	5-15	15-25	55-100	50-95	35-90	15-80	20-39	2-13
	8-36	Channery fine sandy loam, channery sandy clay loam, gravelly clay loam	SP-SM, SC-SM, SC, GM, GP-GM, SM	A-4, A-2-4, A-1, A-2	0-3	0-15	55-95	50-90	30-65	10-40	16-40	2-21
	36-60	Channery sandy loam, channery loamy sand, very gravelly clay loam	SP-SM, GC, SM, GM, GP-GM	A-4, A-2-4, A-3, A-1, A-2	1-3	5-25	35-75	10-70	10-65	5-45	16-40	2-21
2233698: Lansdale-----	0-8	Loam	SM, CL-ML, SC, CL, ML	A-4, A-2	0	0-2	80-95	75-90	60-80	30-70	20-30	3-10
	8-34	Sandy loam, sandy clay loam, channery sandy loam	SM, SC-SM, SC, CL, ML	A-4, A-2-4	0	0-10	60-90	60-80	40-70	30-65	20-30	3-10
	34-46	Channery sandy loam, very channery sandy loam	SM, SC-SM, SC, GC, GM	A-4, A-2-4, A-1-b, A-2	0	0-20	55-80	50-70	40-60	15-40	20-30	2-8
	46-50	Bedrock	---	---	---	---	---	---	---	---	---	---

Table 14.-Engineering Properties-Continued

Map unit symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 in	3-10 in	4	10	40	200		
	In				Pct	Pct					Pct	
2233702:												
Penn-----	0-10	Channery silt loam	CL, ML	A-4	0	0-5	95-100	85-100	85-95	60-85	22-37	6-13
	10-22	Channery silt loam, channery loam, channery silty clay loam	SM, CL, GM, ML	A-6, A-4, A-2	0	0-10	55-100	50-100	45-95	30-75	27-42	12-22
	22-28	Very channery silt loam, very channery loam	SM, GC, ML, CL, GM	A-4, A-6, A-1, A-2	0	0-15	35-100	20-100	15-95	15-70	27-36	12-17
	28-48	Bedrock	---	---	---	---	---	---	---	---	---	---
Lansdale-----	0-10	Channery loam	SC-SM, SM, CL-ML, ML	A-4, A-2	0	0-2	80-95	75-95	55-80	30-60	20-35	2-10
	10-30	Sandy loam, sandy clay loam, channery sandy loam	SM, SC-SM, SC	A-2-6, A-2, A-2-4	0	0-10	80-90	75-85	50-70	25-35	21-37	6-17
	30-47	Channery loamy sand, channery sandy loam, very channery sandy loam	SC-SM, SM, GM, SC	A-1, A-2-4, A-1-b, A-2	0	0-20	55-80	50-70	30-45	15-25	20-30	6-12
	47-57	Bedrock	---	---	---	---	---	---	---	---	---	---
2233703:												
Penn-----	0-10	Channery silt loam	CL, ML, GM	A-4	0	0-10	60-90	50-80	45-75	40-65	22-37	6-13
	10-22	Channery silt loam, channery loam, channery silty clay loam	SM, CL, GM, ML	A-6, A-4, A-2	0	0-10	55-100	50-100	45-95	30-75	27-42	12-22
	22-28	Very channery silt loam, very channery loam	SM, GC, ML, CL, GM	A-4, A-6, A-1, A-2	0	0-15	35-100	20-100	15-95	15-70	27-36	12-17
	28-48	Bedrock	---	---	---	---	---	---	---	---	---	---
Lansdale-----	0-10	Channery loam	ML, CL-ML	A-4	0	0-10	80-90	75-85	65-75	50-60	20-35	2-10
	10-30	Sandy loam, sandy clay loam, channery sandy loam	SM, SC-SM, SC	A-2-6, A-2, A-2-4	0	0-10	80-90	75-85	50-70	25-35	21-37	6-17
	30-47	Channery loamy sand, channery sandy loam, very channery sandy loam	SC-SM, SM, GM, SC	A-1, A-2-4, A-1-b, A-2	0	0-20	55-80	50-70	30-45	15-25	20-30	6-12
	47-57	Bedrock	---	---	---	---	---	---	---	---	---	---

Table 14.—Engineering Properties—Continued

Map unit symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 in	3-10 in	4	10	40	200		
	In				Pct	Pct					Pct	
2233709: Penn-----	0-10	Silt loam	CL, ML	A-4	0	0-5	95-100	85-100	85-95	60-85	22-37	6-13
	10-22	Channery silt loam, channery loam, channery silty clay loam	SM, CL, GM, ML	A-6, A-4, A-2	0	0-10	55-100	50-100	45-95	30-75	27-42	12-22
	22-28	Very channery silt loam, very channery loam	SM, GC-GM, GC, CL, GM, ML	A-4, A-6, A-1, A-2	0	0-15	35-100	20-100	15-95	15-70	27-36	12-17
	28-48	Bedrock	---	---	---	---	---	---	---	---	---	---
2233712: Penn-----	0-10	Silt loam	CL, ML	A-4	0	0-5	95-100	85-100	85-95	60-85	22-37	6-13
	10-22	Channery silt loam, channery loam, channery silty clay loam	SM, CL, GM, ML	A-6, A-4, A-2	0	0-10	55-100	50-100	45-95	30-75	27-42	12-22
	22-28	Very channery silt loam, very channery loam	SM, GC-GM, GC, CL, GM, ML	A-4, A-6, A-1, A-2	0	0-15	35-100	20-100	15-95	15-70	27-36	12-17
	28-48	Bedrock	---	---	---	---	---	---	---	---	---	---
2233717: Klinesville-----	0-3	Channery silt loam	SM, SC, GM, GP	A-4, A-2-6, A-1, A-2	0	0-10	25-75	15-55	10-50	4-40	22-39	6-17
	3-12	Channery silt loam, very channery silt loam	SP, GC, SM, GM, GP	A-4, A-2-6, A-1, A-2	0	0-10	25-75	15-55	10-50	4-40	20-32	6-13
	12-16	Channery silt loam, extremely channery silt loam, very channery silt loam	SP, GC, SM, GM, GP	A-2-4, A-2, A-1	0	0-20	15-60	10-50	10-40	4-30	20-30	6-13
	16-28	Bedrock	---	---	---	---	---	---	---	---	---	---
2248203: Lansdale-----	0-8	Loam	SM, CL-ML, SC, CL, ML	A-4, A-2	0	0-2	80-95	75-90	60-80	30-70	20-30	3-10
	8-34	Sandy loam, sandy clay loam, channery sandy loam	SM, SC-SM, SC, CL, ML	A-4, A-2-4	0	0-10	60-90	60-80	40-70	30-65	20-30	3-10
	34-46	Channery sandy loam, very channery sandy loam	SM, SC-SM, SC, GC, GM	A-4, A-2-4, A-1-b, A-2	0	0-20	55-80	50-70	40-60	15-40	20-30	2-8
	46-50	Bedrock	---	---	---	---	---	---	---	---	---	---

Table 14.—Engineering Properties—Continued

Map unit symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 in	3-10 in	4	10	40	200		
	In				Pct	Pct					Pct	
2249335:												
Lawrenceville---	0-12	Silt loam	CL, ML	A-6, A-4	0	0	95-100	95-100	90-100	75-95	25-43	6-17
	12-26	Silt loam, silty clay loam	CL, ML	A-6, A-4	0	0	90-100	90-100	85-100	70-95	27-42	12-22
	26-47	Silt loam, loam	CL, ML, CL-ML	A-6, A-4	0	0	80-100	80-100	75-100	70-90	27-36	12-19
	47-75	Silt loam, channery loam, channery silt loam	SM, CL, ML, CL-ML, GM	A-6, A-4	0-2	0-10	55-100	50-100	45-100	40-100	27-36	12-19
2379116:												
Birdsboro-----	0-9	Silt loam	ML, CL-ML, CL	A-6, A-4	0	0	95-100	85-100	80-100	65-90	22-43	6-18
	9-49	Silt loam, sandy clay loam, gravelly clay loam	ML, SM, CL, GM	A-6, A-4	0	0-5	70-100	65-100	60-100	45-95	29-44	13-25
	49-73	Very gravelly sandy loam, very gravelly loam	SM, SC, ML, GM, GW-GM	A-4, A-2-6, A-1, A-2	0-2	0-20	40-100	20-100	15-70	10-55	16-40	2-21
2379949:												
Duffield-----	0-10	Silt loam	ML, CL-ML, CL	A-7, A-6, A-4	0	0	85-100	85-100	80-100	70-95	20-50	5-20
	10-53	Silty clay loam, silty clay, channery loam	CH, CL, MH, ML	A-7, A-7-6, A-4, A-6	0	0-10	65-100	60-100	55-100	55-95	30-55	8-22
	53-72	Silt loam, loam, clay	ML, SM, GM, MH	A-7-5, A-7, A-5	0	0-20	65-100	50-100	45-90	40-90	40-60	9-29
2384072:												
Glenville-----	0-9	Silt loam	SM, ML	A-4	0	0	85-100	85-100	70-95	45-80	25-35	3-10
	9-19	Silt loam, channery loam, channery silty clay loam	SC, ML, GM, CL, CL-ML	A-6, A-4	0	0-10	70-100	60-100	60-95	45-80	25-40	5-13
	19-39	Silt loam, channery loam, silty clay loam	SC, ML, GM, CL, CL-ML	A-6, A-4	0	0-10	65-100	60-100	55-95	45-80	25-40	5-13
	39-82	Channery loam, very channery sandy loam	SM, GC, SC, CL-ML, GM, ML	A-4, A-2-4, A-1, A-2	0	0-20	45-90	20-75	10-75	5-65	25-35	5-10
2386596:												
Duffield-----	0-10	Silt loam	ML, CL-ML, CL	A-7, A-6, A-4	0	0	85-100	85-100	80-100	70-95	20-50	5-20
	10-56	Silt loam, silty clay, silty clay loam	MH, ML, CH, CL	A-4, A-7-6, A-6, A-7	0	0-10	65-100	60-100	55-100	55-95	30-55	8-22
	56-65	Silt loam, loam, channery silt loam	ML, SM, GM, MH	A-7-5, A-7, A-5	0	0-20	65-100	50-100	45-90	40-90	40-60	9-29

Table 14.—Engineering Properties—Continued

Map unit symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 in	3-10 in	4	10	40	200		
	In				Pct	Pct					Pct	
2386599:												
Duffield-----	0-10	Silt loam	ML, CL-ML, CL	A-7, A-6, A-4	0	0	85-100	85-100	80-100	70-95	20-50	5-20
	10-56	Silt loam, silty clay, silty clay loam	MH, ML, CH, CL	A-4, A-7-6, A-6, A-7	0	0-10	65-100	60-100	55-100	55-95	30-55	8-22
	56-65	Silt loam, loam, channery silt loam	ML, SM, GM, MH	A-7-5, A-7, A-5	0	0-20	65-100	50-100	45-90	40-90	40-60	9-29
2397950:												
Bowmansville----	0-7	Silt loam	SM, ML	A-4	0	0-5	95-100	80-100	60-100	35-90	25-37	6-11
	7-26	Silty clay loam, sandy clay loam	SC, SM, CL, ML	A-7, A-6, A-4	0	0-5	95-100	80-100	80-100	40-90	24-40	9-21
	26-43	Fine sandy loam, sandy loam, gravelly silt loam	ML, SM, CL, MH	A-7, A-6	0	0-10	90-100	65-100	60-100	35-100	24-40	9-21
	43-65	Stratified gravel to sand	ML, SM, CL-ML, GM	A-4, A-2-4, A-1, A-2	0-1	0-20	40-100	20-100	15-75	10-55	0-23	NP-6
Knauers-----	0-8	Silt loam	ML, CL-ML	A-6, A-4	0	0	90-100	85-100	75-100	50-90	20-30	NP-10
	8-17	Silt loam, silty clay loam, clay loam	ML, CL-ML, CL	A-7, A-6, A-4	0	0	90-100	85-100	75-100	50-90	25-35	5-20
	17-24	Gravelly sandy loam, loam	SM, SC-SM, SC, CL, ML	A-6, A-2-4, A-2, A-4	0	0-5	80-100	60-100	30-60	10-50	15-25	NP-10
	24-60	Stratified sand to gravelly sandy loam	SP-SM, GP-GM, GP, SP	A-1-a, A-2-4, A-1	0-1	0-10	30-75	20-50	5-35	0-10	5-15	NP-5

Table 15.—Physical Soil Properties

(Sand, silt, and clay values are shown either as a range or as a representative value. Absence of an entry indicates that data were not estimated. Soil properties are measured or inferred from direct observations in the field or laboratory)

Map unit symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Permeability (Ksat)	Available water capacity	Shrink- swell potential	Organic matter
	In	Pct	Pct	Pct	g/cc	In/hr	In/in	Pct	Pct
541148: Birdsboro-----	0-9	27	54	10-27	1.20-1.50	0.6-2.0	0.16-0.20	0.0-2.9	1.0-3.0
	9-49	21	55	20-35	1.30-1.60	0.6-2.0	0.14-0.18	0.0-2.9	0.0-0.5
	49-73	67	15	5-30	1.30-1.60	0.6-20.0	0.06-0.12	0.0-2.9	0.0-0.5
541159: Brecknock, extremely stony	0-10	30	55	10-20	1.20-1.30	0.6-2.0	0.10-0.18	0.0-2.9	2.0-3.0
	10-32	21	55	17-32	1.30-1.50	0.6-2.0	0.08-0.14	0.0-2.9	0.0-0.5
	32-41	21	55	17-32	1.30-1.50	0.6-2.0	0.03-0.10	0.0-2.9	0.0-0.5
	41-51	---	---	---	---	0.6-6.0	---	---	---
541164: Codorus-----	0-12	15-35	45-65	15-25	1.20-1.40	0.6-2.0	0.14-0.20	0.0-2.9	2.0-4.0
	12-48	15-35	40-60	18-35	1.20-1.50	0.6-2.0	0.14-0.18	0.0-2.9	0.0-0.5
	48-60	15-90	10-65	5-12	1.20-1.50	2.0-20.0	0.04-0.08	0.0-2.9	0.0-0.5
541165: Croton-----	0-11	7	70	15-30	1.28-1.42	0.2-2.0	0.15-0.22	0.0-2.9	1.0-3.0
	11-19	7	64	20-40	1.38-1.55	0.2-0.6	0.14-0.20	3.0-5.9	0.5-1.0
	19-30	6	59	20-40	1.65-1.88	0.0-0.2	0.06-0.12	0.0-2.9	0.0-0.5
	30-44	7	68	20-30	1.60-1.80	0.2-2.0	0.08-0.12	0.0-2.9	0.0-0.5
	44-64	---	---	---	---	0.2-2.0	---	---	---
541194: Lawrenceville---	0-12	14	69	10-25	1.20-1.40	0.6-2.0	0.18-0.22	0.0-2.9	2.0-4.0
	12-26	7	68	18-32	1.40-1.60	0.6-2.0	0.14-0.18	0.0-2.9	0.0-0.5
	26-47	7	70	18-27	1.60-1.80	0.2-0.6	0.14-0.18	0.0-2.9	0.0-0.0
	47-75	7	70	18-27	1.60-1.80	0.2-0.6	0.10-0.18	0.0-2.9	0.0-0.0
541245: Raritan-----	0-9	30	55	10-20	1.20-1.40	0.6-2.0	0.16-0.20	0.0-2.9	2.0-4.0
	9-27	35	38	18-34	1.40-1.60	0.6-2.0	0.12-0.16	0.0-2.9	0.0-0.5
	27-43	35	38	18-34	1.40-1.60	0.2-0.6	0.08-0.12	0.0-2.9	0.0-0.5
	43-60	---	---	5-15	1.40-1.60	0.6-6.0	0.06-0.10	0.0-2.9	0.0-0.5
541247: Readington-----	0-8	29	53	15-20	1.20-1.40	0.6-2.0	0.18-0.23	0.0-2.9	1.0-3.0
	8-29	20	54	18-35	1.40-1.60	0.6-2.0	0.08-0.14	0.0-2.9	0.0-0.5
	29-58	20	54	20-30	1.60-1.80	0.2-0.6	0.06-0.10	0.0-2.9	0.0-0.5
	58-68	---	---	---	---	0.2-2.0	---	---	---

