

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories (24). 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. Table 18 shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

ORDER. Ten soil orders are recognized. 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 Inceptisol.

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. The last syllable in the name of a suborder indicates the order. An example is Umbrept (*Umbr*, meaning shade, plus *ept*, from Inceptisol).

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; and base status. 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 Xerumbrepts (*Xer*, meaning moist in winter and dry in summer, plus *umbrept*, the suborder of the Inceptisols that has an umbric epipedon).

SUBGROUP. Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic is the central concept of the great group; it is not necessarily the most extensive. 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 known kind of soil. 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 Xerumbrepts.

FAMILY. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Mostly the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle-size class, mineral content, temperature regime, thickness of the root zone, consistence, moisture equivalent, slope, and permanent cracks. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is fine-loamy, mixed, mesic Typic Xerumbrepts.

SERIES. The series consists of soils that have similar horizons in their profile. The horizons are similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile. The texture of the surface layer or of the substratum can differ within a series.

Soil Series and Their Morphology

In this section, each soil series recognized in the survey area is described. The descriptions are arranged in alphabetic order.

Characteristics of the soil and the material in which it formed are identified for each unit. A pedon, a small three-dimensional area of soil, that is typical of the unit in the survey area is described. The detailed description of each soil horizon follows standards in the *Soil Survey Manual* (19). Many of the technical terms used in the descriptions are defined in *Soil Taxonomy* (24). Unless otherwise stated, colors in the descriptions are for moist soil. Following the pedon description is the range of important characteristics of the soils in the unit.

The map units of each soil series are described in the section "Detailed Soil Map Units."

Alderwood Series

The Alderwood series consists of moderately deep, moderately well drained soils on glacial till plains. These soils formed in glacial till. Slope is 0 to 50 percent. Elevation is 50 to 500 feet. The average annual precipitation is 40 to 60 inches, the average annual temperature is about 50 degrees F, and the average frost-free season is 165 to 200 days.

These soils are loamy-skeletal, mixed, mesic Dystric Entic Durochrepts.

Typical pedon of Alderwood gravelly sandy loam, 3 to 15 percent slopes, 2 miles west of Olympia; about 1,950 feet east and 2,350 feet south of the northwest corner of sec. 17, T. 18 N., R. 2 W.

- A—0 to 6 inches; very dark brown (10YR 2/2) gravelly sandy loam, dark brown (7.5YR 3/4) dry; moderate fine granular structure; slightly hard, very friable, slightly sticky and slightly plastic; many coarse, medium, and fine roots; many very fine interstitial pores; 20 percent pebbles; slightly acid; abrupt smooth boundary.
- Bw1—6 to 15 inches; dark brown (7.5YR 3/4) gravelly sandy loam, yellowish brown (10YR 5/6) dry; weak medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; many coarse and medium roots; many fine tubular pores; 30 percent pebbles; slightly acid; clear smooth boundary.
- Bw2—15 to 30 inches; dark brown (7.5YR 3/4) very gravelly sandy loam, light yellowish brown (10YR 6/4) dry; weak medium subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; common coarse and medium roots; many fine tubular pores; 40 percent pebbles; slightly acid; abrupt smooth boundary.
- Bqm—30 inches; a dark grayish brown (2.5Y 4/2), weakly cemented duripan that crushes to very gravelly loamy sand; light brownish gray (10YR 6/2) dry; massive; extremely hard, extremely firm, nonsticky and nonplastic; 55 percent pebbles; slightly acid.

Depth to the weakly cemented, strongly compacted Bqm horizon ranges from 20 to 40 inches. The content of rock fragments in the control section ranges from 35 to 40 percent. The lower part of the subsoil is very gravelly sandy loam or very gravelly loam. The soils are strongly acid to slightly acid throughout.

The A horizon has hue of 10YR or 7.5YR, value of 2 or 3 when moist and 3 to 5 when dry, and chroma of 2

to 4 when moist or dry. The Bw horizon has hue of 10YR or 7.5YR and value and chroma of 3 to 6 when moist or dry. The Bqm horizon has hue of 10YR or 2.5Y, value of 4 to 6 when moist or dry, and chroma of 2 or 3 when moist or dry. It is mottled in some areas. It is very gravelly sandy loam or very gravelly loamy sand.

Baldhill Series

The Baldhill series consists of deep, well drained soils on terminal moraines. These soils formed in glacial drift. Slope is 0 to 60 percent. Elevation is 400 to 700 feet. The average precipitation is 40 to 60 inches, the average annual air temperature is about 50 degrees F, and the average frost-free season is 160 to 210 days.

These soils are loamy-skeletal, mixed, mesic Dystric Xerochrepts.

Typical pedon of Baldhill very stony sandy loam, 30 to 60 percent slopes, 8 miles southeast of Yelm; about 400 feet west and 200 feet north of the southeast corner of sec. 29, T. 16 N., R. 3 E.

- A—0 to 4 inches; dark brown (10YR 3/3) very stony sandy loam, brown (10YR 5/3) dry; moderate fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine and fine and few medium and coarse roots; common very fine and fine interstitial pores; 3 to 25 percent stones on the surface; 25 percent pebbles; medium acid; clear smooth boundary.
- BA—4 to 12 inches; dark yellowish brown (10YR 4/4) very stony sandy loam, pale brown (10YR 6/3) dry; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine and fine and few medium and coarse roots; many very fine and fine interstitial pores; 25 percent stones and 15 percent pebbles; medium acid; gradual wavy boundary.
- Bw1—12 to 29 inches; dark brown (10YR 4/3) very stony sandy loam, pale brown (10YR 6/3) dry; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine and fine and few medium roots; many very fine and fine interstitial pores; 25 percent stones and 25 percent pebbles; medium acid; gradual wavy boundary.
- Bw2—29 to 36 inches; olive brown (2.5Y 4/4) very gravelly sandy loam, light brownish gray (2.5Y 6/2) dry; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; few medium roots; many very fine and fine interstitial pores; 35 percent pebbles; slightly acid; clear wavy boundary.
- Bw3—36 to 45 inches; olive brown (2.5YR 4/4) very

gravelly sandy loam, pale brown (10YR 6/3) dry; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; few medium roots; many very fine and fine interstitial pores; 50 percent pebbles; slightly acid; clear wavy boundary.

Bw4—45 to 54 inches; dark yellowish brown (10YR 4/4) extremely gravelly sandy loam, pale brown (10YR 6/3) dry; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; few fine roots; many very fine and fine interstitial pores; 65 percent pebbles; neutral; abrupt wavy boundary.

C—54 to 60 inches; dark yellowish brown (10YR 4/6) very gravelly loamy sand, yellowish brown (10YR 5/8) dry; weak medium and coarse subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine and fine interstitial pores; 50 percent pebbles; neutral.

The particle-size control section is 10 to 25 percent stone-sized fragments and 20 to 45 percent pebbles.

The A horizon has hue of 10YR or 7.5YR, value of 2 or 3 when moist and 4 to 6 when dry, and chroma of 2 to 4 when moist or dry. It is slightly acid or medium acid. The Bw horizon has hue of 7.5YR, 10YR, or 2.5Y, value of 3 or 4 when moist and 5 or 6 when dry, and chroma of 3 to 6 when moist or dry. It is slightly acid or medium acid in the upper part and neutral to medium acid in the lower part. The C horizon has hue of 10YR or 2.5Y, value of 3 or 4 when moist and 5 or 6 when dry, and chroma of 4 to 8 when moist or dry.

Baumgard Series

The Baumgard series consists of deep, well drained soils on uplands. These soils formed in residuum and colluvium derived from andesite. Slope is 10 to 65 percent. Elevation is 400 to 1,600 feet. The average annual precipitation is 55 to 65 inches, the average annual air temperature is about 48 degrees F, and the average frost-free season is 150 to 175 days.

These soils are fine-loamy, mixed, mesic Typic Xerumbrepts.

Typical pedon of Baumgard loam, 10 to 40 percent slopes, 8 miles southeast of Bucoda; about 1,200 feet east and 2,500 feet north of the southwest corner of sec. 21, T. 15 N., R. 1 E.

A1—0 to 8 inches; dark reddish brown (5YR 3/3) loam, reddish brown (5YR 4/3) dry; moderate fine granular structure; slightly hard, friable, slightly sticky and

slightly plastic; many fine and medium roots; many fine tubular pores; medium acid; clear wavy boundary.

A2—8 to 14 inches; dark reddish brown (5YR 3/3) loam, reddish brown (5YR 5/3) dry; moderate fine subangular blocky structure; hard, friable, slightly sticky and slightly plastic; many medium and coarse roots; many very fine and fine tubular pores; 5 percent pebbles; medium acid; clear irregular boundary.

BA—14 to 25 inches; reddish brown (5YR 4/3) clay loam, light reddish brown (5YR 6/3) dry; moderate fine and medium subangular blocky structure; hard, friable, sticky and plastic; common fine and medium roots; common fine and medium tubular pores; 5 percent pebbles; strongly acid; gradual wavy boundary.

Bw—25 to 30 inches; yellowish red (5YR 4/6) clay loam, light reddish brown (5YR 6/4) dry; moderate medium subangular blocky structure; hard, firm, sticky and plastic; few fine roots; few fine tubular pores; 10 percent pebbles; strongly acid; clear wavy boundary.

BC—30 to 45 inches; dark yellowish brown (10YR 4/4) very gravelly clay loam, pale brown (10YR 6/3) dry; massive; hard, firm, sticky and plastic; few fine tubular pores; 40 percent pebbles; strongly acid; clear irregular boundary.

R—45 inches; fractured andesite.

The depth to bedrock ranges from 40 to more than 60 inches. The content of rock fragments in the particle-size control section ranges from 5 to 35 percent. The fragments are dominantly pebbles, but a few are cobbles.

The A horizon has hue of 5YR or 7.5YR, value of 2 or 3 when moist and 4 or 5 when dry, and chroma of 2 or 3 when moist or dry. The BA and Bw horizons have hue of 5YR or 7.5YR, value of 3 or 4 when moist and 5 or 6 when dry, and chroma of 3 to 6 when moist and 3 or 4 when dry. They are clay loam or gravelly clay loam. The content of pebbles and cobbles in these horizons ranges from 5 to 25 percent. The BC horizon is gravelly clay loam or very gravelly clay loam.

Bellingham Series

The Bellingham series consists of very deep, poorly drained soils in depressions. Drainage has been altered by tiling and open ditches. These soils formed in alluvium. Slope is 0 to 3 percent. Elevation is 20 to 400 feet. The average annual precipitation is 35 to 60

inches, the average annual air temperature is about 50 degrees F, and the average frost-free season is 150 to 200 days.

These soils are fine, mixed, nonacid, mesic Mollic Haplaquepts.

Typical pedon of Bellingham silty clay loam, 8 miles northwest of Olympia: about 2,100 feet east and 400 feet south of the northwest corner of sec. 34, T. 19 N., R. 3 W.

- Ap—0 to 5 inches: black (10YR 2/1) silty clay loam, dark gray (10YR 4/1) dry; strong fine granular structure; hard, friable, sticky and plastic; many fine roots; medium acid; abrupt smooth boundary.
- Bg1—5 to 8 inches: gray (5Y 5/1) silty clay, light gray (N 7/0) dry; few fine distinct yellowish brown (10YR 5/8) mottles; weak medium prismatic structure; very hard, firm, sticky and plastic; many fine roots; many medium tubular and vesicular pores; medium acid; clear smooth boundary.
- Bg2—8 to 14 inches: dark gray (5Y 4/1) silty clay, light gray (N 7/0) dry; few fine distinct yellowish brown (10YR 5/8) mottles; moderate medium prismatic structure; very hard, firm, very sticky and very plastic; common fine roots; many medium tubular and interstitial pores; thin patchy clay films on faces of peds and lining pores; slightly acid; clear smooth boundary.
- Bg3—14 to 22 inches: gray (5Y 5/1) clay, light gray (N 7/0) dry; many medium distinct yellowish brown (10YR 5/8) mottles; moderate medium prismatic structure; very hard, firm, very sticky and very plastic; common fine roots; many medium tubular and interstitial pores; continuous pressure faces on peds; slightly acid; clear smooth boundary.
- Bg4—22 to 48 inches: dark gray (5Y 4/1) clay, white (5Y 8/1) dry; many medium distinct yellowish brown (10YR 5/8) mottles; moderate medium prismatic structure; very hard, firm, very sticky and plastic; few fine roots; few medium tubular and interstitial pores; continuous pressure faces on peds; neutral; gradual smooth boundary.
- Bg5—48 to 60 inches: gray (5Y 5/1) silty clay, white (5Y 8/1) dry; many medium distinct yellowish brown (10YR 5/8) mottles; moderate medium prismatic structure; very hard, firm, very sticky and very plastic; common fine roots; many medium tubular and interstitial pores; continuous pressure faces on peds; slightly acid.

The particle-size control section is 40 to 60 percent clay. The A horizon has value of 2 or 3 when moist and

3 or 4 when dry and chroma of 1 or 2. It has dark brown mottles in some areas. It is medium acid or slightly acid. The Bg horizon has hue of 5Y, 5BG, or 5GY, value of 4 to 6 when moist and 6 to 8 when dry, and chroma of 0 to 2. It has few to many, fine and medium mottles. It is silty clay or clay. Weak or distinct pressure faces are on some peds. This horizon is slightly acid or neutral.

Boistfort Series

The Boistfort series consists of very deep, well drained soils on uplands. These soils formed in material weathered from basalt. Slope is 5 to 40 percent. Elevation is 300 to 1,800 feet. The average annual precipitation is 70 to 75 inches, the average annual air temperature is about 50 degrees F, and the average frost-free season is 150 to 200 days.

These soils are medial, mesic Andic Haplumbrepts.

Typical pedon of Boistfort silt loam, 5 to 20 percent slopes, 5 miles northwest of Littlerock; about 1,800 feet west and 600 feet north of the southeast corner of sec. 24, T. 17 N., R. 4 W.

- Oi—2 inches to 0; twigs, needles, and some moss.
- A1—0 to 9 inches: dark brown (7.5YR 3/2) silt loam, dark grayish brown (10YR 4/2) dry; weak fine granular structure; soft, very friable, slightly sticky and slightly plastic; weakly smeary; many coarse, medium, and fine roots; many medium tubular pores; 25 percent firm shotlike concretions; very strongly acid; clear wavy boundary.
- A2—9 to 19 inches: dark brown (7.5YR 3/2) silty clay loam, dark brown (10YR 4/3) dry; moderate very fine subangular blocky structure; slightly hard, friable, sticky and plastic; weakly smeary; many coarse, medium, and fine roots; many medium tubular pores; few firm shotlike concretions; very strongly acid; clear wavy boundary.
- Bw1—19 to 37 inches: dark brown (7.5YR 4/4) silty clay, yellowish brown (10YR 5/6) dry; weak fine subangular blocky structure; hard, friable, sticky and plastic; weakly smeary; few fine roots; common medium tubular and interstitial pores; extremely acid; gradual wavy boundary.
- Bw2—37 to 53 inches: strong brown (7.5YR 5/6) silty clay, yellowish brown (10YR 5/8) dry; weak fine subangular blocky structure; hard, friable, sticky and plastic; weakly smeary; few roots; few fine tubular pores and common medium interstitial pores; extremely acid; gradual wavy boundary.
- BC—53 to 60 inches: strong brown (7.5YR 5/6) silty

clay, yellowish brown (10YR 5/6) dry; weak very fine subangular blocky structure; very hard, friable, sticky and plastic; weakly smeary; few fine tubular pores and common medium interstitial pores; extremely acid.

The thickness of the solum ranges from 40 to more than 60 inches, and the depth to basalt is more than 60 inches. The content of rock fragments ranges from 0 to 35 percent and averages less than 10 percent. The umbric epipedon is 10 to 20 inches thick.

The A horizon generally has value and chroma of 2 or 3 when moist or dry; however, value and chroma are one unit higher in some areas. The content of firm shotlike concretions in this horizon is 15 to 35 percent. Reaction is strongly acid or very strongly acid. The B horizon has hue of 5YR or 7.5YR when moist and value and chroma of 4 to 6. It is dominantly clay loam, silty clay loam, or silty clay, but some thin subhorizons are the gravelly or cobbly analogs of silty clay loam, clay loam, or silty clay. This horizon is very strongly acid or extremely acid.

Bunker Series

The Bunker series consists of deep, well drained soils on uplands. These soils formed in colluvial basalt. Slope is 5 to 65 percent. Elevation is 500 to 2,200 feet. The average annual precipitation is 70 to 75 inches, the average annual air temperature is about 50 degrees F, and the average frost-free season is 150 to 175 days.

These soils are medial, mesic Andic Haplumbrepts.

Typical pedon of Bunker gravelly silt loam, 5 to 30 percent slopes, 6 miles northwest of Littlerock; about 1,300 feet east and 2,200 feet north of the southwest corner of sec. 14, T. 17 N., R. 4 W.

Oi—2 inches to 0; twigs, needles, and some moss.

A—0 to 10 inches; dark reddish brown (5YR 3/3) gravelly silt loam, reddish brown (5YR 4/4) dry; moderate fine granular structure; slightly hard, friable, slightly sticky and slightly plastic; weakly smeary; many very fine and fine roots; common fine and very fine pores; 20 percent angular basalt pebbles; medium acid; clear wavy boundary.

Bw1—10 to 17 inches; dark reddish brown (5YR 3/4) gravelly silt loam, reddish brown (5YR 4/4) dry; moderate fine and medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; weakly smeary; many very fine and fine and common medium roots; common very fine and fine pores; 25 percent angular basalt pebbles;

medium acid; clear irregular boundary.

Bw2—17 to 30 inches; reddish brown (5YR 4/4) gravelly silt loam, strong brown (7.5YR 5/6) dry; moderate fine and medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; weakly smeary; common fine and medium roots; common fine pores; 30 percent angular basalt pebbles; medium acid; gradual wavy boundary.

Bw3—30 to 54 inches; reddish brown (5YR 4/4) gravelly silt loam, strong brown (7.5YR 5/6) dry; weak medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; weakly smeary; few fine and medium roots; common fine pores; 35 percent angular basalt pebbles; medium acid; gradual wavy boundary.

R—54 inches; fractured basalt.

The depth to fractured bedrock ranges from 40 to more than 60 inches. Reaction ranges from very strongly acid to medium acid throughout the profile. The content of rock fragments in the particle-size control section ranges from 15 to 35 percent.

The A horizon has hue of 5YR or 7.5YR, value of 2 or 3 when moist and 4 or 5 when dry, and chroma of 1 to 3 when moist and 3 or 4 when dry. The content of pebbles in this horizon is 0 to 15 percent. The B horizon has hue of 5YR to 10YR, value of 3 or 4 when moist and 4 or 5 when dry, and chroma of 3 or 4 when moist and 3 to 6 when dry. It is gravelly loam, gravelly clay loam, gravelly silt loam, or gravelly silty clay loam.

Cagey Series

The Cagey series consists of very deep, moderately well drained soils on terraces. These soils formed in sandy glacial drift. Slope is 0 to 4 percent. Elevation is 100 to 300 feet. The average annual precipitation is 40 to 60 inches, the average annual air temperature is about 50 degrees F, and the average frost-free season is 170 to 200 days.

These soils are mixed, mesic Aquic Xeropsamments.

Typical pedon of Cagey loamy sand, 3 miles south of Tumwater; about 1,600 feet west and 200 feet north of the southeast corner of sec. 16, T. 17 N., R. 2 W.

Ap—0 to 6 inches; dark brown (10YR 3/3) loamy sand, brown (10YR 5/3) dry; single grained; loose; many fine roots; many very fine pores; slightly acid; abrupt smooth boundary.

Bw—6 to 28 inches; dark yellowish brown (10YR 4/4) loamy sand, pale brown (10YR 6/3) dry; single grained; loose; common fine roots; many very fine

pores; slightly acid; abrupt wavy boundary.

C1—28 to 34 inches; light olive brown (2.5Y 5/4) fine sand, light brownish gray (2.5Y 6/2) dry; massive; loose, very friable, nonsticky and nonplastic; few fine roots; many very fine pores; slightly acid; abrupt wavy boundary.

C2—34 to 60 inches; light olive brown (2.5Y 5/4) fine sand, pale olive (5Y 6/3) dry; many fine distinct strong brown (7.5YR 5/8) mottles; massive; loose, very friable, nonsticky and nonplastic; few fine roots; many very fine pores; slightly acid.

The soils are slightly acid or neutral throughout. The A or Ap horizon has hue of 7.5YR or 10YR, value of 3 or 4 when moist and 5 or 6 when dry, and chroma of 2 or 3 when moist or dry. The B horizon has hue of 10YR or 2.5Y, value of 4 or 5 when moist and 6 when dry, and chroma of 4 or 5 when moist and 2 or 3 when dry. In some areas it is mottled in the lower part. It is sand, fine sand, or loamy sand. The C horizon has hue of 2.5Y or 5Y when moist or dry and chroma of 2 to 4 when moist or dry. It is fine sand or sand.

Cathcart Series

The Cathcart series consists of deep, well drained soils on uplands. These soils formed in glacial drift, volcanic ash, and material weathered from sandstone and siltstone. Slope is 3 to 35 percent. Elevation is 100 to 900 feet. The average annual precipitation is 40 to 55 inches, the average annual air temperature is about 49 degrees F, and the average frost-free season is 160 to 200 days.

These soils are medial, mesic Andic Xerochrepts.

Typical pedon of Cathcart gravelly loam, 3 to 15 percent slopes, 3 miles southwest of Maytown; about 600 feet east and 850 feet south of the northwest corner of sec. 18, T. 16 N., R. 2 W.

A—0 to 4 inches; dark brown (10YR 3/3) gravelly loam, dark yellowish brown (10YR 4/4) dry; strong fine and medium granular structure; soft, very friable, slightly sticky and slightly plastic; weakly smeary; common very fine and fine roots; many very fine and fine tubular pores; 25 percent rounded pebbles; medium acid; clear wavy boundary.

BA—4 to 12 inches; dark brown (7.5YR 3/4) gravelly loam, dark yellowish brown (10YR 4/4) dry; strong fine and medium subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; weakly smeary; common very fine and fine roots;

many very fine and fine tubular pores; 20 percent rounded pebbles; medium acid; gradual wavy boundary.

Bw1—12 to 25 inches; reddish brown (5YR 4/4) silt loam, strong brown (7.5YR 5/6) dry; strong medium and coarse subangular blocky structure; hard, friable, sticky and plastic; weakly smeary; common fine and medium roots; common very fine and fine tubular pores; 10 percent rounded pebbles; medium acid; gradual wavy boundary.

Bw2—25 to 33 inches; yellowish red (5YR 4/6) silt loam, strong brown (7.5YR 5/8) dry; moderate medium and coarse subangular blocky structure; hard, friable, sticky and plastic; weakly smeary; few fine roots; common fine interstitial pores; medium acid; gradual wavy boundary.

C—33 to 44 inches; reddish brown (2.5YR 4/4) clay loam, red (2.5YR 4/6) dry; many large prominent brown (10YR 5/3) mottles; moderate medium and coarse subangular blocky structure; hard, friable, sticky and plastic; few fine interstitial pores; 10 percent soft siltstone fragments; medium acid; gradual wavy boundary.

Cr—44 inches; weathered siltstone.

The depth to paralithic contact ranges from 40 to 60 inches. The content of hard rock fragments in the control section is less than 15 percent by weighted average.

The A horizon has hue of 10YR or 7.5YR, value of 3 or 4 when moist or dry, and chroma of 3 to 6 when moist or dry. It is strongly acid or medium acid. The B horizon has hue of 5YR to 10YR, value of 3 to 5 when moist and 4 or 5 when dry, and chroma of 4 to 6 when moist and 4 to 8 when dry. It is loam or silt loam and is strongly acid or medium acid. The C horizon varies widely in color and texture, depending on the type of bedrock. This horizon has hue of 2.5YR to 2.5Y.

Centralia Series

The Centralia series consists of very deep, well drained soils on uplands. These soils formed in material weathered from sandstone. Slope is 8 to 60 percent. Elevation is 200 to 500 feet. The average annual precipitation is 40 to 50 inches, the average annual temperature is about 50 degrees F, and the average frost-free season is 150 to 200 days.

These soils are fine-loamy, mixed, mesic Ultic Haploxeralfs.

Typical pedon of Centralia silt loam, 15 to 30 percent

slopes, 4 miles southwest of Bucoda; about 1,150 feet east and 1,450 feet north of the southwest corner of sec. 16, T. 15 N., R. 2 W.

Oi—2 inches to 0; needles, leaves, and twigs.

A1—0 to 5 inches: very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; moderate very fine, fine, and medium subangular blocky structure; hard, friable, slightly sticky and slightly plastic; many very fine, fine, medium, and coarse roots; many very fine interstitial and tubular pores; medium acid; clear smooth boundary.

A2—5 to 10 inches; dark brown (10YR 3/3) silt loam, brown (10YR 5/3) dry; moderate medium and coarse subangular blocky structure; hard, friable, slightly sticky and slightly plastic; common medium and coarse and many very fine and fine roots; common medium and many very fine tubular pores; medium acid; clear smooth boundary.

BA—10 to 15 inches; dark brown (10YR 4/3) clay loam, light yellowish brown (10YR 6/4) dry; moderate coarse subangular blocky structure; hard, friable, sticky and plastic; common very fine, medium, and coarse roots; common medium and many very fine tubular pores; medium acid; gradual wavy boundary.

Bt1—15 to 21 inches; dark brown (7.5YR 4/4) clay loam, reddish yellow (7.5YR 6/6) dry; moderate medium and coarse subangular and angular blocky structure; hard, firm, sticky and plastic; common very fine, fine, medium, and coarse roots; common medium and many very fine tubular pores; few thin clay films on faces of peds and lining pores; medium acid; gradual wavy boundary.

Bt2—21 to 35 inches; dark brown (7.5YR 4/4) clay loam, yellowish brown (10YR 5/6) dry; moderate medium and coarse angular blocky structure; hard, firm, sticky and plastic; common very fine, fine, medium, and coarse roots; many very fine tubular pores; many moderately thick clay films on faces of peds and lining pores; medium acid; clear wavy boundary.

Bt3—35 to 42 inches; dark yellowish brown (10YR 4/4) clay loam, light yellowish brown (10YR 6/4) dry; moderate medium and coarse angular blocky structure; hard, firm, sticky and plastic; common very fine, fine, medium, and coarse roots; many very fine and fine tubular pores; many moderately thick clay films on faces of peds and lining pores; medium acid; clear wavy boundary.

BCt—42 to 60 inches; dark yellowish brown (10YR 4/4) clay loam, light yellowish brown (10YR 6/4) dry;

weak medium and coarse blocky structure; hard, firm, sticky and plastic; few fine roots; common very fine and fine tubular pores; continuous moderately thick and thick clay films on fragments of sandstone; 20 percent soft sandstone chips; strongly acid.

The umbric epipedon is 10 to 20 inches thick. The particle-size control section is 27 to 35 percent clay and more than 15 percent material that is coarser than very fine sand. The argillic horizon is more than 22 inches thick. Hue is 10YR or 7.5YR throughout the profile.

The A horizon has value of 2 or 3 when moist and chroma of 2 or 3 when moist or dry. It is slightly acid to strongly acid. The Bt horizon has value of 4 or 5 when moist and 5 or 6 when dry and chroma of 3 or 4 when moist and 4 to 6 when dry. It is silty clay loam or clay and is medium acid or strongly acid. The BCt horizon has value of 4 or 5 when moist and 5 or 6 when dry and chroma of 2 to 4 when moist or dry. It is silty clay loam or clay loam. It has visible mica chips and sand grains in most places. It is 0 to 35 percent soft, pebble-sized fragments of sandstone. It is strongly acid or very strongly acid. In some areas there are mottles that have hue of 10YR or 7.5YR, value of 4 or 5 when moist or dry, and chroma of 4 to 6 when moist or dry.

Chehalis Series

The Chehalis series consists of very deep, well drained soils on flood plains. These soils formed in alluvium. Slope is 0 to 2 percent. Elevation is 100 to 200 feet. The average annual precipitation is 40 to 50 inches, the average annual air temperature is about 50 degrees F, and the average frost-free season is 150 to 200 days.

These soils are fine-silty, mixed, mesic, Cumulic Ultic Haploxerolls.

Typical pedon of Chehalis silt loam, 3 miles west of Rochester; about 2,250 feet south and 200 feet west of the northeast corner of sec. 2, T. 15 N., R. 4 W.

Ap—0 to 7 inches; very dark grayish brown (10YR 3/2) silt loam, dark brown (10YR 4/3) dry; strong fine and medium granular structure; hard, very friable, slightly sticky and slightly plastic; many very fine roots; many very fine tubular pores; medium acid; abrupt smooth boundary.

A—7 to 25 inches; dark brown (10YR 3/3) silty clay loam, dark yellowish brown (10YR 5/4) dry; moderate fine and medium subangular blocky structure; hard, friable, sticky and plastic; few very

fine roots; common very fine and fine tubular pores; medium acid; abrupt smooth boundary.

Bw1—25 to 33 inches; dark yellowish brown (10YR 3/4) silty clay loam, yellowish brown (10YR 5/4) dry; moderate fine and medium subangular blocky structure; hard, friable, sticky and plastic; few fine roots; common very fine and fine tubular pores; medium acid; abrupt smooth boundary.

Bw2—33 to 44 inches; dark brown (7.5YR 4/2) silty clay loam, yellowish brown (10YR 5/4) dry; moderate fine and medium subangular blocky structure; hard, friable, sticky and plastic; many very fine and fine tubular pores; medium acid; clear wavy boundary.

C—44 to 60 inches; dark brown (7.5YR 3/4) loam, yellowish brown (10YR 5/6) dry; massive; soft, very friable, slightly sticky and slightly plastic; many very fine and fine tubular pores; medium acid.