Table 15.—Physical Soil Properties—Continued

Map unit symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Permeability (Ksat)	Available water capacity	Shrink- swell potential	Organic matter
	In	Pct	Pct	Pct	g/cc	In/hr	In/in	Pct	Pct
541254: Rowland-----	0-12	30	55	10-20	1.10-1.30	0.2-2.0	0.14-0.18	0.0-2.9	2.0-4.0
	12-34	18	54	15-32	1.20-1.50	0.2-2.0	0.14-0.18	0.0-2.9	0.5-1.0
	34-46	18	54	15-32	1.20-1.50	0.2-2.0	0.12-0.16	0.0-2.9	0.5-1.0
	46-61	---	---	3-12	1.40-1.70	2.0-6.0	0.03-0.08	0.0-2.9	0.5-1.0
541256: Rowland-----	0-6	26	53	15-25	1.20-1.40	0.6-2.0	0.16-0.20	0.0-2.9	1.0-3.0
	6-29	22	55	18-35	1.40-1.60	0.6-2.0	0.08-0.14	0.0-2.9	0.5-1.0
	29-54	27	54	15-30	1.60-1.80	0.2-0.6	0.06-0.10	0.0-2.9	0.5-1.0
541257: Rowland-----	0-7	26	53	15-25	1.20-1.40	0.6-2.0	0.16-0.20	0.0-2.9	1.0-3.0
	7-40	22	55	18-35	1.40-1.60	0.6-2.0	0.08-0.14	0.0-2.9	0.5-1.0
	40-52	27	54	15-30	1.60-1.80	0.2-0.6	0.06-0.10	0.0-2.9	0.5-1.0
641312: Duffield-----	0-10	22	55	15-30	1.10-1.40	0.6-2.0	0.16-0.22	0.0-2.9	2.0-4.0
	10-53	18	50	20-42	1.30-1.60	0.6-2.0	0.14-0.20	3.0-5.9	0.0-0.5
	53-72	20	54	18-41	1.30-1.60	0.6-2.0	0.14-0.20	3.0-5.9	0.0-0.5
641350: Edgemont-----	0-8	46	44	5-20	1.20-1.40	0.6-6.0	0.10-0.18	0.0-2.9	2.0-4.0
	8-36	70	16	5-30	1.30-1.50	0.6-6.0	0.08-0.12	0.0-2.9	0.0-0.5
	36-60	66	19	5-30	1.40-1.60	0.6-6.0	0.06-0.10	0.0-2.9	0.0-0.5
641351: Edgemont-----	0-8	46	44	5-20	1.20-1.40	0.6-6.0	0.10-0.18	0.0-2.9	2.0-4.0
	8-36	70	16	5-30	1.30-1.50	0.6-6.0	0.08-0.12	0.0-2.9	0.0-0.5
	36-60	66	19	5-30	1.40-1.60	0.6-6.0	0.06-0.10	0.0-2.9	0.0-0.5
641352: Edgemont-----	0-8	46	44	5-20	1.20-1.40	0.6-6.0	0.10-0.18	0.0-2.9	2.0-4.0
	8-36	70	16	5-30	1.30-1.50	0.6-6.0	0.08-0.12	0.0-2.9	0.0-0.5
	36-60	66	19	5-30	1.40-1.60	0.6-6.0	0.06-0.10	0.0-2.9	0.0-0.5
641353: Edgemont, extremely stony	0-8	68	20	5-20	1.20-1.40	0.6-6.0	0.10-0.18	0.0-2.9	2.0-4.0
	8-36	67	14	18-30	1.30-1.50	0.6-6.0	0.08-0.12	0.0-2.9	0.0-0.5
	36-60	67	15	5-30	1.40-1.60	0.6-6.0	0.06-0.10	0.0-2.9	0.0-0.5
641354: Edgemont, extremely stony	0-8	70	24	5-20	1.20-1.40	0.6-6.0	0.10-0.18	0.0-2.9	2.0-4.0
	8-36	70	16	5-30	1.30-1.50	0.6-6.0	0.08-0.12	0.0-2.9	0.0-0.5
	36-60	66	19	5-30	1.40-1.60	0.6-6.0	0.06-0.10	0.0-2.9	0.0-0.5

Table 15.—Physical Soil Properties—Continued

Map unit symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Permeability (Ksat)	Available water capacity	Shrink- swell potential	Organic matter
	In	Pct	Pct	Pct	g/cc	In/hr	In/in	Pct	Pct
641355: Edgemont, extremely stony	0-8	70	24	5-20	1.20-1.40	0.6-6.0	0.10-0.18	0.0-2.9	2.0-4.0
	8-36	70	16	5-30	1.30-1.50	0.6-6.0	0.08-0.12	0.0-2.9	0.0-0.5
	36-60	66	19	5-30	1.40-1.60	0.6-6.0	0.06-0.10	0.0-2.9	0.0-0.5
641418: Codorus-----	0-12	15-35	45-65	15-25	1.20-1.40	0.6-2.0	0.14-0.20	0.0-2.9	2.0-4.0
	12-48	15-35	40-60	18-35	1.20-1.50	0.6-2.0	0.14-0.18	0.0-2.9	0.0-0.5
	48-60	15-90	10-65	5-12	1.20-1.50	2.0-20.0	0.04-0.08	0.0-2.9	0.0-0.5
641481: Conestoga-----	0-10	26	54	15-25	1.20-1.40	0.6-2.0	0.16-0.20	0.0-2.9	2.0-3.0
	10-38	18	54	22-35	1.40-1.60	0.6-2.0	0.12-0.16	0.0-2.9	0.3-0.6
	38-75	43	39	7-27	1.40-1.60	0.6-2.0	0.06-0.10	0.0-2.9	0.1-0.2
641483: Conestoga-----	0-10	26	54	15-25	1.20-1.40	0.6-2.0	0.16-0.20	0.0-2.9	2.0-3.0
	10-38	18	54	22-35	1.40-1.60	0.6-2.0	0.12-0.16	0.0-2.9	0.3-0.6
	38-75	43	39	7-27	1.40-1.60	0.6-2.0	0.06-0.10	0.0-2.9	0.1-0.2
641484: Conestoga-----	0-10	26	54	15-25	1.20-1.40	0.6-2.0	0.16-0.20	0.0-2.9	2.0-3.0
	10-38	18	54	22-35	1.40-1.60	0.6-2.0	0.12-0.16	0.0-2.9	0.3-0.6
	38-75	43	39	7-27	1.40-1.60	0.6-2.0	0.06-0.10	0.0-2.9	0.1-0.2
641523: Glenville-----	0-9	30	55	10-20	1.20-1.40	0.6-2.0	0.16-0.20	0.0-2.9	2.0-4.0
	9-19	22	55	20-35	1.40-1.60	0.6-2.0	0.12-0.16	0.0-2.9	0.0-0.5
	19-39	27	54	15-35	1.60-1.80	0.1-0.6	0.08-0.12	0.0-2.9	0.0-0.5
	39-82	43	39	5-25	1.40-1.60	0.2-0.6	0.06-0.12	0.0-2.9	0.0-0.5
641543: Lindside-----	0-10	11	68	15-27	1.20-1.40	0.6-2.0	0.20-0.26	0.0-2.9	2.0-5.0
	10-50	7	64	18-35	1.20-1.40	0.2-2.0	0.17-0.22	0.0-2.9	0.5-1.0
	50-60	---	---	18-35	1.20-1.40	0.2-6.0	0.12-0.18	0.0-2.9	0.2-0.5
641583: Penn-----	0-10	30	55	10-20	1.20-1.40	0.6-6.0	0.16-0.20	0.0-2.9	1.0-3.0
	10-22	20	54	18-32	1.40-1.60	0.6-6.0	0.14-0.18	0.0-2.9	0.0-0.5
	22-28	26	52	18-25	1.40-1.60	0.6-6.0	0.04-0.08	0.0-2.9	0.0-0.5
	28-48	---	---	---	---	0.2-6.0	---	---	---
641584: Penn-----	0-10	30	55	10-20	1.20-1.40	0.6-6.0	0.16-0.20	0.0-2.9	1.0-3.0
	10-22	20	54	18-32	1.40-1.60	0.6-6.0	0.14-0.18	0.0-2.9	0.0-0.5
	22-28	26	52	18-25	1.40-1.60	0.6-6.0	0.04-0.08	0.0-2.9	0.0-0.5
	28-48	---	---	---	---	0.2-6.0	---	---	---

Table 15.—Physical Soil Properties—Continued

Map unit symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Permeability (Ksat)	Available water capacity	Shrink- swell potential	Organic matter
	In	Pct	Pct	Pct	g/cc	In/hr	In/in	Pct	Pct
641586:									
Penn-----	0-8	30	55	10-20	1.20-1.40	0.6-6.0	0.16-0.20	0.0-2.9	1.0-3.0
	8-20	20	54	18-32	1.40-1.60	0.6-6.0	0.14-0.18	0.0-2.9	0.0-0.5
	20-33	38	36	18-32	1.40-1.60	0.6-6.0	0.14-0.18	0.0-2.9	0.0-0.5
	33-36	68	22	5-20	1.40-1.60	0.6-6.0	0.04-0.08	0.0-2.9	0.0-0.5
	36-37	---	---	---	---	0.2-6.0	---	---	---
641605:									
Udorthents, limestone-----	0-6	18	51	27-35	1.35-1.60	0.2-0.6	0.14-0.20	3.0-5.9	0.0-2.0
	6-60	28	29	35-50	1.35-1.60	0.1-0.2	0.14-0.20	3.0-5.9	0.0-1.0
641614:									
Conestoga-----	0-9	26	54	15-25	1.20-1.40	0.6-2.0	0.16-0.20	0.0-2.9	1.0-3.0
	9-40	18	54	22-35	1.40-1.60	0.6-2.0	0.12-0.16	0.0-2.9	0.0-0.5
	40-60	38	36	12-35	1.40-1.60	0.6-2.0	0.06-0.10	0.0-2.9	0.0-0.5
810899:									
Mattapex-----	0-9	14	72	10-18	1.10-1.45	0.6-2.0	0.20-0.28	0.0-2.9	0.5-3.0
	9-42	7	69	18-30	1.25-1.45	0.2-2.0	0.18-0.22	0.0-2.9	0.0-0.5
	42-45	66	23	8-15	1.45-1.65	0.6-6.0	0.14-0.18	0.0-2.9	0.0-0.5
	45-70	65	29	3-8	1.50-1.80	6.0-20.0	0.05-0.08	0.0-2.9	0.0-0.5
810907:									
Clarksburg-----	0-8	27	54	10-27	1.20-1.40	0.6-2.0	0.14-0.20	0.0-2.9	1.0-3.0
	8-27	21	55	22-35	1.30-1.50	0.6-2.0	0.12-0.18	3.0-5.9	0.0-0.5
	27-51	20	54	22-35	1.40-1.70	0.1-0.6	0.06-0.12	3.0-5.9	0.0-0.5
	51-84	20	54	22-40	1.20-1.60	0.1-0.6	0.06-0.16	3.0-5.9	0.0-0.5
1482148:									
Croton-----	0-6	7	70	15-30	1.28-1.42	0.2-2.0	0.15-0.22	0.0-2.9	3.0-5.0
	6-19	7	64	20-35	1.38-1.55	0.2-0.6	0.12-0.20	3.0-5.9	0.5-1.0
	19-49	7	68	20-30	1.65-1.80	0.1-0.2	0.06-0.10	0.0-2.9	0.0-0.5
	49-78	7	68	20-30	1.60-1.80	0.1-0.2	0.08-0.12	0.0-2.9	0.0-0.5
	78-90	32	43	20-30	1.60-1.80	0.1-0.2	0.08-0.12	0.0-2.9	0.0-0.5
	90-99	---	---	---	---	0.0-0.2	---	---	---
1486423:									
Lawrenceville---	0-12	14	69	10-25	1.20-1.40	0.6-2.0	0.18-0.22	0.0-2.9	2.0-4.0
	12-26	7	68	18-32	1.40-1.60	0.6-2.0	0.14-0.18	0.0-2.9	0.0-0.5
	26-47	7	70	18-27	1.60-1.80	0.2-0.6	0.14-0.18	0.0-2.9	0.0-0.0
	47-75	7	70	18-27	1.60-1.80	0.2-0.6	0.10-0.18	0.0-2.9	0.0-0.0
1539365:									
Gibraltar-----	0-4	34	58	5-12	1.20-1.30	0.6-2.0	0.18-0.22	0.0-2.9	3.0-4.0
	4-24	34	58	5-12	1.20-1.40	0.6-2.0	0.16-0.22	0.0-2.9	0.5-1.0
	24-30	68	20	10-15	1.20-1.45	0.2-2.0	0.14-0.18	0.0-2.9	0.5-1.0
	30-62	22	55	15-30	1.30-1.45	0.2-2.0	0.14-0.20	0.0-2.9	0.5-1.0

Table 15.—Physical Soil Properties—Continued

Map unit symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Permeability (Ksat)	Available water capacity	Shrink- swell potential	Organic matter
	In	Pct	Pct	Pct	g/cc	In/hr	In/in	Pct	Pct
1602815: Holly-----	0-7	26	53	15-27	1.20-1.40	0.6-2.0	0.20-0.24	0.0-2.9	2.0-5.0
	7-26	18	54	18-30	1.20-1.50	0.2-2.0	0.17-0.21	0.0-2.9	0.5-2.0
	26-44	18	54	10-30	1.20-1.45	0.6-6.0	0.10-0.20	0.0-2.9	0.5-2.0
	44-62	84	9	5-27	1.20-1.40	0.6-6.0	0.07-0.18	0.0-2.9	0.5-2.0
1612216: Penn-----	0-7	30	55	10-20	1.20-1.40	0.6-6.0	0.16-0.20	0.0-2.9	1.0-3.0
	7-13	20	54	18-32	1.40-1.60	0.6-6.0	0.14-0.18	0.0-2.9	0.0-0.5
	13-21	38	36	18-32	1.40-1.60	0.6-6.0	0.14-0.18	0.0-2.9	0.0-0.5
	21-33	68	22	5-20	1.40-1.60	0.6-6.0	0.04-0.08	0.0-2.9	0.0-0.5
	33-37	---	---	---	---	0.2-6.0	---	---	---
1612248: Penn-----	0-8	30	55	10-20	1.20-1.40	0.6-6.0	0.14-0.18	0.0-2.9	1.0-3.0
	8-21	20	54	18-32	1.40-1.60	0.6-6.0	0.14-0.18	0.0-2.9	0.0-0.5
	21-34	26	52	18-25	1.40-1.60	0.6-6.0	0.04-0.08	0.0-2.9	0.0-0.5
	34-44	---	---	---	---	0.2-6.0	---	---	---
2229473: Udorthents, limestone-----	0-6	18	51	27-35	1.35-1.60	0.2-0.6	0.14-0.20	3.0-5.9	0.0-2.0
	6-60	28	29	35-50	1.35-1.60	0.1-0.2	0.14-0.20	3.0-5.9	0.0-1.0
2229474: Udorthents, limestone-----	0-6	18	51	27-35	1.35-1.60	0.2-0.6	0.14-0.20	3.0-5.9	0.0-2.0
	6-60	28	29	35-50	1.35-1.60	0.1-0.2	0.14-0.20	3.0-5.9	0.0-1.0
2229478: Udorthents, shale and sandstone-----	0-6	29	53	8-27	0.90-1.30	0.2-6.0	0.02-0.06	0.0-2.9	1.0-5.0
	6-60	19	54	6-50	1.00-1.60	0.1-20.0	0.01-0.08	0.0-2.9	0.0-0.5
2229493: Penn-----	0-8	30	55	10-20	1.20-1.40	0.6-6.0	0.14-0.18	0.0-2.9	1.0-3.0
	8-21	20	54	18-32	1.40-1.60	0.6-6.0	0.14-0.18	0.0-2.9	0.0-0.5
	21-34	26	52	18-25	1.40-1.60	0.6-6.0	0.04-0.08	0.0-2.9	0.0-0.5
	34-44	---	---	---	---	0.2-6.0	---	---	---
2229495: Udorthents, limestone-----	0-6	35	34	27-35	1.35-1.60	0.2-0.6	0.14-0.20	3.0-5.9	1.0-2.0
	6-60	28	29	35-50	1.35-1.60	0.1-0.2	0.14-0.20	3.0-5.9	1.0-2.0