The mollic epipedon is 24 to more than 60 inches thick. The particle-size control section is silty clay loam and is 25 to 30 percent clay. Hue ranges from 2.5Y to 7.5YR throughout the profile.

The A or Ap horizon has value of 2 or 3 when moist and 4 or 5 when dry and chroma of 2 or 3 when moist or dry. It is slightly acid or medium acid. The Bw1 horizon has value of 2 or 3 when moist and 4 or 5 when dry. The Bw2 horizon has value of 2 to 4 when moist and 4 to 6 when dry and chroma of 2 or 3 when moist or dry. The Bw horizon is heavy silt loam or silty clay loam. It ranges from neutral to medium acid. The C horizon has value of 3 or 4 when moist and 5 or 6 when dry and chroma of 3 or 4 when moist and dry. It is neutral to medium acid and is silt loam, loam, or fine sandy loam.

Delphi Series

The Delphi series consists of deep, well drained soils on glacial uplands. These soils formed in continental glacial till. Slope is 3 to 30 percent. Elevation is 100 to 1,000 feet. The average annual precipitation is 50 to 60 inches, the average annual air temperature is about 50 degrees F, and the average frost-free season is 165 to 195 days.

These soils are medial-skeletal, mesic Andic Xerumbrepts.

Typical pedon of Delphi very gravelly loam, 3 to 15 percent slopes, 11 miles west of Olympia; about 1,700 feet west and 1,400 feet south of the northeast corner of sec. 19, T. 18 N., R. 3 W.

Oi—2 inches to 1 inch; needles, leaves, wood, and bark.

Oe—1 inch to 0; partially decomposed needles, wood, and bark.

A—0 to 8 inches; dark reddish brown (5YR 3/3) very gravelly loam, dark brown (10YR 4/3) dry; weak fine granular structure; soft, very friable, nonsticky and nonplastic; weakly smeary; 40 percent rounded glacial gravel, which includes 20 percent shot-sized concretions; many coarse, medium, and fine roots; medium acid; clear smooth boundary.

AB—8 to 13 inches; dark brown (7.5YR 3/2) very gravelly loam, brown (10YR 5/3) dry; weak fine granular structure; soft, very friable, nonsticky and nonplastic; weakly smeary; 40 percent rounded glacial gravel; many coarse, medium, and fine roots; medium acid; clear smooth boundary.

Bw1—13 to 31 inches; dark yellowish brown (10YR 4/4) very gravelly silt loam, light yellowish brown (10YR 6/4) dry; moderate fine subangular blocky structure; soft, friable, slightly sticky and slightly plastic; weakly smeary; 40 percent rounded glacial pebbles; common medium and fine roots; strongly acid; clear smooth boundary.

Bw2—31 to 48 inches; dark yellowish brown (10YR 4/4) extremely gravelly silt loam, light yellowish brown (10YR 6/4) dry; moderate fine subangular blocky structure; 60 percent rounded glacial pebbles; about 20 percent clay; few fine roots; strongly acid; clear smooth boundary.

2Bqm—48 to 60 inches; dark yellowish brown (10YR 4/4) extremely gravelly clay loam, yellowish brown (10YR 5/4) dry; massive; very hard, very firm; weakly cemented; 70 percent rounded glacial pebbles; strongly acid.

Depth to the cemented till ranges from 40 to 55 inches. The control section is silt loam or loam and is 35 to 70 percent rock fragments.

The A horizon has hue of 5YR or 7.5YR when moist and 7.5YR or 10YR when dry, value of 4 or 5 when dry, and chroma of 2 or 3 when moist or dry. The AB horizon is very gravelly silt loam or very gravelly loam. The A and AB horizons are medium acid or strongly acid.

The Bw horizon has hue of 7.5YR or 10YR when moist and value of 4 to 6 when dry. It is very gravelly silt loam, very gravelly loam, extremely gravelly loam, or extremely gravelly silt loam. The Bqm horizon is compact and weakly cemented. It is extremely gravelly clay loam or extremely gravelly loam in the upper 2 feet and extremely gravelly loamy sand in the lower part.

Dupont Series

The Dupont series consists of very deep, very poorly drained soils in depressions on uplands. Drainage has been altered by tiling and open ditches. These soils formed in organic deposits. Slope is 0 to 1 percent. Elevation is 50 to 350 feet. The average annual precipitation is 40 to 60 inches, the average air temperature is about 50 degrees F, and the average frost-free season is 150 to 190 days.

These soils are diatomaceous, euic, mesic Limnic Medisaprists.

Typical pedon of Dupont muck, 5 miles west of Yelm; about 500 feet east and 1,000 feet south of the northwest corner of sec. 17, T. 17 N., R. 1 E.

- Op—0 to 7 inches; dark brown (10YR 3/3) sapric material, light brownish gray (10YR 6/2) dry; about 12 percent fiber, less than 5 percent rubbed; strong fine subangular blocky structure; hard, friable, nonsticky and nonplastic; many fine roots; about 15 percent volcanic ash and diatomaceous earth; very strongly acid; abrupt smooth boundary.
- C—7 to 17 inches; dark grayish brown (10YR 4/2) volcanic ash and diatomaceous earth lenses, light gray (2.5Y 7/2) dry; strong medium angular blocky structure; slightly hard, firm, nonsticky and nonplastic; few fine roots; mixed with common discontinuous horizontal lenses of muck about ¼ inch thick; very strongly acid; abrupt smooth boundary.
- Oa1—17 to 26 inches; dark reddish brown (5YR 3/2) sapric material, very dark grayish brown (10YR 3/2) dry; about 25 percent fiber, less than 5 percent rubbed; massive; soft, friable, nonsticky and nonplastic; few fine roots; strongly acid; abrupt smooth boundary.
- Oa2—26 to 52 inches; dark reddish brown (5YR 3/2) sapric material, gray (10YR 5/1) dry; massive; soft, very friable, nonsticky and nonplastic; about 30 percent fiber, less than 10 percent rubbed; strongly acid; abrupt smooth boundary.
- C'—52 to 54 inches; white (2.5Y 8/2) silt (mixed volcanic ash and diatomaceous earth), white (N 8/0) dry; massive; soft, friable, nonsticky and nonplastic; strongly acid; abrupt smooth boundary.
- Oa'—54 to 60 inches; dark reddish brown (5YR 3/2) sapric material, gray (10YR 5/1) dry; about 25 percent fiber, less than 10 percent rubbed; massive; hard, friable, nonsticky and nonplastic; strongly acid.

The organic material ranges from 52 inches to more

than 10 feet in thickness. The depth to limnic material is 7 to 20 inches near the perimeter of most bogs and 20 to 50 inches near the center. These soils are mostly decomposed spirea, sedges, and grasses. The control section is sapric material with an unrubbed fiber content of 20 to 40 percent and a rubbed fiber content of 10 to less than 5 percent. The limnic material is mixed diatomaceous earth and volcanic ash 2 to 10 inches thick. It has hue of 7.5YR to 2.5Y, value of 3 to 8, and chroma of 0 to 3. The organic material has hue of 10YR or 5YR. The soils are strongly acid or very strongly acid throughout.

Eld Series

The Eld series consists of very deep, well drained soils on alluvial fans and flood plains. These soils formed in alluvium. Slope is 0 to 5 percent. Elevation is 150 to 250 feet. The average annual precipitation is 45 to 55 inches, the average annual air temperature is about 50 degrees F, and the average frost-free season is 150 to 200 days.

These soils are fine-loamy, mixed, mesic Cumulic Ultic Haploxerolls.

Typical pedon of Eld loam, 1.5 miles northwest of Littlerock; about 800 feet east and 2,350 feet north of the southwest corner of sec. 35, T. 17 N., R. 3 W.

- Ap—0 to 7 inches; dark reddish brown (5YR 3/3) loam, yellowish red (5YR 4/6) dry; strong fine and very fine granular structure; slightly hard, very friable, slightly sticky and slightly plastic; many fine and very fine roots; common very fine and fine tubular pores; medium acid; abrupt smooth boundary.
- AB—7 to 22 inches; dark reddish brown (5YR 3/3) loam, yellowish red (5YR 5/6) dry; moderate very fine and fine subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; common very fine roots; few medium and common very fine and fine tubular pores; medium acid; gradual wavy boundary.
- Bw1—22 to 35 inches; dark brown (7.5YR 3/4) loam, strong brown (7.5YR 5/6) dry; moderate fine and medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; few very fine roots; common very fine and fine tubular pores; medium acid; gradual wavy boundary.
- Bw2—35 to 60 inches; dark brown (7.5YR 4/4) silt loam, strong brown (7.5YR 5/6) dry; moderate fine and medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; common very fine and fine tubular pores; medium acid.

The solum ranges from 40 to more than 60 inches in thickness. These soils are slightly acid or medium acid throughout. In some areas the content of pebbles is as much as 15 percent.

The A horizon has hue of 10YR to 5YR, value of 2 or 3 when moist and 3 to 5 when dry, and chroma of 2 or 3 when moist and 2 to 6 when dry. It is silt loam or loam. The B horizon has hue of 5YR to 10YR, value of 3 or 4 when moist and 4 to 6 when dry, and chroma of 3 or 4 when moist and 3 to 6 when dry. It is loam or silt loam in the upper part and silt loam or silty clay loam in the lower part.

Everett Series

The Everett series consists of very deep, somewhat excessively drained soils on glacial terraces, moraines, and terrace escarpments. These soils formed in glacial outwash. Slope is 0 to 50 percent. Elevation is 50 to 700 feet. The average annual precipitation is 35 to 45 inches, the average annual air temperature is about 50 degrees F, and the average frost-free season is 150 to 200 days.

These soils are sandy-skeletal, mixed, mesic Andic Xerochrepts.

Typical pedon of Everett very gravelly sandy loam, 3 to 15 percent slopes, 6 miles southeast of Olympia; about 1,100 feet east and 2,600 feet north of the southwest corner of sec. 35, T. 18 N., R. 1 W.

A—0 to 3 inches: dark reddish brown (5YR 2/2) very gravelly sandy loam, dark brown (10YR 4/3) dry; weak very fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; many fine, medium, and coarse roots; many very fine and fine interstitial pores; 35 percent rounded pebbles; very strongly acid; abrupt smooth boundary.

Bw—3 to 12 inches: dark brown (7.5YR 3/4) extremely gravelly sandy loam, brown (10YR 5/3) dry; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; many fine, medium, and coarse roots; many very fine interstitial pores; 65 percent rounded pebbles; medium acid; clear smooth boundary.

BC—12 to 20 inches: dark yellowish brown (10YR 4/4) extremely gravelly loamy sand, pale brown (10YR 6/3) dry; single grained; loose; common fine and medium roots; many very fine interstitial pores; 75 percent rounded pebbles; medium acid; clear smooth boundary.

C1—20 to 28 inches: olive brown (2.5Y 4/4) extremely gravelly loamy sand, grayish brown (2.5Y 5/2) dry;

single grained; loose; common fine and medium roots; many very fine interstitial pores; 75 percent rounded pebbles; medium acid; clear smooth boundary.

C2—28 to 60 inches: dark grayish brown (2.5Y 4/2) extremely gravelly sand, gray (5Y 6/1) dry; single grained; loose; few fine roots; 85 percent rounded pebbles; slightly acid.

The solum ranges from 12 to 26 inches in thickness. The content of coarse fragments in the control section ranges from 50 to 80 percent. The soils are very strongly acid to medium acid throughout.

The A horizon has hue of 10YR to 5YR, value of 2 to 5 when moist, and chroma of 2 or 3 when moist or dry. Some pedons do not have an A horizon. The Bw horizon has hue of 10YR or 7.5YR, value of 3 to 6 when moist and 3 to 5 when dry, and chroma of 2 to 4 when moist or dry. It is very gravelly sandy loam or extremely gravelly sandy loam. The C horizon has hue of 10YR to 5Y, value of 4 to 6 when moist or dry, and chroma of 2 to 4 when moist or dry. It is extremely gravelly sand to extremely loamy sand.

Everson Series

The Everson series consists of deep, poorly drained soils in depressions on glacial terraces. Drainage has been altered by tiling and open ditches. These soils formed in alluvium or lacustrine deposits and glacial outwash. Slope is 0 to 2 percent. Elevation is 100 to 300 feet. The average annual precipitation is 40 to 55 inches, the average annual air temperature is about 50 degrees F, and the average frost-free season is 150 to 200 days.

These soils are clayey over sandy or sandy-skeletal, mixed, nonacid, mesic Typic Humaquepts.

Typical pedon of Everson clay loam, 2 miles northwest of Maytown; about 2,300 feet west and 950 feet north of the southeast corner of sec. 32, T. 17 N., R. 2 W.

Ap—0 to 6 inches: very dark grayish brown (10YR 3/2) clay loam, dark grayish brown (10YR 4/2) dry; strong medium and coarse granular structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine and fine and common medium roots; many very fine and fine pores; strongly acid; abrupt smooth boundary.

Bg1—6 to 9 inches: very dark grayish brown (10YR 3/2) clay loam, grayish brown (10YR 5/2) dry; common fine prominent yellowish red (5YR 5/6) mottles;

strong medium and coarse granular structure; slightly hard, friable, sticky and plastic; many very fine and common medium roots; many very fine and fine pores; medium acid; abrupt wavy boundary.

Bg2—9 to 16 inches: very dark gray (10YR 3/1) silty clay, light gray (10YR 7/1) dry; many large prominent reddish brown (5YR 5/4) and light reddish brown (5YR 6/4) mottles; moderate medium and coarse subangular blocky structure; hard, firm, sticky and plastic; common very fine roots; common very fine and fine pores; medium acid; clear wavy boundary.

Bg3—16 to 25 inches: brown (10YR 5/3) clay, light brownish gray (10YR 6/2) dry; many large prominent yellowish red (5YR 5/6 and 4/8) mottles; weak medium and coarse subangular blocky structure; very hard, firm, sticky and plastic; common very fine roots; common very fine and fine pores; medium acid; clear wavy boundary.

Bg4—25 to 30 inches: grayish brown (2.5Y 5/2) clay loam, gray (5Y 6/1) dry; many large prominent reddish yellow (7.5YR 6/8), yellowish red (5YR 5/8), and brownish yellow (10YR 6/6) mottles; massive; hard, firm, sticky and plastic; many fine and very fine roots; few very fine and fine pores; medium acid; abrupt smooth boundary.

2Cg—30 to 60 inches: dark gray (5Y 4/1) sand, gray (5Y 6/1) dry; many large prominent strong brown (7.5YR 5/8) mottles; massive; soft, very friable, nonsticky and nonplastic; many very fine pores; strongly acid.

The upper part of the control section is 35 to 45 percent clay, and the lower part is 0 to 10 percent clay. The solum is 25 to 30 inches thick. By weighted average, the lower part of the control section is 0 to 10 percent pebbles. In some areas gravelly strata are below a depth of 40 inches.

The Ap horizon has value of 2 or 3 when moist and 4 or 5 when dry and chroma of 1 or 2 when moist or dry. The B horizon has hue of 10YR or 2.5Y, value of 3 to 5 when moist and 5 to 7 when dry, and chroma of 1 or 2 when moist or dry. It is silty clay, clay loam, or clay. The C horizon has hue of 5Y or 2.5Y, value of 4 or 5 when moist and 5 to 7 when dry, and chroma of 2 to 4 when moist or dry. It has mottles with hue of 7.5YR or 10YR. The fine-earth fraction of this horizon is loamy sand or sand.

Galvin Series

The Galvin series consists of very deep, somewhat

poorly drained soils on alluvial fans and terraces. These soils formed in alluvium derived from shale and sandstone. Slope is 0 to 5 percent. Elevation is 150 to 500 feet. The average annual precipitation is 40 to 50 inches, the average annual air temperature is about 50 degrees F, and the average frost-free season is 150 to 200 days.

These soils are fine-silty, mixed, mesic Aquic Palexeralfs.

Typical pedon of Galvin silt loam, 0 to 5 percent slopes, 2 miles northeast of Bucoda; about 900 feet west and 2,200 feet south of the northeast corner of sec. 5, T. 15 N., R. 1 W.

Ap—0 to 7 inches: very dark grayish brown (10YR 3/2) silt loam, pale brown (10YR 6/3) dry; moderate medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine and fine and few medium roots; many very fine and fine tubular pores; slightly acid; abrupt smooth boundary.

AB—7 to 12 inches: dark brown (10YR 3/3) silt loam, pale brown (10YR 6/3) dry; moderate medium subangular blocky structure; hard, friable, slightly sticky and slightly plastic; common very fine and fine roots; many very fine and fine pores; medium acid; clear smooth boundary.

Bt1—12 to 20 inches: dark yellowish brown (10YR 4/4) silt loam, yellowish brown (10YR 5/4) dry; common medium prominent strong brown (7.5YR 5/6) mottles; moderate very coarse, coarse, and medium subangular blocky structure; hard, friable, slightly sticky and slightly plastic; few very fine roots; many very fine tubular pores; many thin and moderately thick clay films on faces of peds and lining pores; slightly acid; clear smooth boundary.

Bt2—20 to 35 inches: dark yellowish brown (10YR 4/4) silty clay loam, very pale brown (10YR 7/3) dry; many large prominent pale red (2.5YR 6/2) and strong brown (7.5YR 5/8) mottles; moderate very coarse, coarse, and medium subangular blocky structure; hard, friable, slightly sticky and slightly plastic; few very fine roots; common fine and medium pores; many thin and moderately thick clay films on faces of peds and lining pores; medium acid; clear smooth boundary.

Bt3—35 to 60 inches: mixed light yellowish brown (10YR 6/4), grayish brown (2.5Y 5/2), and reddish yellow (7.5YR 6/8) silty clay, very pale brown (10YR 7/4), light yellowish brown (10YR 6/4), and reddish yellow (7.5YR 6/8) dry; strong coarse, medium, and fine angular blocky structure; very hard, firm, sticky

and plastic; few very fine roots; common very fine tubular pores; continuous thin and moderately thick clay films on faces of peds and lining pores; medium acid.

The solum ranges from 40 to more than 60 inches in thickness. The control section is loam, silt loam, or silty clay loam and is 23 to 35 percent clay.

The A horizon has hue of 10YR or 7.5YR, value of 2 to 4 when moist and 5 or 6 when dry, and chroma of 2 or 3 when moist or dry. The lower part of this horizon is silt loam or silty clay loam. The Bt horizon has prominent mottles with hue of 2.5YR to 7.5YR, value of 5 or 6 when moist and 4 to 6 when dry, and chroma of 2 to 8 when moist and 4 to 8 when dry.

Giles Series

The Giles series consists of deep, well drained soils on terraces and terrace escarpments. These soils formed in volcanic ash and glacial outwash. Slopes are 0 to 30 percent. Elevation is 50 to 500 feet. The average annual precipitation is 45 to 55 inches, the average annual air temperature is about 49 degrees F, and the average frost-free season is 170 to 200 days.

These soils are medial, mesic Andic Xerochrepts.

Typical pedon of Giles silt loam, 0 to 3 percent slopes, ½ mile southwest of East Olympia Station; about 1,900 feet west and 2,150 feet south of the northeast corner of sec. 18, T. 17 N., R. 1 W.

- Oi—1 inch to 0; partially decomposed needles and twigs.
- A—0 to 3 inches; dark brown (7.5YR 3/2) silt loam, grayish brown (10YR 5/2) dry; strong fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; many medium and fine roots; strongly acid; abrupt wavy boundary.
- Bw1—3 to 10 inches; dark yellowish brown (10YR 4/4) silt loam, pale brown (10YR 6/3) dry; strong fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common medium and fine roots; medium acid; clear smooth boundary.
- Bw2—10 to 48 inches; olive brown (2.5Y 4/4) silt loam, pale brown (10YR 6/3) dry; strong fine angular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; few medium and fine roots; many medium tubular and interstitial pores; medium acid; abrupt smooth boundary.
- C—48 to 60 inches; olive brown (2.5Y 4/4) silt loam, pale yellow (2.5Y 7/4) dry; massive; soft, friable,

slightly sticky and nonplastic; many medium tubular and interstitial pores; medium acid.

The A horizon has hue of 10YR or 7.5YR when moist and 10YR or 2.5Y when dry, value of 3 or 4 when moist and 5 to 7 when dry, and chroma of 2 to 4 when moist or dry. It is strongly acid to slightly acid. Some pedons have an E horizon. The Bw horizon has hue of 10YR to 5Y, value of 4 or 5 when moist and 6 or 7 when dry, and chroma of 3 or 4 when moist or dry. It is silt loam or fine sandy loam and is medium acid or slightly acid. The C horizon has hue of 5Y to 10YR, value of 4 or 5 when moist and 6 or 7 when dry, and chroma of 3 or 4 when moist or dry. It is sandy loam or silt loam or is stratified silt loam to sand. It is medium acid or slightly acid.

Godfrey Series

The Godfrey series consists of deep, poorly drained soils in depressions on flood plains. Drainage has been altered by tiling. These soils formed in alluvium. Slope is 0 to 3 percent. Elevation is 20 to 200 feet. The average annual precipitation is 40 to 50 inches, the average annual temperature is about 50 degrees F, and the average frost-free season is 150 to 200 days.

These soils are fine, mixed, nonacid, mesic Typic Fluvaquents.

Typical pedon of Godfrey silty clay loam, 1.5 miles southeast of Tumwater; about 700 feet east and 1,250 feet north of the southwest corner of sec. 36, T. 18 N., R. 2 W.

- Ap—0 to 8 inches; very dark grayish brown (10YR 3/2) silty clay loam, gray (10YR 5/1) dry; many fine distinct strong brown (7.5YR 5/8) and yellowish brown (10YR 5/8) mottles; strong coarse subangular blocky structure; hard, firm, sticky and plastic; many fine roots; many coarse, medium, and fine tubular pores and many coarse interstitial pores; very strongly acid; abrupt smooth boundary.
- BA—8 to 11 inches; very dark gray (10YR 3/1) silty clay loam, gray (5Y 5/1) dry; common medium distinct strong brown (7.5YR 5/8) mottles; strong coarse angular blocky structure; hard, firm, sticky and plastic; many fine roots; many coarse, medium, and fine tubular pores and many coarse interstitial pores; medium acid; clear smooth boundary.
- Bg—11 to 30 inches; dark gray (5Y 4/1) silty clay, gray (5Y 6/1) dry; common medium distinct strong brown (7.5YR 5/8) mottles; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky

and slightly plastic; few fine roots; many coarse, medium, and fine tubular pores and many coarse interstitial pores; slightly acid; abrupt smooth boundary.

Cg1—30 to 42 inches; dark gray (5Y 4/1) clay loam, gray (5Y 6/1) dry; many coarse distinct strong brown (7.5YR 5/8) mottles; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; few fine roots; many coarse, medium, and fine tubular pores and many coarse interstitial pores; slightly acid; abrupt smooth boundary.

Cg2—42 to 52 inches; olive gray (5Y 4/2) silty clay loam, light olive gray (5Y 6/2) dry; many coarse distinct strong brown (7.5YR 5/8) mottles; moderate medium platy structure; hard, friable, sticky and plastic; few fine interstitial pores; slightly acid; abrupt smooth boundary.

Cg3—52 to 64 inches; dark gray (5Y 4/1) silty clay, gray (5Y 6/1) dry; few fine faint strong brown (7.5YR 5/8) mottles; massive; very hard, firm, sticky and plastic; few fine interstitial pores; slightly acid.

The particle-size control section does not include coarse fragments. It ranges from 35 to 50 percent clay.

The A horizon has value of 3 to 5 when moist and 5 or 6 when dry and chroma of 1 or 2 when moist or dry. It is very strongly acid or medium acid. The B horizon has hue of 10YR to 5Y, value of 3 or 4 when moist and 5 or 6 when dry, and chroma of 0 or 1 when moist or dry. It is silty clay loam, silty clay, or clay. It is medium acid or slightly acid. The C horizon has hue of 10YR to 5Y, value of 4 to 6 when moist and 6 to 8 when dry, and chroma of 0 to 2 when moist or dry. It is clay loam, silty clay, or silty clay loam. It is slightly acid or neutral.

Grove Series

The Grove series consists of very deep, somewhat excessively drained soils on terraces. These soils formed in glacial outwash. Slope is 3 to 15 percent. Elevation is 100 to 500 feet. The average annual precipitation is 50 to 60 inches, the average annual air temperature is about 50 degrees F, and the average frost-free season is 160 to 200 days.

These soils are sandy-skeletal, mixed, mesic Dystric Xerorthents.

Typical pedon of the Grove very gravelly sandy loam, 3 to 15 percent slopes, 14 miles west of Olympia; about 2,500 feet north and 200 feet west of the southeast corner of sec. 9, T. 18 N., R. 4 W.

Oi—3 inches to 1 inch; needles, twigs, and leaves.

Oe—1 inch to 0; partially decomposed needles, twigs, and leaves.

Bw1—0 to 6 inches; dark reddish brown (5YR 3/2) very gravelly sandy loam, dark brown (7.5YR 4/4) dry; weak fine granular structure; soft, very friable, nonsticky and nonplastic; many very fine and common medium and coarse roots; common very fine pores; 45 percent rounded pebbles; medium acid; clear wavy boundary.

Bw2—6 to 21 inches; reddish brown (5YR 4/4) very gravelly loamy sand, strong brown (7.5YR 5/8) dry; single grained; loose, nonsticky and nonplastic; common very fine roots; common very fine pores; 55 percent pebbles; medium acid; gradual wavy boundary.

BC—21 to 36 inches; dark brown (7.5YR 4/4) very gravelly sand, yellowish brown (10YR 5/4) dry; single grained; loose, nonsticky and nonplastic; common very fine roots; common very fine pores; 60 percent rounded pebbles; medium acid; gradual wavy boundary.

C—36 to 60 inches; dark brown (10YR 4/3) extremely gravelly coarse sand, yellowish brown (10YR 5/4) dry; single grained; loose, nonsticky and nonplastic; few very fine roots; common very fine pores; 70 percent rounded pebbles; medium acid.

The content of coarse fragments in the control section exceeds 55 percent and is as much as 75 percent by volume. The fragments are dominantly gravel. Some pedons have a thin A horizon.

The Bw horizon has hue of 5YR or 7.5YR, value of 2 to 4 when moist and 4 to 6 when dry, and chroma of 2 to 4 when moist and 4 to 8 when dry. It is very gravelly loamy sand, very gravelly sand, or very gravelly sandy loam. The BC horizon has hue of 10YR or 7.5YR and value and chroma of 3 to 5. It is gravelly or extremely gravelly sand. The C horizon has hue of 10YR to 5Y, value of 3 to 5, and chroma of 1 to 4. It is very gravelly sand or extremely gravelly sand.

Hoogdal Series

The Hoogdal series consists of moderately deep, moderately well drained soils on terraces and terrace escarpments. These soils formed in loess and glaciolacustrine sediment. Slope is 15 to 50 percent. Elevation is 100 to 300 feet. The average annual precipitation is 40 to 50 inches, the average annual air temperature is about 51 degrees F, and the average frost-free period is 160 to 200 days.

These soils are fine, mixed, mesic Aquic Dystric Xerochrepts.

Typical pedon of Hoogdal silt loam, 30 to 50 percent slopes, 6 miles northwest of Olympia; about 1,150 feet north and 2,530 feet west of the southeast corner of sec. 18, T. 19 N., R. 1 W.

A—0 to 5 inches: dark grayish brown (10YR 4/2) silt loam, pale brown (10YR 6/3) dry; weak medium subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; common fine and medium roots; common very fine interstitial pores; medium acid; abrupt wavy boundary.

Bw1—5 to 10 inches: yellowish brown (10YR 5/6) silty clay loam, very pale brown (10YR 7/3) dry; weak medium subangular blocky structure; slightly hard, friable, sticky and plastic; common fine and few medium and coarse roots; common very fine interstitial pores; medium acid; clear smooth boundary.

Bw2—10 to 25 inches: light yellowish brown (10YR 6/4) silty clay, white (10YR 8/2) dry; common fine faint light yellowish brown (2.5Y 6/4) mottles; weak coarse subangular blocky structure; slightly hard, friable, sticky and plastic; common fine roots; few fine tubular pores and common very fine interstitial pores; medium acid; clear smooth boundary.

C—25 to 60 inches: olive gray (5Y 4/2) silty clay, pale yellow (5Y 7/3) dry; few fine faint light yellowish brown (2.5Y 6/4) mottles; massive; hard, firm, very sticky and very plastic; very few interstitial pores; medium acid.

The thickness of the solum ranges from 17 to 30 inches. The A horizon has value of 3 or 4 when moist and 5 or 6 when dry and chroma of 2 or 3 when moist or dry. The Bw horizon has hue of 2.5Y to 10YR, value of 4 to 6 when moist and 6 to 8 when dry, and chroma of 3 or 4 when moist or dry. It is silt loam, silty clay loam, or silty clay. The content of clay in this horizon ranges from 13 to 45 percent. The C horizon has value of 5 or 6 when moist and 6 to 8 when dry and chroma of 2 or 3 when moist or dry. It is silty clay or clay. The content of clay in this horizon ranges from 40 to 65 percent.

Indianola Series

The Indianola series consists of very deep, somewhat excessively drained soils on terraces, terrace escarpments, eskers, and kames. These soils formed in sandy glacial drift. Slope is 0 to 30 percent. Elevation is

50 to 700 feet. The annual precipitation is 40 to 55 inches, the average annual air temperature is about 50 degrees F, and the average frost-free season is 160 to 210 days.

These soils are mixed, mesic Dystric Xeropsamments.

Typical pedon of Indianola loamy sand, 3 to 15 percent slopes, 2 miles southeast of Tumwater; about 2,200 feet east and 2,550 feet north of the southwest corner of sec. 1, T. 16 N., R. 2 W.