Table 15.—Physical Soil Properties—Continued

Map unit symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Permeability (Ksat)	Available water capacity	Shrink- swell potential	Organic matter
	In	Pct	Pct	Pct	g/cc	In/hr	In/in	Pct	Pct
2229496: Udorthents, shist and gneiss-----	0-6	42	38	15-25	1.00-1.45	0.1-0.6	0.14-0.18	0.0-2.9	1.0-2.0
	6-40	17	53	25-35	1.30-1.60	0.1-0.2	0.14-0.20	3.0-5.9	1.0-2.0
	40-60	---	---	---	---	---	---	---	---
2229498: Udorthents, shale and sandstone-----	0-6	43	40	8-27	0.90-1.30	0.2-6.0	0.02-0.06	0.0-2.9	1.0-5.0
	6-60	19	54	6-50	1.00-1.60	0.1-20.0	0.01-0.08	0.0-2.9	0.0-0.6
2229499: Udorthents, shale and sandstone-----	0-6	43	40	8-27	0.90-1.30	0.2-6.0	0.02-0.06	0.0-2.9	1.0-5.0
	6-60	18	54	6-50	1.00-1.60	0.1-20.0	0.01-0.08	0.0-2.9	0.0-0.5
2229501: Readington-----	0-8	29	53	15-20	1.20-1.40	0.6-2.0	0.18-0.23	0.0-2.9	1.0-3.0
	8-29	20	54	18-35	1.40-1.60	0.6-2.0	0.08-0.14	0.0-2.9	0.0-0.5
	29-58	20	54	20-30	1.60-1.80	0.2-0.6	0.06-0.10	0.0-2.9	0.0-0.5
	58-68	---	---	---	---	0.2-2.0	---	---	---
2230323: Buckingham-----	0-16	29	53	10-25	1.10-1.40	0.6-2.0	0.16-0.22	0.0-2.9	2.0-3.0
	16-40	20	54	18-32	1.20-1.40	0.6-2.0	0.14-0.22	0.0-2.9	0.0-0.5
	40-48	18	54	18-35	1.65-1.80	0.1-0.6	0.15-0.22	0.0-2.9	0.0-0.5
	48-62	26	53	17-25	1.60-1.75	0.1-0.6	0.06-0.12	0.0-2.9	0.0-0.5
2230591: Abbottstown-----	0-10	29	53	10-25	1.10-1.40	0.6-2.0	0.16-0.22	0.0-2.9	2.0-3.0
	10-20	21	55	17-32	1.20-1.40	0.6-2.0	0.14-0.22	0.0-2.9	0.0-0.5
	20-39	39	37	17-32	1.30-1.60	0.1-0.2	0.06-0.10	0.0-2.9	0.0-0.5
	39-48	21	55	17-32	1.50-1.90	0.1-0.6	0.06-0.12	0.0-2.9	0.0-0.0
	48-49	---	---	---	1.40-1.80	0.1-0.6	---	---	---
2232623: Penn-----	0-8	30	55	10-20	1.20-1.40	0.6-6.0	0.14-0.18	0.0-2.9	1.0-3.0
	8-21	20	54	18-32	1.40-1.60	0.6-6.0	0.14-0.18	0.0-2.9	0.0-0.5
	21-34	26	52	18-25	1.40-1.60	0.6-6.0	0.04-0.08	0.0-2.9	0.0-0.5
	34-44	---	---	---	---	0.2-6.0	---	---	---
Klinesville-----	0-8	29	53	10-25	1.20-1.40	2.0-6.0	0.08-0.12	0.0-2.9	0.5-2.0
	8-14	27	54	10-20	1.40-1.60	2.0-6.0	0.06-0.10	0.0-2.9	0.0-0.5
	14-18	30	55	10-20	1.40-1.60	2.0-6.0	0.04-0.08	0.0-2.9	0.0-0.5
	18-28	---	---	---	---	0.2-2.0	0.00-0.00	---	---

Table 15.—Physical Soil Properties—Continued

Map unit symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Permeability (Ksat)	Available water capacity	Shrink- swell potential	Organic matter
	In	Pct	Pct	Pct	g/cc	In/hr	In/in	Pct	Pct
2232624: Raritan-----	0-14	30	55	10-20	1.20-1.40	0.6-2.0	0.16-0.20	0.0-2.9	2.0-4.0
	14-27	34	38	18-34	1.40-1.60	0.6-2.0	0.12-0.16	0.0-2.9	0.0-0.5
	27-43	34	38	18-34	1.40-1.60	0.2-0.6	0.08-0.12	0.0-2.9	0.0-0.5
	43-60	---	---	5-30	1.40-1.60	0.6-6.0	0.06-0.10	0.0-2.9	0.0-0.5
2232625: Readington-----	0-8	29	53	15-20	1.20-1.40	0.6-2.0	0.18-0.23	0.0-2.9	1.0-3.0
	8-29	20	54	18-35	1.40-1.60	0.6-2.0	0.08-0.14	0.0-2.9	0.0-0.5
	29-58	20	54	20-30	1.60-1.80	0.2-0.6	0.06-0.10	0.0-2.9	0.0-0.5
	58-68	---	---	---	---	0.2-2.0	---	---	---
2232626: Readington-----	0-11	29	53	15-20	1.20-1.40	0.6-2.0	0.18-0.23	0.0-2.9	1.0-3.0
	11-29	19	54	18-35	1.40-1.60	0.6-2.0	0.08-0.14	0.0-2.9	0.0-0.5
	29-58	20	54	20-30	1.60-1.80	0.2-0.6	0.06-0.10	0.0-2.9	0.0-0.5
	58-68	---	---	---	---	0.2-2.0	---	---	---
2233645: Edgemont-----	0-8	46	44	5-20	1.20-1.40	0.6-6.0	0.10-0.18	0.0-2.9	2.0-4.0
	8-36	70	16	5-30	1.30-1.50	0.6-6.0	0.08-0.12	0.0-2.9	0.0-0.5
	36-60	66	19	5-30	1.40-1.60	0.6-6.0	0.06-0.10	0.0-2.9	0.0-0.5
2233646: Edgemont-----	0-8	46	44	5-20	1.20-1.40	0.6-6.0	0.10-0.18	0.0-2.9	2.0-4.0
	8-36	70	16	5-30	1.30-1.50	0.6-6.0	0.08-0.12	0.0-2.9	0.0-0.5
	36-60	66	19	5-30	1.40-1.60	0.6-6.0	0.06-0.10	0.0-2.9	0.0-0.5
2233647: Edgemont-----	0-8	46	44	5-20	1.20-1.40	0.6-6.0	0.10-0.18	0.0-2.9	2.0-4.0
	8-36	70	16	5-30	1.30-1.50	0.6-6.0	0.08-0.12	0.0-2.9	0.0-0.5
	36-60	66	19	5-30	1.40-1.60	0.6-6.0	0.06-0.10	0.0-2.9	0.0-0.5
2233649: Edgemont, extremely stony	0-8	70	24	5-20	1.20-1.40	0.6-6.0	0.10-0.18	0.0-2.9	2.0-4.0
	8-36	70	16	5-30	1.30-1.50	0.6-6.0	0.08-0.12	0.0-2.9	0.0-0.5
	36-60	66	19	5-30	1.40-1.60	0.6-6.0	0.06-0.10	0.0-2.9	0.0-0.5
2233698: Lansdale-----	0-8	46	42	10-25	1.25-1.35	0.6-2.0	0.15-0.24	0.0-2.9	2.0-4.0
	8-34	67	19	10-25	1.35-1.45	0.6-6.0	0.10-0.15	0.0-2.9	0.2-0.6
	34-46	67	19	10-18	1.35-1.45	2.0-6.0	0.07-0.10	0.0-2.9	0.1-0.2
	46-50	---	---	---	---	0.2-0.6	---	---	---

Table 15.—Physical Soil Properties—Continued

Map unit symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Permeability (Ksat)	Available water capacity	Shrink- swell potential	Organic matter
	In	Pct	Pct	Pct	g/cc	In/hr	In/in	Pct	Pct
2233702:									
Penn-----	0-10	30	55	10-20	1.20-1.40	0.6-6.0	0.16-0.20	0.0-2.9	1.0-3.0
	10-22	20	54	18-32	1.40-1.60	0.6-6.0	0.14-0.18	0.0-2.9	0.0-0.5
	22-28	26	52	18-25	1.40-1.60	0.6-6.0	0.04-0.08	0.0-2.9	0.0-0.5
	28-48	---	---	---	---	0.2-6.0	---	---	---
Lansdale-----	0-10	46	44	5-15	1.25-1.35	0.6-2.0	0.12-0.18	0.0-2.9	2.0-4.0
	10-30	67	15	10-25	1.35-1.45	0.6-6.0	0.09-0.16	0.0-2.9	0.5-1.0
	30-47	84	2	10-18	1.40-1.55	2.0-6.0	0.07-0.10	0.0-2.9	0.0-0.5
	47-57	---	---	---	---	0.2-0.6	---	---	---
2233703:									
Penn-----	0-10	30	55	10-20	1.20-1.40	0.6-6.0	0.14-0.18	0.0-2.9	1.0-3.0
	10-22	20	54	18-32	1.40-1.60	0.6-6.0	0.14-0.18	0.0-2.9	0.0-0.5
	22-28	26	52	18-25	1.40-1.60	0.6-6.0	0.04-0.08	0.0-2.9	0.0-0.5
	28-48	---	---	---	---	0.2-6.0	---	---	---
Lansdale-----	0-10	46	44	5-15	1.30-1.40	0.6-2.0	0.10-0.16	0.0-2.9	2.0-4.0
	10-30	67	15	10-25	1.35-1.45	0.6-6.0	0.09-0.16	0.0-2.9	0.5-1.0
	30-47	84	2	10-18	1.40-1.55	2.0-6.0	0.07-0.10	0.0-2.9	0.0-0.5
	47-57	---	---	---	---	0.2-0.6	---	---	---
2233709:									
Penn-----	0-10	30	55	10-20	1.20-1.40	0.6-6.0	0.16-0.20	0.0-2.9	1.0-3.0
	10-22	20	54	18-32	1.40-1.60	0.6-6.0	0.14-0.18	0.0-2.9	0.0-0.5
	22-28	26	52	18-25	1.40-1.60	0.6-6.0	0.04-0.08	0.0-2.9	0.0-0.5
	28-48	---	---	---	---	0.2-6.0	---	---	---
2233712:									
Penn-----	0-10	30	55	10-20	1.20-1.40	0.6-6.0	0.16-0.20	0.0-2.9	1.0-3.0
	10-22	20	54	18-32	1.40-1.60	0.6-6.0	0.14-0.18	0.0-2.9	0.0-0.5
	22-28	26	52	18-25	1.40-1.60	0.6-6.0	0.04-0.08	0.0-2.9	0.0-0.5
	28-48	---	---	---	---	0.2-6.0	---	---	---
2233717:									
Klinesville-----	0-3	29	53	10-25	1.20-1.40	2.0-6.0	0.06-0.10	0.0-2.9	1.0-2.0
	3-12	27	54	10-20	1.40-1.60	2.0-6.0	0.06-0.10	0.0-2.9	0.0-0.5
	12-16	30	55	10-20	1.40-1.60	2.0-6.0	0.04-0.08	0.0-2.9	0.0-0.0
	16-28	---	---	---	---	0.2-2.0	0.00-0.00	---	---
2248203:									
Lansdale-----	0-8	46	42	10-25	1.25-1.35	0.6-2.0	0.15-0.24	0.0-2.9	1.5-3.0
	8-34	67	19	10-25	1.35-1.45	0.6-6.0	0.10-0.15	0.0-2.9	0.2-0.6
	34-46	67	19	10-18	1.35-1.45	2.0-6.0	0.07-0.10	0.0-2.9	0.1-0.2
	46-50	---	---	---	---	0.2-0.6	---	---	---

Table 15.—Physical Soil Properties—Continued

Map unit symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Permeability (Ksat)	Available water capacity	Shrink- swell potential	Organic matter
	In	Pct	Pct	Pct	g/cc	In/hr	In/in	Pct	Pct
2249335:									
Lawrenceville----	0-12	14	69	10-25	1.20-1.40	0.6-2.0	0.18-0.22	0.0-2.9	2.0-4.0
	12-26	7	68	18-32	1.40-1.60	0.6-2.0	0.14-0.18	0.0-2.9	0.0-0.5
	26-47	7	70	18-27	1.60-1.80	0.2-0.6	0.14-0.18	0.0-2.9	0.0-0.0
	47-75	7	70	18-27	1.60-1.80	0.2-0.6	0.10-0.18	0.0-2.9	0.0-0.0
2379116:									
Birdsboro-----	0-9	27	54	10-27	1.20-1.50	0.6-2.0	0.16-0.20	0.0-2.9	1.0-3.0
	9-49	21	55	20-35	1.30-1.60	0.6-2.0	0.14-0.18	0.0-2.9	0.0-0.5
	49-73	67	15	5-30	1.30-1.60	0.6-20.0	0.06-0.12	0.0-2.9	0.0-0.5
2379949:									
Duffield-----	0-10	22	55	15-30	1.10-1.40	0.6-2.0	0.16-0.22	0.0-2.9	2.0-4.0
	10-53	18	50	20-42	1.30-1.60	0.6-2.0	0.14-0.20	3.0-5.9	0.0-0.5
	53-72	20	54	18-41	1.30-1.60	0.6-2.0	0.14-0.20	3.0-5.9	0.0-0.5
2384072:									
Glenville-----	0-9	30	55	10-20	1.20-1.40	0.6-2.0	0.16-0.20	0.0-2.9	2.0-4.0
	9-19	22	55	20-35	1.40-1.60	0.6-2.0	0.12-0.16	0.0-2.9	0.0-0.5
	19-39	27	54	15-35	1.60-1.80	0.1-0.6	0.08-0.12	0.0-2.9	0.0-0.5
	39-82	43	39	5-25	1.40-1.60	0.2-0.6	0.06-0.12	0.0-2.9	0.0-0.5
2386596:									
Duffield-----	0-10	26	53	15-27	1.10-1.40	0.6-2.0	0.16-0.22	0.0-2.9	2.0-4.0
	10-56	18	56	20-40	1.30-1.60	0.6-2.0	0.14-0.20	3.0-5.9	0.0-0.5
	56-65	18	56	18-41	1.30-1.60	0.6-2.0	0.14-0.20	3.0-5.9	0.0-0.5
2386599:									
Duffield-----	0-10	26	53	15-27	1.10-1.40	0.6-2.0	0.16-0.22	0.0-2.9	2.0-4.0
	10-56	18	56	20-40	1.30-1.60	0.6-2.0	0.14-0.20	3.0-5.9	0.0-0.5
	56-65	18	56	18-41	1.30-1.60	0.6-2.0	0.14-0.20	3.0-5.9	0.0-0.5
2397950:									
Bowmansville----	0-7	30	56	10-17	1.20-1.40	0.6-2.0	0.16-0.20	0.0-2.9	2.0-4.0
	7-26	18	54	15-30	1.30-1.50	0.2-0.6	0.16-0.20	0.0-2.9	0.0-0.5
	26-43	68	14	15-30	1.20-1.50	0.2-2.0	0.12-0.18	0.0-2.9	0.0-0.5
	43-65	---	---	0-10	1.20-1.70	2.0-6.0	0.04-0.08	0.0-2.9	0.0-0.5
Knauers-----	0-8	30	55	10-20	1.20-1.40	0.6-2.0	0.16-0.24	0.0-2.9	2.0-4.0
	8-17	22	55	15-30	1.20-1.40	0.2-0.6	0.16-0.22	0.0-2.9	0.0-0.5
	17-24	67	23	5-15	1.40-1.60	0.6-2.0	0.08-0.14	0.0-2.9	0.0-0.5
	24-60	---	---	0-5	1.60-1.80	6.0-20.0	0.02-0.06	0.0-2.9	0.0-0.5

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Table 16.-Erosion Properties

(Entries under "Erosion factors" apply to the entire profile. Entries under "Wind erodibility group" and "Wind erodibility index" apply only to the surface layer)

Map unit symbol and soil name	Depth (inches)	Erosion factors			Wind erodi- bility group	Wind erodi- bility index
		Kw	Kf	T		
541148: Birdsboro-----	0-9	.37	.37	5	5	56
	9-49	.28	.28			
	49-73	.17	.20			
541159: Brecknock, extremely stony	0-10	.24	.32	3	8	0
	10-32	.24	.28			
	32-41	.24	.32			
	41-51	---	---			
541164: Codorus-----	0-12	.37	.37	5	5	56
	12-48	.37	.37			
	48-60	.24	.28			
541165: Croton-----	0-11	.43	.43	3	8	0
	11-19	.43	.49			
	19-30	.37	.49			
	30-44	.37	.43			
	44-64	---	---			
541194: Lawrenceville-----	0-12	.43	.43	4	5	56
	12-26	.49	.49			
	26-47	.49	.49			
	47-75	.32	.37			
541245: Raritan-----	0-9	.37	.37	4	5	56
	9-27	.28	.28			
	27-43	.28	.28			
	43-60	.28	.32			
541247: Readington-----	0-8	.43	.43	4	5	56
	8-29	.32	.32			
	29-58	.32	.37			
	58-68	---	---			
541254: Rowland-----	0-12	.43	.43	4	5	56
	12-34	.28	.28			
	34-46	.28	.28			
	46-61	.17	.17			
541256: Rowland-----	0-6	.43	.43	4	5	56
	6-29	.32	.32			
	29-54	.32	.37			
541257: Rowland-----	0-7	.43	.43	4	5	56
	7-40	.32	.32			
	40-52	.32	.37			

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Table 16.—Erosion Properties—Continued

Map unit symbol and soil name	Depth (inches)	Erosion factors			Wind erodi- bility group	Wind erodi- bility index
		Kw	Kf	T		
641312: Duffield-----	0-10	.37	.37	5	6	48
	10-53	.28	.28			
	53-72	.28	.32			
641350: Edgemont-----	0-8	.15	.15	5	6	48
	8-36	.15	.17			
	36-60	.15	.20			
641351: Edgemont-----	0-8	.15	.15	5	6	48
	8-36	.15	.17			
	36-60	.15	.20			
641352: Edgemont-----	0-8	.15	.15	5	6	48
	8-36	.15	.17			
	36-60	.15	.20			
641353: Edgemont, extremely stony-	0-8	.15	.15	5	8	0
	8-36	.15	.17			
	36-60	.15	.20			
641354: Edgemont, extremely stony-	0-8	.15	.15	5	8	0
	8-36	.15	.17			
	36-60	.15	.20			
641355: Edgemont, extremely stony-	0-8	.15	.15	5	8	0
	8-36	.15	.17			
	36-60	.15	.20			
641418: Codorus-----	0-12	.37	.37	5	5	56
	12-48	.37	.37			
	48-60	.24	.28			
641481: Conestoga-----	0-10	.32	.32	5	5	56
	10-38	.24	.24			
	38-75	.24	.28			
641483: Conestoga-----	0-10	.32	.32	5	5	56
	10-38	.24	.24			
	38-75	.24	.28			
641484: Conestoga-----	0-10	.32	.32	5	5	56
	10-38	.24	.24			
	38-75	.24	.28			
641523: Glenville-----	0-9	.32	.32	3	5	56
	9-19	.24	.28			
	19-39	.24	.28			
	39-82	.24	.32			

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Table 16.—Erosion Properties—Continued

Map unit symbol and soil name	Depth (inches)	Erosion factors			Wind erodi- bility group	Wind erodi- bility index
		Kw	Kf	T		
641543: Lindsay-----	0-10	.32	.32	5	6	48
	10-50	.37	.37			
	50-60	.32	.32			
641583: Penn-----	0-10	.32	.32	3	5	56
	10-22	.24	.28			
	22-28	.24	.28			
	28-48	---	---			
641584: Penn-----	0-10	.32	.32	3	5	56
	10-22	.24	.28			
	22-28	.24	.28			
	28-48	---	---			
641586: Penn-----	0-8	.32	.32	3	5	56
	8-20	.24	.28			
	20-33	.24	.28			
	33-36	.24	.28			
	36-37	---	---			
641605: Udorthents, limestone----	0-6	.32	.32	5	4L	86
	6-60	.28	.28			
641614: Urban land.						
Conestoga-----	0-9	.32	.32	4	5	56
	9-40	.24	.24			
	40-60	.24	.28			
641641. Water						
810899: Mattapex-----	0-9	.43	.43	5	5	56
	9-42	.43	.43			
	42-45	.28	.28			
	45-70	.17	.17			
810907: Clarksburg-----	0-8	.37	.37	4	5	56
	8-27	.28	.28			
	27-51	.28	.32			
	51-84	.28	.32			
1482148: Croton-----	0-6	.43	.43	3	8	0
	6-19	.43	.49			
	19-49	.43	.49			
	49-78	.37	.43			
	78-90	.37	.43			
	90-99	---	---			

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Table 16.—Erosion Properties—Continued

Map unit symbol and soil name	Depth (inches)	Erosion factors			Wind erodi- bility group	Wind erodi- bility index
		Kw	Kf	T		
1486423: Lawrenceville-----	0-12	.43	.43	4	5	56
	12-26	.49	.49			
	26-47	.49	.49			
	47-75	.32	.37			
1539365: Gibraltar-----	0-4	.43	.43	5	5	56
	4-24	.37	.37			
	24-30	.32	.32			
	30-62	.28	.28			
1602815: Holly-----	0-7	.28	.28	5	6	48
	7-26	.28	.32			
	26-44	.28	.32			
	44-62	.28	.37			
1612216: Penn-----	0-7	.32	.32	3	5	56
	7-13	.24	.28			
	13-21	.24	.28			
	21-33	.24	.28			
	33-37	---	---			
1612248: Urban land.						
Penn-----	0-8	.28	.32	3	6	48
	8-21	.24	.28			
	21-34	.24	.28			
	34-44	---	---			
2229473: Udorthents, limestone----	0-6	.32	.32	5	4L	86
	6-60	.28	.28			
2229474: Udorthents, limestone----	0-6	.32	.32	5	4L	86
	6-60	.28	.28			
2229478: Udorthents, shale and sandstone-----	0-6	.43	.43	3	8	0
	6-60	.17	.28			
2229480. Urban land						
2229481. Urban land						
2229493: Urban land.						
Penn-----	0-8	.28	.32	3	6	48
	8-21	.24	.28			
	21-34	.24	.28			
	34-44	---	---			

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Table 16.—Erosion Properties—Continued

Map unit symbol and soil name	Depth (inches)	Erosion factors			Wind erodi- bility group	Wind erodi- bility index
		Kw	Kf	T		
2229495: Urban land.						
Udorthents, limestone-----	0-6	.32	.32	5	6	48
	6-60	.28	.28			
2229496: Urban land.						
Udorthents, schist and gneiss-----	0-6	.28	.28	4	5	56
	6-40	.37	.37			
	40-60	---	---			
2229498: Urban land.						
Udorthents, shale and sandstone-----	0-6	.17	.24	3	8	0
	6-60	.17	.28			
2229499: Urban land.						
Udorthents, shale and sandstone-----	0-6	.17	.24	3	8	0
	6-60	.17	.28			
2229500. Pits, quarries						
2229501: Urban land.						
Readington-----	0-8	.43	.43	4	5	56
	8-29	.32	.32			
	29-58	.32	.37			
	58-68	---	---			
2230323: Buckingham-----	0-16	.43	.49	4	5	56
	16-40	.37	.43			
	40-48	.28	.37			
	48-62	.32	.37			
2230591: Abbottstown-----	0-10	.43	.43	4	5	56
	10-20	.43	.43			
	20-39	.28	.32			
	39-48	.28	.32			
	48-49	---	---			
2232623: Penn-----	0-8	.28	.32	3	6	48
	8-21	.24	.28			
	21-34	.24	.28			
	34-44	---	---			
Klinesville-----	0-8	.20	.28	2	6	48
	8-14	.20	.28			
	14-18	.20	.28			
	18-28	---	---			

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Table 16.—Erosion Properties—Continued

Map unit symbol and soil name	Depth (inches)	Erosion factors			Wind erodi- bility group	Wind erodi- bility index
		Kw	Kf	T		
2232624: Raritan-----	0-14	.37	.37	4	5	56
	14-27	.28	.28			
	27-43	.28	.28			
	43-60	.28	.32			
2232625: Readington-----	0-8	.43	.43	4	5	56
	8-29	.32	.32			
	29-58	.32	.37			
	58-68	---	---			
2232626: Readington-----	0-11	.43	.43	4	5	56
	11-29	.32	.32			
	29-58	.32	.37			
	58-68	---	---			
2233645: Edgemont-----	0-8	.15	.15	5	6	48
	8-36	.15	.17			
	36-60	.15	.20			
2233646: Edgemont-----	0-8	.15	.15	5	6	48
	8-36	.15	.17			
	36-60	.15	.20			
2233647: Edgemont-----	0-8	.15	.15	5	6	48
	8-36	.15	.17			
	36-60	.15	.20			
2233649: Edgemont, extremely stony-	0-8	.15	.15	5	8	0
	8-36	.15	.17			
	36-60	.15	.20			
2233698: Lansdale-----	0-8	.28	.32	4	5	56
	8-34	.20	.32			
	34-46	.17	.32			
	46-50	---	---			
2233702: Penn-----	0-10	.32	.32	3	5	56
	10-22	.24	.28			
	22-28	.24	.28			
	28-48	---	---			
Lansdale-----	0-10	.32	.32	4	5	56
	10-30	.28	.32			
	30-47	.28	.32			
	47-57	---	---			
2233703: Penn-----	0-10	.28	.32	3	6	48
	10-22	.24	.28			
	22-28	.24	.28			
	28-48	---	---			

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Table 16.—Erosion Properties—Continued

Map unit symbol and soil name	Depth (inches)	Erosion factors			Wind erodi- bility group	Wind erodi- bility index
		Kw	Kf	T		
2233703: Lansdale-----	0-10	.28	.32	4	5	56
	10-30	.28	.32			
	30-47	.28	.32			
	47-57	---	---			
2233709: Penn-----	0-10	.32	.32	3	5	56
	10-22	.24	.28			
	22-28	.24	.28			
	28-48	---	---			
2233712: Penn-----	0-10	.32	.32	3	5	56
	10-22	.24	.28			
	22-28	.24	.28			
	28-48	---	---			
2233717: Klinesville-----	0-3	.20	.28	2	8	0
	3-12	.20	.28			
	12-16	.20	.28			
	16-28	---	---			
2248203: Lansdale-----	0-8	.28	.32	4	5	56
	8-34	.20	.32			
	34-46	.17	.32			
	46-50	---	---			
2249335: Lawrenceville-----	0-12	.43	.43	4	5	56
	12-26	.49	.49			
	26-47	.49	.49			
	47-75	.32	.37			
2379116: Birdsboro-----	0-9	.37	.37	5	5	56
	9-49	.28	.28			
	49-73	.17	.20			
2379949: Duffield-----	0-10	.37	.37	5	6	48
	10-53	.28	.28			
	53-72	.28	.32			
2384072: Glenville-----	0-9	.32	.32	3	5	56
	9-19	.24	.28			
	19-39	.24	.28			
	39-82	.24	.32			
2386596: Duffield-----	0-10	.37	.37	5	6	48
	10-56	.28	.28			
	56-65	.28	.32			

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Table 16.—Erosion Properties—Continued

Map unit symbol and soil name	Depth (inches)	Erosion factors			Wind erodi- bility group	Wind erodi- bility index
		Kw	Kf	T		
2386599:						
Duffield-----	0-10	.37	.37			
	10-56	.28	.28			
	56-65	.28	.32			
2397950:						
Bowmansville-----	0-7	.32	.32	4	5	56
	7-26	.28	.28			
	26-43	.28	.28			
	43-65	.17	.24			
Knauers-----	0-8	.37	.37	4	5	56
	8-17	.32	.32			
	17-24	.20	.20			
	24-60	.10	.17			

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Table 17.—Total Soil Carbon

(This table displays soil organic carbon (SOC) and soil inorganic carbon (SIC) in kilograms per square meter to a depth of 2 meters or to the representative top depth of any kind of bedrock or any cemented soil horizon. SOC and SIC are reported on a volumetric whole soil basis, corrected for representative rock fragments indicated in the database. SOC is converted from horizon soil organic matter of the fraction of the soil less than 2 mm in diameter. If soil organic matter indicated in the database is NULL, SOC is assumed to be zero. SIC is converted from horizon calcium carbonate content fraction of the soil less than 2 mm in diameter. If horizon calcium carbonate indicated in the database is NULL, SIC is assumed to be zero. A weighted average of all horizons is used in the calculations. Only major components of a map unit are displayed in this table)

Map unit symbol, component name, and component percent	SOC	SIC
	kg/m ²	kg/m ²
541148: Birdsboro (97%)-----	6	0
541159: Brecknock, extremely stony (94%)-----	4	0
541164: Codorus (85%)-----	8	0
541165: Croton (82%)-----	6	0
541194: Lawrenceville (81%)-----	7	0
541245: Raritan (96%)-----	7	0
541247: Readington (85%)-----	5	0
541254: Rowland (82%)-----	12	0
541256: Rowland (95%)-----	9	0
541257: Rowland (90%)-----	9	0
641312: Duffield (90%)-----	8	0
641350: Edgemont (93%)-----	5	0
641351: Edgemont (93%)-----	5	0
641352: Edgemont (93%)-----	5	0
641353: Edgemont, extremely stony (90%)-----	5	0

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Table 17.—Total Soil Carbon—Continued

Map unit symbol, component name, and component percent	SOC	SIC
	kg/m ²	kg/m ²
641354: Edgemont, extremely stony (93%)-----	5	0
641355: Edgemont, extremely stony (93%)-----	5	0
641418: Codorus (85%)-----	8	0
641481: Conestoga (90%)-----	8	0
641483: Conestoga (90%)-----	8	0
641484: Conestoga (90%)-----	8	0
641523: Glenville (90%)-----	8	0
641543: Lindside (85%)-----	13	0
641583: Penn (87%)-----	4	0
641584: Penn (90%)-----	4	0
641586: Penn (90%)-----	4	0
641605: Udorthents, limestone (100%)-----	7	0
641614: Urban land (50%) Conestoga (35%)-----	6	0
641641: Water (100%)		
810899: Mattapex (95%)-----	6	0
810907: Clarksburg (90%)-----	6	0
1482148: Croton (90%)-----	10	0
1486423: Lawrenceville (83%)-----	7	0
1539365: Gibraltar (95%)-----	11	0
1602815: Holly (90%)-----	17	2