A—0 to 6 inches: dark reddish brown (5YR 3/3) loamy sand, brown (10YR 5/3) dry; weak coarse and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine and few coarse and medium roots; common fine tubular pores; neutral; abrupt smooth boundary.

Bw—6 to 13 inches: dark reddish brown (5YR 3/4) loamy sand, pale brown (10YR 6/3) dry; weak coarse subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine and few medium roots; few fine tubular pores; neutral; clear smooth boundary.

BC—13 to 25 inches: dark brown (10YR 4/3) loamy sand, pale brown (10YR 6/3) dry; massive; soft, very friable, nonsticky and nonplastic; few very fine and fine roots; few very fine tubular pores; 5 percent rounded pebbles; neutral; clear smooth boundary.

C1—25 to 35 inches: dark yellowish brown (10YR 4/4) sand, light brownish gray (2.5Y 6/2) dry; single grained; loose; few very fine roots; few very fine tubular pores; 5 percent rounded pebbles; neutral; gradual wavy boundary.

C2—35 to 60 inches: olive brown (2.5Y 4/4) sand, light brownish gray (2.5Y 6/2) dry; single grained; loose; few very fine roots; many fine interstitial pores; 5 percent rounded pebbles; neutral.

Reaction is neutral or slightly acid throughout the profile. The content of rock fragments is 0 to 15 percent in the particle-size control section.

The A horizon has hue of 10YR to 5YR, value of 2 or 3 when moist and 4 to 6 when dry, and chroma of 1 to 3 when moist or dry. The Bw horizon has hue of 10YR to 5YR, value of 2 or 3 when moist and 4 to 6 when dry, and chroma of 1 to 4 when moist or dry. It is loamy fine sand or loamy sand. The BC horizon has hue of 10YR or 2.5Y, value of 4 or 5 when moist and 6 or 7 when dry, and chroma of 3 or 4 when moist or dry. It is loamy fine sand or loamy sand. The C horizon has hue of 10YR to 5Y, value of 4 to 6 when moist and 5 to 7

when dry, and chroma of 2 to 4 when moist or dry. It is loamy fine sand or sand.

Jonas Series

The Jonas series consists of deep, well drained soils on mountain slopes. These soils formed in colluvium and andesite residuum mixed with volcanic ash in the upper part. Slope is 30 to 65 percent. Elevation is 1,800 to 2,400 feet. The average annual precipitation is 60 to 75 inches, the average annual air temperature is about 43 degrees F, and the average frost-free season is 130 to 160 days.

These soils are medial, frigid Andic Haplumbrepts.

Typical pedon of Jonas silt loam, 30 to 65 percent slopes, 7 miles southeast of Vail; about 925 feet west and 1,600 feet north of the southeast corner of sec. 23, T. 15 N., R. 2 E.

A1—0 to 4 inches; very dark grayish brown (10YR 3/2) silt loam, brown (10YR 5/3) dry; weak fine and medium granular structure; soft, very friable, slightly sticky and slightly plastic; weakly smeary; many fine and common medium roots; many fine pores; 10 percent pebbles; medium acid; clear wavy boundary.

A2—4 to 14 inches; very dark brown (10YR 2/2) very cobbly silt loam, dark grayish brown (10YR 4/2) dry; weak fine and medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; weakly smeary; many fine and medium and few coarse roots; many fine pores; 30 percent cobbles and 25 percent pebbles; strongly acid; clear wavy boundary.

Bw1—14 to 25 inches; dark brown (10YR 3/3) cobbly loam, pale brown (10YR 6/3) dry; weak medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; weakly smeary; common fine and few medium roots; common fine and very fine pores; 10 percent cobbles and 15 percent pebbles; strongly acid; clear wavy boundary.

Bw2—25 to 42 inches; dark brown (10YR 4/3) cobbly clay loam, very pale brown (10YR 7/4) dry; weak coarse subangular blocky structure; hard, friable, slightly sticky and plastic; few fine and medium roots; 20 percent cobbles and 10 percent pebbles; few fine pores; strongly acid; clear wavy boundary.

BC—42 to 60 inches; dark yellowish brown (10YR 4/4) cobbly clay loam, very pale brown (10YR 7/4) dry; weak coarse subangular blocky structure; hard, friable, slightly sticky and plastic; few fine pores; 20

percent cobbles and 15 percent pebbles; strongly acid.

The depth to unweathered bedrock ranges from 40 to more than 60 inches. The content of rock fragments in the particle-size control section ranges from 15 to 35 percent, including 5 to 15 percent andesite pebbles and 5 to 20 percent andesite cobbles. The soils are strongly acid or medium acid throughout.

The A horizon has hue of 7.5YR or 10YR, value of 2 or 3 when moist and 4 or 5 when dry, and chroma of 2 or 3 when moist or dry. It is silt loam or silty clay loam. The content of pebbles ranges from 15 to 30 percent in the upper part of this horizon. In the lower part, the content of andesite pebbles ranges from 25 to 30 percent and the content of andesite cobbles ranges from 10 to 30 percent. The B horizon is loam or silt loam.

Kapowsin Series

The Kapowsin series consists of moderately deep, moderately well drained soils on uplands. These soils formed in compact glacial till. Slope is 0 to 50 percent. Elevation is 50 to 600 feet. The average annual precipitation is 35 to 50 inches, the average annual air temperature is about 50 degrees F, and the average frost-free season is 150 to 200 days.

These soils are medial over loamy, mixed, mesic Dystric Entic Durochrepts.

Typical pedon of Kapowsin silt loam, 3 to 15 percent slopes, 7 miles northwest of Olympia; about 700 feet east and 350 feet north of the southwest corner of sec. 7, T. 19 N., R. 2 W.

A—0 to 4 inches; dark brown (10YR 3/3) silt loam, brown (10YR 5/3) dry; weak fine granular structure; slightly hard, very friable, slightly sticky and slightly plastic; weakly smeary; many very fine and fine roots; few very fine pores; 20 percent medium concretions; medium acid; abrupt smooth boundary.

BA—4 to 11 inches; dark yellowish brown (10YR 3/4) silt loam, light yellowish brown (10YR 6/4) dry; weak fine subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; weakly smeary; common very fine, fine, and medium roots; few very fine pores; 30 percent medium concretions; medium acid; gradual wavy boundary.

Bw1—11 to 18 inches; dark yellowish brown (10YR 4/4) silt loam, pale brown (10YR 6/3) dry; moderate fine and medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic;

weakly smeary; common very fine, fine, and medium roots; few very fine pores; 10 percent rounded pebbles; medium acid; clear wavy boundary.

Bw2—18 to 22 inches: dark yellowish brown (10YR 3/6) loam, light yellowish brown (10YR 6/4) dry; few fine faint yellowish brown (10YR 5/4) mottles; moderate medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; weakly smeary; common very fine, fine, and medium roots; few very fine pores; medium acid; clear wavy boundary.

2Bw3—22 to 30 inches: dark yellowish brown (10YR 4-6) gravelly loam, pale brown (10YR 6/3) dry; few fine faint yellowish brown (10YR 5/4) mottles; moderate medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; few very fine and fine roots; few very fine pores; 20 percent pebbles; medium acid; clear wavy boundary.

2Bqm—30 to 60 inches: grayish brown (2.5Y 5/2) gravelly loam, light gray (2.5Y 7/2) dry; massive; weakly cemented; very compact in place; hard, firm, slightly sticky and slightly plastic; slightly acid.

The control section is 10 to 30 percent coarse fragments, 45 to 60 percent sand, and 6 to 15 percent clay. The solum has a few stones and cobbles throughout. Depth to the 2Bqm horizon ranges from 20 to 32 inches. The soils are medium acid or slightly acid throughout.

The A horizon has hue of 10YR or 7.5YR, value of 3 or 4 when moist, and chroma of 2 or 3 when moist. It is silt loam in which the content of concretions is 20 to 30 percent. The Bw horizon has hue of 7.5YR or 10YR, value of 3 to 6 when moist, and chroma of 3 or 4 when moist. It is loam or silt loam. The 2Bqm horizon has value of 4 or 5 when moist and chroma of 2 to 4 when moist. It is mottled in some areas.

Katula Series

The Katula series consists of moderately deep, well drained soils on uplands. These soils formed in material weathered from basalt. Slope is 20 to 65 percent. Elevation is 1,800 to 2,650 feet. The average annual precipitation is 70 to 80 inches, the average annual air temperature is about 48 degrees F, and the average frost-free season is 130 to 170 days.

These soils are medial-skeletal, mesic Andic Haplumbrepts.

Typical pedon of Katula very cobbly loam, 30 to 65

percent slopes, 6 miles northwest of Littlerock; about 900 feet east and 2,000 feet south of the northwest corner of sec. 1, T. 17 N., R. 4 W.

A—0 to 5 inches; dark reddish brown (5YR 3/3) very cobbly loam, dark brown (10YR 4/3) dry; strong medium and fine granular structure; slightly hard, very friable, nonsticky and nonplastic; weakly smeary; many fine, common coarse, and few medium roots; many fine tubular pores; 35 percent cobbles and 20 percent pebbles; medium acid; clear smooth boundary.

AB—5 to 14 inches; dark brown (7.5YR 3/2) extremely cobbly loam, dark brown (10YR 4/3) dry; strong medium and fine granular structure; slightly hard, very friable, nonsticky and slightly plastic; weakly smeary; few coarse and medium and many very fine and fine roots; many fine tubular pores; 45 percent cobbles and 25 percent pebbles; medium acid; gradual smooth boundary.

Bw—14 to 32 inches; dark brown (7.5YR 3/2) extremely cobbly loam, brown (7.5YR 5/4) dry; moderate fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; weakly smeary; common very fine and fine roots; common fine tubular pores; 50 percent cobbles and 25 percent pebbles; medium acid; abrupt smooth boundary.

R—32 inches; fractured basalt.

The depth to lithic contact ranges from 20 to 40 inches. Angular cobbles, pebbles, and stones make up, by volume, 60 to 80 percent of the control section. They are dominantly cobble-sized fragments. In some areas the content of shotlike concretions is as much as 30 percent in the upper part of the A horizon.

The A horizon has hue of 5YR to 10YR, value of 2 or 3 when moist and 2 to 4 when dry, and chroma of 2 or 3 when moist and 3 to 6 when dry. The content of cobbles in this horizon is 15 to 45 percent, and the content of pebbles is 20 to 35 percent. The Bw horizon has hue of 5YR to 10YR, value of 3 to 5 when moist and 4 or 5 when dry, and chroma of 2 to 6 when moist and 3 or 4 when dry. It is extremely cobbly clay loam or extremely cobbly loam.

Lates Series

The Lates series consists of moderately deep, well drained soils on mountains. These soils formed in material weathered from basalt. Slope is 8 to 65 percent. Elevation is 1,800 to 2,600 feet. The average annual precipitation is about 75 to 80 inches, the

average annual air temperature is about 43 degrees F, and the average frost-free season is 130 to 170 days.

These soils are medial, frigid Andic Haplumbrepts.

Typical pedon of Lates silt loam, 8 to 30 percent slopes, 6 miles northeast of Littlerock; about 500 feet east and 2,000 feet north of the southwest corner of sec. 1, T. 17 N., R. 4 W.

- A1—0 to 4 inches; very dark brown (10YR 2/2) silt loam, dark brown (10YR 3/3) dry; weak medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; weakly smeary; common very fine, fine, and medium roots; many very fine and fine tubular pores; 5 percent pebbles; very strongly acid; abrupt wavy boundary.
- A2—4 to 12 inches; very dark brown (10YR 2/2) silt loam, dark brown (10YR 3/3) dry; moderate medium subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; weakly smeary; many fine and common coarse roots; common fine and medium tubular pores; 5 percent pebbles; very strongly acid; abrupt smooth boundary.
- Bw1—12 to 22 inches; dark brown (7.5YR 3/4) gravelly loam, dark yellowish brown (10YR 4/6) dry; weak fine and medium subangular blocky structure; slightly hard, firm, slightly sticky and slightly plastic; weakly smeary; common very fine and fine roots; common very fine and fine tubular pores; 20 percent pebbles; strongly acid; abrupt irregular boundary.
- Bw2—22 to 32 inches; dark yellowish brown (10YR 3/4) gravelly silt loam, dark yellowish brown (10YR 4/6) dry; moderate fine and medium subangular blocky structure; slightly hard, firm, slightly sticky and slightly plastic; weakly smeary; common very fine and fine roots; common very fine and fine tubular pores; 25 percent pebbles; strongly acid; abrupt irregular boundary.
- R—32 inches; fractured basalt.

The depth to lithic contact ranges from 20 to 40 inches. The particle-size control section is dominantly gravelly loam in which the content of clay is 20 to 30 percent and the content of rock fragments is 15 to 30 percent.

The A horizon has hue of 7.5YR or 10YR, value of 2 or 3 when moist and 3 or 4 when dry, and chroma of 1 to 3 when moist and 2 to 4 when dry. It is strongly acid or very strongly acid. The Bw horizon has hue of 7.5YR or 10YR, value of 3 or 4 when moist and 4 or 5 when dry, and chroma of 3 to 6 when moist or dry. It is medium acid or strongly acid.

Mal Series

The Mal series consists of very deep, moderately well drained soils on foothills and mountain slopes. These soils formed in material weathered from tuffaceous marine siltstone and sandstone mixed with volcanic ash in the upper part. Slope is 5 to 65 percent. Elevation is 1,800 to 2,300 feet. The average annual precipitation is 60 to 70 inches, the average annual air temperature is about 43 degrees F, and the average frost-free season is 120 to 150 days.

These soils are fine, mixed, frigid Ultic Haploxeralfs.

Typical pedon of Mal clay loam, 5 to 30 percent slopes, 14 miles southeast of Yelm; about 1,500 feet west and 1,000 feet south of the northeast corner of sec. 22, T. 15 N., R. 2 E.

- A—0 to 7 inches; dark yellowish brown (10YR 4/6) clay loam, light yellowish brown (10YR 6/4) dry; moderate fine and medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine tubular pores; 10 percent pebbles; medium acid; clear wavy boundary.
- Bt1—7 to 16 inches; dark brown (7.5YR 4/4) clay loam, pale brown (10YR 6/3) dry; moderate fine, medium, and coarse subangular blocky structure; slightly hard, friable, sticky and plastic; many fine roots; common very fine and fine tubular pores; 10 percent pebbles; strongly acid; gradual smooth boundary.
- Bt2—16 to 35 inches; dark yellowish brown (10YR 4/6) clay, reddish yellow (7.5YR 6/6) dry; moderate medium, coarse, and very coarse subangular blocky structure; slightly hard, friable, sticky and plastic; few fine and very fine roots; few very fine tubular pores; few thin clay films on faces of peds and lining pores; strongly acid; gradual wavy boundary.
- Bt3—35 to 60 inches; strong brown (7.5YR 5/6) clay, reddish yellow (7.5YR 6/6) dry; moderate medium, coarse, and very coarse subangular blocky structure; hard, firm, sticky and plastic; few fine roots; few very fine tubular pores; few thin clay films on faces of peds and lining pores; strongly acid.

The depth to weathered siltstone is more than 60 inches. The content of weathered, gravel-sized siltstone fragments in the particle-size control section is 0 to 15 percent. The soils are medium acid to very strongly acid throughout.

The A horizon has hue of 10YR or 7.5YR, value of 2 or 3 when moist and 2 to 4 when dry, and chroma of 2

to 6 when moist or dry. The Bt horizon has hue of 7.5YR or 10YR, value of 4 or 5 when moist and 5 or 6 when dry, and chroma of 4 to 6 when moist or dry. It is heavy clay loam, heavy silty clay loam, silty clay, or clay. It has thin to thick, nearly continuous clay films on faces of peds and in pores. Some pedons have a C horizon, which is clay loam, silty clay loam, silty clay, or clay.

Mashel Series

The Mashel series consists of deep, moderately well drained soils on uplands. These soils formed in glacial till. Slope is 5 to 65 percent. Elevation is 900 to 1,500 feet. The average annual precipitation is 50 to 60 inches, the average annual air temperature is about 49 degrees F, and the average frost-free season is 130 to 190 days.

These soils are fine, halloysitic, mesic Ultic Haploxeralfs.

Typical pedon of Mashel loam, 5 to 30 percent slopes, 12 miles southeast of Yelm; about 800 feet east and 600 feet north of the southwest corner of sec. 14, T. 15 N., R. 3 E.

Oa—3 inches to 0; partially decomposed roots, leaves, and twigs.

A—0 to 8 inches; dark brown (10YR 3/3) loam, brown (10YR 5/3) dry; moderate fine and medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; many fine roots; many fine pores; few rounded pebbles; very strongly acid; clear smooth boundary.

BA—8 to 16 inches; dark brown (10YR 4/3) heavy loam, pale brown (10YR 6/3) dry; few fine faint dark brown (10YR 3/3) mottles; moderate medium subangular blocky structure; hard, firm, slightly sticky and slightly plastic; many fine and medium roots; many fine pores; few rounded pebbles; thin patchy clay films on faces of some peds; very strongly acid; clear wavy boundary.

Bt—16 to 36 inches; yellowish brown (10YR 5/4) clay loam, light yellowish brown (10YR 6/4) dry; moderate medium and coarse subangular blocky structure; hard, firm, sticky and plastic; common fine and medium roots; common fine and medium pores; 5 percent rounded, unweathered and weathered pebbles; many thin or moderately thick dark brown clay films on faces of peds and in pores; common uncoated silt and sand particles on faces of some peds and within some peds; few black stains; very strongly acid; gradual wavy boundary.

BCt—36 to 55 inches; yellowish brown (10YR 5/4) and light yellowish brown (10YR 6/4), very strongly weathered glacial till that is silty clay after prolonged rubbing; light gray (10YR 7/2) and very pale brown (10YR 7/3) dry; weak coarse subangular blocky structure; rock structure in 75 percent of the horizon; slightly hard, friable, sticky and plastic; few fine pores; continuous thick dark brown clay films in pores and along faces of fractures; few pebbles; many small pockets of dark brown clay; very strongly acid; gradual wavy boundary.

C—55 to 60 inches; mixed grayish brown (10YR 5/2) and light yellowish brown (10YR 6/4), strongly weathered glacial till that is loam after prolonged rubbing and exhibits rock structure; massive; slightly hard, friable, slightly sticky and slightly plastic; few pebbles; strongly acid.

The content of unweathered pebbles in the particle-size control section ranges from 0 to 10 percent. The A horizon has hue of 10YR or 7.5YR, value of 3 or 4 when moist and 5 or 6 when dry, and chroma of 2 or 3 when dry. The Bt horizon has hue of 10YR or 7.5YR and value of 4 or 5 when moist and 5 or 6 when dry. It has few or common black stains. In some pedons it has few or common, faint or distinct mottles. It is clay loam or silty clay loam. It has few to many uncoated particles of sand and silt occurring as thin coatings on faces of some peds. The BCt horizon is silty clay, silty clay loam, or clay loam. Thin lenses and pockets of dark brown clay make up to 5 to 20 percent of this horizon. Rounded pebbles make up 0 to 10 percent.

Maytown Series

The Maytown series consists of very deep, moderately well drained soils on flood plains. These soils formed in alluvium derived from glacial sediment. Slope is 0 to 2 percent. Elevation is 50 to 500 feet. The average annual precipitation is 50 to 65 inches, the average annual air temperature is about 51 degrees F, and the average frost-free season is 150 to 200 days.

These soils are fine-silty, mixed, mesic Fluventic Haploxerolls.

Typical pedon of Maytown silt loam, 4.5 miles southwest of Littlerock; about 300 feet west and 200 feet south of the northeast corner of sec. 20, T. 16 N., R. 3 W.

Ap—0 to 8 inches; dark brown (10YR 3/3) silt loam, brown (10YR 5/3) dry; moderate fine subangular blocky structure; hard, friable, slightly sticky and

slightly plastic; many fine roots; very fine tubular pores; strongly acid; abrupt smooth boundary.

A—8 to 16 inches; dark brown (10YR 3/3) silt loam, brown (10YR 5/3) dry; moderate fine subangular blocky structure; hard, friable, slightly sticky and slightly plastic; many fine roots; common very fine and fine tubular pores; strongly acid; clear smooth boundary.

Bw1—16 to 28 inches; brown (10YR 4/3) heavy silt loam, brown (10YR 5/3) dry; strong fine subangular blocky structure; hard, friable, sticky and plastic; common fine roots; common very fine and fine tubular pores; medium acid; gradual smooth boundary.

Bw2—28 to 36 inches; brown (10YR 4/3) silty clay loam, yellowish brown (10YR 5/4) dry; strong fine subangular blocky structure; hard, friable, sticky and plastic; few fine roots; common very fine tubular pores; very strongly acid; gradual smooth boundary.

Bw3—36 to 60 inches; brown (10YR 4/3) silty clay loam, yellowish brown (10YR 5/4) dry; few fine faint light brownish gray (2.5Y 6/2) mottles; strong fine subangular blocky structure; hard, friable, sticky and plastic; few fine roots; common fine tubular pores; very strongly acid.

Faint to distinct mottles are below a depth of 30 inches. Base saturation is 50 to 75 percent in the upper 30 inches.

The A horizon has hue of 10YR or 7.5YR, value of 4 or 5 when dry, and chroma of 2 or 3 when moist or dry. It is strongly acid or medium acid. The Bw horizon has hue of 10YR or 2.5Y, value of 5 or 6 when dry, and chroma of 3 or 4 when moist or dry. It is dominantly silt loam or silty clay loam but has thin, discontinuous layers of fine sandy loam or silty clay in some areas. It is very strongly acid to slightly acid.

McKenna Series

The McKenna series consists of moderately deep, poorly drained soils in depressions and drainageways. These soils formed in glacial drift. Slope is 0 to 5 percent. Elevation is 50 to 500 feet. The average annual precipitation is 45 to 55 inches, the average annual air temperature is 50 degrees F, and the average frost-free season is 150 to 180 days.

These soils are loamy-skeletal, mixed, nonacid, mesic Mollic Haplaquepts.

Typical pedon of McKenna gravelly silt loam, 0 to 5 percent slopes, 3 miles southwest of Olympia; about 1,900 feet west and 1,400 feet south of the northeast

corner of sec. 8, T. 18 N., R. 2 W.

A—0 to 9 inches; black (10YR 2/1) gravelly silt loam, dark gray (10YR 4/1) dry; strong fine and medium granular structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine, fine, and medium roots; many very fine and fine interstitial pores; 20 percent rounded pebbles; medium acid; abrupt smooth boundary.

BA—9 to 13 inches; very dark grayish brown (10YR 3/2) gravelly silt loam, light brownish gray (10YR 6/2) dry; few fine faint yellowish brown (10YR 5/6) mottles; moderate fine subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; common fine and medium roots; common very fine tubular pores; 25 percent rounded pebbles; medium acid; gradual smooth boundary.

Bw1—13 to 21 inches; very dark grayish brown (10YR 3/2) very gravelly silt loam, pale brown (10YR 6/3) dry; moderate fine subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; few fine and medium roots; common very fine tubular pores; 35 percent rounded pebbles; medium acid; clear wavy boundary.

Bw2—21 to 28 inches; dark brown (10YR 3/3) very gravelly loam, pale brown (10YR 6/3) dry; common medium distinct dark brown (7.5YR 4/4) mottles; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; few fine roots; few very fine tubular pores; 45 percent rounded pebbles; medium acid; clear wavy boundary.

Bw3—28 to 36 inches; dark yellowish brown (10YR 3/4) very gravelly loam, pale brown (10YR 6/3) dry; few fine faint yellowish brown (10YR 5/8) and olive gray (5Y 5/2) mottles; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; few fine roots; few very fine tubular pores; 50 percent rounded pebbles; medium acid; abrupt smooth boundary.

Cr—36 to 60 inches; dark greenish gray (5BG 4/1) dense glacial till that crushes to very gravelly loam, gray (N 6/0) dry; massive; extremely hard, firm, nonsticky and nonplastic; 50 percent rounded pebbles; medium acid.

The thickness of the solum ranges from 20 to 40 inches. The particle-size control section ranges from 35 to 60 percent coarse fragments and 20 to 35 percent clay.

The A horizon has hue of 7.5YR or 10YR, value of 2 or 3 when moist and 2 to 5 when dry, and chroma of 1

or 2. It is strongly acid or medium acid. The Bw horizon has hue of 10YR to 5Y, value of 3 to 6 when moist and 5 to 8 when dry, and chroma of 1 or 2. It has coarse to fine, prominent to faint mottles. It is clay loam, loam, or silt loam. The content of coarse fragments in this horizon generally ranges from 35 to 60 percent, but in some areas it is less than 35 percent in the upper part. This horizon is strongly acid or medium acid. The Cr horizon has hue of 10YR, 2.5Y, or 5BG or is neutral in hue. It has value of 4 to 6 when moist and 6 to 8 when dry and chroma of 0 to 3. It is mottled in most places. It is dense, compact glacial till that crushes to the gravelly, very gravelly, or extremely gravelly analogs of sandy loam, loam, clay loam, silty clay loam, or silty clay.

Melbourne Series

The Melbourne series consists of deep, well drained soils on uplands. These soils formed in siltstone and shale residuum. Slope is 5 to 65 percent. Elevation is 200 to 600 feet. The average annual precipitation is 45 to 60 inches, the average annual air temperature is about 50 degrees F, and the average frost-free season is 150 to 200 days.

These soils are fine, mixed, mesic Ultic Haploxeralfs.

Typical pedon of Melbourne silty clay loam, 5 to 20 percent slopes, 3 miles south of Rochester; about 1,450 feet west and 1,900 feet south of the northeast corner of sec. 17, T. 15 N., R. 3 W.

- A1—0 to 6 inches; dark brown (10YR 3/3) silty clay loam, dark grayish brown (10YR 4/2) dry; moderate fine and medium subangular blocky structure; hard, friable, slightly sticky and slightly plastic; many very fine, fine, and medium roots; many very fine interstitial pores; slightly acid; clear smooth boundary.
- A2—6 to 11 inches; dark brown (10YR 3/3) silty clay loam, dark brown (10YR 4/3) dry; moderate medium and coarse subangular blocky structure; hard, friable, slightly sticky and slightly plastic; many very fine, fine, and medium roots; few very fine tubular pores; slightly acid; clear smooth boundary.
- Bt1—11 to 21 inches; dark brown (7.5YR 3/4) silty clay loam, brown (10YR 4/3) dry; moderate medium and coarse subangular blocky structure; hard, friable, slightly sticky and slightly plastic; many very fine, fine, and medium roots; many very fine interstitial pores and common very fine tubular pores; common thin clay films on faces of peds and lining pores; medium acid; gradual smooth boundary.

Bt2—21 to 42 inches; dark brown (7.5YR 3/4) silty clay loam, brown (7.5YR 4/4) dry; moderate medium and coarse subangular blocky structure; hard, friable, slightly sticky and slightly plastic; common very fine and fine roots; many very fine tubular pores; many thin and moderately thick clay films on faces of peds and lining pores; very strongly acid; gradual smooth boundary.

Bt3—42 to 54 inches; dark brown (7.5YR 3/4) silty clay loam, dark brown (7.5YR 4/4) dry; strong medium and coarse subangular blocky structure; hard, friable, slightly sticky and slightly plastic; few very fine roots; many very fine tubular pores; common thin and moderately thick clay films on faces of peds and lining pores; very strongly acid; gradual smooth boundary.

Bct—54 to 60 inches; dark brown (7.5YR 4/4) clay loam, brown (7.5YR 5/4) dry; moderate medium and coarse subangular blocky structure; hard, friable, sticky and slightly plastic; few very fine tubular pores; few thin and moderately thick clay films on faces of peds and lining pores; 20 percent fragments of soft siltstone; very strongly acid.

The solum ranges from 40 to more than 60 inches in thickness. The soil has hue of 10YR or 7.5YR throughout. Base saturation, by sum of cations, is 35 to 70 percent in the upper 30 inches of the argillic horizon. The control section is silty clay loam, silty clay, clay loam, or clay. The content of clay in this section ranges from 35 to 60 percent.

The A horizon has value of 2 or 3 when moist and 4 to 6 when dry and chroma of 2 to 4 when moist or dry. It is slightly acid or medium acid. The Bt horizon has value of 3 to 5 when moist and 4 to 6 when dry and chroma of 3 or 4 when moist and 3 to 8 when dry. It is silty clay loam, silty clay, or clay. It is medium acid to very strongly acid. Some pedons have a C horizon. This horizon has value of 4 or 5 when moist and 5 or 6 when dry and chroma of 2 to 4 when moist and 2 to 8 when dry. It is clay loam, silty clay loam, silty clay, or clay. It is strongly acid or very strongly acid.

Mukilteo Series

The Mukilteo series consists of very deep, very poorly drained soils in upland depressions. These soils formed in deep organic deposits. Slope is 0 to 2 percent. Elevation is 50 to 700 feet. The average annual precipitation is 40 to 60 inches, the average annual air temperature is about 50 degrees F, and the average frost-free season is 150 to 200 days.

These soils are dystic, mesic Typic Medihemists.

Typical pedon of Mukilteo muck, drained, 3 miles northeast of Olympia; about 600 feet north and 500 feet west of the southeast corner of sec. 12, T. 18 N., R. 2 W.

- Oe—0 to 2 inches; dark yellowish brown (10YR 4/4) sapric material; about 20 percent fiber, 10 percent rubbed; about 70 percent fine fibrous roots; extremely acid; abrupt smooth boundary.
- Oa—2 to 6 inches; dark reddish brown (5YR 2/2) sapric material; about 50 percent fiber, 6 percent rubbed; moderate fine angular blocky structure; friable; many fine roots; very strongly acid; abrupt smooth boundary.
- O'e1—6 to 11 inches; dark reddish brown (5YR 3/2) hemic material; about 80 percent fiber, 20 percent rubbed; weak fine subangular blocky structure; friable; common fine roots; very strongly acid; clear smooth boundary.
- O'e2—11 to 42 inches; dark reddish brown (5YR 3/2) hemic material; about 65 percent fiber, 20 percent rubbed; massive; friable; few fine roots to a depth of about 24 inches; very strongly acid; clear smooth boundary.
- O'e3—42 to 72 inches; dark reddish brown (5YR 3/2) hemic material; about 60 percent fiber, 24 percent rubbed; massive; friable; very strongly acid.

The organic material ranges from 52 to more than 120 inches in thickness. The soils are strongly acid or very strongly acid. The fibers are derived mostly from sedges.

The surface tier has hue of 5YR or 7.5YR, value of 2 or 3, and chroma of 1 or 2. It generally has one or more layers of sapric material that is less than 15 percent fiber when rubbed. The subsurface tiers are hemic. They have hue of 5YR or 10YR and value and chroma of 2 to 4. The content of fiber in these tiers ranges from 18 to 50 percent after rubbing. The bottom tier is similar in color and fiber content to the subsurface tiers, but it generally has a higher fiber content.

Newberg Series

The Newberg series consists of very deep, well drained soils on flood plains. These soils formed in alluvium. Slope is 0 to 3 percent. Elevation is 100 to 500 feet. The average annual precipitation is 45 to 55 inches, the average annual air temperature is about 50 degrees F, and the average frost-free season is 165 to 210 days.

These soils are coarse-loamy, mixed, mesic Fluventic Haploxerolls.

Typical pedon of Newberg loam, 5 miles southeast of Rochester; about 1,875 feet north and 250 feet east of the southwest corner of sec. 24, T. 15 N., R. 3 W.

- Ap—0 to 8 inches; very dark grayish brown (10YR 3/2) loam, dark brown (10YR 4/3) dry; weak very fine and fine subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; many very fine and fine roots; many microinterstitial pores; slightly acid; abrupt smooth boundary.
- A—8 to 17 inches; dark brown (10YR 3/3) fine sandy loam, brown (10YR 5/3) dry; weak coarse and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine roots; common very fine tubular pores and many micro interstitial pores; slightly acid; abrupt smooth boundary.
- C1—17 to 42 inches; dark yellowish brown (10YR 3/4) fine sandy loam, light brownish gray (10YR 6/2) dry; massive; soft, very friable, nonsticky and nonplastic; common very fine roots; common very fine tubular pores; slightly acid; abrupt smooth boundary.
- C2—42 to 60 inches; dark yellowish brown (10YR 3/4) fine sandy loam, light brownish gray (10YR 6/2) dry; single grained; loose, very friable, nonsticky and nonplastic; few very fine roots; many very fine interstitial pores; slightly acid.

The mollic epipedon is 10 to 15 inches thick. Reaction ranges from slightly acid to medium acid throughout the profile. The control section averages loamy very fine sand or sandy loam and lacks contrasting textures.

The upper 10 inches of the A horizon has value of 2 or 3 when moist and 4 or 5 when dry and chroma of 2 or 3. The lower part has hue of 10YR or 7.5YR, value of 3 or 4 when moist and 4 to 6 when dry, and chroma of 2 to 4. In some areas very gravelly or sandy substrata are below a depth of 40 inches.

Nisqually Series

The Nisqually series consists of very deep, somewhat excessively drained soils on terraces. These soils formed in sandy glacial outwash. Slope is 0 to 15 percent. Elevation is 50 to 400 feet. The average annual precipitation is 40 to 55 inches, the average annual air temperature is about 51 degrees F, and the average frost-free season is 150 to 200 days.

These soils are sandy, mixed, mesic Pachic Xerumbrepts.

Typical pedon of Nisqually loamy fine sand, 0 to 3 percent slopes, 5 miles south of Olympia; about 700 feet east and 350 feet south of the northwest corner of sec. 13, T. 17 N., R. 2 W.

- Ap—0 to 5 inches; black (5YR 2/1) loamy fine sand, dark gray (10YR 4/1) dry; massive; soft, very friable, nonsticky and nonplastic; many medium and fine roots; very high organic matter content; medium acid; abrupt smooth boundary.
- A1—5 to 18 inches; very dark gray (10YR 3/1) loamy fine sand, dark gray (10YR 4/1) dry; massive; soft, very friable, nonsticky and nonplastic; common medium and fine roots; high organic matter content; medium acid; gradual wavy boundary.
- A2—18 to 31 inches; very dark grayish brown (10YR 3/2) loamy fine sand, grayish brown (10YR 5/2) dry; massive; soft, very friable, nonsticky and nonplastic; common medium and fine roots; medium acid; gradual wavy boundary.
- C1—31 to 48 inches; light olive brown (2.5Y 5/4) loamy sand, grayish brown (2.5Y 5/2) dry; massive; soft, very friable, nonsticky and nonplastic; common medium and fine roots; slightly acid; gradual wavy boundary.
- C2—48 to 60 inches; light olive brown (2.5Y 5/4) loamy sand, light brownish gray (2.5Y 6/2) dry; single grained; loose; few medium and fine roots; slightly acid.

The umbric epipedon is 25 to 38 inches thick. The soils are slightly acid or medium acid throughout.

The A horizon has hue of 5YR to 10YR, value of 2 or 3 when moist and 2 to 4 when dry, and chroma of 1 or 2 when moist or dry. The part of this horizon below the surface layer is loamy fine sand or loamy sand.

Norma Series

The Norma series consists of very deep, poorly drained soils in depressions on till plains. These soils formed in old alluvium. Slope is 0 to 3 percent. Elevation is 50 to 500 feet. The average annual precipitation is 40 to 55 inches, the average annual air temperature is 50 degrees F, and the average frost-free season is 150 to 200 days.

These soils are coarse-loamy, mixed, nonacid, mesic Mollic Haplaquepts.

Typical pedon of Norma silt loam, 4 miles southwest of Tumwater; about 650 feet west and 1,000 feet north of the southeast corner of sec. 21, T. 17 N., R. 2 W.

Ap—0 to 8 inches; very dark gray (10YR 3/1) silt loam, dark brown (10YR 4/3) dry; moderate fine granular structure; slightly hard, friable, slightly sticky and slightly plastic; many fine, medium, and coarse roots; many very fine tubular pores; medium acid; abrupt smooth boundary.

Bw—8 to 30 inches; grayish brown (2.5Y 5/2) sandy loam, light brownish gray (2.5Y 6/2) dry; common medium prominent reddish yellow (7.5YR 6/6) mottles; weak medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; few fine roots; many very fine tubular pores; medium acid; clear smooth boundary.

Cg—30 to 60 inches; olive gray (5Y 5/2) sandy loam, light gray (5Y 7/2) dry; common medium prominent red (2.5YR 5/8) mottles; massive; soft, very friable, nonsticky and nonplastic; few fine roots; many very fine tubular pores; slightly acid.

The control section is 0 to 20 percent coarse fragments, 5 to 10 percent clay, and more than 15 percent fine sand or coarser sand.

The A horizon has value of 2 or 3 when moist and 4 or 5 when dry and chroma of 1 to 3 when moist or dry. It ranges from strongly acid to slightly acid. The B horizon has hue of 10YR to 5Y, value of 4 or 5 when moist and 5 or 6 when dry, and chroma of 1 or 2 when moist or dry. It is fine sandy loam, loam, sandy loam, or silt loam. It is medium acid or slightly acid. The C horizon has hue of 2.5Y or 5Y. It is sandy loam or loamy sand. It is medium acid or slightly acid.

Olympic Series

The Olympic series consists of very deep, well drained soils on uplands. These soils formed in material weathered from basalt. Slope is 5 to 40 percent. Elevation is 200 to 1,600 feet. The average annual precipitation is 50 to 60 inches, the average annual air temperature is about 51 degrees F, and the average frost-free season is 150 to 200 days.

These soils are clayey, mixed, mesic Xeric Haplohumults.

Typical pedon of Olympic silt loam, 20 to 40 percent slopes, 4 miles west of Littlerock; about 1,000 feet west and 2,400 feet south of the northeast corner of sec. 6, T. 16 N., R. 3 W.

A1—0 to 6 inches; dark brown (7.5YR 3/2) silt loam, dark brown (10YR 4/3) dry; moderate fine and medium granular structure; slightly hard, friable, slightly sticky and plastic; many fine and medium

roots; many very fine interstitial pores; slightly acid; clear smooth boundary.

A2—6 to 12 inches; dark reddish brown (5YR 3/3) silt loam, dark yellowish brown (10YR 4/4) dry; moderate fine and medium granular structure; slightly hard, friable, slightly sticky and plastic; many fine and medium roots; many very fine interstitial pores; slightly acid; clear smooth boundary.

Bt1—12 to 24 inches; yellowish red (5YR 4/6) silty clay loam, dark brown (7.5YR 4/4) dry; moderate very fine and fine subangular blocky structure; hard, friable, slightly sticky and plastic; common very fine and fine roots; many very fine tubular pores; common thin clay films on faces of peds and lining pores; medium acid; gradual smooth boundary.

Bt2—24 to 35 inches; yellowish red (5YR 4/6) clay, reddish brown (5YR 5/4) dry; moderate fine and medium subangular blocky structure; hard, friable, slightly sticky and very plastic; common fine roots; common very fine and fine tubular pores; common thin clay films on faces of peds and lining pores; very strongly acid; gradual smooth boundary.

Bt3—35 to 60 inches; yellowish red (5YR 4/6) clay, yellowish red (5YR 5/6) dry; moderate fine, medium, and coarse subangular blocky structure; hard, friable, slightly sticky and very plastic; few fine roots; common very fine and fine tubular pores; many thin and continuous moderately thick clay films on faces of peds and lining pores; very strongly acid.

The solum ranges from 40 to more than 60 inches in thickness. It has hue of 7.5YR or 5YR throughout. It ranges from slightly acid to very strongly acid.

The A horizon has value of 3 or 4 when moist and 4 or 5 when dry and chroma of 2 or 3 when moist and 3 or 4 when dry. The B horizon has value of 3 or 4 when moist and 4 or 5 when dry and chroma of 4 to 6 when moist or dry. It is clay loam, silty clay loam, silty clay, or clay. The content of rock fragments below a depth of 40 inches ranges from 0 to about 45 percent.

Pheene Series

The Pheene series consists of moderately deep, well drained soils on upland ridgetops and mountain slopes. These soils formed in residuum and colluvium derived from andesite mixed with volcanic ash. Slope is 5 to 90 percent. Elevation is 1,500 to 2,800 feet. The average annual precipitation is 60 to 70 inches, the average annual air temperature is about 43 degrees F, and the average frost-free season is 130 to 170 days.

These soils are medial-skeletal, frigid Andic Xerumbrepts.

Typical pedon of Pheene gravelly loam, 5 to 30 percent slopes, 3 miles south of Vail; about 1,750 feet east and 2,375 feet south of the northwest corner of sec. 3, T. 15 N., R. 1 E.

Oi—0.5 inch to 0; loose, undecomposed forest litter and moss.

A1—0 to 6 inches; black (10YR 2/1) gravelly loam, dark gray (10YR 4/1) dry; moderate medium granular structure; soft, very friable, slightly sticky and slightly plastic; weakly smeary; many fine, medium, and coarse roots; 20 percent angular pebbles; medium acid; clear broken boundary.

A2—6 to 10 inches; very dark brown (10YR 2/2) gravelly silt loam, dark grayish brown (10YR 4/2) dry; moderate fine and medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; weakly smeary; many fine and medium roots; many fine pores; 30 percent angular pebbles; medium acid; clear broken boundary.

Bw—10 to 30 inches; dark yellowish brown (10YR 3/4) very gravelly silt loam, yellowish brown (10YR 5/4) dry; weak fine and medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; weakly smeary; 45 percent angular pebbles; 20 percent cobbles; medium acid; abrupt irregular boundary.

R—30 inches; slightly weathered, fractured andesite.

The depth to lithic contact ranges from 20 to 40 inches. The content of rock fragments in the particle-size control section ranges from 35 to 65 percent. The soils are strongly acid or medium acid throughout.

The A horizon has hue of 10YR or 7.5YR, value of 2 or 3 when moist and 3 or 4 when dry, and chroma of 1 to 3 when moist or dry. The content of pebbles in this horizon is 15 to 30 percent. The B horizon has hue of 10YR or 7.5YR, value of 3 or 4 when moist and 4 to 6 when dry, and chroma of 3 or 4 when moist or dry. It is very gravelly silt loam or very gravelly loam. The content of pebbles in this horizon is 25 to 50 percent, and the content of cobbles is 10 to 20 percent.

Pilchuck Series

The Pilchuck series consists of deep, somewhat excessively drained soils on flood plains. These soils formed in alluvium. Slope is 0 to 3 percent. Elevation is 20 to 600 feet. The average annual precipitation is 40 to 55 inches, the average annual air temperature is about

50 degrees F. and the average frost-free season is 160 to 210 days.

These soils are mixed, mesic Dystric Xeropsamments.

Typical pedon of Pilchuck loamy sand, 6 miles east of Lacey; about 400 feet east and 900 feet north of the southwest corner of sec. 9, T. 18 N., R. 1 E.

- A—0 to 6 inches: very dark brown (10YR 2/2) loamy sand, dark grayish brown (2.5Y 4/2) dry; single grained; loose; few fine and medium roots; many very fine interstitial pores; neutral; abrupt wavy boundary.
- C1—6 to 24 inches: very dark grayish brown (10YR 3/2) fine sand, gray (10YR 5/1) dry; single grained; loose; few fine and medium roots; many very fine interstitial pores; neutral; abrupt wavy boundary.
- C2—24 to 32 inches: very dark gray (10YR 3/1) loamy fine sand, dark gray (10YR 4/1) dry; single grained; loose; few fine roots; many very fine interstitial pores; neutral; abrupt wavy boundary.
- C3—32 to 60 inches: dark gray (10YR 4/1) fine sand, grayish brown (10YR 5/2) dry; single grained; loose; few fine roots; many very fine interstitial pores; neutral.

The control section is sand, fine sand, or loamy fine sand. The content of coarse fragments in this section ranges from 0 to 15 percent by weighted average. The soils are neutral or slightly acid throughout. In some areas, the A horizon has weak granular structure and the part of the profile below the A horizon is structureless. In other areas the soil is structureless throughout. The upper 40 inches has hue of 10YR or 2.5Y, value of 2 to 4 when moist and 4 to 6 when dry, and chroma of 1 or 2 when moist or dry. It is loamy sand, loamy fine sand, fine sand, or sand. The part of the profile below the control section has colors and textures similar to those in the upper 40 inches, but the range includes gravelly analogs.

Prather Series

The Prather series consists of very deep, moderately well drained soils on terraces. These soils formed in highly weathered, ancient glacial drift. Slope is 3 to 20 percent. Elevation is 200 to 600 feet. The average annual precipitation is 40 to 60 inches, the average annual air temperature is about 50 degrees F, and the average frost-free season is 150 to 200 days.

These soils are clayey, kaolinitic, mesic Xeric Haplohumults.

Typical pedon of Prather silty clay loam, 3 to 8

percent slopes, 4 miles southeast of Rochester; about 2,400 feet west and 1,150 feet north of the southeast corner of sec. 21, T. 15 N., R. 3 W.

- A1—0 to 5 inches; very dark grayish brown (10YR 3/2) silty clay loam, brown (10YR 5/3) dry; moderate very fine and fine subangular blocky structure; hard, friable, slightly sticky and plastic; many very fine, fine, and medium roots; few very fine and fine tubular pores and many very fine interstitial pores; medium acid; clear smooth boundary.
- A2—5 to 12 inches; dark brown (7.5YR 3/4) silty clay loam, pale brown (10YR 6/3) dry; moderate very fine, fine, and medium subangular blocky structure; hard, friable, slightly sticky and plastic; many very fine and fine roots; common very fine tubular pores and many very fine interstitial pores; medium acid; clear smooth boundary.
- Bt1—12 to 29 inches; dark brown (7.5YR 4/4) silty clay, strong brown (7.5YR 5/6) dry; moderate fine and medium subangular blocky structure; hard, friable, sticky and plastic; few very fine and fine roots; common very fine tubular pores; common thin clay films on faces of peds and lining pores; strongly acid; gradual smooth boundary.
- Bt2—29 to 42 inches; dark brown (7.5YR 4/4) silty clay, strong brown (7.5YR 5/6) dry; common medium faint brown (7.5YR 5/2) mottles; moderate fine and medium subangular blocky structure; hard, friable, sticky and plastic; few very fine and fine roots; common very fine tubular pores; many thin clay films on faces of peds and lining pores; strongly acid; clear irregular boundary.
- BcT—42 to 60 inches; yellowish brown (10YR 5/6) clay, strong brown (7.5YR 5/6) dry; common medium distinct gray (10YR 5/1) mottles; moderate medium and coarse subangular blocky structure; hard, friable, sticky and plastic; few very fine roots; common very fine tubular pores; many thin and moderately thick clay films on faces of peds and lining pores; medium acid.

The solum ranges from 40 to more than 60 inches in thickness. The depth to slowly permeable or very slowly permeable material ranges from 20 to 30 inches. The depth to mottles that have chroma of 2 or less also ranges from 20 to 30 inches. The particle-size control section is 35 to 65 percent clay. It typically is silty clay, but in some areas it is silty clay loam or clay. Some pedons have a C horizon. Hue is 10YR or 7.5YR in the A horizon and in the upper part of the B horizon and ranges from 2.5YR to 2.5Y in the BC and C horizons.

The A horizon has value of 2 or 3 when moist and 5 or 6 when dry and chroma of 2 to 4 when moist or dry. It is slightly acid or medium acid. The Bt horizon has value of 3 to 5 when moist and 4 or 5 when dry and chroma of 4 to 6 when moist and 6 to 8 when dry. It is silty clay or clay. It is medium acid or strongly acid.

Puget Series

The Puget series consists of very deep, poorly drained soils in depressions on flood plains. Drainage has been altered by tiling. These soils formed in alluvium. Slope is 0 to 3 percent. Elevation is 10 to 100 feet. The average annual precipitation is 40 to 55 inches, the average annual air temperature is about 50 degrees F, and the average frost-free season is 150 to 200 days.

The soils are fine-silty, mixed, nonacid, mesic Aeric Fluvaquents.

Typical pedon of Puget silt loam, 5 miles east of Lacey; about 1,800 feet west and 1,450 feet south of the northeast corner of sec. 18, T. 18 N., R. 1 E.

- Ap—0 to 6 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; common fine prominent yellowish red (5YR 4/8) mottles; moderate fine and medium granular structure; hard, friable, nonsticky and nonplastic; many very fine and fine roots; many very fine interstitial pores; slightly acid; abrupt smooth boundary.
- A—6 to 9 inches; very dark grayish brown (10YR 3/2) silt loam, light brownish gray (10YR 6/2) dry; common fine prominent yellowish red (5YR 5/8) mottles; moderate coarse and very coarse subangular blocky structure; hard, friable, slightly sticky and slightly plastic; many very fine, fine, and medium roots; common very fine tubular pores; slightly acid; abrupt smooth boundary.
- Cg1—9 to 30 inches; dark grayish brown (2.5Y 4/2) silty clay loam, light brownish gray (2.5Y 6/2) dry; many medium prominent yellowish red (5YR 4/8) mottles; moderate medium and coarse subangular blocky structure; hard, friable, sticky and slightly plastic; common very fine and fine roots; common very fine and many medium and coarse tubular pores; slightly acid; gradual smooth boundary.
- Cg2—30 to 36 inches; dark grayish brown (2.5Y 4/2) silt loam, light brownish gray (2.5Y 6/2) dry; many medium prominent yellowish red (5YR 4/8) mottles; weak coarse and very coarse subangular blocky structure; slightly hard, very friable, slightly sticky and nonplastic; few very fine and fine roots; many

medium and coarse pores; slightly acid; gradual wavy boundary.

- Cg3—36 to 60 inches; olive gray (5Y 4/2) silt loam, light olive gray (5Y 6/2) dry; common fine prominent yellowish brown (10YR 5/8) mottles; massive; slightly hard, very friable, slightly sticky and nonplastic; medium acid.

The A horizon has value of 3 to 5 when moist and 5 or 6 when dry and chroma of 1 or 2 when moist or dry. It is medium acid to neutral. The Cg horizon is slightly acid to very strongly acid. The part of this horizon within a depth of 40 inches has hue of 10YR to 5Y and value of 4 or 5 when moist and 6 or 7 when dry. It is dominantly silt loam or silty clay loam, but some pedons have strata of sand or loamy sand. These strata are less than 2 inches thick. The part of the Cg horizon below a depth of 40 inches has hue of 2.5Y, 5Y, or 5GY, value of 4 or 5 when moist and 6 or 7 when dry, and chroma of 0 to 2 when moist or dry. It is dominantly silt loam, silty clay loam, or silty clay, but in some pedons it has strata of sand or loamy sand.

Puyallup Series

The Puyallup series consists of deep, well drained soils on flood plains. These soils formed in alluvium. Slope is 0 to 3 percent. Elevation is 20 to 600 feet. The average annual precipitation is 40 to 60 inches, the average annual air temperature is about 50 degrees F, and the average frost-free season is 170 to 200 days.

These soils are coarse-loamy over sandy or sandy-skeletal, mixed, mesic Fluventic Haploxerolls.

Typical pedon of Puyallup silt loam, 2 miles southeast of Tumwater; about 1,100 feet west and 2,400 feet south of the northeast corner of sec. 1, T. 17 N., R. 2 W.

- Ap—0 to 10 inches; very dark grayish brown (10YR 3/2) silt loam, dark grayish brown (10YR 4/2) dry; moderate very fine and fine subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; many very fine and fine roots; many very fine interstitial pores; slightly acid; abrupt wavy boundary.
- A1—10 to 12 inches; dark brown (10YR 3/3) loamy fine sand, dark grayish brown (10YR 4/2) dry; massive; loose, very friable, nonsticky and nonplastic; common very fine and fine roots; many very fine and fine interstitial pores; neutral; abrupt wavy boundary.
- A2—12 to 19 inches; dark brown (10YR 3/3) fine sandy

loam, grayish brown (10YR 5/2) dry; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; few very fine and fine roots; many very fine interstitial pores; neutral; abrupt wavy boundary.

2C—19 to 60 inches; very dark gray (10YR 3/1) sand, dark grayish brown (10YR 4/2) dry; single grained; loose; neutral.

The upper part of the particle-size control section is fine sandy loam, loam, or silt loam. The content of clay in this part of the control section is 5 to 15 percent. The soils are neutral to medium acid throughout.

The A horizon has hue of 10YR or 2.5Y and value and chroma of 2 or 3. It is silt loam, fine sandy loam, or loamy fine sand. Depth to the 2C horizon ranges from 15 to 20 inches. This horizon has value of 3 to 5 when moist and 4 to 6 when dry. It is sand, loamy sand, or gravelly sand. The content of pebbles in this horizon ranges from 0 to 20 percent.

Rainier Series

The Rainier series consists of deep, moderately well drained soils on mountain slopes. These soils formed in material weathered from breccia and glacial till. Slope is 5 to 65 percent. Elevation is 700 to 1,700 feet. The average annual precipitation is 45 to 55 inches, the average annual air temperature is about 50 degrees F, and the average frost-free season is 130 to 150 days.

These soils are fine, mixed, mesic Ultic Haploxeralfs.

Typical pedon of Rainier clay loam, 5 to 30 percent slopes, 16 miles east of Vail; about 1,500 feet west and 400 feet south of the northeast corner of sec. 11, T. 15 N., R. 3 E.

Oi—1 inch to 0; needles, twigs, bark, and moss.

A1—0 to 2 inches; very dark grayish brown (10YR 3/2) clay loam, grayish brown (10YR 5/2) dry; weak fine and medium granular structure; slightly hard, friable, slightly sticky and slightly plastic; weakly smeary; many fine and medium roots; medium acid; abrupt smooth boundary.

A2—2 to 8 inches; very dark grayish brown (10YR 3/2) clay loam, grayish brown (10YR 5/2) dry; weak medium subangular blocky structure; slightly hard, firm, slightly sticky and slightly plastic; many roots; medium acid; clear wavy boundary.

AB—8 to 14 inches; very dark grayish brown (10YR 3/2) clay loam, grayish brown (10YR 5/2) dry; moderate medium subangular blocky structure; slightly hard, firm, sticky and plastic; common roots;

medium acid; clear wavy boundary.

Bt1—14 to 21 inches; dark grayish brown (10YR 4/2) clay loam, light brownish gray (10YR 6/2) dry; moderate medium and coarse subangular blocky structure; hard, firm, sticky and plastic; few roots; strongly acid; gradual wavy boundary.

Bt2—21 to 32 inches; dark brown (7.5YR 3/2) clay, brown (7.5YR 5/4) dry; moderate medium prismatic structure parting to moderate medium subangular blocky; hard, very firm, very sticky and very plastic; common fine and medium roots that tend to fan out at the bottom of the horizon; thin nearly continuous clay films on faces of peds; strongly acid; gradual wavy boundary.

Bt3—32 to 45 inches; dark brown (7.5YR 3/2) clay, brown (7.5YR 4/4) dry; moderate coarse and very coarse subangular blocky structure; extremely hard, very firm, sticky and plastic; strongly acid; gradual irregular boundary.

R—45 inches; massive, slightly weathered breccia; few fractures more than 4 inches apart.

The depth to hard breccia ranges from 40 to 60 inches. The content of rock fragments in the control section ranges from 0 to 30 percent. The content of clay ranges from 35 to 45 percent.

The A horizon has hue of 10YR or 7.5YR. It is strongly acid or medium acid. The AB horizon is clay loam or loam. The Bt horizon has hue of 10YR to 5YR, value of 3 or 4 when moist and 4 to 6 when dry, and chroma of 2 or 3 when moist and 2 to 4 when dry. It is very strongly acid or strongly acid. It is clay, silty clay loam, or silty clay. The content of rock fragments in this horizon ranges from 0 to 15 percent.

Raught Series

The Raught series consists of very deep, well drained soils on uplands. These soils formed in material weathered from basalt. Slope is 5 to 65 percent. Elevation is 200 to 1,500 feet. The average annual precipitation is 50 to 70 inches, the average annual air temperature is about 50 degrees F, and the average frost-free season is 150 to 200 days.

These soils are medial, mesic Andic Xerumbrepts.

Typical pedon of Raught silt loam, 5 to 30 percent slopes, 12 miles west of Olympia; about 150 feet east and 1,800 feet north of the southwest corner of sec. 24, T. 18 N., R. 4 W.

A—0 to 11 inches; dark brown (7.5YR 3/2) silt loam, brown (7.5YR 4/2) dry; strong fine, medium, and

coarse subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; weakly smeary; common very fine and fine roots; many very fine tubular pores; slightly acid; gradual wavy boundary.

Bw1—11 to 30 inches; dark brown (7.5YR 3/4) silt loam, brown (7.5YR 5/4) dry; strong fine, medium, and coarse subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; weakly smeary; common fine and medium roots; common fine and medium tubular pores; slightly acid; clear smooth boundary.

Bw2—30 to 55 inches; dark brown (7.5YR 3/4) silt loam, brown (7.5YR 5/4) dry; strong medium, coarse, and very coarse subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; weakly smeary; few coarse roots; few very fine tubular pores; 10 percent angular pebbles; slightly acid; clear smooth boundary.

Bw3—55 to 60 inches; dark reddish brown (5YR 3/4) silt loam, strong brown (7.5YR 5/6) dry; strong medium, coarse, and very coarse subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; weakly smeary; few coarse roots; few very fine tubular pores; 10 percent angular pebbles; medium acid.

The particle-size control section ranges from 5 to 15 percent rock fragments. The depth to basalt is more than 60 inches.

The A horizon has value of 4 or 5 when dry and chroma of 2 or 3 when moist or dry. The Bw horizon has hue of 5YR or 7.5YR, value of 3 or 4 when moist, and chroma of 3 or 4 when moist and 3 to 6 when dry. It is silt loam or silty clay loam. The content of pebbles in this horizon is as much as 15 percent.

Salkum Series

The Salkum series consists of deep, well drained soils on terraces. These soils formed in highly weathered, ancient glacial drift. Slope is 3 to 30 percent. Elevation is 200 to 600 feet. The average annual precipitation is 45 to 60 inches, the average annual air temperature is about 50 degrees F, and the average frost-free season is 150 to 200 days.

These soils are clayey, kaolinitic, mesic Xeric Haplohumults.

Typical pedon of Salkum silty clay loam, 8 to 15 percent slopes, 2 miles southwest of Rochester; about 800 feet east and 2,300 feet south of the northwest corner of sec. 7, T. 15 N., R. 3 W.

A—0 to 6 inches; dark brown (7.5YR 3/4) silty clay loam, yellowish brown (10YR 5/4) dry; strong very fine, fine, and medium subangular blocky structure; hard, very friable, slightly sticky and slightly plastic; many very fine, fine, and medium roots; common very fine tubular pores; very strongly acid; clear smooth boundary.

AB—6 to 12 inches; dark brown (7.5YR 4/4) silty clay loam, pale brown (10YR 6/3) dry; strong very fine, fine, and medium subangular blocky structure; hard, very friable, sticky and slightly plastic; many very fine, fine, and medium roots; common very fine tubular pores; few thin clay films on faces of peds and lining pores; very strongly acid; clear smooth boundary.

Bt1—12 to 39 inches; reddish brown (5YR 4/4) silty clay, reddish yellow (7.5YR 6/8) dry; strong medium and coarse subangular blocky structure; hard, friable, sticky and plastic; common very fine roots; many very fine tubular pores; many moderately thick clay films on faces of peds and lining pores; very strongly acid; gradual smooth boundary.

Bt2—39 to 51 inches; yellowish red (5YR 4/6) silty clay, strong brown (7.5YR 5/6) dry; moderate fine, medium, and coarse subangular blocky structure; hard, friable, sticky and plastic; few very fine roots; common very fine tubular pores; many moderately thick clay films on faces of peds and lining pores; very strongly acid; clear wavy boundary.