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Table 17.—Total Soil Carbon—Continued

Map unit symbol, component name, and component percent	SOC	SIC
	kg/m ²	kg/m ²
1612216: Penn (90%)-----	4	0
1612248: Urban land (65%)		
Penn (25%)-----	3	0
2229473: Udorthents, limestone (100%)-----	7	0
2229474: Udorthents, limestone (100%)-----	7	0
2229478: Udorthents, shale and sandstone (85%)-----	5	0
2229480. Urban land (90%)		
2229481. Urban land (90%)		
2229493: Urban land (65%)		
Penn (25%)-----	3	0
2229495: Urban land (80%)		
Udorthents, limestone (15%)-----	18	0
2229496: Urban land (80%)		
Udorthents, schist and gneiss (15%)-----	12	0
2229498: Urban land (80%)		
Udorthents, shale and sandstone (15%)-----	4	0
2229499: Urban land (80%)		
Udorthents, shale and sandstone (15%)-----	3	0
2229500. Pits, quarries (80%)		
2229501: Urban land (65%)		
Readington (25%)-----	5	0
2230323: Buckingham (80%)-----	9	0
2230591: Abbottstown (93%)-----	6	0

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Table 17.—Total Soil Carbon—Continued

Map unit symbol, component name, and component percent	SOC	SIC
	kg/m ²	kg/m ²
2232623		
Penn (47%)-----	3	0
Klinesville (40%)-----	1	0
2232624:		
Raritan (90%)-----	10	0
2232625:		
Readington (80%)-----	5	0
2232626:		
Readington (86%)-----	6	0
2233645:		
Edgemont (93%)-----	5	0
2233646:		
Edgemont (93%)-----	5	0
2233647:		
Edgemont (93%)-----	5	0
2233649:		
Edgemont, extremely stony (93%)-----	5	0
2233698:		
Lansdale (92%)-----	6	0
2233702:		
Penn (69%)-----	4	0
Lansdale (25%)-----	8	0
2233703:		
Penn (50%)-----	4	0
Lansdale (40%)-----	8	0
2233709:		
Penn (87%)-----	4	0
2233712:		
Penn (90%)-----	4	0
2233717:		
Klinesville (85%)-----	1	0
2248203:		
Lansdale (92%)-----	5	0
2249335:		
Lawrenceville (83%)-----	7	0
2379116:		
Birdsboro (92%)-----	6	0
2379949:		
Duffield (90%)-----	8	0
2384072:		
Glenville (90%)-----	8	0

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Table 17.—Total Soil Carbon—Continued

Map unit symbol, component name, and component percent	SOC	SIC
	<u>kg/m²</u>	<u>kg/m²</u>
2386596: Duffield (85%)-----	8	0
2386599: Duffield (85%)-----	8	0
2397950: Bowmansville (40%)-----	6	0
Knauers (40%)-----	6	0

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Table 18.—Chemical Soil Properties

(Absence of an entry indicates that data were not estimated)

Map unit symbol and soil name	Depth	Cation- exchange capacity	Effective cation- exchange capacity	Soil reaction
	In	meq/100 g	meq/100 g	pH
541148: Birdsboro-----	0-9	5.4-14.7	---	5.4-6.9
	9-49	10.1-18.4	---	3.6-6.0
	49-73	---	1.3-15.1	3.6-5.5
541159: Brecknock, extremely stony-----	0-10	9.1-17.3	---	4.5-6.5
	10-32	12.2-24.7	---	4.5-6.5
	32-41	12.2-24.7	---	4.5-6.5
	41-51	---	---	---
541164: Codorus-----	0-12	---	3.6-7.1	4.5-6.0
	12-48	9.1-18.4	---	5.1-6.5
	48-60	2.6-6.4	---	5.1-6.5
541165: Croton-----	0-11	---	3.8-9.5	4.5-5.5
	11-19	10.6-21.3	---	4.5-6.0
	19-30	10.1-21.0	---	4.5-6.0
	30-44	---	6.4-14.9	4.5-6.0
	44-64	---	---	---
541194: Lawrenceville-----	0-12	5.5-13.6	---	5.4-6.9
	12-26	9.1-16.9	---	4.5-6.0
	26-47	---	8.4-13.4	4.5-6.0
	47-75	---	8.4-13.4	4.5-6.0
541245: Raritan-----	0-9	5.5-11.0	---	5.4-6.9
	9-27	9.1-17.9	---	4.5-6.0
	27-43	9.1-17.9	---	4.5-6.0
	43-60	---	1.3-6.8	4.5-6.0
541247: Readington-----	0-8	8.1-10.9	---	5.4-6.9
	8-29	9.1-18.4	---	3.6-6.5
	29-58	10.1-15.8	---	5.1-6.5
	58-68	---	---	---
541254: Rowland-----	0-12	9.1-17.5	---	5.4-6.9
	12-34	12.5-25.3	---	4.5-6.5
	34-46	12.5-25.3	---	4.5-6.5
	46-61	2.9-10.5	---	4.5-6.5
541256: Rowland-----	0-6	12.8-21.2	---	3.6-6.5
	6-29	14.7-27.5	---	3.6-6.5
	29-54	12.5-23.9	---	5.1-6.5
541257: Rowland-----	0-7	12.8-21.2	---	3.6-6.5
	7-40	14.7-27.5	---	3.6-6.5
	40-52	12.5-23.9	---	5.1-6.5

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Table 18.—Chemical Soil Properties—Continued

Map unit symbol and soil name	Depth	Cation-	Effective	Soil reaction
		exchange capacity	cation- exchange capacity	
	In	meq/100 g	meq/100 g	pH
641312:				
Duffield-----	0-10	8.2-16.3	---	6.1-7.3
	10-53	10.1-22.1	---	5.1-7.3
	53-72	9.1-21.6	---	5.1-6.5
641350:				
Edgemont-----	0-8	2.8-11.0	---	5.4-6.9
	8-36	---	5.7-15.1	3.6-5.5
	36-60	---	1.3-15.1	3.6-5.5
641351:				
Edgemont-----	0-8	2.8-11.0	---	5.4-6.9
	8-36	---	5.7-15.1	3.6-5.5
	36-60	---	1.3-15.1	3.6-5.5
641352:				
Edgemont-----	0-8	2.8-11.0	---	5.4-6.9
	8-36	---	5.7-15.1	3.6-5.5
	36-60	---	1.3-15.1	3.6-5.5
641353:				
Edgemont, extremely stony-----	0-8	---	1.0-5.5	4.2-6.6
	8-36	---	5.7-15.1	3.6-5.5
	36-60	---	1.3-15.1	3.6-5.5
641354:				
Edgemont, extremely stony-----	0-8	---	1.0-5.5	3.6-6.6
	8-36	---	5.7-15.1	3.6-5.5
	36-60	---	1.3-15.1	3.6-5.5
641355:				
Edgemont, extremely stony-----	0-8	---	1.0-5.5	3.6-6.6
	8-36	---	5.7-15.1	3.6-5.5
	36-60	---	1.3-15.1	3.6-5.5
641418:				
Codorus-----	0-12	---	3.6-7.1	4.5-6.0
	12-48	9.1-18.4	---	5.1-6.5
	48-60	2.6-6.4	---	5.1-6.5
641481:				
Conestoga-----	0-10	7.5-14.5	4.5-7.3	4.5-7.0
	10-38	8.8-14.0	4.6-7.5	4.5-5.5
	38-75	8.8-14.0	4.0-8.0	5.6-7.8
641483:				
Conestoga-----	0-10	7.5-14.5	4.5-7.3	4.5-7.0
	10-38	8.8-14.0	4.6-7.5	4.5-5.5
	38-75	8.8-14.0	4.0-8.0	5.6-7.8
641484:				
Conestoga-----	0-10	7.5-14.5	4.5-7.3	4.5-7.0
	10-38	8.8-14.0	4.6-7.5	4.5-5.5
	38-75	8.8-14.0	4.0-8.0	5.6-7.8

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Table 18.—Chemical Soil Properties—Continued

Map unit symbol and soil name	Depth	Cation- exchange capacity	Effective cation- exchange capacity	Soil reaction
		meq/100 g	meq/100 g	pH
641523: Glenville-----	0-9	5.5-11.0	---	4.5-7.3
	9-19	---	6.4-18.1	4.5-6.0
	19-39	---	6.4-18.1	4.5-6.0
	39-82	---	1.3-12.3	4.5-5.5
641543: Lindsay-----	0-10	9.0-16.8	---	5.1-7.8
	10-50	7.2-14.0	---	5.1-7.8
	50-60	7.2-14.0	---	5.6-7.8
641583: Penn-----	0-10	---	5.7-11.2	4.2-6.6
	10-22	12.9-24.7	---	3.6-6.0
	22-28	12.9-19.7	---	5.1-6.5
	28-48	---	---	---
641584: Penn-----	0-10	---	5.7-11.2	4.2-6.6
	10-22	12.9-24.7	---	3.6-6.0
	22-28	12.9-19.7	---	5.1-6.5
	28-48	---	---	---
641586: Penn-----	0-8	10.0-20.0	2.8-6.3	4.2-6.6
	8-20	8.0-15.0	3.6-6.8	3.6-6.0
	20-33	8.0-15.0	3.6-6.8	3.6-6.0
	33-36	5.0-15.0	---	5.1-6.5
	36-37	---	---	---
641605: Udorthents, limestone	0-6	18.5-24.5	---	5.1-6.5
	6-60	23.2-33.5	---	5.1-6.5
641614: Conestoga-----	0-9	8.1-13.6	---	4.5-7.3
	9-40	11.1-18.4	---	4.5-7.3
	40-60	6.1-18.4	---	5.6-7.8
810899: Mattapex-----	0-9	2.0-15.0	2.4-5.9	5.4-6.9
	9-42	2.0-10.0	3.6-6.4	3.6-5.5
	42-45	2.0-5.0	1.6-3.4	3.6-5.5
	45-70	2.0-5.0	0.6-2.0	3.6-5.5
810907: Clarksburg-----	0-8	8.9-22.7	---	5.1-6.5
	8-27	15.4-26.7	---	5.1-6.5
	27-51	15.4-26.7	---	5.1-6.5
	51-84	15.4-30.2	---	5.1-6.5
1482148: Croton-----	0-6	8.2-16.4	---	5.4-6.9
	6-19	---	5.9-12.3	4.5-6.0
	19-49	---	6.4-15.1	4.5-6.0
	49-78	---	6.4-15.1	4.5-6.0
	78-90	---	6.4-15.1	4.5-6.0
	90-99	---	---	---

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Table 18.—Chemical Soil Properties—Continued

Map unit symbol and soil name	Depth	Cation- exchange capacity	Effective cation- exchange capacity	Soil reaction
		meq/100 g	meq/100 g	
	In			pH
1486423:				
Lawrenceville-----	0-12	5.5-13.6	---	5.4-6.9
	12-26	9.1-16.9	---	4.5-6.0
	26-47	---	8.4-13.4	4.5-6.0
	47-75	---	8.4-13.4	4.5-6.0
1539365:				
Gibraltar-----	0-4	2.8-6.6	---	5.6-6.5
	4-24	2.7-6.5	---	5.6-6.5
	24-30	5.4-8.1	---	5.6-6.5
	30-62	8.0-16.0	---	5.6-6.5
1602815:				
Holly-----	0-7	8.2-14.8	---	5.6-7.3
	7-26	9.6-16.2	---	5.1-7.3
	26-44	5.4-16.2	---	5.6-7.8
	44-62	2.7-14.6	---	5.6-7.8
1612216:				
Penn-----	0-7	10.0-20.0	2.8-6.3	4.2-6.6
	7-13	8.0-15.0	3.6-6.8	3.6-6.0
	13-21	8.0-15.0	3.6-6.8	3.6-6.0
	21-33	5.0-15.0	---	5.1-6.5
	33-37	---	---	---
1612248:				
Penn-----	0-8	---	5.7-11.2	4.2-6.6
	8-21	12.9-24.7	---	3.6-6.0
	21-34	12.9-19.7	---	5.1-6.5
	34-44	---	---	---
2229473:				
Udorthents, limestone	0-6	18.5-24.5	---	5.1-6.5
	6-60	23.2-33.5	---	5.1-6.5
2229474:				
Udorthents, limestone	0-6	18.5-24.5	---	5.1-6.5
	6-60	23.2-33.5	---	5.1-6.5
2229478:				
Udorthents, shale and sandstone-----	0-6	6.4-21.0	---	4.5-8.4
	6-60	3.6-30.0	---	4.5-8.4
2229493:				
Penn-----	0-8	---	5.7-11.2	4.2-6.6
	8-21	12.9-24.7	---	3.6-6.0
	21-34	12.9-19.7	---	5.1-6.5
	34-44	---	---	---
2229495:				
Udorthents, limestone	0-6	18.5-24.5	---	5.1-6.5
	6-60	23.2-33.5	---	5.1-6.5
2229496:				
Udorthents, schist and gneiss-----	0-6	11.1-18.3	---	5.1-6.5
	6-40	17.3-24.5	---	5.1-6.5
	40-60	---	---	---

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Table 18.—Chemical Soil Properties—Continued

Map unit symbol and soil name	Depth	Cation- exchange capacity	Effective cation- exchange capacity	Soil reaction
		meq/100 g	meq/100 g	
	In			pH
2229498: Udorthents, shale and sandstone-----	0-6	6.4-21.0	---	4.5-8.4
	6-60	3.6-30.3	---	4.5-8.4
2229499: Udorthents, shale and sandstone-----	0-6	6.4-21.0	---	4.5-8.4
	6-60	3.6-30.0	---	4.5-8.4
2229501: Readington-----	0-8	8.1-10.9	---	3.6-6.5
	8-29	9.1-18.4	---	3.6-6.5
	29-58	10.1-15.8	---	5.1-6.5
	58-68	---	---	---
2230323: Buckingham-----	0-16	10.0-20.0	---	5.6-6.5
	16-40	8.0-16.0	---	5.6-6.5
	40-48	8.0-16.0	---	5.6-7.3
	48-62	8.0-16.0	---	5.6-7.3
2230591: Abbottstown-----	0-10	5.5-13.6	---	5.3-6.9
	10-20	8.6-16.9	---	4.5-6.5
	20-39	8.6-16.9	---	5.1-6.5
	39-48	8.6-16.0	---	5.1-6.5
	48-49	---	---	---
2232623: Penn-----	0-8	8.9-17.3	---	5.4-6.9
	8-21	12.9-24.7	---	3.6-6.0
	21-34	12.9-19.7	---	5.1-6.5
	34-44	---	---	---
Klinesville-----	0-8	5.4-13.5	---	4.5-6.0
	8-14	5.1-10.6	---	4.5-6.0
	14-18	---	2.9-9.5	4.5-6.0
	18-28	---	---	---
2232624: Raritan-----	0-14	5.5-11.0	---	5.4-6.9
	14-27	9.1-17.9	---	4.5-6.0
	27-43	9.1-17.9	---	4.5-6.0
	43-60	---	1.3-15.1	4.5-6.0
2232625: Readington-----	0-8	8.1-10.9	---	5.4-6.9
	8-29	9.1-18.4	---	3.6-6.5
	29-58	10.1-15.8	---	5.1-6.5
	58-68	---	---	---
2232626: Readington-----	0-11	8.1-10.9	---	5.4-6.9
	11-29	9.1-18.4	---	3.6-6.5
	29-58	10.1-15.8	---	5.1-6.5
	58-68	---	---	---

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Table 18.—Chemical Soil Properties—Continued

Map unit symbol and soil name	Depth	Cation-	Effective	Soil reaction
		exchange capacity	cation- exchange capacity	
	In	meq/100 g	meq/100 g	pH
2233645:				
Edgemont-----	0-8	2.8-11.0	---	5.4-6.9
	8-36	---	5.7-15.1	3.6-5.5
	36-60	---	1.3-15.1	3.6-5.5
2233646:				
Edgemont-----	0-8	2.8-11.0	---	5.4-6.9
	8-36	---	5.7-15.1	3.6-5.5
	36-60	---	1.3-15.1	3.6-5.5
2233647:				
Edgemont-----	0-8	2.8-11.0	---	5.4-6.9
	8-36	---	5.7-15.1	3.6-5.5
	36-60	---	1.3-15.1	3.6-5.5
2233649:				
Edgemont, extremely stony-----	0-8	---	1.0-5.5	3.6-6.6
	8-36	---	5.7-15.1	3.6-5.5
	36-60	---	1.3-15.1	3.6-5.5
2233698:				
Lansdale-----	0-8	5.5-9.0	3.5-6.0	4.5-6.6
	8-34	4.0-7.2	2.2-4.1	4.5-5.0
	34-46	4.0-7.2	2.1-3.8	4.5-5.0
	46-50	---	0.0-0.0	---
2233702:				
Penn-----	0-10	---	5.7-11.2	4.2-6.6
	10-22	12.9-24.7	---	3.6-6.0
	22-28	12.9-19.7	---	5.1-6.5
	28-48	---	---	---
Lansdale-----	0-10	8.0-16.0	2.5-6.0	4.5-5.0
	10-30	5.0-12.0	2.4-5.8	4.5-5.0
	30-47	4.0-8.0	2.0-4.0	4.5-5.0
	47-57	---	---	---
2233703:				
Penn-----	0-10	---	5.7-11.2	4.2-6.6
	10-22	12.9-24.7	---	3.6-6.0
	22-28	12.9-19.7	---	5.1-6.5
	28-48	---	---	---
Lansdale-----	0-10	8.0-16.0	2.5-6.0	4.5-5.0
	10-30	5.0-12.0	2.4-5.8	4.5-5.0
	30-47	4.0-8.0	2.0-4.0	4.5-5.0
	47-57	---	---	---
2233709:				
Penn-----	0-10	---	5.7-11.2	4.2-6.6
	10-22	12.9-24.7	---	3.6-6.0
	22-28	12.9-19.7	---	5.1-6.5
	28-48	---	---	---
2233712:				
Penn-----	0-10	---	5.7-11.2	4.2-6.6
	10-22	12.9-24.7	---	3.6-6.0
	22-28	12.9-19.7	---	5.1-6.5
	28-48	---	---	---

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Table 18.—Chemical Soil Properties—Continued

Map unit symbol and soil name	Depth	Cation- exchange capacity	Effective cation- exchange capacity	Soil reaction
		meq/100 g	meq/100 g	
	In			pH
2233717:				
Klinesville-----	0-3	5.4-13.5	---	4.5-6.0
	3-12	5.1-10.6	---	4.5-6.0
	12-16	---	4.3-9.5	4.5-6.0
	16-28	---	---	---
2248203:				
Lansdale-----	0-8	5.5-9.0	3.1-5.3	4.5-6.6
	8-34	4.0-7.2	2.2-4.1	4.5-5.0
	34-46	4.0-7.2	2.1-3.8	4.5-5.0
	46-50	---	0.0-0.0	---
2249335:				
Lawrenceville-----	0-12	5.5-13.6	---	5.4-6.9
	12-26	9.1-16.9	---	4.5-6.0
	26-47	---	8.4-13.4	4.5-6.0
	47-75	---	8.4-13.4	4.5-6.0
2379116:				
Birdsboro-----	0-9	5.4-14.7	---	5.4-6.9
	9-49	10.1-18.4	---	3.6-6.0
	49-73	---	1.3-15.1	3.6-5.5
2379949:				
Duffield-----	0-10	8.2-16.3	---	6.1-7.3
	10-53	10.1-22.1	---	5.1-7.3
	53-72	9.1-21.6	---	5.1-6.5
2384072:				
Glenville-----	0-9	5.5-11.0	---	4.5-7.3
	9-19	---	6.4-18.1	4.5-6.0
	19-39	---	6.4-18.1	4.5-6.0
	39-82	---	1.3-12.3	4.5-5.5
2386596:				
Duffield-----	0-10	8.2-14.7	---	6.1-7.3
	10-56	10.1-21.0	---	5.1-7.3
	56-65	9.1-21.6	---	5.1-6.5
2386599:				
Duffield-----	0-10	8.2-14.7	---	6.1-7.3
	10-56	10.1-21.0	---	5.1-7.3
	56-65	9.1-21.6	---	5.1-6.5
2397950:				
Bowmansville-----	0-7	5.5-9.3	---	5.4-6.9
	7-26	7.6-15.8	---	5.1-6.5
	26-43	7.6-15.8	---	5.1-7.3
	43-65	0.0-5.4	---	5.1-7.3
Knauers-----	0-8	5.5-11.0	---	5.1-6.5
	8-17	7.6-15.8	---	5.1-6.5
	17-24	2.6-8.0	---	5.1-6.5
	24-60	0.0-2.7	---	5.1-6.5

Table 19.—Water Features

(See text for definitions of terms used in this table. Estimates of the frequency of ponding and flooding apply to the whole year rather than to individual months. Absence of an entry indicates that the feature is not a concern or that data were not estimated)

Map unit symbol and soil name	Hydro- logic group	Months	Water table			Ponding		Flooding	
			Upper limit	Lower limit	Surface water depth	Duration	Frequency	Duration	Frequency
			Ft	Ft	Ft				
541148: Birdsboro-----	B	January	4.0	>6.0	---	---	None	---	None
		February	4.0	>6.0	---	---	None	---	None
		March	4.0	>6.0	---	---	None	---	None
		November	4.0	>6.0	---	---	None	---	None
		December	4.0	>6.0	---	---	None	---	None
541159: Brecknock, extremely stony-----	B	Jan-Dec	---	---	---	---	None	---	None
541164: Codorus-----	C	January	2.3	>6.0	---	---	None	Very brief	Occasional
		February	2.3	>6.0	---	---	None	Very brief	Occasional
		March	2.3	>6.0	---	---	None	Very brief	Occasional
		April	2.3	>6.0	---	---	None	Very brief	Occasional
		November	2.3	>6.0	---	---	None	Very brief	Occasional
		December	2.3	>6.0	---	---	None	Very brief	Occasional
541165: Croton-----	D	January	0.3	1.7	0.0-0.3	Brief	Occasional	---	None
		February	0.3	1.7	0.0-3.6	Brief	Occasional	---	None
		March	0.3	1.7	0.0-0.3	Brief	Occasional	---	None
		April	0.3	1.7	0.0-0.3	Brief	Occasional	---	None
		May	0.3	1.7	0.0-0.3	Brief	Occasional	---	None
		November	0.3	1.7	0.0-0.3	Brief	Occasional	---	None
		December	0.3	1.7	0.0-0.3	Brief	Occasional	---	None
541194: Lawrenceville-----	C	January	2.3	2.6	---	---	None	---	None
		February	2.3	2.6	---	---	None	---	None
		March	2.3	2.6	---	---	None	---	None
		November	2.3	2.6	---	---	None	---	None
		December	2.3	2.6	---	---	None	---	None

Table 19.—Water Features—Continued

Map unit symbol and soil name	Hydro- logic group	Months	Water table			Ponding		Flooding	
			Upper limit	Lower limit	Surface water depth	Duration	Frequency	Duration	Frequency
			Ft	Ft	Ft				
541245: Raritan-----	C	January	1.7	2.4	---	---	None	---	None
		February	1.7	2.4	---	---	None	---	None
		March	1.7	2.4	---	---	None	---	None
		November	1.7	2.4	---	---	None	---	None
		December	1.7	2.4	---	---	None	---	None
541247: Readington-----	C	January	2.3	2.4	---	---	None	---	None
		February	2.3	2.4	---	---	None	---	None
		March	2.3	2.4	---	---	None	---	None
		November	2.3	2.4	---	---	None	---	None
		December	2.3	2.4	---	---	None	---	None
541254: Rowland-----	C	January	2.0	>6.0	---	---	None	Brief	Occasional
		February	2.0	>6.0	---	---	None	Brief	Occasional
		March	2.0	>6.0	---	---	None	Brief	Occasional
		April	2.0	>6.0	---	---	None	---	None
		May	2.0	>6.0	---	---	None	---	None
		November	2.0	>6.0	---	---	None	Brief	Occasional
		December	2.0	>6.0	---	---	None	Brief	Occasional
541256: Rowland-----	C	January	2.3	2.5	---	---	None	Very brief	Frequent
		February	2.3	2.5	---	---	None	Very brief	Frequent
		March	2.3	2.5	---	---	None	Very brief	Frequent
		November	2.3	2.5	---	---	None	Very brief	Frequent
		December	2.3	2.5	---	---	None	Very brief	Frequent
541257: Rowland-----	C	January	2.3	2.5	---	---	None	Very brief	Frequent
		February	2.3	2.5	---	---	None	Very brief	Frequent
		March	2.3	2.5	---	---	None	Very brief	Frequent
		November	2.3	2.5	---	---	None	Very brief	Frequent
		December	2.3	2.5	---	---	None	Very brief	Frequent
641312: Duffield-----	B	Jan-Dec	---	---	---	---	None	---	None

Table 19.—Water Features—Continued

Map unit symbol and soil name	Hydro- logic group	Months	Water table			Ponding		Flooding	
			Upper limit	Lower limit	Surface water depth	Duration	Frequency	Duration	Frequency
			Ft	Ft	Ft				
641350: Edgemont-----	B	Jan-Dec	---	---	---	---	None	---	None
641351: Edgemont-----	B	Jan-Dec	---	---	---	---	None	---	None
641352: Edgemont-----	B	Jan-Dec	---	---	---	---	None	---	None
641353: Edgemont, extremely stony-----	B	Jan-Dec	---	---	---	---	None	---	None
641354: Edgemont, extremely stony-----	B	Jan-Dec	---	---	---	---	None	---	None
641355: Edgemont, extremely stony-----	B	Jan-Dec	---	---	---	---	None	---	None
641418: Codorus-----	C	January	2.3	>6.0	---	---	None	Very brief	Occasional
		February	2.3	>6.0	---	---	None	Very brief	Occasional
		March	2.3	>6.0	---	---	None	Very brief	Occasional
		April	2.3	>6.0	---	---	None	Very brief	Occasional
		November	2.3	>6.0	---	---	None	Very brief	Occasional
		December	2.3	>6.0	---	---	None	Very brief	Occasional
641481: Conestoga-----	B	Jan-Dec	---	---	---	---	None	---	None
641483: Conestoga-----	B	Jan-Dec	---	---	---	---	None	---	None
641484: Conestoga-----	B	Jan-Dec	---	---	---	---	None	---	None

Table 19.—Water Features—Continued

Map unit symbol and soil name	Hydro- logic group	Months	Water table			Ponding		Flooding	
			Upper limit	Lower limit	Surface water depth	Duration	Frequency	Duration	Frequency
			Ft	Ft	Ft				
641523: Glenville-----	C	January	1.7	2.5	---	---	None	---	None
		February	1.7	2.5	---	---	None	---	None
		March	1.7	2.5	---	---	None	---	None
		April	1.7	2.5	---	---	None	---	None
		November	1.7	2.5	---	---	None	---	None
		December	1.7	2.5	---	---	None	---	None
641543: Lindsay-----	C	January	2.3	>6.0	---	---	None	Brief	Occasional
		February	2.3	>6.0	---	---	None	Brief	Occasional
		March	2.3	>6.0	---	---	None	Brief	Occasional
		April	2.3	>6.0	---	---	None	Brief	Occasional
		December	2.3	>6.0	---	---	None	Brief	Occasional
641583: Penn-----	C	Jan-Dec	---	---	---	---	None	---	None
641584: Penn-----	C	Jan-Dec	---	---	---	---	None	---	None
641586: Penn-----	C	Jan-Dec	---	---	---	---	None	---	None
641605: Udorthents, limestone-----	C/D	January	5.0	>6.0	---	---	None	---	None
		February	5.0	>6.0	---	---	None	---	None
		March	5.0	>6.0	---	---	None	---	None
		November	5.0	>6.0	---	---	None	---	None
		December	5.0	>6.0	---	---	None	---	None
641614: Urban land. Conestoga-----	B	Jan-Dec	---	---	---	---	None	---	None
641641. Water									

Table 19.—Water Features—Continued

Map unit symbol and soil name	Hydro- logic group	Months	Water table			Ponding		Flooding	
			Upper limit	Lower limit	Surface water depth	Duration	Frequency	Duration	Frequency
			Ft	Ft	Ft				
810899: Mattapex-----	C	January	2.3	>6.0	---	---	None	---	None
		February	2.3	>6.0	---	---	None	---	None
		March	2.3	>6.0	---	---	None	---	None
		April	2.3	>6.0	---	---	None	---	None
810907: Clarksburg-----	C	January	2.3	4.2	---	---	None	---	None
		February	2.3	4.2	---	---	None	---	None
		March	2.3	4.2	---	---	None	---	None
		November	2.3	4.2	---	---	None	---	None
		December	2.3	4.2	---	---	None	---	None
1482148: Croton-----	D	January	0.3	1.7	0.0-0.3	Brief	Occasional	---	None
		February	0.3	1.7	0.0-0.3	Brief	Occasional	---	None
		March	0.3	1.7	0.0-0.3	Brief	Occasional	---	None
		April	0.3	1.7	0.0-0.3	Brief	Occasional	---	None
		May	0.3	1.7	---	---	None	---	None
		November	0.3	1.7	0.0-0.3	Brief	Occasional	---	None
		December	0.3	1.7	0.0-0.3	Brief	Occasional	---	None
1486423: Lawrenceville-----	C	January	2.3	2.6	---	---	None	---	None
		February	2.3	2.6	---	---	None	---	None
		March	2.3	2.6	---	---	None	---	None
		November	2.3	2.6	---	---	None	---	None
		December	2.3	2.6	---	---	None	---	None
1539365: Gibraltar-----	C	January	4.0	>6.0	---	---	None	Brief	Rare
		February	4.0	>6.0	---	---	None	Brief	Rare
		March	4.0	>6.0	---	---	None	Brief	Rare
		April	4.0	>6.0	---	---	None	Brief	Rare
		May	4.0	>6.0	---	---	None	Brief	Rare
		June	---	---	---	---	None	Brief	Rare
		July	---	---	---	---	None	Brief	Rare
		August	---	---	---	---	None	Brief	Rare
		September	---	---	---	---	None	Brief	Rare
		October	---	---	---	---	None	Brief	Rare
		November	4.0	>6.0	---	---	None	Brief	Rare
		December	4.0	>6.0	---	---	None	Brief	Rare

Table 19.—Water Features—Continued

Map unit symbol and soil name	Hydro- logic group	Months	Water table			Ponding		Flooding	
			Upper limit	Lower limit	Surface water depth	Duration	Frequency	Duration	Frequency
			Ft	Ft	Ft				
1602815: Holly-----	B/D	January	0.5	>6.0	0.0-1.0	Brief	Occasional	Long	Frequent
		February	0.5	>6.0	0.0-1.0	Brief	Occasional	Long	Frequent
		March	0.5	>6.0	0.0-1.0	Brief	Occasional	Long	Frequent
		April	0.5	>6.0	0.0-1.0	Brief	Occasional	Long	Frequent
		May	0.5	>6.0	0.0-1.0	Brief	Occasional	Long	Frequent
		June	---	---	0.0-1.0	Brief	Occasional	---	None
		July	---	---	0.0-1.0	Brief	Occasional	---	None
		August	---	---	0.0-1.0	Brief	Occasional	---	None
		September	---	---	0.0-1.0	Brief	Occasional	---	None
		October	---	---	0.0-1.0	Brief	Occasional	---	None
		November	---	---	0.0-1.0	Brief	Occasional	Long	Frequent
		December	0.5	>6.0	0.0-1.0	Brief	Occasional	Long	Frequent
1612216: Penn-----	C	Jan-Dec	---	---	---	---	None	---	None
1612248: Urban land. Penn-----	C	Jan-Dec	---	---	---	---	None	---	None
2229473: Udorthents, limestone-----	C/D	January	5.0	>6.0	---	---	None	---	None
		February	5.0	>6.0	---	---	None	---	None
		March	5.0	>6.0	---	---	None	---	None
		November	5.0	>6.0	---	---	None	---	None
		December	5.0	>6.0	---	---	None	---	None
2229474: Udorthents, limestone-----	C/D	January	5.0	>6.0	---	---	None	---	None
		February	5.0	>6.0	---	---	None	---	None
		March	5.0	>6.0	---	---	None	---	None
		November	5.0	>6.0	---	---	None	---	None
		December	5.0	>6.0	---	---	None	---	None