BC—51 to 60 inches; yellowish red (5YR 5/8) silty clay, yellow (10YR 8/6) dry; weak fine, medium, and coarse subangular blocky structure; hard, friable, sticky and plastic; many very fine tubular pores; common thick clay films on faces of peds and lining pores; very strongly acid.

The soils are medium acid to very strongly acid throughout. The A horizon has hue of 7.5YR or 10YR, value of 2 or 3 when moist and 4 or 5 when dry, and chroma of 2 to 4 when moist or dry. The Bt horizon has hue of 5YR to 10YR, value of 3 to 5 when moist and 4 to 6 when dry, and chroma of 4 to 6 when moist or dry. It is silty clay loam or silty clay in which the content of clay is 40 to 55 percent. The depth to mottles that have chroma of 2 or less is more than 36 inches.

Scamman Series

The Scamman series consists of deep, somewhat poorly drained soils on terraces. These soils formed in mixed glacial and sedimentary material. Slope is 0 to 20 percent. Elevation is 150 to 1,600 feet. The average annual precipitation is 45 to 70 inches, the average

annual air temperature is 50 degrees F, and the average frost-free season is 150 to 200 days.

These soils are fine, mixed, mesic Aquic Palexeralfs.

Typical pedon of Scamman silty clay loam, 5 to 20 percent slopes, 16 miles southeast of Yelm; about 1,700 feet west and 1,900 feet north of the southeast corner of sec. 17, T. 15 N., R. 4 E.

A—0 to 5 inches; dark brown (10YR 4/3) silty clay loam, brown (10YR 5/3) dry; moderate very fine and fine subangular blocky structure; slightly hard, very friable, sticky and slightly plastic; common very fine and fine roots; many very fine interstitial pores; slightly acid; abrupt smooth boundary.

E—5 to 11 inches; dark yellowish brown (10YR 4/4) silty clay loam, very pale brown (10YR 7/3) dry; common fine prominent grayish brown (2.5Y 5/2) mottles; moderate medium and coarse subangular blocky structure; hard, friable, sticky and slightly plastic; common very fine roots; many very fine tubular pores; medium acid; clear smooth boundary.

B/E—11 to 24 inches; about 35 percent gray (10YR 5/1) silt loam (E), white (10YR 8/2) dry, on faces of peds and in pores, 1 to 3 millimeters thick; massive; about 65 percent dark brown (10YR 4/3) peds of silty clay loam (B), very pale brown (10YR 7/3) dry; common medium distinct strong brown (7.5YR 5/6) mottles; moderate fine, medium, and coarse subangular blocky structure; hard, friable, very sticky and slightly plastic; common very fine and fine roots; many very fine tubular pores; common thin clay films on faces of peds and lining pores; medium acid; clear smooth boundary.

Bt1—24 to 34 inches; dark grayish brown (10YR 4/2) silty clay, light gray (10YR 7/2) dry; many large prominent strong brown (7.5YR 5/6) mottles; weak medium and coarse prismatic structure; hard, friable, sticky and plastic; common very fine roots; many very fine tubular pores; common thin and moderately thick clay films on faces of peds and lining pores; medium acid; abrupt smooth boundary.

Bt2—34 to 60 inches; dark grayish brown (10YR 4/2) silty clay, white (10YR 8/2) dry; many large prominent yellowish red (5YR 4/6) mottles; strong coarse and very coarse angular blocky structure; very hard, firm, sticky and plastic; medium acid.

The thickness of the solum ranges from 48 to more than 60 inches. The control section is silty clay or clay in which the content of clay is 42 to 60 percent. The content of rock fragments is less than 5 percent throughout the profile.

The A or Ap horizon has value of 2 to 4 when moist and 4 or 5 when dry and chroma of 2 or 3 when moist or dry. It is neutral or slightly acid. The E horizon has value of 4 or 5 when moist and 5 to 7 when dry and chroma of 3 or 4 when moist or dry. The B part of the B/E horizon has value of 4 or 5 when moist and 5 to 7 when dry and chroma of 3 or 4 when moist or dry. It is silty clay loam or silty clay and makes up 55 to 65 percent of the horizon. The E part has value of 4 or 5 when moist and 7 or 8 when dry and chroma of 1 or 2 when moist or dry. It makes up 30 to 45 percent of the horizon. The Bt horizon has hue of 10YR or 2.5Y, value of 4 or 5 when moist and 6 to 8 when dry, and chroma of 1 to 3 when moist and 2 or 3 when dry. It has thin to thick clay films on faces of peds and lining pores.

Schneider Series

The Schneider series consists of deep, well drained soils on foothills and mountains. These soils formed in colluvium derived from basalt. Slope is 20 to 65 percent. Elevation is 500 to 1,200 feet. The average annual precipitation is 60 to 70 inches, the average annual air temperature is about 49 degrees F, and the average frost-free season is 150 to 200 days.

These soils are medial-skeletal, mesic Andic Xerumbrepts.

Typical pedon of Schneider very gravelly loam, 20 to 40 percent slopes, 7 miles northwest of Olympia; about 2,100 feet east and 2,300 feet north of the southwest corner of sec. 2, T. 18 N., R. 3 W.

A—0 to 6 inches; dark brown (7.5YR 3/2) very gravelly loam, dark brown (7.5YR 4/2) dry; moderate fine granular structure; slightly hard, very friable, slightly sticky and slightly plastic; weakly smeary; many fine, medium, and coarse roots; many very fine interstitial pores; 55 percent angular basalt pebbles; slightly acid; clear smooth boundary.

AB—6 to 22 inches; dark reddish brown (5YR 3/3) very gravelly silt loam, dark brown (7.5YR 4/4) dry; moderate fine granular structure; slightly hard, very friable, slightly sticky and slightly plastic; weakly smeary; many medium and coarse roots; many very fine interstitial pores; 60 percent angular basalt pebbles; medium acid; clear smooth boundary.

Bw1—22 to 32 inches; dark reddish brown (5YR 3/3) very gravelly silt loam, dark brown (7.5YR 4/4) dry; weak fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; weakly smeary; common fine, medium, and coarse roots; common very fine tubular pores; 55 percent angular

basalt pebbles; medium acid; gradual wavy boundary.

Bw2—32 to 55 inches; dark brown (7.5YR 4/4) extremely gravelly silt loam, yellowish brown (10YR 5/4) dry; weak fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; weakly smeary; common fine, medium, and coarse roots; common very fine tubular pores; 80 percent angular basalt pebbles; medium acid; abrupt wavy boundary.

R—55 inches; fractured basalt.

The depth to fractured basalt ranges from 40 to more than 60 inches. The content of rock fragments in the 10- and 40-inch control section ranges from 35 to 80 percent. The fragments are dominantly angular basalt pebbles. Pedons at elevations of less than 800 feet also have rounded pebbles. The particle-size control section is dominantly amorphous material.

The A horizon has hue of 7.5YR or 10YR when moist, value of 2 or 3 when moist and 3 to 5 when dry, and chroma of 2 or 3 when moist. It is slightly acid to strongly acid. The AB horizon has hue of 5YR or 7.5YR, value of 2 or 3 when moist and 3 to 5 when dry, and chroma of 3 or 4 when dry. It is slightly acid to strongly acid. The Bw horizon has hue of 5YR to 10YR, value of 3 to 5 when moist and 4 to 7 when dry, and chroma of 2 to 4 when moist and dry. It is slightly acid or medium acid. The AB and Bw horizons are the very gravelly or extremely gravelly analogs of loam or silt loam. Some pedons have a C horizon.

Semiahmoo Series

The Semiahmoo series consists of very deep, very poorly drained soils on flood plains. Drainage has been altered by tiling and open ditches. These soils formed in herbaceous organic deposits. Slope is 0 to 3 percent. Elevation is 20 to 300 feet. The average annual precipitation is 45 to 55 inches, the average annual air temperature is about 50 degrees F, and the average annual frost-free season is 150 to 200 days.

These soils are euic, mesic Typic Medisaprists.

Typical pedon of Semiahmoo muck, 2 miles north of Littlerock; about 850 feet east and 1,575 feet north of the southwest corner of sec. 25, T. 17 N., R. 3 W.

Op—0 to 6 inches; black (5YR 2/1) sapric material, very dark gray (5YR 3/1) dry; moderate fine granular structure; slightly hard, very friable, slightly sticky and slightly plastic; 15 percent fiber, 5 percent rubbed; few medium and common very fine and fine

roots; common very fine tubular pores; medium acid; clear wavy boundary.

Oa1—6 to 25 inches; black (5YR 2/1) sapric material, dark reddish brown (5YR 2/2) dry; weak very thin platy structure; hard, very friable, nonsticky and nonplastic; 30 percent fiber, 10 percent rubbed; few very fine and fine roots; few medium and common very fine tubular pores; medium acid; abrupt smooth boundary.

Oa2—25 to 60 inches; black (5YR 2/1) sapric material, dark reddish brown (5YR 2/2) dry; massive; hard, very friable, nonsticky and nonplastic; 25 percent fiber, 15 percent rubbed; few very fine roots; few medium and fine tubular pores; medium acid.

The organic material is more than 60 inches thick. It is mostly grass and sedge material, but in some areas it includes as much as 5 percent woody material. The control section is dominantly sapric material. The fiber content ranges from 20 to 40 percent, 5 to 15 percent rubbed. The bottom tier generally has the highest fiber content. When moist, the tiers have hue of 5YR or 7.5YR and value and chroma of 1 or 2. The soils are very strongly acid to medium acid throughout. Some pedons have a 2C horizon, which is sand to clay.

Shalcar Series

The Shalcar series consists of deep, very poorly drained soils in upland depressions. These soils formed in organic deposits over alluvium. Slope is 0 to 2 percent. Elevation is 50 to 700 feet. The average annual precipitation is 45 to 55 inches, the average annual air temperature is about 50 degrees F, and the average frost-free season is 150 to 200 days.

These soils are loamy, mixed, euic, mesic Terric Medisaprists.

Typical pedon of Shalcar muck, 2 miles southwest of Yelm; about 1,800 feet east and 2,000 feet south of the northwest corner of sec. 36, T. 17 N., R. 1 E.

Op—0 to 6 inches; black (5YR 2/1) sapric material, very dark brown (10YR 2/2) dry; moderate fine granular structure; slightly hard, very friable, slightly sticky and slightly plastic; about 20 percent fiber, 10 percent rubbed; about 60 percent live fine fibrous roots; very strongly acid; clear smooth boundary.

Oa—6 to 24 inches; black (5YR 2/1) sapric material, dark reddish brown (5YR 2/2) dry; moderate fine subangular blocky structure; hard, very friable, slightly sticky and slightly plastic; about 40 percent fiber, 10 percent rubbed; common fine roots; very

strongly acid; abrupt smooth boundary.

C1—24 to 29 inches: olive gray (5Y 5/2) silt loam, light gray (5Y 7/1) dry; moderate medium and coarse subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; few very fine and fine roots; few fine and medium tubular pores; medium acid; gradual wavy boundary.

C2—29 to 60 inches: grayish brown (2.5Y 5/2) silty clay loam, white (5Y 8/2) dry; common medium prominent brown (7.5YR 5/4) mottles; massive; hard, very friable, sticky and plastic; few fine pores; medium acid.

The organic material ranges from 20 to 30 inches in thickness. It is mostly grass and sedge material. The content of fiber ranges from 20 to 40 percent, 5 to 15 percent rubbed. The tiers have hue of 5YR to 10YR when moist and value and chroma of 1 or 2 when moist and 2 or 3 when dry. The C horizon has hue of 2.5Y or 5Y, value of 4 to 6 when moist and 7 or 8 when dry, and chroma of 1 or 2 when moist or dry. It is silt loam to silty clay loam.

Shalcar Variant

The Shalcar Variant consists of deep, very poorly drained soils on flood plains. These soils formed in organic deposits over alluvium. Slope is 0 to 3 percent. Elevation is 20 to 300 feet. The average annual precipitation is 45 to 55 inches, the average annual air temperature is about 50 degrees F, and the average frost-free season is 150 to 200 days.

These soils are clayey, mixed, euic, mesic Terric Medisaprists.

Typical pedon of Shalcar Variant muck, 1 mile southeast of Vail; about 1,325 feet west and 800 feet north of the southeast corner of sec. 35, T. 16 N., R. 1 E.

Op—0 to 6 inches: dark reddish brown (5YR 2/2) sapric material, dark reddish brown (2.5YR 2/4) dry; moderate fine granular structure; slightly hard, very friable, nonsticky and nonplastic; 15 percent fiber, 5 percent rubbed; few medium and common very fine and fine roots; common very fine tubular pores; medium acid; clear smooth boundary.

Oa—6 to 20 inches: black (5YR 2/1) sapric material, dark reddish brown (5YR 3/2) dry; moderate medium subangular blocky structure; hard, very friable, nonsticky and nonplastic; 30 percent fiber, 10 percent rubbed; few very fine and fine roots;

common very fine tubular pores; strongly acid; abrupt smooth boundary.

C1—20 to 25 inches; very dark grayish brown (10YR 3/2) and grayish brown (10YR 5/2) silty clay, dark grayish brown (2.5Y 4/2) and light brownish gray (2.5Y 6/2) dry; strong very thin platy structure; hard, very friable, sticky and plastic; few very fine and fine roots; few fine and medium tubular pores; medium acid; gradual wavy boundary.

C2—25 to 60 inches; very dark grayish brown (10YR 3/2) and dark grayish brown (10YR 4/2) clay, very dark grayish brown (2.5Y 3/2) and grayish brown (2.5Y 5/2) dry; moderate very thin and thin platy structure; hard, very friable, sticky and plastic; few fine pores; medium acid.

The organic material ranges from 16 to 30 inches in thickness. The fiber content ranges from 20 to 50 percent, 5 to 15 percent rubbed. The tiers have hue of 2.5YR to 7.5YR when moist and value and chroma of 1 or 2 when moist and 2 to 4 when dry. The C horizon has hue of 10YR or 2.5Y, value of 3 to 5 when moist and 3 to 6 when dry, and chroma of 2 when moist or dry. It is silty clay to clay and is strongly acid or medium acid.

Skipopa Series

The Skipopa series consists of moderately deep, somewhat poorly drained soils on terraces. These soils formed in volcanic ash and loess over glaciolacustrine sediment. Slope is 0 to 15 percent. Elevation is 150 to 300 feet. The average annual precipitation is 40 to 50 inches, the average annual temperature is about 50 degrees F, and the average frost-free season is 150 to 200 days.

These soils are medial over clayey, mixed, mesic Aquic Xerochrepts.

Typical pedon of Skipopa silt loam, 0 to 3 percent slopes, 8 miles northwest of Olympia; about 2,600 feet east and 1,100 feet north of the southwest corner of sec. 27, T. 19 N., R. 3 W.

Apc—0 to 8 inches: dark brown (10YR 3/3) silt loam, pale brown (10YR 6/3) dry; strong fine granular structure; slightly hard, very friable, slightly sticky and slightly plastic; weakly smeary; many fine roots; very porous; 25 to 50 percent iron concretions; medium acid; abrupt smooth boundary.

Bt—8 to 15 inches: brown (10YR 4/3) silt loam, pale yellow (2.5Y 7/4) dry; strong fine angular blocky

structure; slightly hard, very friable, slightly sticky and slightly plastic; weakly smeary; many fine roots; very porous; 10 percent concretions; thin patchy clay films on faces of peds and in pores; medium acid; clear wavy boundary.

2Btg—15 to 18 inches; grayish brown (2.5Y 5/2) silty clay loam, light gray (2.5Y 7/2) dry; many medium faint dark yellowish brown (10YR 4/4) mottles; strong fine angular blocky structure; hard, friable, sticky and plastic; common fine roots; common medium and fine tubular pores and fine interstitial pores; thin continuous clay films on faces of peds and in pores; medium acid; clear wavy boundary.

2Cg1—18 to 28 inches; greenish gray (5GY 6/1) silty clay, pale yellow (5Y 7/3) dry; common medium distinct strong brown (7.5YR 5/8) mottles; moderate fine prismatic structure parting to moderate thin platy; hard, firm, very sticky and very plastic; few fine roots; common fine tubular pores and many medium interstitial pores; medium continuous clay films on peds and in pores; medium acid; gradual wavy boundary.

2Cg2—28 to 60 inches; greenish gray (5GY 6/1) clay, light gray (5Y 7/1) dry; common medium distinct strong brown (7.5YR 5/8) mottles; massive; thin platy laminations; hard, very firm, very sticky and very plastic; common medium interstitial pores; medium acid.

The thickness of the solum ranges from 14 to 24 inches. The content of rock fragments in the control section ranges from 0 to 10 percent.

The A horizon has hue of 7.5YR or 10YR, value of 2 or 3 when moist and 4 to 6 when dry, and chroma of 2 or 3 when moist and dry. It is medium acid or slightly acid. The Bt horizon has hue of 10YR or 2.5Y, value of 4 or 5 when moist and 6 or 7 when dry, and chroma of 3 or 4 when moist or dry. It is silt loam or silty clay loam in which the content of clay ranges from 12 to 30 percent. It is medium acid or strongly acid. The 2C horizon has hue of 2.5Y, 5Y, 5G, or 5GY, value of 4 to 6 when moist and 7 or 8 when dry, chroma of 1 to 3 when moist or dry. It is silty clay or clay in which the content of clay ranges from 40 to 60 percent. This horizon is slightly acid or medium acid.

Spana Series

The Spana series consists of very deep, somewhat poorly drained soils in drainageways on outwash plains. These soils formed in glacial outwash. Slope is 0 to 3 percent. Elevation is 100 to 500 feet. The average

annual precipitation is 35 to 45 inches, the average annual air temperature is about 51 degrees F, and the average frost-free season is 150 to 200 days.

These soils are loamy-skeletal, mixed, mesic Pachic Xerumbrepts.

Typical pedon of Spana gravelly loam, 4 miles southeast of Lacey; about 2,300 feet west and 400 feet north of the southeast corner of sec. 25, T. 18 N., R. 1 W.

A—0 to 22 inches; black (10YR 2/1) gravelly loam, very dark grayish brown (10YR 3/2) dry; moderate very fine and fine granular structure; soft, very friable, slightly sticky and slightly plastic; many very fine and fine roots; 20 percent pebbles; medium acid; gradual wavy boundary.

Bw1—22 to 26 inches; very dark grayish brown (10YR 3/2) gravelly loam, grayish brown (10YR 5/2) dry; moderate fine and medium subangular blocky structure; soft, friable, slightly sticky and slightly plastic; common very fine and fine roots; 35 percent pebbles; medium acid; abrupt wavy boundary.

Bw2—26 to 38 inches; brown (10YR 5/3) very gravelly loam, pale brown (10YR 6/3) dry; weak coarse subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; few fine roots; 45 percent pebbles; medium acid; abrupt wavy boundary.

2C1—38 to 39 inches; dark yellowish brown (10YR 4/4) extremely gravelly sandy loam, very pale brown (10YR 7/4) dry; massive; hard, firm, nonsticky and nonplastic; 65 percent pebbles; medium acid; abrupt smooth boundary.

2C2—39 to 60 inches; dark brown (10YR 4/3) extremely gravelly sandy loam, pale brown (10YR 6/3) dry; single grained; loose; 80 percent pebbles and 10 percent cobbles; strongly acid.

The thickness of the solum ranges from 24 to 38 inches. The particle-size control section ranges from 35 to 50 percent coarse fragments and from 5 to 18 percent clay. The umbric epipedon is 20 to 30 inches thick.

The A horizon has value of 2 to 4 when dry and chroma of 1 or 2 when moist or dry. The Bw horizon has value of 3 to 5 when moist. It is 5 to 15 percent clay and 20 to 45 percent coarse fragments. It has faint or distinct, yellowish brown or strong brown mottles in some areas. The 2C horizon is extremely gravelly sandy loam, extremely gravelly loamy sand, or very gravelly sandy loam.

Spanaway Series

The Spanaway series consists of very deep, somewhat excessively drained soils on terraces. These soils formed in glacial outwash and volcanic ash. Slope is 0 to 15 percent. Elevation is 100 to 400 feet. The average annual precipitation is 40 to 55 inches, the average annual air temperature is about 51 degrees F, and the average frost-free season is 150 to 200 days.

These soils are sandy-skeletal, mixed, mesic Andic Xerumbrepts.

Typical pedon of Spanaway gravelly sandy loam, 0 to 3 percent slopes, 4 miles southeast of Lacey; about 250 feet west and 400 feet south of the northeast corner of sec. 25, T. 36 N., R. 1 W.

A—0 to 15 inches; black (10YR 2/1) gravelly sandy loam, very dark grayish brown (10YR 3/2) dry; weak fine granular structure; loose, very friable, nonsticky and nonplastic; many fine, medium, and coarse roots; 25 percent pebbles; strongly acid; clear smooth boundary.

Bw—15 to 20 inches; dark yellowish brown (10YR 3/4) very gravelly sandy loam, light olive brown (2.5Y 5/4) dry; weak fine subangular blocky structure; loose, very friable, nonsticky and nonplastic; many fine, medium, and coarse roots; 55 percent pebbles; medium acid; clear smooth boundary.

C—20 to 60 inches; dark yellowish brown (10YR 4/4) extremely gravelly sand, yellowish brown (10YR 5/4) dry; single grained; loose; few fine roots; 80 percent pebbles, 10 percent cobbles; slightly acid.

The thickness of the solum ranges from 15 to 25 inches. The content of coarse fragments in the control section ranges from 50 to 85 percent. The weighted average texture of this section is very gravelly sand or extremely gravelly sand. The umbric epipedon is 10 to 20 inches thick.

The A horizon has hue of 10YR or 7.5YR, value of 3 or 4 when dry, and chroma of 1 or 2 when moist or dry. It is medium acid or strongly acid. The Bw horizon has value of 4 or 5 when dry and 3 or 4 when moist. It is very gravelly sandy loam, very gravelly loam, or extremely gravelly sandy loam. The C horizon has hue of 10YR or 2.5Y, value of 5 or 6 when dry and 4 or 5 when moist, and chroma of 3 or 4 when dry or moist. It is extremely gravelly sand or extremely gravelly loamy sand and is slightly acid or neutral.

Sultan Series

The Sultan series consists of very deep, moderately

well drained soils on flood plains. These soils formed in alluvium. Slope is 0 to 3 percent. Elevation is 20 to 75 feet. The average annual precipitation is 40 to 50 inches, the average annual air temperature is about 50 degrees F, and the average frost-free season is 150 to 200 days.

These soils are fine-silty, mixed, nonacid, mesic Aquic Xerofluvents.

Typical pedon of Sultan silt loam, 7 miles east of Lacey; about 1,000 feet east and 1,975 feet north of the southwest corner of sec. 16, T. 18 N., R. 1 E.

Ap—0 to 7 inches; dark yellowish brown (10YR 3/4) silt loam, brown (10YR 5/3) dry; moderate fine and medium granular structure; slightly hard, very friable, slightly sticky and slightly plastic; many fine, medium, and coarse roots; many very fine and fine tubular pores; slightly acid; abrupt smooth boundary.

BA—7 to 20 inches; dark yellowish brown (10YR 4/4) silt loam, brown (10YR 5/3) dry; moderate fine and medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine, fine, and medium roots; many very fine and fine tubular pores; slightly acid; clear wavy boundary.

Bw1—20 to 25 inches; dark brown (10YR 3/3) silt loam, grayish brown (2.5Y 5/2) dry; common fine prominent red (2.5YR 5/8) mottles; moderate fine and medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; common fine and medium roots; common very fine and fine tubular pores; slightly acid; gradual wavy boundary.

Bw2—25 to 45 inches; dark brown (10YR 4/3) silt loam, light brownish gray (10YR 6/2) dry; common medium prominent red (2.5YR 5/8) mottles; moderate medium and coarse subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; few very fine and fine roots; few very fine and fine tubular pores; slightly acid; gradual wavy boundary.

C—45 to 60 inches; grayish brown (10YR 5/2) silt loam, light gray (10YR 7/2) dry; common medium prominent dark brown (7.5YR 4/4) mottles; massive; slightly hard, very friable, slightly sticky and slightly plastic; slightly acid.

The soils are slightly acid or neutral in the control section and range from slightly acid to strongly acid below a depth of 40 inches. Mottles that have chroma of 3 or more are at a depth of more than 20 inches.

The Ap horizon has hue of 10YR, value of 3 or 4 when moist, and chroma of 3 or 4 when dry. The Bw horizon has hue of 10YR or 2.5Y, value of 3 or 4 when moist and 5 or 6 when dry, and chroma of 2 or 3 when moist or dry. It has thin strata of fine sandy loam to silty clay loam. The C horizon has hue of 10YR, value of 5 to 7 when moist, and chroma of 2 when moist.

Tacoma Series

The Tacoma series consists of deep, very poorly drained soils on flood plains and deltas. These soils formed in alluvium that has a high content of volcanic ash. Slope is 0 to 1 percent. Elevation is 0 to 20 feet. The average annual precipitation is 40 to 50 inches, the average annual air temperature is about 50 degrees F, and the average frost-free season is 160 to 200 days.

These soils are coarse-silty, mixed, acid, mesic Sulfic Fluvaquents.

Typical pedon of Tacoma silt loam, 6 miles northeast of Lacey; about 1,000 feet north and 300 feet west of the southeast corner of sec. 31, T. 19 N., R. 1 E.

Oe—3 inches to 0; mat of fine grass roots.

A—0 to 7 inches; dark brown (10YR 3/3) silt loam, grayish brown (10YR 5/2) dry; many medium distinct dark brown (7.5YR 4/4) mottles; moderate fine angular blocky structure; friable, nonsticky and slightly plastic; many medium and fine roots; extremely acid; abrupt smooth boundary.

Cg1—7 to 23 inches; dark grayish brown (10YR 4/2) silt loam, light brownish gray (10YR 6/2) dry; many fine distinct dark yellowish brown (10YR 4/4) mottles; moderate medium prismatic structure; friable, slightly sticky and slightly plastic; many medium and fine roots; extremely acid; abrupt smooth boundary.

Cg2—23 to 40 inches; dark grayish brown (10YR 4/2) silt loam, light brownish gray (10YR 6/2) dry; many fine distinct dark yellowish brown (10YR 4/4) mottles; weak medium prismatic structure; friable, nonsticky and slightly plastic; few fine roots; extremely acid; clear smooth boundary.

Cg3—40 to 50 inches; grayish brown (10YR 5/2) silt loam, gray (10YR 6/1) dry; massive; friable, slightly sticky and slightly plastic; extremely acid; abrupt smooth boundary.

2Cg4—50 to 60 inches; dark greenish gray (5GY 4/1) clay; common medium distinct brown (7.5YR 4/4) mottles; massive; friable, very sticky and very plastic; few fine tubular pores; strongly acid.

The soils are more than 60 inches deep, but the

rooting depth is limited by the water table unless the plant is hydrophytic. Some pedons have layers of muck 1 to 4 inches thick. These layers have a cumulative thickness of less than 16 inches. The content of weighted organic carbon is less than 12 percent in the control section.

The A or Ap horizon has hue of 10YR or 5Y, value of 3 or 4 when moist, and chroma of 1 or 2 when moist. It has faint or distinct mottles. It is strongly acid to extremely acid. The Cg horizon has hue of 10YR, 2.5Y, or 5Y or is neutral in hue. It has value of 3 to 6 when moist and 4 to 8 when dry and chroma of 0 to 2 when moist or dry. It has faint to prominent mottles. It is very strongly acid or extremely acid. The 2Cg horizon is stratified clay to sand. It varies in texture within short distances. It is very strongly acid or extremely acid. The depth to this horizon is more than 60 inches in some areas.

Tenino Series

The Tenino series consists of moderately deep, well drained soils on terminal moraines. These soils formed in glacial till over glacial outwash. Slope is 3 to 65 percent. Elevation is 50 to 400 feet. The average annual precipitation is 45 to 60 inches, the average annual air temperature is about 50 degrees F, and the average frost-free season is 150 to 200 days.

These soils are coarse-loamy, mixed, mesic Dystric Entic Durochrepts.

Typical pedon of Tenino gravelly loam, 3 to 15 percent slopes, 2 miles northwest of Littlerock; about 800 feet east and 400 feet north of the southwest corner of sec. 27, T. 17 N., R. 3 W.

A1—0 to 5 inches; dark reddish brown (5YR 2/2) gravelly loam, dark grayish brown (10YR 4/2) dry; moderate fine granular structure; soft, very friable, nonsticky and nonplastic; 30 percent pebbles; many very fine, fine, medium, and coarse roots; many very fine tubular pores; strongly acid; clear smooth boundary.

A2—5 to 11 inches; dark yellowish brown (10YR 3/4) gravelly loam, dark brown (10YR 4/3) dry; moderate fine granular structure; soft, very friable, nonsticky and nonplastic; 30 percent pebbles; many fine, medium, and coarse roots; many very fine tubular pores; medium acid; clear smooth boundary.

Bw1—11 to 21 inches; dark brown (7.5YR 4/4) gravelly loam, light yellowish brown (10YR 6/4) dry; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; 30 percent pebbles;

- common fine, medium, coarse roots; many very fine tubular pores; medium acid; clear smooth boundary.
- Bw2—21 to 36 inches; dark yellowish brown (10YR 4/4) gravelly sandy loam, pale brown (10YR 6/3) dry; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; 30 percent pebbles; common fine and medium roots; many very fine pores; medium acid; abrupt wavy boundary.
- Bqm—36 to 40 inches; yellowish brown (10YR 5/4) very gravelly loam, very pale brown (10YR 7/3) dry; massive; very hard, very firm; fine roots in cracks; medium acid; clear smooth boundary.
- 2C—40 to 60 inches; dark yellowish brown (10YR 4/4) extremely gravelly sandy loam, light gray (10YR 7/1) dry; single grained; loose, nonsticky and nonplastic; 70 percent pebbles; very few fine roots; medium acid.