Table 19.—Water Features—Continued

Map unit symbol and soil name	Hydro- logic group	Months	Water table			Ponding		Flooding	
			Upper limit	Lower limit	Surface water depth	Duration	Frequency	Duration	Frequency
			Ft	Ft	Ft				
2229478: Udorthents, shale and sandstone-----	B/D	January	5.0	>6.0	---	---	None	---	None
		February	5.0	>6.0	---	---	None	---	None
		March	5.0	>6.0	---	---	None	---	None
		November	5.0	>6.0	---	---	None	---	None
		December	5.0	>6.0	---	---	None	---	None
2229480: Urban land.									
2229481. Urban land									
2229493: Urban land.									
Penn-----	C	Jan-Dec	---	---	---	---	None	---	None
2229495: Urban land.									
Udorthents, limestone-----	C/D	January	1.7	>6.0	---	---	None	---	None
		February	1.7	>6.0	---	---	None	---	None
		March	1.7	>6.0	---	---	None	---	None
		November	1.7	>6.0	---	---	None	---	None
		December	1.7	>6.0	---	---	None	---	None
2229496: Urban land.									
Udorthents, schist and gneiss-----	B	January	5.0	>6.0	---	---	None	---	None
		February	5.0	>6.0	---	---	None	---	None
		March	5.0	>6.0	---	---	None	---	None
		November	5.0	>6.0	---	---	None	---	None
		December	5.0	>6.0	---	---	None	---	None
2229498: Urban land.									
Udorthents, shale and sandstone-----	B/D	Jan-Dec	---	---	---	---	None	---	None

Table 19.—Water Features—Continued

Map unit symbol and soil name	Hydro- logic group	Months	Water table		Surface water depth	Ponding		Flooding	
			Upper limit	Lower limit		Duration	Frequency	Duration	Frequency
			Ft	Ft	Ft				
2229499: Urban land.									
Udorthents, shale and sandstone-----	B/D	Jan-Dec	---	---	---	---	None	---	None
2229500. Pits, quarries									
2229501: Urban land.									
Readington-----	C	January	2.3	>6.0	---	---	None	---	None
		February	2.3	>6.0	---	---	None	---	None
		March	2.3	>6.0	---	---	None	---	None
		November	2.3	>6.0	---	---	None	---	None
		December	2.3	>6.0	---	---	None	---	None
2230323: Buckingham-----	C	January	1.0	2.6	---	---	None	---	None
		February	1.0	2.6	---	---	None	---	None
		March	1.0	2.6	---	---	None	---	None
		November	1.0	2.6	---	---	None	---	None
		December	1.0	2.6	---	---	None	---	None
2230591: Abbottstown-----	C	January	1.2	2.7	---	---	None	---	None
		February	1.2	2.7	---	---	None	---	None
		March	1.2	2.7	---	---	None	---	None
		November	1.2	2.7	---	---	None	---	None
		December	1.2	2.7	---	---	None	---	None
2232623: Penn-----	C	Jan-Dec	---	---	---	---	None	---	None
Klinesville-----	C	Jan-Dec	---	---	---	---	None	---	None

Table 19.—Water Features—Continued

Map unit symbol and soil name	Hydro- logic group	Months	Water table			Ponding		Flooding	
			Upper limit	Lower limit	Surface water depth	Duration	Frequency	Duration	Frequency
			Ft	Ft	Ft				
2232624: Raritan-----	C	January	1.7	2.4	---	---	None	---	None
		February	1.7	2.4	---	---	None	---	None
		March	1.7	2.4	---	---	None	---	None
		November	1.7	2.4	---	---	None	---	None
		December	1.7	2.4	---	---	None	---	None
2232625: Readington-----	C	January	2.3	2.4	---	---	None	---	None
		February	2.3	2.4	---	---	None	---	None
		March	2.3	2.4	---	---	None	---	None
		November	2.3	2.4	---	---	None	---	None
		December	2.3	2.4	---	---	None	---	None
2232626: Readington-----	C	January	2.3	2.4	---	---	None	---	None
		February	2.3	2.4	---	---	None	---	None
		March	2.3	2.4	---	---	None	---	None
		November	2.3	2.4	---	---	None	---	None
		December	2.3	2.4	---	---	None	---	None
2233645: Edgemont-----	B	Jan-Dec	---	---	---	---	None	---	None
2233646: Edgemont-----	B	Jan-Dec	---	---	---	---	None	---	None
2233647: Edgemont-----	B	Jan-Dec	---	---	---	---	None	---	None
2233649: Edgemont, extremely stony-----	B	Jan-Dec	---	---	---	---	None	---	None
2233698: Lansdale-----	B	Jan-Dec	---	---	---	---	None	---	None

Table 19.—Water Features—Continued

Map unit symbol and soil name	Hydro- logic group	Months	Water table			Ponding		Flooding	
			Upper limit	Lower limit	Surface water depth	Duration	Frequency	Duration	Frequency
			Ft	Ft	Ft				
2233702: Penn-----	C	Jan-Dec	---	---	---	---	None	---	None
Lansdale-----	B	Jan-Dec	---	---	---	---	None	---	None
2233703: Penn-----	C	Jan-Dec	---	---	---	---	None	---	None
Lansdale-----	B	Jan-Dec	---	---	---	---	None	---	None
2233709: Penn-----	C	Jan-Dec	---	---	---	---	None	---	None
2233712: Penn-----	C	Jan-Dec	---	---	---	---	None	---	None
2233717: Klinesville-----	C	Jan-Dec	---	---	---	---	None	---	None
2248203: Lansdale-----	B	Jan-Dec	---	---	---	---	None	---	None
2249335: Lawrenceville-----	C	January	2.3	2.6	---	---	None	---	None
		February	2.3	2.6	---	---	None	---	None
		March	2.3	2.6	---	---	None	---	None
		November	2.3	2.6	---	---	None	---	None
		December	2.3	2.6	---	---	None	---	None
2379116: Birdsboro-----	B	January	4.0	>6.0	---	---	None	---	None
		February	4.0	>6.0	---	---	None	---	None
		March	4.0	>6.0	---	---	None	---	None
		November	4.0	>6.0	---	---	None	---	None
		December	4.0	>6.0	---	---	None	---	None

Table 19.—Water Features—Continued

Map unit symbol and soil name	Hydro- logic group	Months	Water table			Ponding		Flooding	
			Upper limit	Lower limit	Surface water depth	Duration	Frequency	Duration	Frequency
			Ft	Ft	Ft				
2379949: Duffield-----	B	Jan-Dec	---	---	---	---	None	---	None
2384072: Glenville-----	C	January	1.7	2.5	---	---	None	---	None
		February	1.7	2.5	---	---	None	---	None
		March	1.7	2.5	---	---	None	---	None
		April	1.7	2.5	---	---	None	---	None
		November	1.7	2.5	---	---	None	---	None
		December	1.7	2.5	---	---	None	---	None
2386596: Duffield-----	B	Jan-Dec	---	---	---	---	None	---	None
2386599: Duffield-----	B	Jan-Dec	---	---	---	---	None	---	None
2397950: Bowmansville-----	B/D	January	0.8	>6.0	---	---	None	Very brief	Occasional
		February	0.8	>6.0	---	---	None	Very brief	Occasional
		March	0.8	>6.0	---	---	None	Very brief	Occasional
		April	0.8	>6.0	---	---	None	Very brief	Occasional
		May	0.8	>6.0	---	---	None	Very brief	Occasional
		September	0.8	>6.0	---	---	None	---	None
		October	0.8	>6.0	---	---	None	---	None
		November	0.8	>6.0	---	---	None	Very brief	Occasional
		December	0.8	>6.0	---	---	None	Very brief	Occasional
Knauers-----	D	January	0.0	>6.0	0.0-0.5	Very long	Frequent	Very brief	Occasional
		February	0.0	>6.0	0.0-0.5	Very long	Frequent	Very brief	Occasional
		March	0.0	>6.0	0.0-0.5	Very long	Frequent	Very brief	Occasional
		April	0.0	>6.0	0.0-0.5	Very long	Frequent	Very brief	Occasional
		May	0.0	>6.0	0.0-0.5	Very long	Frequent	Very brief	Occasional
		June	0.0	>6.0	0.0-0.5	Very long	Frequent	Very brief	Occasional
		September	0.0	>6.0	0.0-0.5	Very long	Frequent	---	None
		October	0.0	>6.0	0.0-0.5	Very long	Frequent	---	None
		November	0.0	>6.0	0.0-0.5	Very long	Frequent	Very brief	Occasional
		December	0.0	>6.0	0.0-0.5	Very long	Frequent	Very brief	Occasional

Table 20.—Soil Features

(See text for definitions of terms used in this table. Absence of an entry indicates that data were not estimated)

Map unit symbol and soil name	Restrictive layer				Potential for frost action	Risk of corrosion	
	Kind	Depth	Thickness	Hardness		Uncoated steel	Concrete
		to top	In				
541148: Birdsboro-----	Lithic bedrock	72-99	---	Very strongly cemented	Moderate	Moderate	High
541159: Brecknock, extremely stony-----	Lithic bedrock	40-60	---	Very strongly cemented	Moderate	Low	Moderate
541164: Codorus-----	Lithic bedrock	72-99	---	Very strongly cemented	High	High	Moderate
541165: Croton-----	Fragipan Lithic bedrock	12-25 40-60	15-25 ---	Noncemented Very strongly cemented	High	High	High
541194: Lawrenceville-----	Fragipan Lithic bedrock	24-38 48-99	---	Noncemented Strongly cemented	Moderate	Moderate	Moderate
541245: Raritan-----	Fragipan Lithic bedrock	20-30 60-99	---	Noncemented Very strongly cemented	High	High	Moderate
541247: Readington-----	Fragipan Lithic bedrock	20-36 40-70	20-36 ---	Noncemented Very strongly cemented	Moderate	Moderate	Moderate
541254: Rowland-----	Lithic bedrock	60-99	---	Very strongly cemented	High	High	Moderate
541256: Rowland-----	Lithic bedrock	60-99	---	Very strongly cemented	Moderate	Moderate	Moderate
541257: Rowland-----	Lithic bedrock	60-99	---	Very strongly cemented	Moderate	Moderate	Moderate
641312: Duffield-----	Lithic bedrock	48-120	---	Indurated	Moderate	Moderate	Moderate

Table 20.—Soil Features—Continued

Map unit symbol and soil name	Restrictive layer				Potential for frost action	Risk of corrosion	
	Kind	Depth	Thickness	Hardness		Uncoated steel	Concrete
		to top					
641350: Edgemont-----	Lithic bedrock	42-84	---	Very strongly cemented	Moderate	Low	High
641351: Edgemont-----	Lithic bedrock	42-84	---	Very strongly cemented	Moderate	Low	High
641352: Edgemont-----	Lithic bedrock	42-84	---	Very strongly cemented	Moderate	Low	High
641353: Edgemont, extremely stony-----	Lithic bedrock	42-84	---	Very strongly cemented	Moderate	Low	High
641354: Edgemont, extremely stony-----	Lithic bedrock	42-84	---	Very strongly cemented	Moderate	Low	High
641355: Edgemont, extremely stony-----	Lithic bedrock	42-84	---	Very strongly cemented	Moderate	Low	High
641418: Codorus-----	Lithic bedrock	72-99	---	Very strongly cemented	High	High	Moderate
641481: Conestoga-----	Lithic bedrock	60-99	---	Indurated	Moderate	Moderate	High
641483: Conestoga-----	Lithic bedrock	60-99	---	Indurated	Moderate	Moderate	High
641484: Conestoga-----	Lithic bedrock	60-99	---	Indurated	Moderate	Moderate	High
641523: Glenville-----	Fragipan Paralithic bedrock	15-30 60-99	15-30 ---	Noncemented Moderately cemented	High	High	Moderate
641543: Lindside-----	No restriction	---	---	---	High	Moderate	Low
641583: Penn-----	Lithic bedrock	20-40	---	Very strongly cemented	Moderate	Low	Moderate

Table 20.—Soil Features—Continued

Map unit symbol and soil name	Restrictive layer				Potential for frost action	Risk of corrosion	
	Kind	Depth	Thickness	Hardness		Uncoated steel	Concrete
		to top					
641584: Penn-----	Lithic bedrock	20-40	---	Very strongly cemented	Moderate	Low	Moderate
641586: Penn-----	Lithic bedrock	20-40	---	Very strongly cemented	Moderate	Low	Moderate
641605: Udorthents, limestone-----	Lithic bedrock	40-99	---	Indurated	Moderate	High	Moderate
641614: Urban land. Conestoga-----	Lithic bedrock	60-99	---	Indurated	Moderate	Moderate	High
641641. Water							
810899: Mattapex-----	Lithic bedrock	60-99	---	Strongly cemented	Moderate	High	High
810907: Clarksburg-----	Fragipan	20-36	20-36	Noncemented	Moderate	Moderate	Moderate
1482148: Croton-----	Fragipan Lithic bedrock	15-25 42-99	15-25 ---	Noncemented Very strongly cemented	High	High	High
1486423: Lawrenceville-----	Fragipan Lithic bedrock	24-38 48-99	24-38 ---	Noncemented Strongly cemented	Moderate	Moderate	Moderate
1539365: Gibraltar-----	Lithic bedrock	60-72	---	Very strongly cemented	High	High	Moderate
1602815: Holly-----	No restriction	---	---	---	High	High	Moderate
1612216: Penn-----	Lithic bedrock	20-40	---	Very strongly cemented	Moderate	Low	Moderate

Table 20.--Soil Features--Continued

Map unit symbol and soil name	Restrictive layer				Potential for frost action	Risk of corrosion	
	Kind	Depth	Thickness	Hardness		Uncoated steel	Concrete
		to top					
1612248: Urban land.							
Penn----- Lithic bedrock	Lithic bedrock	20-40	---	Very strongly cemented	Moderate	Low	Moderate
2229473: Udorthents, limestone-----	Lithic bedrock	40-99	---	Indurated	Moderate	High	Moderate
2229474: Udorthents, limestone-----	Lithic bedrock	40-99	---	Indurated	Moderate	High	Moderate
2229478: Udorthents, shale and sandstone-----	Lithic bedrock	20-99	---	Very strongly cemented	Low	High	High
2229480. Urban land							
2229481. Urban land							
2229493: Urban land.							
Penn----- Lithic bedrock	Lithic bedrock	20-40	---	Very strongly cemented	Moderate	Low	Moderate
2229495: Urban land.							
Udorthents, limestone-----	Lithic bedrock	20-99	---	Indurated	Moderate	High	Moderate
2229496: Urban land.							
Udorthents, schist and gneiss-----	Paralithic bedrock	20-70	---	Moderately cemented	Moderate	Moderate	Moderate
2229498: Urban land.							
Udorthents, shale and sandstone-----	Lithic bedrock	20-99	---	Very strongly cemented	Low	High	High

Table 20.--Soil Features--Continued

Map unit symbol and soil name	Restrictive layer				Potential for frost action	Risk of corrosion	
	Kind	Depth	Thickness	Hardness		Uncoated steel	Concrete
		to top					
2229499: Urban land. Udorthents, shale and sandstone-----	Lithic bedrock	20-99	---	Very strongly cemented	Low	High	High
2229500. Pits, quarries							
2229501: Urban land. Readington-----	Fragipan Lithic bedrock	20-36 40-70	20-36 ---	Noncemented Very strongly cemented	Moderate	Moderate	Moderate
2230323: Buckingham-----	Fragipan Lithic bedrock	20-40 80-99	---	Noncemented Strongly cemented	High	High	Moderate
2230591: Abbottstown-----	Fragipan Lithic bedrock	15-30 40-60	---	Noncemented Very strongly cemented	High	High	Moderate
2232623: Penn-----	Lithic bedrock	20-40	---	Very strongly cemented	Moderate	Low	Moderate
Klinesville-----	Lithic bedrock	10-20	---	Very strongly cemented	Moderate	Moderate	High
2232624: Raritan-----	Fragipan Lithic bedrock	20-30 60-99	20-30 ---	Noncemented Very strongly cemented	High	High	Moderate
2232625: Readington-----	Fragipan Lithic bedrock	20-36 40-70	20-36 ---	Noncemented Very strongly cemented	Moderate	Moderate	Moderate
2232626: Readington-----	Fragipan Lithic bedrock	20-36 40-70	---	Noncemented Very strongly cemented	Moderate	Moderate	Moderate

Table 20.—Soil Features—Continued

Map unit symbol and soil name	Restrictive layer				Potential for frost action	Risk of corrosion	
	Kind	Depth	Thickness	Hardness		Uncoated steel	Concrete
		to top					
2233645: Edgemont-----	Lithic bedrock	42-84	---	Very strongly cemented	Moderate	Low	High
2233646: Edgemont-----	Lithic bedrock	42-84	---	Very strongly cemented	Moderate	Low	High
2233647: Edgemont-----	Lithic bedrock	42-84	---	Very strongly cemented	Moderate	Low	High
2233649: Edgemont, extremely stony-----	Lithic bedrock	42-84	---	Very strongly cemented	Moderate	Low	High
2233698: Lansdale-----	Lithic bedrock	42-60	---	Very strongly cemented	Moderate	Low	High
2233702: Penn-----	Lithic bedrock	20-40	---	Very strongly cemented	Moderate	Low	Moderate
Lansdale-----	Lithic bedrock	42-60	---	Very strongly cemented	Moderate	Low	High
2233703: Penn-----	Lithic bedrock	20-40	---	Very strongly cemented	Moderate	Low	Moderate
Lansdale-----	Lithic bedrock	42-60	---	Very strongly cemented	Moderate	Low	High
2233709: Penn-----	Lithic bedrock	20-40	---	Very strongly cemented	Moderate	Low	Moderate
2233712: Penn-----	Lithic bedrock	20-40	---	Very strongly cemented	Moderate	Low	Moderate
2233717: Klinesville-----	Lithic bedrock	10-20	---	Very strongly cemented	Moderate	Moderate	High

Table 20.--Soil Features--Continued

Map unit symbol and soil name	Restrictive layer				Potential for frost action	Risk of corrosion	
	Kind	Depth	Thickness	Hardness		Uncoated steel	Concrete
		to top			In		
2248203: Lansdale-----	Lithic bedrock	42-60	---	Very strongly cemented	Moderate	Low	High
2249335: Lawrenceville-----	Fragipan Lithic bedrock	24-38 48-99	24-38 ---	Noncemented Strongly cemented	Moderate	Moderate	Moderate
2379116: Birdsboro-----	Lithic bedrock	72-99	---	Very strongly cemented	Moderate	Moderate	High
2379949: Duffield-----	Lithic bedrock	48-120	---	Indurated	Moderate	Moderate	Moderate
2384072: Glennville-----	Fragipan Paralithic bedrock	15-30 60-99	15-30 ---	Noncemented Moderately cemented	High	High	Moderate
2386596: Duffield-----	Lithic bedrock	60-80	---	Indurated	Moderate	Moderate	Moderate
2386599: Duffield-----	Lithic bedrock	60-80	---	Indurated	Moderate	Moderate	Moderate
2397950: Bowmansville-----	Lithic bedrock	72-99	---	Very strongly cemented	High	High	Moderate
Knauers-----	Lithic bedrock	72-99	---	Moderately cemented	High	High	Moderate

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Table 21.—Taxonomic Classification of the Soils

Soil name	Family or higher taxonomic class
Abbottstown-----	Fine-loamy, mixed, active, mesic Aeric Fragiaqualfs
Andover-----	Fine-loamy, mixed, active, mesic Typic Fragiaquults
Baile-----	Fine-loamy, mixed, semiactive, mesic Typic Endoaquults
Berks-----	Loamy-skeletal, mixed, active, mesic Typic Dystrudepts
Birdsboro-----	Fine-loamy, mixed, active, mesic Oxyaquic Hapludulfs
Bowmansville-----	Fine-loamy, mixed, active, nonacid, mesic Fluventic Endoaquepts
Brecknock-----	Fine-loamy, mixed, superactive, mesic Ultic Hapludalfts
Brinkerton-----	Fine-silty, mixed, superactive, mesic Typic Fragiaqualfs
Buchanan-----	Fine-loamy, mixed, semiactive, mesic Aquic Fragiudulfs
Buckingham-----	Fine-loamy, mixed, active, mesic Aeric Fragiaqualfs
Carbo-----	Very fine, mixed, active, mesic Typic Hapludalfts
Catoctin-----	Loamy-skeletal, mixed, superactive, mesic Ruptic-Alfic Eutrudepts
Chalfont-----	Fine-silty, mixed, active, mesic Aquic Fragiudalfts
Clarksburg-----	Fine-loamy, mixed, superactive, mesic Oxyaquic Fragiudalfts
Codorus-----	Fine-loamy, mixed, active, mesic Fluvaquentic Dystrudepts
Conestoga-----	Fine-loamy, mixed, active, mesic Typic Hapludalfts
Croton-----	Fine-silty, mixed, active, mesic Typic Fragiaqualfs
Doylestown-----	Fine-silty, mixed, active, mesic Typic Fragiaqualfs
Duffield-----	Fine-loamy, mixed, active, mesic Ultic Hapludalfts
Edgemont-----	Fine-loamy, mixed, active, mesic Typic Hapludulfs
Elk-----	Fine-silty, mixed, active, mesic Ultic Hapludalfts
Funkstown-----	Fine-loamy, mixed, active, mesic Oxyaquic Hapludalfts
Gibraltar-----	Coarse-loamy, mixed, active, nonacid, mesic Mollic Udifluvents
Gladstone-----	Fine-loamy, mixed, active, mesic Typic Hapludulfs
Glenelg-----	Fine-loamy, mixed, semiactive, mesic Typic Hapludulfs
Glenville-----	Fine-loamy, mixed, active, mesic Aquic Fragiudulfs
Hagerstown-----	Fine, mixed, semiactive, mesic Typic Hapludalfts
Hatboro-----	Fine-loamy, mixed, active, nonacid, mesic Fluvaquentic Endoaquepts
Hollinger-----	Fine-loamy, mixed, active, mesic Typic Hapludalfts
Holly-----	Fine-loamy, mixed, active, nonacid, mesic Fluvaquentic Endoaquepts
Klinesville-----	Loamy-skeletal, mixed, active, mesic Lithic Dystrudepts
Knauers-----	Fine-loamy over sandy or sandy-skeletal, mixed, active, nonacid, mesic Typic Fluvaquents
Lamington-----	Fine-loamy, mixed, semiactive, mesic Typic Fragiaquults
Lansdale-----	Coarse-loamy, mixed, active, mesic Typic Hapludulfs
Lawrenceville-----	Fine-silty, mixed, active, mesic Oxyaquic Fragiudalfts
Lehigh-----	Fine-loamy, mixed, superactive, mesic Aquic Hapludalfts
Letort-----	Fine-loamy, mixed, superactive, mesic Typic Hapludalfts
Linden-----	Coarse-loamy, mixed, active, mesic Fluventic Dystrudepts
Lindside-----	Fine-silty, mixed, active, mesic Fluvaquentic Eutrudepts
Mattapex-----	Fine-silty, mixed, active, mesic Aquic Hapludulfs
Newark-----	Fine-silty, mixed, active, nonacid, mesic Fluventic Endoaquepts
Nolin-----	Fine-silty, mixed, active, mesic Dystric Fluventic Eutrudepts
Othello-----	Fine-silty, mixed, active, mesic Typic Endoaquults
Penlaw-----	Fine-silty, mixed, semiactive, mesic Aquic Fragiudalfts
Penn-----	Fine-loamy, mixed, superactive, mesic Ultic Hapludalfts
Pequea-----	Coarse-loamy, mixed, active, mesic Typic Eutrudepts
Raritan-----	Fine-loamy, mixed, active, mesic Aquic Fragiudulfs
Readington-----	Fine-loamy, mixed, active, mesic Oxyaquic Fragiudalfts
Reaville-----	Fine-loamy, mixed, active, mesic Aquic Hapludalfts
Rowland-----	Fine-loamy, mixed, superactive, mesic Fluvaquentic Dystrudepts
Ryder-----	Fine-loamy, mixed, semiactive, mesic Ultic Hapludalfts
Thorndale-----	Fine-silty, mixed, active, mesic Typic Fragiaqualfs
Udorthents-----	Udorthents

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Table 22.—Soil Classification Key

ORDER	Suborder	Great Group	Subgroup	Series or Higher Category
ALFISOLS	Aqualfs	Fragiaqualfs	Typic Fragiaqualfs	Croton-----Fine-silty, mixed, active, mesic Typic Fragiaqualfs
				Doylestown-----Fine-silty, mixed, active, mesic Typic Fragiaqualfs
				Thorndale-----Fine-silty, mixed, active, mesic Typic Fragiaqualfs
				Brinkerton-----Fine-silty, mixed, superactive, mesic Typic Fragiaqualfs
		Aeric Fragiaqualfs		Abbottstown-----Fine-loamy, mixed, active, mesic Aeric Fragiaqualfs
				Buckingham-----Fine-loamy, mixed, active, mesic Aeric Fragiaqualfs
	Udalfs	Fragiudalfs	Aquic Fragiudalfs	Chalfont-----Fine-silty, mixed, active, mesic Aquic Fragiudalfs
				Penlaw-----Fine-silty, mixed, semiactive, mesic Aquic Fragiudalfs
			Oxyaquic Fragiudalfs	Readington-----Fine-loamy, mixed, active, mesic Oxyaquic Fragiudalfs
				Clarksburg-----Fine-loamy, mixed, superactive, mesic Oxyaquic Fragiudalfs
				Lawrenceville-----Fine-silty, mixed, active, mesic Oxyaquic Fragiudalfs
		Hapludalfs	Typic Hapludalfs	Hagerstown-----Fine, mixed, semiactive, mesic Typic Hapludalfs
				Conestoga-----Fine-loamy, mixed, active, mesic Typic Hapludalfs
				Hollinger-----Fine-loamy, mixed, active, mesic Typic Hapludalfs
				Letort-----Fine-loamy, mixed, superactive, mesic Typic Hapludalfs
				Carbo-----Very fine, mixed, active, mesic Typic Hapludalfs
			Aquic Hapludalfs	Reaville-----Fine-loamy, mixed, active, mesic Aquic Hapludalfs
				Lehigh-----Fine-loamy, mixed, superactive, mesic Aquic Hapludalfs
			Oxyaquic Hapludalfs	Funkstown-----Fine-loamy, mixed, active, mesic Oxyaquic Hapludalfs
			Ultic Hapludalfs	Duffield-----Fine-loamy, mixed, active, mesic Ultic Hapludalfs
				Ryder-----Fine-loamy, mixed, semiactive, mesic Ultic Hapludalfs
				Brecknock-----Fine-loamy, mixed, superactive, mesic Ultic Hapludalfs
				Penn-----Fine-loamy, mixed, superactive, mesic Ultic Hapludalfs
				Elk-----Fine-silty, mixed, active, mesic Ultic Hapludalfs
ENTISOLS	Aquents	Fluvaquents	Typic Fluvaquents	Knauers-----Fine-loamy over sandy or sandy-skeletal, mixed, active, nonacid, mesic Typic Fluvaquents
	Fluents	Udifuluents	Mollic Udifuluents	Gibraltar-----Coarse-loamy, mixed, active, nonacid, mesic Mollic Udifuluents
	Orthents	Udorthents		Udorthents-----Udorthents

Soil Survey of Valley Forge National Historical Park, Pennsylvania

Table 22.—Soil Classification Key—Continued

ORDER	
Suborder	
Great Group	
Subgroup	
Series or Higher Category	
INCEPTISOLS	
Aquepts	
Endoaquepts	
Fluvaquentic Endoaquepts	
Hatboro-----	Fine-loamy, mixed, active, nonacid, mesic Fluvaquentic Endoaquepts
Holly-----	Fine-loamy, mixed, active, nonacid, mesic Fluvaquentic Endoaquepts
Fluventic Endoaquepts	
Bowmansville-----	Fine-loamy, mixed, active, nonacid, mesic Fluventic Endoaquepts
Newark-----	Fine-silty, mixed, active, nonacid, mesic Fluventic Endoaquepts
Udepts	
Dystrudepts	
Lithic Dystrudepts	
Klinesville-----	Loamy-skeletal, mixed, active, mesic Lithic Dystrudepts
Fluvaquentic Dystrudepts	
Codorus-----	Fine-loamy, mixed, active, mesic Fluvaquentic Dystrudepts
Rowland-----	Fine-loamy, mixed, superactive, mesic Fluvaquentic Dystrudepts
Fluventic Dystrudepts	
Linden-----	Coarse-loamy, mixed, active, mesic Fluventic Dystrudepts
Typic Dystrudepts	
Berks-----	Loamy-skeletal, mixed, active, mesic Typic Dystrudepts
Eutrudepts	
Fluvaquentic Eutrudepts	
Lindside-----	Fine-silty, mixed, active, mesic Fluvaquentic Eutrudepts
Dystric Fluventic Eutrudepts	
Nolin-----	Fine-silty, mixed, active, mesic Dystric Fluventic Eutrudepts
Ruptic-Alfic Eutrudepts	
Catoctin-----	Loamy-skeletal, mixed, superactive, mesic Ruptic-Alfic Eutrudepts
Typic Eutrudepts	
Pequea-----	Coarse-loamy, mixed, active, mesic Typic Eutrudepts
ULTISOLS	
Aqualts	
Fragiaqualts	
Typic Fragiaqualts	
Andover-----	Fine-loamy, mixed, active, mesic Typic Fragiaqualts
Lamington-----	Fine-loamy, mixed, semiactive, mesic Typic Fragiaqualts
Endoaqualts	
Typic Endoaqualts	
Baile-----	Fine-loamy, mixed, semiactive, mesic Typic Endoaqualts
Othello-----	Fine-silty, mixed, active, mesic Typic Endoaqualts
Udults	
Fragiudults	
Aquic Fragiudults	
Glenville-----	Fine-loamy, mixed, active, mesic Aquic Fragiudults
Raritan-----	Fine-loamy, mixed, active, mesic Aquic Fragiudults
Buchanan-----	Fine-loamy, mixed, semiactive, mesic Aquic Fragiudults
Hapludults	
Typic Hapludults	
Lansdale-----	Coarse-loamy, mixed, active, mesic Typic Hapludults
Edgemont-----	Fine-loamy, mixed, active, mesic Typic Hapludults
Gladstone-----	Fine-loamy, mixed, active, mesic Typic Hapludults
Glenelg-----	Fine-loamy, mixed, semiactive, mesic Typic Hapludults
Aquic Hapludults	
Mattapex-----	Fine-silty, mixed, active, mesic Aquic Hapludults
Oxyaquic Hapludults	
Birdsboro-----	Fine-loamy, mixed, active, mesic Oxyaquic Hapludults

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