Depth to the Bqm horizon ranges from 25 to 40 inches. The content of coarse fragments in the control section ranges from 20 to 35 percent, including as much as 10 percent cobbles.

The A horizon has hue of 10YR, 7.5YR, or 5YR when moist and 10YR or 7.5YR when dry, value of 2 or 3 when moist and 4 to 6 when dry, and chroma of 2 to 4 when moist or dry. The Bw horizon has hue of 7.5YR to 5Y, value of 3 to 5 when moist and 6 or 7 when dry, and chroma of 2 to 4 when moist or dry. It is gravelly sandy loam or gravelly loam. The Bqm horizon ranges from 50 to 80 percent pebbles. It is 4 to 10 inches thick and is weakly cemented. The 2C horizon is extremely gravelly loamy sand or extremely gravelly sandy loam. It ranges from 60 to 90 percent pebbles and from 0 to 10 percent cobbles.

Tisch Series

The Tisch series consists of deep, very poorly drained soils in upland depressions and drainageways. Drainage has been altered by tiling. These soils formed in diatomaceous earth, volcanic ash, and alluvium. Slope is 0 to 3 percent. Elevation is 50 to 200 feet. The average annual precipitation is 40 to 50 inches, the average annual air temperature is about 50 degrees F, and the average frost-free season is 150 to 200 days.

These soils are medial, nonacid, mesic Mollic Andaquepts.

Typical pedon of Tisch silt loam, 3 miles south of Yelm; about 500 feet east and 300 feet north of the southwest corner of sec. 5, T. 16 N., R. 2 E.

- Ap—0 to 6 inches; very dark brown (10YR 2/2) silt

- loam, grayish brown (10YR 5/2) dry; moderate fine and medium granular structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine and fine tubular pores; medium acid; clear smooth boundary.
- A—6 to 11 inches; very dark grayish brown (10YR 3/2) silt, grayish brown (10YR 5/2) dry; few fine faint yellowish brown (10YR 5/8) mottles; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine and fine tubular pores; medium acid; abrupt smooth boundary.
- C1—11 to 22 inches; dark grayish brown (10YR 4/2) silt, light gray (10YR 7/2) dry; few fine faint yellowish brown (10YR 5/8) mottles; weak thick platy structure; slightly hard, firm, slightly sticky and slightly plastic; many very fine roots; common very fine and fine tubular pores; medium acid; abrupt smooth boundary.
- C2—22 to 30 inches; dark brown (10YR 4/3) silt, very pale brown (10YR 7/3) dry; massive; slightly hard, firm, slightly sticky and slightly plastic; common very fine roots; common very fine and fine pores; slightly acid; abrupt smooth boundary.
- C3—30 to 50 inches; very dark brown (10YR 2/2) silt, grayish brown (10YR 5/2) dry; massive; slightly hard, firm, slightly sticky and slightly acid; abrupt smooth boundary.
- 20a—50 to 60 inches; black (10YR 2/1) muck, dark grayish brown (10YR 4/2) dry; massive; hard, friable, slightly sticky and slightly plastic; few very fine tubular pores; medium acid.

The soils are neutral to strongly acid throughout. The A horizon has hue of 10YR to 5Y, value of 2 or 3 when moist and 4 or 5 when dry, and chroma of 1 or 2 when moist or dry. The content of organic matter in this horizon is as much as 20 percent. The C horizon has hue of 10YR or 2.5Y or is neutral in hue. It has value of 2 to 4 when moist and 4 to 8 when dry and chroma of 0 to 3 when moist or dry. It is silt or silt loam. Some pedons have no layers of sapric material.

Vailton Series

The Vailton series consists of deep, well drained soils on mountainsides. These soils formed in colluvium and residuum derived from siltstone and shale mixed with volcanic ash. Slope is 5 to 65 percent. Elevation is 1,700 to 2,500 feet. The average annual precipitation is 70 to 80 inches, the average annual air temperature is about 43 degrees F, and the average frost-free season is 130 to 170 days.

These soils are medial, frigid Andic Haplumbrepts.

Typical pedon of Vailton silt loam, 5 to 30 percent slopes. 12 miles southeast of Yelm; about 400 feet west and 1,975 feet south of the northeast corner of sec. 21, T. 15 N., R. 2 E.

A1—0 to 10 inches; very dark grayish brown (10YR 3/2) silt loam, brown (10YR 5/3) dry; moderate fine subangular blocky structure; hard, friable, slightly sticky and slightly plastic; weakly smeary; common fine, medium, and coarse roots; many fine tubular pores; 5 percent fragments of soft siltstone; strongly acid; clear wavy boundary.

A2—10 to 15 inches; dark brown (10YR 3/3) silty clay loam, brown (10YR 5/3) dry; moderate fine and medium subangular blocky structure; hard, firm, sticky and plastic; weakly smeary; common fine, medium, and coarse roots; many fine tubular pores; 10 percent fragments of soft siltstone; strongly acid; clear wavy boundary.

Bw—15 to 30 inches; dark yellowish brown (10YR 4/4) silty clay loam, light yellowish brown (10YR 6/4) dry; moderate medium subangular blocky structure; hard, firm, sticky and plastic; weakly smeary; common fine and medium roots; many fine tubular pores; 15 percent fragments of soft siltstone; strongly acid; clear smooth boundary.

BC—30 to 42 inches; dark brown (10YR 4/3) silty clay loam, light yellowish brown (10YR 6/4) dry; moderate medium subangular blocky structure; hard, firm, sticky and plastic; weakly smeary; common fine and medium roots; many fine tubular pores; 40 percent fragments of soft siltstone; strongly acid; clear wavy boundary.

C—42 to 48 inches; dark yellowish brown (10YR 6/4) silty clay loam, dark yellowish brown (10YR 4/4) dry; massive; hard, firm, sticky and plastic; few medium roots; many fine tubular pores; 70 percent fragments of soft siltstone; strongly acid; clear wavy boundary.

Cr—48 inches; weathered siltstone.

The depth to paralithic contact is 40 to 60 inches. Fragments of soft rock make up 15 to 35 percent of the particle-size control section. The soils are medium acid or strongly acid throughout.

The A horizon has hue of 7.5YR or 10YR, value of 2 or 3 when moist and 4 or 5 when dry, and chroma of 2 or 3 when moist or dry. The Bw horizon has hue of 7.5YR or 10YR, value of 3 or 4 when moist and 5 or 6 when dry, and chroma of 3 or 4 when moist or dry. It is silty clay loam or clay loam. Fragments of soft rock

make up 15 to 40 percent of the Bw horizon and 60 to 90 percent of the C horizon.

Wilkeson Series

The Wilkeson series consists of very deep, well drained soils on uplands and mountains. These soils formed in material weathered from andesite and basalt. Slope is 5 to 40 percent. Elevation is 600 to 1,200 feet. The average annual precipitation is 50 to 70 inches, the average annual air temperature is about 47 degrees F, and the average frost-free season is 125 to 175 days.

These soils are fine-loamy, mixed, mesic Ultic Haploxeralfs.

Typical pedon of Wilkeson silt loam, 5 to 20 percent slopes, 2 miles south of Vail; about 650 feet west and 300 feet south of the northeast corner of sec. 3, T. 15 N., R. 1 E.

A1—0 to 5 inches; dark brown (10YR 3/3) silt loam, brown (10YR 5/3) dry; strong very fine, fine, and medium subangular blocky structure; hard, friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine and fine tubular pores; medium acid; abrupt smooth boundary.

A2—5 to 11 inches; dark brown (7.5YR 3/2) silt loam, brown (10YR 5/3) dry; strong fine and medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine roots; common very fine and fine tubular pores; medium acid; gradual wavy boundary.

Bt1—11 to 23 inches; dark yellowish brown (10YR 4/4) gravelly silty clay loam, yellowish brown (10YR 5/4) dry; moderate medium subangular blocky structure; hard, firm, slightly sticky and slightly plastic; few very fine roots; common very fine and fine tubular pores; few thin clay films on faces of peds and lining pores; 15 percent angular pebbles; medium acid; clear wavy boundary.

Bt2—23 to 47 inches; dark brown (7.5YR 4/4) gravelly silty clay loam, yellowish brown (10YR 5/4) dry; moderate medium subangular blocky structure; hard, firm, sticky and plastic; few very fine roots; common very fine and fine tubular pores; common moderately thick clay films on faces of peds and lining pores; 20 percent angular pebbles; strongly acid; gradual wavy boundary.

Bt3—47 to 60 inches; dark brown (7.5YR 4/4) gravelly clay loam, brown (7.5YR 5/4) dry; moderate medium subangular blocky structure; hard, firm, slightly sticky and slightly plastic; few very fine and fine tubular pores; few moderately thick clay films

on faces of peds and lining pores; 20 percent angular pebbles; strongly acid.

The soils are strongly acid or medium acid throughout. The particle-size control section ranges from 18 to 35 percent clay and from 15 to 25 percent coarse fragments.

The A horizon has chroma of 2 or 3 when moist or dry. The Bt horizon has hue of 10YR or 7.5YR, value of 4 or 5 when moist and 5 or 6 when dry, and chroma of 3 or 4 when moist or dry. It is clay loam or silty clay loam.

Yelm Series

The Yelm series consists of deep, moderately well drained soils on terraces. These soils formed in glacial outwash. Slope is 0 to 30 percent. Elevation is 25 to 300 feet. The average annual precipitation is 40 to 60 inches, the average annual air temperature is about 51 degrees F, and the average frost-free season is 170 to 200 days.

These soils are medial, mesic, Aquic Dystric Xerochrepts.

Typical pedon of Yelm fine sandy loam, 0 to 3 percent slopes, 2 miles southeast of Olympia; about 950 feet east and 1,950 feet south of the northwest corner of sec. 31, T. 18 N., R. 1 W.

Apc—0 to 8 inches; dark brown (7.5YR 3/2) fine sandy loam, grayish brown (10YR 5/2) dry; moderate very fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; weakly smeary; many fine roots; many very fine interstitial pores; 20 percent shotlike aggregates; medium acid; abrupt smooth boundary.

Bw1—8 to 17 inches; dark yellowish brown (10YR 4/4) fine sandy loam, pale brown (10YR 6/3) dry; few faint greenish gray (5GY 6/1) mottles; weak very fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; weakly smeary; common fine roots; many very fine interstitial pores; medium acid; clear wavy boundary.

Bw2—17 to 36 inches; dark grayish brown (2.5Y 4/2) fine sandy loam, light brownish gray (2.5Y 6/2) dry; few fine faint very dark grayish brown (2.5Y 3/2) organic masses 1 to 2 inches in diameter; few fine faint greenish gray (5GY 6/1) mottles; weak very fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; weakly smeary; few fine roots; many very fine interstitial pores; medium acid; gradual wavy boundary.

Bw3—36 to 46 inches; olive brown (2.5Y 4/4) fine sandy loam, grayish brown (2.5Y 5/2) dry; weak very fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; weakly smeary; few fine roots; many very fine interstitial pores; medium acid; abrupt smooth boundary.

C—46 to 60 inches; light olive brown (2.5Y 5/4) loamy sand, light gray (2.5Y 7/2) dry; loose; nonsticky and nonplastic; weakly smeary; slightly acid.

The soils are medium acid or slightly acid throughout. The A horizon has hue of 10YR or 7.5YR, value of 4 or 5 when dry, and chroma of 2 or 3 when moist or dry. The Bw horizon has hue of 10YR or 5Y, value of 4 or 5 when moist and 5 to 8 when dry, and chroma of 2 to 4 when moist or dry. It has greenish gray (5GY 6/1 or 5/1) mottles. It is dominantly fine sandy loam, but in some areas it has lenses of silt loam or loamy sand.

Formation of the Soils

Soil is a product of the soil-forming processes acting on material deposited or accumulated through geologic forces. The important factors in soil formation are parent material, climate, living organisms, relief, and time.

Climate and living organisms, particularly vegetation, are the active forces in soil formation. Their effect on the parent material is modified by topography and by the length of time that the parent material has been in place. The relative importance of each factor differs from place to place. Occasionally one factor dominates and, therefore, controls development of most of the properties of the soil, but normally all five factors interact to determine the kind of soil that develops in any given place.

Parent Material

Thurston County can be divided into seven major and somewhat distinct geologic areas (4, 10, 13, 17, 26). These areas do not form contiguous units everywhere, nor can they be considered discreet physiographic provinces. They are described in the following paragraphs.

Bald Hills. This area is along the southern boundary of Thurston County. Virtually all of the bedrock within this area is mapped as Tertiary (2 to 50 million years old) volcanic rocks consisting of basalt, andesite, and related sedimentary deposits. The upper part of the bedrock is intensively weathered in many places. The weathering has resulted in the formation of soils that are many feet thick. Most of the soils in the Baumgard-Wilkeson, Pheeney-Mal, Melbourne-Centralia, and Salkum-Prather associations formed in these deposits.

Clam Mountain is an upland surface in this geologic area. It has a very flat summit. The nature of this surface suggests a previous cycle of erosion occurring in the early Pleistocene or perhaps the Pliocene. The surface is being incised by the present cycle of erosion, which apparently started shortly before Wisconsin time. Upland surfaces of similar topography are in areas both east and west of Clam Mountain. They are mantled by

deposits of the Logan Hill Formation. The Baumgard-Wilkeson and Pheeney-Mal associations are in this area.

Black Hills. This area is along the western boundary of the county. The volcanic rocks in this area are of Tertiary age and are underlain by basaltic rocks of Eocene and late Eocene age (37 to 53 million years old). In many places the basalt is columnar or is massive and glassy. Most of the soils in the Olympic-Raught and Schneider-Delphi associations formed in this parent material.

The Black Hills show evidence of one or more previous erosion cycles. The evidence of these cycles, however, is not so strongly expressed as that in the Bald Hills. Capitol Peak and the Larch Mountains are probably remnants of an erosion surface of low relief that has been almost completely destroyed by the present erosion cycle. Capitol Peak is mostly bare, fresh rock, but the lower slopes are covered with very thick, red residual soil that apparently thickens towards the lower elevations because of soil creeping. Outcrops on the lower slopes occur only where streams or artificial cuts have removed the soil.

Michigan Hill. This area is in the southwest corner of the county. The Tertiary core of these uplands consists of poorly consolidated, tuffaceous sandstone and siltstone sediments of the Lincoln Formation (22 to 37 million years old). The soils in the Salkum-Prather and Melbourne-Centralia association formed in these sediments.

Maytown Upland. This upland is in the south-central part of the county, between the towns of Maytown and Tenino. In this area Wisconsin-age drift and deposits of the Logan Hill Formation (1 to 2 million years old) form a generally thick mantle over a core of Tertiary tuffaceous siltstone, andesite, and basalt and marine, nonmarine, and brackish-water sedimentary rocks and interbedded coal deposits of the Skookumchuck, McIntosh, and Northcraft Formations (37 to 53 million years old). The soils in the Cathcart-Tenino association formed in these parent materials.

Kame-Kettle Area. This area is in the east-central part of the county, between the towns of Rainier and Yelm and around Clear Lake. Most of the materials were deposited as ice-contact outwash laid down as an end moraine of the Yelm lobe of the Vashon glacier. The area has a kame and kettle topography formed through the deposition of drift in contact with wasting ice. Closed depressions (kettles) are numerous. Many contain lakes, but most are dry. The areas of hummocky topography consist mainly of rudely stratified outwash of sand and gravel that contains local lenses or pods of till. Baldhill, Indianola, and Kapowsin soils formed in this area.

Peninsular Area. This area is in the northern part of the county and is geologically and topographically similar to the coastal regions and islands of the remainder of the southern Puget Sound region. Vashon-age glacial till mantles much of the surface, and the topography was fashioned by the action of the advancing Vashon glacier. In a few areas where it is more than 20 feet thick, the till is underlain by a complex assortment of Wisconsin-age deposits, including Vashon-advance outwash, Colvos Sand, the Kitsap Formation, and Salmon Springs Drift. Most of the soils in the Alderwood-Everett association formed in Vashon till.

Prairie Area. This area is mainly in the central part of the county. It was covered by glacial meltwater during the receding stages of the Vashon glacier and consequently is of gentle relief. The surface deposits are almost entirely Vashon recessional outwash. Most of the soils in the Spanaway-Nisqually association formed in these deposits. Most of the southern prairies and those adjacent to the Nisqually River are underlain by gravelly outwash, whereas the northern prairies bear a mantle of silty and sandy outwash of varying thickness. Some valley areas have been subsequently covered with postglacial alluvium.

Almost all of the southern gravelly prairies have a thin mantle of black, gravelly soil that allows rapid percolation of water to the very permeable gravel beneath. These prairies are used mainly for grazing. Some crop production is possible if the soil is irrigated and fertilized. Information on the subsurface is inadequate. Well logs, however, indicate a hardpan layer within 40 feet of the surface. This hardpan is tentatively described as Salmon Springs Drift (35,000 to 40,000 years old), but in places it may be Vashon till.

The northern sand-covered prairies, which include the Nisqually and Yelm soils, are generally the most productive agricultural areas because they retain more moisture than the gravel prairies. The sand varies

greatly in thickness. In the vicinity of Olympia, it is very thick. In most places it overlies recessional gravel; near Olympia it overlies fine grained deposits of pre-Salmon Springs age.

Although it differs genetically, the area north of the Mima Prairie and east of Waddell Creek is included in the Prairie Area. The surface deposits occur as a Vashon end moraine. This region has moderate to steep relief and is heavily forested in most places. The deposits in the southern part of the area are Vashon ice-contact outwash. The topography is pitted, as is typical of end moraines. In the northern part of the area, the Vashon outwash is thinner. It most likely overlies thick deposits of Salmon Springs gravel, which is probably part of a Salmon Springs end moraine that was modified by erosion in pre-Vashon time. Tertiary volcanic rock probably underlies the Wisconsin-age deposits in the entire area.

Mima mounds are in areas underlain by Vashon recessional gravel throughout the southern part of the Prairie Area, from Weir Prairie westward. They are a striking physiographic feature where they are well developed. They range in size from barely perceptible swells on the prairie surface to a maximum height of about 7 feet on the Mima and Rocky Prairies. They range from 6 to 70 feet in diameter. The average diameter is about 40 feet.

Some areas include well developed mounds and a few incipiently developed mounds, whereas other areas include only incipiently developed mounds and no large ones. Most of the mounds are closely but irregularly spaced, so that mound areas are roughly equal to intermound areas, but a few isolated mounds are evident on otherwise moundless prairies. The mounds may occur on several terrace levels of any one prairie, such as the Weir Prairie. The higher terraces generally have the best developed mounds. The mounds consist of black, gravelly silt and sand underlain by rudely stratified sand and gravel outwash. The origin of the mounds has long been a controversial subject that has given rise to numerous speculations.

Climate

Climate is directly or indirectly responsible for variations in plant and animal life and for major differences among soils. It affects the rate of weathering of parent materials and the rate of removal and redeposition of material by water, wind, and glaciers.

Thurston County has a marine climate. Summers are cool and dry, and winters are mild, but wet and cloddy. Rainfall is heavier and temperatures are lower at the

higher elevations in the mountains than in the valleys. Rains, however, are gentle. They moisten the soil much more effectively than torrential downpours. The rainwater soaks into the soil and percolates downward. In regions where rainfall is high, soils are more highly leached than they are in semiarid and desert regions. For this reason, most of the bases (nutrient cations) have been leached out of the soils in the county. The soils are generally acid.

Climate has a marked effect on the productivity and fertility of soils. At the higher elevations, the growing season is shorter, spring frost is later, fall frost is earlier, and the average annual temperature is lower than at the lower elevations. Soils at the higher elevations are, therefore, generally less productive than those at the lower elevations. For example, the Bunker soils produce about 171 cubic feet of Douglas-fir per acre per year at elevations below 1,800 feet, while the similar Lates soils, which occur at elevations ranging from 1,800 to 2,600 feet, produce only about 142 cubic feet of Douglas-fir per acre per year.

Living Organisms

All life on and in the soil affects soil formation. The raw soil material is first invaded by simple forms of life, such as bacteria and fungi, that grow and multiply. Mosses and lichens appear, followed by grasses, shrubs, and trees.

Plants and animals furnish organic matter to the soil and transfer plant nutrients from the lower layers of the soil to the upper ones. Grasses and trees drop their dead leaves and trunks on the surface of the soil, and these furnish an enormous quantity of organic material to the soil over a long period. The roots of these plants permeate the soil, sometimes to a depth of many feet, and make it more porous than the parent material. The decay of roots, especially those of grasses, also adds organic matter to the soil. The organic material from grasses and leaves is consumed by worms, bacteria, and fungi and is thus mixed with the mineral soil material.

Deep-rooted plants absorb water from horizons deep in the profile. The water is absorbed into the stems, trunks, and leaves. It includes a certain amount of dissolved mineral material. When the leaves fall and the plants themselves decay, these minerals are returned to the surface of the soil. This process enriches the surface layer. Nutrient cycling is an important process in humid regions where there is a great amount of leaching. Nutrients released from organic material through the process of decaying can be leached from

the surface and carried downward by percolating water. Plant roots may intercept the downward moving water and carry the water and dissolved nutrients back up to the part of the plants above the surface.

Soils that formed under grass and brackenfern, both of which have fibrous, deep-reaching roots, have a deep, very dark brown to black surface layer that is high in content of organic matter. Spanaway and Nisqually are examples of soils that formed under a partial cover of brackenfern. Soils that formed under coniferous and deciduous vegetation generally have a thinner, very dark grayish brown to brown surface layer that is lower in content of organic matter. The Rainier soils are an example.

The decay of forest debris causes the formation of organic acids of various kinds, including carbonic acid. These acids hasten the leaching process of soils and soil material. Most forested soils in humid regions are medium acid or strongly acid. For example, Bunker soils, are medium acid.

The remains of sedges, rushes, moss, Labrador tea, and other plants that tolerate wetness and have grown in standing water have accumulated and formed peat in bog areas. Mukilteo muck is an example of a soil that formed in these areas (7).

Animals convert plant remains into organic matter. They eat the plants, and the waste is returned to the soil, where it is further transformed into organic matter.

Burrowing animals, such as mice, moles, and mountain beaver, mix soil horizons and thus supply a certain amount of fresh parent material to the surface layer, which has been leached of plant nutrients. In places the steep and very steep Bunker soils have been subject to mixing and churning by the mountain beaver. Earthworms consume and thus break down organic matter. As a result, they enrich many tons of soil per acre each year. In many places the burrows of worms or small animals extend deeply into the soil, and the excavated materials are spread out over the surface. When the burrows are abandoned, the cavities fill with surface soil that is rich in organic material. It is possible for roots to grow rapidly through some of this relatively rich material and to penetrate more deeply into the substratum than would otherwise be possible.

Micro-organisms play an important part in the development of soils. They change raw plant material into organic matter. Bacteria and various kinds of fungi help to decompose dead leaves and other plant remains, which are then incorporated into the soil as organic matter. Microscopic soil animals and insects also live on these plant remains and help to convert them into soil material.

Relief

The shape of the landscape influences soil formation through its effect on the amount of runoff and erosion on the surface, the stability of the soil material, and soil drainage. Runoff becomes more rapid as slope increases. Consequently, geologic erosion on steep slopes probably has contributed more to the parent material of soils on toe slopes, benches, valleys, and alluvial bottom land than erosion on broad, relatively flat plains, uplands, and ridges. Once established, vegetation stabilizes the soils on all slopes, so that the rate of erosion decreases and the rate of profile development increases.

When soils are exposed because of clear-cut harvesting, road construction, forest fires, or farming, the potential for erosion increases. Erosion on bare slopes is almost always greater on the steeper terrain, although unprotected soils in undulating to rolling areas are subject to severe losses during the rainy season or under saturated conditions. Soil material may be moved only short distances, rounding off hilltops and filling nearby swales. Sheet erosion generally carries away surface soil. Rill and gully erosion can cut into the subsoil and substratum. Mass-wasting on steep slopes can remove all soil material above the regolith, as it has done in some areas of the steep Centralia and Melbourne soils following timber harvest.

Soils that formed in broad, nearly level to moderately sloping areas in the part of the county that was not glaciated are typically deeper, have fewer rock fragments (or fragments that are highly weathered or very soft), and are more strongly developed than soils on steep or colluvial side slopes. Soil creep is a problem on steep soils. It prevents colluvial soils, such as the Baumgard and Schneider soils, from developing a clay-rich B horizon and from weathering as rapidly or as deeply into the regolith as the associated, less steep Olympic and Wilkeson soils.

Relief results in the removal of runoff from hillsides and the collection of water in swales, basins, and low spots, as is indicated by the soils in the Salkum-Prather association on rolling glaciofluvial outwash plains. The well drained Salkum soils commonly are in the higher positions on the landscape, such as the broad, slightly rounded upper part of terraces, hills, and ridges, from which water is readily drained. The moderately well drained Prather soils are in the flatter areas below the Salkum soils. The somewhat poorly drained Galvin and Scamman soils commonly are in the lowest landscape positions, such as toe slopes, depression areas, and

drainageways, which are most likely to receive and collect runoff.

Although the Salkum soils are silty clay and clay and are moderately slowly permeable, they are in landscape positions that keep them well drained. They are dark brown, brown, and red, colors which indicate good aeration and drainage. Consequently, they support stands of Douglas-fir. The undrained Lacamas soils are ponded in winter and spring. They are poorly aerated and are mottled gray (gleyed) clay below the surface layer. When dry in summer, this clay is hard and impenetrable. As a result, these soils support mixed deciduous trees, including red alder and Oregon ash, and limited types of ground cover, such as wetland plants and salmonberry brush. Where conifers do grow, they either are poor stands of Douglas-fir or are lodgepole pine. The differences in drainage, color, aeration, fertility, and plant cover between the Salkum and Lacamas soils and between the Salkum and Lacamas soils and the intermediate Prather and Scamman soils appear to be mainly the result of their relative positions on the landscape.

Soils on bottom land formed in alluvium deposited by runoff from the surrounding uplands and by floodwater from the adjacent streams and rivers that carried material down valleys from the higher elevations. The frequency and length of flooding can affect soil formation and land use. The well drained Chehalis and Newberg soils are subject only to minor flooding in winter and early in spring; therefore, fertility and cropping are not seriously affected. Minor flooding can be beneficial because it adds nutrients and silty fines to the soil. The poorly drained Godfrey soils are occasionally flooded. Unless the soils are drained, they are waterlogged much of the year and do not dry out sufficiently until midsummer. As a result, soil development is slower than in other soils. The natural vegetation is mainly wetland plants. Semiahmoo soils are in depressions on flood plains or bottom land where drainage outlets are limited. Runoff is very slow or ponded, and water becomes stagnant. These soils mainly support rushes and sedges. They formed in the dead plant material that accumulated as muck and peat.

Time

The length of time required for the formation of a given kind of soil depends on the interaction of climate with the kinds and amounts of living organisms, the parent material, and relief. In time a soil profile that has two or more horizons develops. Young soils have

weakly expressed horizons, while older soils have strongly expressed ones. Distinct horizons develop more slowly in steep soils than in nearly level soils, and soils in arid climates develop more slowly than soils in humid climates.

Spanaway and Salkum soils formed under nearly identical climatic conditions. They are also in close geographic proximity. Salkum soils formed in the oldest glacial deposit in the county. Deposited between 325,000 and 1.5 million years ago, the glacial outwash was originally silt, sand, and hard, rounded pebbles and cobbles. Time, however, has resulted in weathering to the point that Salkum soils are now clayey. The B horizon exhibits thick, continuous clay films on faces of peds and lining pores. The mineralogy of the clay fraction of these soils includes kaolinite, a clay that indicates a very high degree of weathering. In the upper part of the profile, the rock generally is totally weathered and is no longer recognizable. In the lower part, the rock is unconsolidated or very soft, and the hardest fragment can easily be cut with a knife.

Spanaway soils formed in very coarse glacial outwash that is only 12,000 years old. The outwash is primarily very gravelly and cobbly sand. These soils have not weathered greatly in comparison to the much older Salkum soils. There has been no translocation of clays and little weathering of rock. The B horizon is thin and weakly expressed. The C horizon is extremely gravelly sand. Rounded pebbles and cobbles are very hard throughout the profile. Perhaps in 300,000 to 1 million years, if the climate does not change, Spanaway soils will more closely resemble Salkum soils.

Newberg soils formed in young alluvium on flood plains. They are weakly developed, and their parent material shows little evidence of change other than a darkening of the A horizon. There is no evidence of clay movement.

The slumping of soil material on hills alters residual soils by burying, shattering, and mixing the material in the slumped block. New surfaces are exposed to weathering, which results in local differences in age and in degree of development.

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Glossary

Ablation till. Loose, permeable till deposited during the final downwasting of glacial ice. Lenses of crudely sorted sand and gravel are common.

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.

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.

Alluvial terrace. A stream terrace made up of unconsolidated alluvium (including gravel), formed through renewed downcutting of the flood plain or valley floor by a rejuvenated stream or through the later covering of a terrace with alluvium.

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

Angle of repose. The maximum angle of slope at which loose, cohesionless material will come to rest on a pile of similar material.

Animal-unit-month (AUM). The amount of forage required by one mature cow of approximately 1,000 pounds weight, with or without a calf, for 1 month.

Area reclaim (in tables). An area difficult to reclaim after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

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

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of

soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as—

Low	less than 3.75
Moderate	3.75 to 7.5
High	more than 7.5

Back slope. The geomorphic component that forms the steepest inclined surface and principal element of many hillsides. Back slopes in profile are commonly steep, are linear, and may or may not include cliff segments.

Basal area. The area of a cross section of a tree, generally referring to the section at breast height and measured outside the bark. It is a measure of stand density, commonly expressed in square feet.

Basal till. Compact glacial till deposited beneath the ice.

Base saturation. The degree to which material having cation-exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, 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.

Bottom land. The normal flood plain of a stream, subject to flooding.

Boulders. Rock fragments larger than 2 feet (60 centimeters) in diameter.

Breast height. An average height of 4½ feet above the ground surface; the point on a tree where diameter measurements are ordinarily taken.

Brush management. Use of mechanical, chemical, or biological methods to reduce or eliminate competition of woody vegetation to allow understory grasses and forbs to recover, or to make conditions favorable for reseeding. It increases production of forage, which reduces erosion. Brush management may improve the

habitat for some species of wildlife.

Cable yarding. A method of moving felled trees to a nearby central area for transport to a processing facility. Most cable yarding systems involve use of a drum, a pole, and wire cables in an arrangement similar to that of a rod and reel used for fishing. To reduce friction and soil disturbance, felled trees generally are reeled in while one end is lifted or the entire log is suspended.

Canopy. The leafy crown of trees or shrubs. (See *Crown*.)

Capillary water. Water held as a film around soil particles and in tiny spaces between particles. Surface tension is the adhesive force that holds capillary water in the soil.

Chemical treatment. Control of unwanted vegetation by use of chemicals.

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.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coating, clay skin.

Coarse fragments. Mineral or rock particles larger than 2 millimeters in diameter.

Coarse textured soil. Sand or loamy sand.

Cobble (or cobblestone). A rounded or partly rounded fragment of rock 3 to 10 inches (7.6 to 25 centimeters) in diameter.

Cobbly soil material. Material that is 15 to 35 percent, by volume, rounded or partially rounded rock fragments 3 to 10 inches (7.5 to 25 centimeters) in diameter. Very cobbly soil material is 35 to 60 percent of these rock fragments, and extremely cobbly soil material is more than 60 percent.

Colluvial side slope. Any slope upon which the process of mass-wasting is now or has been active, resulting in an incorporation of fractured chips or rock fragments into the soil matrix. This process usually is classified as soil creep. More rapid forms of mass movement do occur, such as earth flows, rockslides, avalanches, and falls, on steeper slopes.

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

Compaction. The process by which a soil mass loses pore space and achieves a higher bulk density in response to increased load or compressive stress.

Complex slope. Irregular or variable slope. Planning or

constructing terraces, diversions, and other water-control measures on a complex slope is difficult.

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.

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

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

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

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

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

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

Sticky.—Adheres to other material and tends to stretch somewhat and pull apart rather than to pull free from other material.

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

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

Cemented.—Hard; little affected by moistening.

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

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

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

Crop residue management. Returning crop residue to the soil, which helps to maintain soil structure,

organic matter content, and fertility and helps to control erosion.

Cropping system. Growing crops using a planned system of rotation and management practices.

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.

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

Cut slope. The uphill slope left after earth-moving equipment has excavated or cut into the hillside to make a roadbed.

Delta. A body of alluvium whose surface is nearly flat and fan shaped, deposited at or near the mouth of a river or stream where it enters a body of relatively quiet water, generally a sea or lake.

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

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

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

Excessively drained.—These soils have very high and high hydraulic conductivity and low water holding capacity. They are not suited to crop production unless irrigated.

Somewhat excessively drained.—These soils have high hydraulic conductivity and low water holding capacity. Without irrigation, only a narrow range of crops can be grown and yields are low.

Well drained.—These soils have intermediate water holding capacity. They retain optimum amounts of moisture, but they are not wet close enough to the surface or long enough during the growing season to adversely affect yields.

Moderately well drained.—These soils are wet

close enough to the surface or long enough that planting or harvesting operations or yields of some field crops are adversely affected unless artificial drainage is provided. Moderately well drained soils commonly have a layer with low hydraulic conductivity, a wet layer relatively high in the profile, additions of water by seepage, or some combination of these.

Somewhat poorly drained.—These soils are wet close enough to the surface or long enough that planting or harvesting operations or crop growth is markedly restricted unless artificial drainage is provided. Somewhat poorly drained soils commonly have a layer with low hydraulic conductivity, a wet layer high in the profile, additions of water through seepage, or a combination of these.

Poorly drained.—These soils commonly are so wet at or near the surface during a considerable part of the year that field crops cannot be grown under natural conditions. Poorly drained conditions are caused by a saturated zone, a layer with low hydraulic conductivity, seepage, or a combination of these.

Very poorly drained.—These soils are wet to the surface most of the time. They are wet enough to prevent the growth of important crops (except rice) unless artificially drained.

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

Duff. A term used to identify a generally firm organic layer on the surface of mineral soils. It consists of fallen plant material that is in the process of decomposition and includes everything from the litter on the surface to underlying pure humus.

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

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

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

Erosion (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of the activities of man or other animals or of a

- catastrophe in nature; for example, fire that exposes the surface.
- Escarpment.** A relatively continuous and steep slope or cliff breaking the general continuity of more gently sloping land surfaces and produced by erosion or faulting. Synonym: scarp.
- Esker** (geology). A narrow, winding ridge of stratified gravelly and sandy drift deposited by a stream flowing in a tunnel beneath a glacier.
- Excess fines** (in tables). Excess silt and clay in the soil. The soil does not provide a source of gravel or sand for construction purposes.
- Excess salts** (in tables). Excess water-soluble salts in the soil that restrict the growth of most plants.
- Extrusive rock.** Igneous rock derived from deep-seated molten matter (magma) emplaced on the earth's surface.
- Fast intake** (in tables). The rapid movement of water into the soil.
- Fertility, soil.** The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.
- Fibric soil material (peat).** The least decomposed of all organic soil material. Peat contains a large amount of well preserved fiber that is readily identifiable according to botanical origin. Peat has the lowest bulk density and the highest water content at saturation of all organic soil material.
- Field moisture capacity.** The moisture content of a soil, expressed as a percentage of the oven-dry weight, after the gravitational, or free, water has drained away; the field moisture content 2 or 3 days after a soaking rain; also called *normal field capacity*, *normal moisture capacity*, or *capillary capacity*.
- 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, and clay.
- Firebreak.** Area cleared of flammable material to stop or help control creeping or running fires. It also serves as a line from which to work and to facilitate the movement of men and equipment in fire fighting. Designated roads also serve as firebreaks.
- First bottom.** The normal flood plain of a stream, subject to frequent or occasional flooding.
- 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.
- Foothill.** A steeply sloping upland that has relief of as much as 1,000 feet (or 300 meters) and fringes a mountain range or high-plateau escarpment.
- Foot slope.** The inclined surface at the base of a hill.
- 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.
- Frost action** (in tables). Freezing and thawing of soil moisture. Frost action can damage roads, buildings and other structures, and plant roots.
- Genesis, soil.** The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.
- Glacial drift** (geology). Pulverized and other rock material transported by glacial ice and then deposited. Also the sorted and unsorted material deposited by streams flowing from glaciers.
- Glacial outwash** (geology). Gravel, sand, and silt, commonly stratified, deposited by glacial meltwater.
- Glacial till** (geology). Unsorted, nonstratified glacial drift consisting of clay, silt, sand, and boulders transported and deposited by glacial ice.
- Glaciofluvial deposits** (geology). Material moved by glaciers and subsequently sorted and deposited by streams flowing from the melting ice. The deposits are stratified and occur as kames, eskers, deltas, and outwash plains.
- Glaciolacustrine deposits.** Material ranging from fine clay to sand derived from glaciers and deposited in glacial lakes mainly by glacial meltwater. Many deposits are interbedded or laminated.
- Gleyed soil.** Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors and mottles.
- Grassed waterway.** A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.
- Gravel.** Rounded or angular fragments of rock as much as 3 inches (2 millimeters to 7.6 centimeters) in diameter. An individual piece is a pebble.
- Gravelly soil material.** Material that is 15 to 50 percent, by volume, rounded or angular rock fragments, not

prominently flattened, as much as 3 inches (7.6 centimeters) in diameter.

Green manure crop (agronomy). A soil-improving crop grown to be plowed under in an early stage of maturity or soon after maturity.

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

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

Hard rock. Rock that cannot be excavated except by blasting or by the use of special equipment that is not commonly used in construction.

Hardpan. A hardened or cemented soil horizon, or layer. The soil material is sandy, loamy, or clayey and is cemented by iron oxide, silica, calcium carbonate, or other substance.

Head out. To form a flower head.

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

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.

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.

E horizon.—The mineral horizon in which the main feature is loss of silicate clay, iron, aluminum, or some 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, the number 2 precedes the letter C.

R layer.—Consolidated rock beneath the soil. The rock commonly underlies a C horizon, but it can be directly below an A or a B horizon.

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

Hydrologic soil groups. Refers to soils grouped according to their runoff-producing characteristics. The chief consideration is the inherent capacity of soil bare of vegetation to permit infiltration. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff. Soils are assigned to four groups. In group A are soils having a high infiltration rate when thoroughly wet and having a low runoff potential. They are mainly deep, well drained, and sandy or gravelly. In group D, at the other extreme, are soils having a very slow infiltration rate and thus a high runoff potential. They have a claypan or clay layer at or near the surface, have a permanent high water table, or are shallow over nearly impervious bedrock or other material. A soil is assigned to two hydrologic groups if part of the acreage is artificially drained and part is undrained.

Igneous rock. Rock formed by solidification from a molten or partially molten state. Major varieties include plutonic and volcanic rock. Examples are andesite, basalt, and granite.

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

Impervious soil. A soil through which water, air, or roots penetrate slowly or not at all. No soil is

absolutely impervious to air and water all the time.

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

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

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

Intake rate. The average rate of water entering the soil under irrigation. Most soils have a fast initial rate; the rate decreases with application time.

Therefore, intake rate for design purposes is not a constant but is a variable depending on the net irrigation application. The rate of water intake in inches per hour is expressed as follows:

Less than 0.2	.....	very low
0.2 to 0.4	.....	low
0.4 to 0.75	.....	moderately low
0.75 to 1.25	.....	moderate
1.25 to 1.75	.....	moderately high
1.75 to 2.5	.....	high
More than 2.5	.....	very high

Intermittent stream. A stream, or reach of a stream, that flows for prolonged periods only when it receives ground water discharge or long, continued contributions from melting snow or other surface and shallow subsurface sources.

Irrigation. Application of water to soils to assist in production of crops. Methods of irrigation are—
Border.—Water is applied at the upper end of a strip in which the lateral flow of water is controlled by small earth ridges called border dikes, or borders.

Basin.—Water is applied rapidly to nearly level plains surrounded by levees or dikes.

Controlled flooding.—Water is released at intervals from closely spaced field ditches and distributed uniformly over the field.

Corrugation.—Water is applied to small, closely spaced furrows or ditches in fields of close-growing crops or in orchards so that it flows in only one direction.

Drip (or trickle).—Water is applied slowly and under low pressure to the surface of the soil or into the soil through such applicators as emitters, porous tubing, or perforated pipe.

Furrow.—Water is applied in small ditches made

by cultivation implements. Furrows are used for tree and row crops.

Sprinkler.—Water is sprayed over the soil surface through pipes or nozzles from a pressure system.

Subirrigation.—Water is applied in open ditches or tile lines until the water table is raised enough to wet the soil.

Wild flooding.—Water, released at high points, is allowed to flow onto an area without controlled distribution.

Lacustrine deposit (geology). Material deposited in lake water and exposed when the water level is lowered or the elevation of the land is raised.

Landslide. The rapid downhill movement of a mass of soil and loose rock, generally when wet or saturated. The speed and distance of movement, as well as the amount of soil and rock material, vary greatly.

Large stones (in tables). Rock fragments 3 inches (7.5 centimeters) or more across. Large stones adversely affect the specified use of the soil.

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

Light textured soil. Sand and loamy sand.

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

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

Loess. Fine grained material, dominantly of silt-sized particles, deposited by wind.

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

Mechanical treatment. Use of mechanical equipment for seeding, brush management, and other management practices.

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

Metamorphic rock. Rock of any origin altered in mineralogical composition, chemical composition, or structure by heat, pressure, and movement. Nearly all such rocks are crystalline.

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

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

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, and fine sandy loam.

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

Moraine (geology). An accumulation of earth, stones, and other debris deposited by a glacier. Some types are terminal, lateral, medial, and ground.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil. Irregular spots of different colors that vary in number and size. Mottling generally indicates poor aeration and impeded drainage. Descriptive terms are as follows: abundance—*few*, *common*, and *many*; size—*fine*, *medium*, and *coarse*; and contrast—*faint*, *distinct*, and *prominent*. The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium*, from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse*, more than 15 millimeters (about 0.6 inch).

Mountain. A natural elevation of the land surface, rising more than 1,000 feet above surrounding lowlands, commonly of restricted summit area (relative to a plateau) and generally having steep sides and considerable bare-rock surface. A mountain can occur as a single, isolated mass or in a group forming a chain or range.

Muck. Dark colored, finely divided, well decomposed organic soil material. (See Sapric soil material.)

Munsell notation. A designation of color by degrees of the three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color in hue of 10YR, value of 6, and chroma of 4.

Narrow ridgetops. Sharp-crested, linear elevations occurring either as an independent hill or as part of a larger mountain or hill; e.g., an extended upland between valleys. These are generally between 50 and 300 feet wide at the crest and are associated with side slopes in excess of 30 percent.

Natural reforestation. The process through which seedlings become established from seed disseminated by nearby trees. The expected period needed for natural reforestation is described in the following terms: *readily*, seedlings expected to occupy the area in 2 to 5 years; *periodically*, 5 to 10 years; and *infrequently*, 10 to 20 years.

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

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

Observed rooting depth. Depth to which roots have been observed to penetrate.

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

Outwash plain. A landform of mainly sandy or coarse textured material of glaciofluvial origin. An outwash plain is commonly smooth; where pitted, it generally is low in relief.

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 downward movement of water through the soil.

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

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

Phase, soil. A subdivision of a soil series based on features that affect its use and management. For example, slope, stoniness, and thickness.

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

Piping (in tables). Formation of subsurface tunnels or pipelike cavities by water moving through the soil.

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of

moisture content within which the soil remains plastic.

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

Plowpan. A compacted layer formed in the soil directly below the plowed layer.

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

Poor filter (in tables). Because of rapid permeability or an impermeable layer near the surface, the soil may not adequately filter effluent from a waste disposal system.

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 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.

Prescribed burning. The application of fire to land under such conditions of weather, soil moisture, and time of day as presumably will result in the intensity of heat and spread required to accomplish specific forest management, wildlife, grazing, or fire hazard reduction purposes.

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

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

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

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

Relief. The elevations or inequalities of a landsurface, considered collectively.

Residuum (residual soil material). Unconsolidated, weathered, or partly weathered mineral material that accumulated as consolidated rock disintegrated in place.

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

Road cut. A sloping surface produced by mechanical means during road construction. It is commonly on the uphill side of the road.

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.

Salty water (in tables.) Water that is too salty for consumption by livestock.

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-size particles.

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

Saprolite (soil science). Unconsolidated residual material underlying the soil and grading to hard bedrock below.

Scarification. The act of abrading, scratching, loosening, crushing, or modifying the surface to increase water absorption or to provide a more tillable soil.

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.

Seepage (in tables). The movement of water through

the soil. Seepage adversely affects the specified use.

Sequum. A sequence consisting of an illuvial horizon and the overlying eluvial horizon. (See Eluviation.)

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer or of the substratum. 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.

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

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

Silica. A combination of silicon and oxygen. The mineral form is called quartz.

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.

Site curve (50 year). A set of related curves on a graph that shows the average height of dominant trees for the range of ages on soils that differ in productivity. Each level is represented by a curve. The basis of the curves is the height of dominant trees that are 50 years old or are 50 years old at breast height.

Site curve (100 year). A set of related curves on a graph that show the average height of dominant and codominant trees for a range of ages on soils that differ in productivity. Each level is represented by a curve. The basis of the curves is the height of dominant and codominant trees that are 100 years old or are 100 years old at breast height.

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.

Skidding. A logging system involving either wheeled or tracked equipment that pulls a log from the area in which it was cut to a loading area. The disturbed

area left after skidding is referred to as the "skid trail" or "skidding path."

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.

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

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

Slump. A landslide characterized by a shearing and rotary movement of a generally independent mass of rock or earth along a curved slip surface (concave upward) and about an axis parallel to the slope from which it descends, and by backward tilting of the mass with respect to that slope, so that the slump surface often exhibits a reversed slope facing uphill.

Slump-slide topography. A soil landscape characterized by slumps of varying frequency.

Small stones (in tables). Rock fragments less than 3 inches (7.5 centimeters) in diameter. Small stones adversely affect the specified use of the soil.

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

Soil creep. The gradual, steady downhill movement of soil and loose rock material on slopes that range from sloping to very steep.

Soil depth. Refers to depth of the soil profile. Classes of soil depth are *shallow*, 10 to 20 inches; *moderately deep*, 20 to 40 inches; *deep*, 40 to 60 inches; and *very deep*, more than 60 inches.

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:

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 underlying material. The living roots and plant and animal activities are largely confined to the solum.

Stable soil surfaces. Those soil landscapes which, as a result of favorable underlying geologic material, low annual precipitation, and chemical resistance to weathering, presently are expressed as smooth, nearly level, and weakly dissected local areas. Sufficient time has elapsed for moderately deep or deep profile development.

Stocking. The degree to which an area is effectively covered with living trees. Fully stocked stands have as many trees per acre as can properly use the growing space available.

Stones. Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter if rounded or 6 to 15 inches (15 to 38 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.

Subsoiling. Tilling a soil below normal plow depth, ordinarily to shatter a hardpan or claypan.

Substratum. The part of the soil below the solum.

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

Terminal moraine. A belt of thick glacial drift that generally marks the termination of important glacial advances.

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."

Thin layer (in tables). Otherwise suitable soil material too thin for the specified use.

Till plain. An extensive flat to undulating area underlain by glacial till.

Tilth, soil. The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

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

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

Tuff. A compacted deposit that is 50 percent or more volcanic ash and dust.

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

Valley fill. In glaciated regions, material deposited in stream valleys by glacial meltwater. In nonglaciated regions, alluvium deposited by heavily loaded streams.

Variant, soil. A soil having properties sufficiently different from those of other known soils to justify a new series name, but occurring in such a limited geographic area that creation of a new series is not justified.

Water bars. Smooth, shallow ditches or depressional areas that are excavated at an angle across a sloping road. They are used to reduce the downward velocity of water and divert it off and away from the road surface. Water bars can easily be driven over if constructed properly.

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.

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

Windthrow. The action of uprooting and tipping over trees by the wind.

Yield (woodland). The volume of wood that can be harvested from a forest stand; usually expressed in cubic feet per acre or board feet per acre.

Tables

TABLE 1.--TEMPERATURE AND PRECIPITATION

(Recorded in the period 1951-78 at Olympia and Centralia, Washington, and 1954-78 at La Grande, Washington)

Month	Temperature						Precipitation				
	Average daily maximum	Average daily minimum	Average	2 years in 10 will have--		Average number of growing degree days*	Average	2 years in 10 will have--		Average number of days with 0.10 inch or more	Average snowfall
				Maximum temperature higher than--	Minimum temperature lower than--			Less than--	More than--		
	<u>°F</u>	<u>°F</u>	<u>°F</u>	<u>°F</u>	<u>°F</u>	<u>Units</u>	<u>In</u>	<u>In</u>	<u>In</u>		<u>In</u>
OLYMPIA:											
January----	43.9	31.8	37.9	58	7	72	8.78	4.80	12.04	16	7.1
February---	49.2	32.8	41.0	64	15	89	5.63	3.43	7.61	12	3.1
March-----	52.2	33.0	42.7	69	19	113	4.95	2.78	6.72	13	2.2
April-----	58.4	35.9	47.2	79	25	221	3.13	1.63	4.35	9	.0
May-----	65.6	40.8	53.2	90	28	409	1.90	.94	2.69	7	.0
June-----	70.8	46.4	58.6	91	34	558	1.42	.54	2.12	5	.0
July-----	77.2	48.9	63.1	97	38	716	.74	.12	1.22	2	.0
August-----	76.4	49.0	62.7	97	37	704	1.37	.26	2.22	4	.0
September--	70.9	45.3	58.1	90	31	543	2.35	.85	3.56	6	.0
October----	60.5	39.7	50.1	78	26	313	4.73	2.22	6.76	10	.0
November---	50.2	35.1	42.7	65	17	119	7.69	4.09	10.62	14	1.5
December---	44.8	32.8	38.8	58	12	63	8.47	5.69	11.00	16	1.3
Yearly:											
Average---	60.0	39.3	49.7	---	---	---	---	---	---	---	---
Extreme---	---	---	---	99	2	---	---	---	---	---	---
Total-----	---	---	---	---	---	3,920	51.16	43.89	58.16	114	15.2
LA GRANDE:											
January----	44.9	33.2	39.1	60	14	88	5.36	2.50	7.68	13	6.9
February---	49.1	35.3	42.2	65	21	121	3.52	2.23	4.68	10	4.9
March-----	51.5	35.6	43.6	70	24	138	4.01	2.47	5.38	12	1.6
April-----	57.6	38.5	48.1	79	30	247	3.14	2.10	4.09	10	.6
May-----	65.8	43.9	54.9	88	34	462	2.48	1.65	3.23	8	.0
June-----	71.1	48.9	60.0	91	39	600	2.12	1.12	2.93	6	.0
July-----	77.7	52.2	65.0	95	43	775	.88	.29	1.36	3	.0
August-----	76.9	52.6	64.8	96	43	769	1.61	.28	2.62	4	.0
September--	70.8	49.4	60.1	90	39	603	2.06	.97	2.94	6	.0
October----	60.5	43.6	52.1	78	32	375	3.36	1.83	4.61	9	.1
November---	50.5	37.5	44.0	66	22	147	4.85	2.87	6.62	12	1.0
December---	46.1	34.6	40.3	61	17	101	5.44	3.33	7.33	13	2.2
Yearly:											
Average---	60.2	42.1	51.2	---	---	---	---	---	---	---	---
Extreme---	---	---	---	98	9	---	---	---	---	---	---
Total-----	---	---	---	---	---	4,426	38.83	35.07	42.55	106	17.3

See footnote at end of table.

TABLE 1.--TEMPERATURE AND PRECIPITATION--Continued

Month	Temperature						Precipitation				
	Average daily maximum	Average daily minimum	Average	2 years in 10 will have--		Average number of growing degree days*	Average	2 years in 10 will have--		Average number of days with 0.10 inch or more	Average snowfall
				Maximum temperature higher than--	Minimum temperature lower than--			Less than--	More than--		
	°F	°F	°F	°F	°F	Units	In	In	In		In
CENTRALIA:											
January----	45.1	33.6	39.4	60	11	91	7.63	4.07	10.54	16	5.0
February----	50.3	35.1	42.7	66	19	114	4.85	3.06	6.46	12	2.2
March-----	53.5	35.3	44.4	71	22	153	4.80	2.64	6.55	13	1.1
April-----	60.1	38.3	49.3	80	28	279	3.04	1.60	4.21	9	.0
May-----	67.4	43.3	55.3	91	31	474	2.05	1.17	2.76	7	.0
June-----	72.3	48.6	60.5	93	38	615	1.78	.85	2.53	6	.0
July-----	78.0	51.3	64.7	97	41	766	.84	.19	1.34	3	.0
August-----	77.0	51.5	64.3	97	41	753	1.49	.29	2.42	4	.0
September--	72.1	48.1	60.1	91	35	603	2.18	.73	3.33	6	.0
October----	61.6	42.6	52.1	80	29	375	4.16	2.12	5.82	10	.0
November---	51.3	37.7	44.5	65	20	149	6.52	3.69	8.82	14	.5
December---	45.9	35.0	40.5	59	15	90	7.57	4.87	10.01	16	.4
Yearly:											
Average----	61.2	41.7	51.5	---	---	---	---	---	---	---	---
Extreme----	---	---	---	100	6	---	---	---	---	---	---
Total-----	---	---	---	---	---	4,462	46.91	41.22	52.40	116	9.2

* A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (40 degrees F).

TABLE 2.--FREEZE DATES IN SPRING AND FALL

Probability	Temperature		
	24° F or lower	28° F or lower	32° F or lower
OLYMPIA:			
Last freezing temperature in spring:			
1 year in 10 later than--	Apr. 11	May 11	May 31
2 years in 10 later than--	Mar. 31	May 3	May 25
5 years in 10 later than--	Mar. 10	Apr. 17	May 13
First freezing temperature in fall:			
1 year in 10 earlier than--	Oct. 17	Oct. 9	Sept. 15
2 years in 10 earlier than--	Oct. 31	Oct. 17	Sept. 24
5 years in 10 earlier than--	Nov. 26	Nov. 2	Oct. 10
LA GRANDE:			
Last freezing temperature in spring:			
1 year in 10 later than--	Mar. 5	Mar. 30	May 3
2 years in 10 later than--	Feb. 21	Mar. 19	Apr. 26
5 years in 10 later than--	Jan. 26	Feb. 25	Apr. 14
First freezing temperature in fall:			
1 year in 10 earlier than--	Nov. 17	Oct. 23	Oct. 23
2 years in 10 earlier than--	Nov. 26	Nov. 5	Oct. 29
5 years in 10 earlier than--	Dec. 13	Nov. 30	Nov. 7

TABLE 2.--FREEZE DATES IN SPRING AND FALL--Continued

Probability	Temperature		
	24° F or lower	28° F or lower	32° F or lower
CENTRALIA:			
Last freezing temperature in spring:			
1 year in 10 later than--	Mar. 19	Apr. 24	May 18
2 years in 10 later than--	Mar. 6	Apr. 14	May 12
5 years in 10 later than--	Feb. 9	Mar. 27	May 1
First freezing temperature in fall:			
1 year in 10 earlier than--	Nov. 3	Oct. 23	Oct. 1
2 years in 10 earlier than--	Nov. 15	Nov. 1	Oct. 9
5 years in 10 earlier than--	Dec. 9	Nov. 19	Oct. 24

TABLE 3.--GROWING SEASON

Probability	Daily minimum temperature during growing season		
	Higher than 24° F	Higher than 28° F	Higher than 32° F
	<u>Days</u>	<u>Days</u>	<u>Days</u>
OLYMPIA:			
9 years in 10	212	164	118
8 years in 10	229	175	128
5 years in 10	261	198	149
2 years in 10	297	220	169
1 year in 10	325	231	180
LA GRANDE:			
9 years in 10	279	240	184
8 years in 10	294	252	192
5 years in 10	329	275	207
2 years in 10	>365	299	222
1 year in 10	>365	314	230
CENTRALIA:			
9 years in 10	258	202	147
8 years in 10	272	214	156
5 years in 10	300	236	175
2 years in 10	343	258	193
1 year in 10	>365	270	203

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Acres	Percent
1	Alderwood gravelly sandy loam, 0 to 3 percent slopes-----	5,230	1.1
2	Alderwood gravelly sandy loam, 3 to 15 percent slopes-----	26,440	5.4
3	Alderwood gravelly sandy loam, 15 to 30 percent slopes-----	7,180	1.5
4	Alderwood gravelly sandy loam, 30 to 50 percent slopes-----	410	0.1
5	Baldhill very stony sandy loam, 0 to 3 percent slopes-----	4,230	0.9
6	Baldhill very stony sandy loam, 3 to 15 percent slopes-----	6,040	1.2
7	Baldhill very stony sandy loam, 15 to 30 percent slopes-----	4,215	0.9
8	Baldhill very stony sandy loam, 30 to 60 percent slopes-----	1,650	0.3
9	Baumgard loam, 10 to 40 percent slopes-----	13,200	2.7
10	Baumgard loam, 40 to 65 percent slopes-----	7,500	1.5
11	Baumgard-Pheeny complex, 10 to 40 percent slopes-----	1,750	0.4
12	Baumgard-Pheeny complex, 40 to 65 percent slopes-----	3,445	0.7
13	Baumgard-Rock outcrop complex, 40 to 65 percent slopes-----	940	0.2
14	Bellingham silty clay loam-----	4,440	0.9
15	Boistfort silt loam, 5 to 20 percent slopes-----	1,250	0.3
16	Boistfort silt loam, 20 to 40 percent slopes-----	3,490	0.7
17	Bunker gravelly silt loam, 5 to 30 percent slopes-----	630	0.1
18	Bunker gravelly silt loam, 30 to 65 percent slopes-----	5,610	1.2
19	Bunker-Boistfort complex, 40 to 65 percent slopes-----	490	0.1
20	Cagey loamy sand-----	6,000	1.2
21	Cathcart gravelly loam, 3 to 15 percent slopes-----	7,835	1.6
22	Cathcart gravelly loam, 15 to 35 percent slopes-----	4,720	1.0
23	Centralia silt loam, 8 to 15 percent slopes-----	2,860	0.6
24	Centralia silt loam, 15 to 30 percent slopes-----	3,580	0.7
25	Centralia silt loam, 30 to 60 percent slopes-----	3,760	0.8
26	Chehalis silt loam-----	7,485	1.5
27	Delphi very gravelly loam, 3 to 15 percent slopes-----	3,570	0.7
28	Delphi very gravelly loam, 15 to 30 percent slopes-----	3,335	0.7
29	Dupont muck-----	350	0.1
30	Dystric Xerochrepts, 60 to 90 percent slopes-----	2,915	0.6
31	Eld loam-----	3,325	0.7
32	Everett very gravelly sandy loam, 0 to 3 percent slopes-----	13,530	2.8
33	Everett very gravelly sandy loam, 3 to 15 percent slopes-----	18,600	3.8
34	Everett very gravelly sandy loam, 15 to 30 percent slopes-----	3,700	0.8
35	Everett very gravelly sandy loam, 30 to 50 percent slopes-----	1,665	0.3
36	Everson clay loam-----	1,820	0.4
37	Galvin silt loam, 0 to 5 percent slopes-----	1,750	0.4
38	Giles silt loam, 0 to 3 percent slopes-----	2,065	0.4
39	Giles silt loam, 3 to 15 percent slopes-----	1,920	0.4
40	Giles silt loam, 15 to 30 percent slopes-----	470	0.1
41	Godfrey silty clay loam-----	6,125	1.3
42	Grove very gravelly sandy loam, 3 to 15 percent slopes-----	1,505	0.3
43	Hoogdal silt loam, 15 to 30 percent slopes-----	700	0.1
44	Hoogdal silt loam, 30 to 50 percent slopes-----	380	0.1
45	Hydraquents, tidal-----	125	*
46	Indianola loamy sand, 0 to 3 percent slopes-----	6,155	1.3
47	Indianola loamy sand, 3 to 15 percent slopes-----	5,075	1.0
48	Indianola loamy sand, 15 to 30 percent slopes-----	2,830	0.6
49	Jonas silt loam, 30 to 65 percent slopes-----	670	0.1
50	Kapowsin silt loam, 0 to 3 percent slopes-----	8,475	1.7
51	Kapowsin silt loam, 3 to 15 percent slopes-----	9,610	2.0
52	Kapowsin silt loam, 15 to 30 percent slopes-----	1,160	0.2
53	Kapowsin silt loam, 30 to 50 percent slopes-----	1,030	0.2
54	Kapowsin stony loam, 0 to 3 percent slopes-----	640	0.1
55	Kapowsin stony loam, 3 to 15 percent slopes-----	1,630	0.3
56	Katula very cobbly loam, 20 to 30 percent slopes-----	900	0.2
57	Katula very cobbly loam, 30 to 65 percent slopes-----	1,800	0.4
58	Lates silt loam, 8 to 30 percent slopes-----	280	0.1
59	Lates silt loam, 30 to 65 percent slopes-----	530	0.1
60	Mal clay loam, 5 to 30 percent slopes-----	1,250	0.3
61	Mal clay loam, 30 to 65 percent slopes-----	320	0.1

See footnote at end of table.

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS--Continued

Map symbol	Soil name	Acres	Percent
62	Mashel loam, 5 to 30 percent slopes-----	3,825	0.8
63	Mashel loam, 30 to 65 percent slopes-----	1,335	0.3
64	Maytown silt loam-----	970	0.2
65	McKenna gravelly silt loam, 0 to 5 percent slopes-----	4,380	0.9
66	Melbourne silty clay loam, 5 to 20 percent slopes-----	5,150	1.1
67	Melbourne silty clay loam, 20 to 40 percent slopes-----	9,780	2.0
68	Melbourne silty clay loam, 40 to 65 percent slopes-----	4,925	1.0
69	Mukilteo muck-----	3,105	0.6
70	Mukilteo muck, drained-----	3,415	0.7
71	Newberg fine sandy loam-----	1,535	0.3
72	Newberg loam-----	2,435	0.5
73	Nisqually loamy fine sand, 0 to 3 percent slopes-----	10,170	2.1
74	Nisqually loamy fine sand, 3 to 15 percent slopes-----	3,785	0.8
75	Norma fine sandy loam-----	2,590	0.5
76	Norma silt loam-----	7,500	1.5
77	Olympic silt loam, 5 to 20 percent slopes-----	2,170	0.4
78	Olympic silt loam, 20 to 40 percent slopes-----	8,680	1.8
79	Pheney gravelly loam, 5 to 30 percent slopes-----	3,060	0.6
80	Pheney gravelly loam, 30 to 65 percent slopes-----	2,140	0.4
81	Pheney-Baumgard complex, 30 to 65 percent slopes-----	1,750	0.4
82	Pheney-Rock outcrop complex, 40 to 65 percent slopes-----	3,090	0.6
83	Pheney-Rock outcrop complex, 65 to 90 percent slopes-----	1,500	0.3
84	Pilchuck loamy sand-----	3,320	0.7
85	Pits, gravel-----	725	0.1
86	Prather silty clay loam, 3 to 8 percent slopes-----	1,030	0.2
87	Prather silty clay loam, 8 to 20 percent slopes-----	300	0.1
88	Puget silt loam-----	930	0.2
89	Puyallup silt loam-----	1,370	0.3
90	Rainier clay loam, 5 to 30 percent slopes-----	3,850	0.8
91	Rainier clay loam, 30 to 65 percent slopes-----	955	0.2
92	Rainier-Rock outcrop complex, 20 to 40 percent slopes-----	700	0.1
93	Raught silt loam, 5 to 30 percent slopes-----	1,900	0.4
94	Raught silt loam, 30 to 65 percent slopes-----	5,310	1.1
95	Riverwash-----	530	0.1
96	Rock outcrop-Pheney complex, 40 to 90 percent slopes-----	2,280	0.5
97	Salkum silty clay loam, 3 to 8 percent slopes-----	3,000	0.6
98	Salkum silty clay loam, 8 to 15 percent slopes-----	2,245	0.5
99	Salkum silty clay loam, 15 to 30 percent slopes-----	1,155	0.2
100	Scamman silty clay loam, 0 to 5 percent slopes-----	625	0.1
101	Scamman silty clay loam, 5 to 20 percent slopes-----	1,540	0.3
102	Schneider very gravelly loam, 20 to 40 percent slopes-----	2,930	0.6
103	Schneider very gravelly loam, 40 to 65 percent slopes-----	6,625	1.4
104	Semiahmoo muck-----	4,130	0.8
105	Shalcar muck-----	555	0.1
106	Shalcar Variant muck-----	615	0.1
107	Skipopa silt loam, 0 to 3 percent slopes-----	5,260	1.1
108	Skipopa silt loam, 3 to 15 percent slopes-----	6,855	1.4
109	Spana gravelly loam-----	1,555	0.3
110	Spanaway gravelly sandy loam, 0 to 3 percent slopes-----	28,215	5.8
111	Spanaway gravelly sandy loam, 3 to 15 percent slopes-----	3,990	0.8
112	Spanaway stony sandy loam, 0 to 3 percent slopes-----	1,970	0.4
113	Spanaway stony sandy loam, 3 to 15 percent slopes-----	1,160	0.2
114	Spanaway-Nisqually complex, 2 to 10 percent slopes-----	9,975	2.0
115	Sultan silt loam-----	800	0.2
116	Tacoma silt loam-----	130	*
117	Tenino gravelly loam, 3 to 15 percent slopes-----	7,140	1.5
118	Tenino gravelly loam, 15 to 30 percent slopes-----	3,710	0.8
119	Tenino gravelly loam, 30 to 60 percent slopes-----	415	0.1
120	Tisch silt loam-----	1,500	0.3
121	Vailton silt loam, 5 to 30 percent slopes-----	380	0.1
122	Vailton silt loam, 30 to 65 percent slopes-----	250	0.1
123	Wilkeson silt loam, 5 to 20 percent slopes-----	6,140	1.3

See footnote at end of table.

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS--Continued

Map symbol	Soil name	Acres	Percent
124	Wilkeson silt loam, 20 to 40 percent slopes-----	6,980	1.4
125	Xerorthents, 0 to 5 percent slopes-----	870	0.2
126	Yelm fine sandy loam, 0 to 3 percent slopes-----	8,075	1.7
127	Yelm fine sandy loam, 3 to 15 percent slopes-----	5,060	1.0
128	Yelm fine sandy loam, 15 to 30 percent slopes-----	415	0.1
	Water-----	7,700	1.6
	Total-----	487,040	100.0

* Less than 0.1 percent.

TABLE 5.--LAND CAPABILITY CLASSES AND YIELDS PER ACRE OF CROPS AND PASTURE

(Yields in the N columns are for nonirrigated soils; those in the I columns are for irrigated soils. Yields are those that can be expected under a high level of management. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil)

Soil name and map symbol	Land capability		Pasture		Grass-legume hay		Corn silage		Green chop*		Strawberries		Raspberries	
	N	I	N	I	N	I	N	I	N	I	N	I	N	I
			AUM**	AUM**	Tons	Tons	Tons	Tons	Tons	Tons	Crates	Crates	Tons	Tons
1----- Alderwood	IVw	---	9.0	---	4.0	---	---	---	4.0	---	200	---	5.0	---
2----- Alderwood	IVe	---	9.0	---	4.0	---	---	---	4.0	---	200	---	5.0	---
3----- Alderwood	IVe	---	8.0	---	---	---	---	---	---	---	---	---	---	---
4----- Alderwood	VIe	---	---	---	---	---	---	---	---	---	---	---	---	---
5, 6, 7, 8----- Baldhill	VIIs	---	---	---	---	---	---	---	---	---	---	---	---	---
9----- Baumgard	IVe	---	---	---	---	---	---	---	---	---	---	---	---	---
10----- Baumgard	VIIe	---	---	---	---	---	---	---	---	---	---	---	---	---
11----- Baumgard- Pheeny	VIe	---	---	---	---	---	---	---	---	---	---	---	---	---
12----- Baumgard- Pheeny	VIIe	---	---	---	---	---	---	---	---	---	---	---	---	---
13***----- Baumgard-Rock outcrop	VIIe	---	---	---	---	---	---	---	---	---	---	---	---	---
14----- Bellingham	IIIw	---	9.0	---	4.0	---	---	---	4.0	---	---	---	---	---
15----- Boistfort	IIIe	---	---	---	---	---	---	---	---	---	---	---	---	---
16----- Boistfort	VIe	---	---	---	---	---	---	---	---	---	---	---	---	---
17----- Bunker	IVe	---	---	---	---	---	---	---	---	---	---	---	---	---
18----- Bunker	VIe	---	---	---	---	---	---	---	---	---	---	---	---	---
19----- Bunker- Boistfort	VIe	---	---	---	---	---	---	---	---	---	---	---	---	---
20----- Cagey	IVw	---	4.0	---	2.0	---	---	---	---	---	---	---	---	---

See footnotes at end of table.

TABLE 5.--LAND CAPABILITY CLASSES AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability		Pasture		Grass-legume hay		Corn silage		Green chop*		Strawberries		Raspberries	
	N	I	N	I	N	I	N	I	N	I	N	I	N	I
			AUM**	AUM**	Tons	Tons	Tons	Tons	Tons	Tons	Crates	Crates	Tons	Tons
21----- Cathcart	IIIe	---	7.0	---	3.0	---	---	---	---	---	---	---	---	---
22----- Cathcart	IVe	---	---	---	---	---	---	---	---	---	---	---	---	---
23----- Centralia	IIIe	---	---	---	---	---	---	---	---	---	---	---	---	---
24----- Centralia	IVe	---	---	---	---	---	---	---	---	---	---	---	---	---
25----- Centralia	VIe	---	---	---	---	---	---	---	---	---	---	---	---	---
26----- Chehalis	IIw	IIw	11.0	15.0	5.0	7.0	25.0	---	---	---	330	330	---	---
27, 28----- Delphi	IVe	---	---	---	---	---	---	---	---	---	---	---	---	---
29----- Dupont	IIIw	---	8.0	---	---	---	---	---	---	---	---	---	---	---
30----- Dystric Xerochrepts	VIIe	---	---	---	---	---	---	---	---	---	---	---	---	---
31----- Eld	I	---	7.0	---	3.0	---	25.0	---	---	---	---	---	---	---
32----- Everett	IVs	---	4.0	---	2.0	---	---	---	2.0	---	---	---	---	---
33----- Everett	IVe	---	---	---	---	---	---	---	---	---	---	---	---	---
34----- Everett	IVe	---	---	---	---	---	---	---	---	---	---	---	---	---
35----- Everett	VIe	---	---	---	---	---	---	---	---	---	---	---	---	---
36----- Everson	IIIw	IIIw	7.0	13.0	3.0	6.0	24.0	---	---	---	---	---	---	---
37----- Galvin	IIIw	---	5.0	---	2.5	---	15.0	---	---	---	---	---	---	---
38----- Giles	IIC	---	11.0	---	5.0	---	25.0	---	---	---	---	---	5.0	---
39----- Giles	IIIe	---	11.0	---	5.0	---	25.0	---	---	---	---	---	---	---
40----- Giles	IVe	---	---	---	---	---	---	---	---	---	---	---	---	---
41----- Godfrey	IIIw	---	9.0	---	4.0	---	17.0	---	---	---	---	---	---	---

See footnotes at end of table.

TABLE 5.--LAND CAPABILITY CLASSES AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability		Pasture		Grass-legume hay		Corn silage		Green chop*		Strawberries		Raspberries	
	N	I	N AUM**	I AUM**	N Tons	I Tons	N Tons	I Tons	N Tons	I Tons	N Crates	I Crates	N Tons	I Tons
42----- Grove	VIe	---	---	---	---	---	---	---	---	---	---	---	---	---
43----- Hoogdal	IVe	---	---	---	---	---	---	---	---	---	---	---	---	---
44----- Hoogdal	VIe	---	---	---	---	---	---	---	---	---	---	---	---	---
45----- Hydraquents	VIIw	---	---	---	---	---	---	---	---	---	---	---	---	---
46----- Indianola	IVs	---	4.0	13.0	2.0	6.0	12.0	---	2.0	---	400	---	4.0	---
47----- Indianola	IVs	---	3.0	13.0	1.5	6.0	10.0	---	1.5	---	400	---	4.0	---
48----- Indianola	IVs	---	---	---	---	---	---	---	---	---	---	---	---	---
49----- Jonas	VIe	---	---	---	---	---	---	---	---	---	---	---	---	---
50----- Kapowsin	IIIw	---	7.0	---	3.0	---	---	---	3.0	---	200	---	4.5	---
51----- Kapowsin	IIIe	---	7.0	---	3.0	---	---	---	3.0	---	200	---	4.5	---
52----- Kapowsin	IVe	---	6.0	---	---	---	---	---	---	---	---	---	---	---
53----- Kapowsin	VIe	---	---	---	---	---	---	---	---	---	---	---	---	---
54----- Kapowsin	IVw	---	7.0	---	3.0	---	---	---	---	---	---	---	---	---
55----- Kapowsin	IVe	---	7.0	---	3.0	---	---	---	---	---	---	---	---	---
56, 57----- Katula	VI s	---	---	---	---	---	---	---	---	---	---	---	---	---
58----- Lates	IVe	---	---	---	---	---	---	---	---	---	---	---	---	---
59----- Lates	VIe	---	---	---	---	---	---	---	---	---	---	---	---	---
60----- Mal	IVe	---	---	---	---	---	---	---	---	---	---	---	---	---
61----- Mal	VIe	---	---	---	---	---	---	---	---	---	---	---	---	---
62----- Mashel	IVe	---	---	---	---	---	---	---	---	---	---	---	---	---

See footnotes at end of table.

TABLE 5.--LAND CAPABILITY CLASSES AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability		Pasture		Grass-legume hay		Corn silage		Green chop*		Strawberries		Raspberries	
	N	I	N	I	N	I	N	I	N	I	N	I	N	I
			AUM**	AUM**	Tons	Tons	Tons	Tons	Tons	Tons	Crates	Crates	Tons	Tons
63----- Mashel	VIIe	---	---	---	---	---	---	---	---	---	---	---	---	---
64----- Maytown	IIw	---	12.0	---	6.0	---	---	---	---	---	---	---	---	---
65----- McKenna	VIw	---	8.0	---	---	---	---	---	---	---	---	---	---	---
66----- Melbourne	IIIe	---	---	---	---	---	---	---	---	---	---	---	---	---
67----- Melbourne	VIe	---	---	---	---	---	---	---	---	---	---	---	---	---
68----- Melbourne	VIIe	---	---	---	---	---	---	---	---	---	---	---	---	---
69----- Mukilteo	VIIw	---	---	---	---	---	---	---	---	---	---	---	---	---
70----- Mukilteo	IIw	---	13.0	---	6.0	---	---	---	---	---	---	---	---	---
71, 72----- Newberg	IIw	---	13.0	---	6.0	---	20.0	---	---	---	---	---	---	---
73----- Nisqually	IVs	---	4.5	---	2.0	---	12.0	---	---	---	440	---	---	---
74----- Nisqually	IVe	---	4.5	---	2.0	---	---	---	---	---	---	---	---	---
75, 76----- Norma	VIw	---	9.0	---	4.0	---	---	---	---	---	---	---	---	---
77----- Olympic	IIIe	---	---	---	---	---	---	---	---	---	---	---	---	---
78----- Olympic	VIe	---	---	---	---	---	---	---	---	---	---	---	---	---
79----- Pheenev	IVe	---	---	---	---	---	---	---	---	---	---	---	---	---
80----- Pheenev	VIe	---	---	---	---	---	---	---	---	---	---	---	---	---
81----- Pheenev- Baumgard	VIe	---	---	---	---	---	---	---	---	---	---	---	---	---
82***, 83***----- Pheenev-Rock outcrop	VIIe	---	---	---	---	---	---	---	---	---	---	---	---	---
84----- Pilchuck	IVw	---	3.0	---	---	---	---	---	5.0	---	---	---	---	---
85***----- Pits	VIIIIs	---	---	---	---	---	---	---	---	---	---	---	---	---

See footnotes at end of table.

TABLE 5.--LAND CAPABILITY CLASSES AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability		Pasture		Grass-legume hay		Corn silage		Green chop*		Strawberries		Raspberries	
	N	I	N	I	N	I	N	I	N	I	N	I	N	I
			AUM**	AUM**	Tons	Tons	Tons	Tons	Tons	Tons	Crates	Crates	Tons	Tons
86----- Prather	IIe	---	5.0	---	2.5	---	---	---	---	---	---	---	---	---
87----- Prather	IIIe	---	5.0	---	2.5	---	---	---	---	---	---	---	---	---
88----- Puget	IIw	IIw	8.0	15.0	3.5	7.0	25.0	---	3.5	---	---	160	---	---
89----- Puyallup	IIw	IIw	8.0	14.0	3.5	6.5	25.0	---	---	---	---	---	2.5	5.0
90----- Rainier	IVe	---	---	---	---	---	---	---	---	---	---	---	---	---
91----- Rainier	VIe	---	---	---	---	---	---	---	---	---	---	---	---	---
92***----- Rainier-Rock outcrop	VIe	---	---	---	---	---	---	---	---	---	---	---	---	---
93----- Raught	IVe	---	---	---	---	---	---	---	---	---	---	---	---	---
94----- Raught	VIe	---	---	---	---	---	---	---	---	---	---	---	---	---
95***----- Riverwash	VIIIw	---	---	---	---	---	---	---	---	---	---	---	---	---
96----- Rock outcrop- Pheeny	VIIe	---	---	---	---	---	---	---	---	---	---	---	---	---
97----- Salkum	IIe	---	7.0	---	3.0	---	20.0	---	---	---	---	---	---	---
98----- Salkum	IIIe	---	6.0	---	2.5	---	---	---	---	---	---	---	---	---
99----- Salkum	IVe	---	---	---	---	---	---	---	---	---	---	---	---	---
100----- Scamman	IIIw	---	6.0	---	2.5	---	15.0	---	2.5	---	---	---	---	---
101----- Scamman	IIIe	---	---	---	---	---	---	---	---	---	---	---	---	---
102----- Schneider	IVe	---	---	---	---	---	---	---	---	---	---	---	---	---
103----- Schneider	VIIe	---	---	---	---	---	---	---	---	---	---	---	---	---
104----- Semiahmoo	IIw	---	13.0	---	6.0	---	---	---	6.0	---	---	---	---	---
105----- Shalcar	VIw	---	---	---	---	---	---	---	---	---	---	---	---	---

See footnotes at end of table.

TABLE 5.--LAND CAPABILITY CLASSES AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability		Pasture		Grass-legume hay		Corn silage		Green chop*		Strawberries		Raspberries	
	N	I	N	I	N	I	N	I	N	I	N	I	N	I
			AUM**	AUM**	Tons	Tons	Tons	Tons	Tons	Tons	Crates	Crates	Tons	Tons
106----- Shalcar Variant	Vw	---	9.0	---	4.0	---	---	---	---	---	---	---	---	---
107----- Skipopa	IIIw	---	7.0	---	3.0	---	---	---	---	---	---	---	---	---
108----- Skipopa	IIIe	---	7.0	---	3.0	---	---	---	---	---	---	---	---	---
109----- Spana	IIIw	---	7.0	---	---	---	7.0	---	---	---	---	---	---	---
110, 111----- Spanaway	IVs	IVs	4.0	7.0	2.0	3.0	---	---	---	3.0	---	---	---	---
112, 113----- Spanaway	IVs	---	4.0	---	2.0	---	---	---	---	---	---	---	---	---
114----- Spanaway- Nisqually	IVs	---	4.0	---	2.0	---	---	---	---	---	---	---	---	---
115----- Sultan	IIw	---	9.0	---	4.0	---	---	---	10.0	---	---	---	---	---
116----- Tacoma	Vw	---	8.0	---	---	---	---	---	---	---	---	---	---	---
117----- Tenino	IVe	---	8.0	---	3.5	---	---	---	---	---	---	---	---	---
118----- Tenino	IVe	---	---	---	---	---	---	---	---	---	---	---	---	---
119----- Tenino	VIe	---	---	---	---	---	---	---	---	---	---	---	---	---
120----- Tisch	IIIw	---	9.0	---	4.0	---	---	---	12.0	---	---	---	---	---
121----- Vailton	IVe	---	---	---	---	---	---	---	---	---	---	---	---	---
122----- Vailton	VIe	---	---	---	---	---	---	---	---	---	---	---	---	---
123----- Wilkeson	IIIe	---	---	---	---	---	---	---	---	---	---	---	---	---
124----- Wilkeson	VIe	---	---	---	---	---	---	---	---	---	---	---	---	---
125----- Xerorthents	VIIIs	---	---	---	---	---	---	---	---	---	---	---	---	---
126----- Yelm	IIw	IIw	7.0	15.0	3.0	7.0	25.0	---	---	---	---	---	---	---
127----- Yelm	IIIe	IIIe	7.0	---	3.0	7.0	25.0	---	---	---	---	---	---	---

See footnotes at end of table.

TABLE 5.--LAND CAPABILITY CLASSES AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Land capability		Pasture		Grass-legume hay		Corn silage		Green chop*		Strawberries		Raspberries	
	N	I	N	I	N	I	N	I	N	I	N	I	N	I
			AUM**	AUM**	Tons	Tons	Tons	Tons	Tons	Tons	Crates	Crates	Tons	Tons
128----- Yelm	Ive	---	---	---	---	---	---	---	---	---	---	---	---	---

* Values given as air-dry weight because of seasonal moisture differences.

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

*** See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 6.--CAPABILITY CLASSES AND SUBCLASSES

(Miscellaneous areas are excluded. Absence of an entry indicates no acreage)

Class	Total acreage	Major management concerns (Subclass)			
		Erosion (e)	Wetness (w)	Soil problem (s)	Climate (c)
		Acres	Acres	Acres	Acres
I	3,325	---	---	---	---
II	37,240	4,030	31,145	---	2,065
III	84,835	52,935	31,900	---	---
IV	222,604	127,636	15,190	79,778	---
V	745	---	745	---	---
VI	88,209	54,349	15,025	18,835	---
VII	37,479	33,379	3,230	870	---
VIII	4,903	---	530	4,373	---

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY

(Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that information was not available)

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity			Trees to plant
		Equipment limitation	Seedling mortality	Wind-throw hazard	Plant competition	Common trees	Site index	Productivity class*	
1, 2, 3----- Alderwood	11D	Slight	Moderate	Moderate	Moderate	Douglas-fir----- Red alder----- Western redcedar---- Western hemlock----- Pacific madrone-----	111 --- --- --- ---	11 --- --- --- ---	Douglas-fir, red alder.
4----- Alderwood	11R	Severe	Moderate	Moderate	Moderate	Douglas-fir----- Red alder----- Western redcedar---- Western hemlock----- Pacific madrone-----	111 --- --- --- ---	11 --- --- --- ---	Douglas-fir, red alder.
5, 6, 7----- Baldhill	11X	Severe	Severe	Slight	Moderate	Douglas-fir----- Red alder----- Bigleaf maple----- Western hemlock----- Western redcedar----	114 --- --- --- ---	11 --- --- --- ---	Douglas-fir, red alder.
8----- Baldhill	11R	Severe	Severe	Slight	Moderate	Douglas-fir----- Red alder----- Bigleaf maple----- Western hemlock----- Western redcedar----	114 --- --- --- ---	11 --- --- --- ---	Douglas-fir, red alder.
9----- Baumgard	12A	Moderate	Slight	Slight	Severe	Douglas-fir----- Red alder----- Western hemlock----- Western redcedar---- Bigleaf maple-----	122 --- --- --- ---	12 --- --- --- ---	Douglas-fir, red alder.
10----- Baumgard	12R	Severe	Slight	Slight	Severe	Douglas-fir----- Red alder----- Western hemlock----- Western redcedar---- Bigleaf maple-----	122 --- --- --- ---	12 --- --- --- ---	Douglas-fir, red alder.
11**: Baumgard-----	12A	Moderate	Slight	Slight	Severe	Douglas-fir----- Red alder----- Western hemlock----- Western redcedar---- Bigleaf maple-----	122 --- --- --- ---	12 --- --- --- ---	Douglas-fir, red alder.
Pheeney-----	13F	Moderate	Moderate	Moderate	Moderate	Douglas-fir----- Western hemlock----- Red alder----- Bigleaf maple----- Western redcedar----	101 85 --- --- ---	10 13 --- --- ---	Douglas-fir, western hemlock.
12**: Baumgard-----	12R	Severe	Slight	Slight	Severe	Douglas-fir----- Red alder----- Western hemlock----- Western redcedar---- Bigleaf maple-----	122 --- --- --- ---	12 --- --- --- ---	Douglas-fir, red alder.

See footnotes at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity			Trees to plant
		Equipment limitation	Seedling mortality	Wind-throw hazard	Plant competition	Common trees	Site index	Productivity class*	
12**: Pheeny-----	13R	Severe	Moderate	Moderate	Moderate	Douglas-fir----- Western hemlock---- Red alder----- Bigleaf maple----- Western redcedar---	101 85 --- --- ---	10 13 --- --- ---	Douglas-fir, western hemlock.
13**: Baumgard-----	12R	Severe	Slight	Slight	Severe	Douglas-fir----- Red alder----- Western hemlock---- Western redcedar--- Bigleaf maple-----	122 --- --- --- ---	12 --- --- --- ---	Douglas-fir, red alder.
Rock outcrop. 14----- Bellingham	6W	Severe	Severe	Severe	Severe	Red alder----- Western redcedar--- Western hemlock----	85 --- ---	6 --- ---	Western redcedar, red alder.
15----- Boistfort	18A	Moderate	Slight	Slight	Severe	Douglas-fir----- Western hemlock---- Red alder----- Western redcedar--- Bigleaf maple-----	129 114 --- --- ---	13 18 --- --- ---	Douglas-fir, western hemlock, red alder.
16----- Boistfort	18R	Severe	Slight	Slight	Severe	Douglas-fir----- Western hemlock---- Red alder----- Western redcedar--- Bigleaf maple-----	129 114 --- --- ---	13 18 --- --- ---	Douglas-fir, western hemlock, red alder.
17----- Bunker	17A	Moderate	Slight	Slight	Severe	Douglas-fir----- Western hemlock---- Red alder----- Western redcedar--- Bigleaf maple-----	124 110 --- --- ---	12 17 --- --- ---	Douglas-fir, western hemlock, red alder.
18----- Bunker	17R	Severe	Slight	Slight	Severe	Douglas-fir----- Western hemlock---- Red alder----- Western redcedar--- Bigleaf maple-----	124 110 --- --- ---	12 17 --- --- ---	Douglas-fir, western hemlock, red alder.
19**: Bunker-----	17R	Severe	Slight	Slight	Severe	Douglas-fir----- Western hemlock---- Red alder----- Western redcedar--- Bigleaf maple-----	124 110 --- --- ---	12 17 --- --- ---	Douglas-fir, western hemlock, red alder.
Boistfort-----	18R	Severe	Slight	Slight	Severe	Douglas-fir----- Western hemlock---- Red alder----- Western redcedar--- Bigleaf maple-----	129 114 --- --- ---	13 18 --- --- ---	Douglas-fir, western hemlock, red alder.

See footnotes at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity			Trees to plant
		Equipment limitation	Seedling mortality	Wind-throw hazard	Plant competition	Common trees	Site index	Productivity class*	
20----- Cagey	12S	Slight	Severe	Slight	Moderate	Douglas-fir----- Red alder----- Bigleaf maple----- Western redcedar-----	120 --- --- ---	12 --- --- ---	Douglas-fir, red alder.
21, 22----- Cathcart	13A	Moderate	Slight	Slight	Severe	Douglas-fir----- Red alder----- Western redcedar----- Pacific madrone-----	130 --- --- ---	13 --- --- ---	Douglas-fir, red alder.
23, 24----- Centralia	13A	Moderate	Slight	Slight	Severe	Douglas-fir----- Red alder----- Western redcedar----- Western hemlock----- Bigleaf maple-----	135 --- --- --- ---	13 --- --- --- ---	Douglas-fir, red alder.
25----- Centralia	13R	Severe	Slight	Slight	Severe	Douglas-fir----- Red alder----- Western redcedar----- Western hemlock----- Bigleaf maple-----	135 --- --- --- ---	13 --- --- --- ---	Douglas-fir, red alder.
26----- Chehalis	13W	Moderate	Moderate	Slight	Severe	Douglas-fir----- Red alder----- Grand fir----- Western redcedar----- Bigleaf maple-----	130 --- --- --- ---	13 --- --- --- ---	Douglas-fir, red alder.
27, 28----- Delphi	13F	Moderate	Moderate	Slight	Moderate	Douglas-fir----- Red alder----- Western redcedar----- Western hemlock----- Bigleaf maple-----	129 --- --- --- ---	13 --- --- --- ---	Douglas-fir, red alder.
30----- Dystric Xerochrepts	11R	Severe	Severe	Moderate	Moderate	Douglas-fir----- Red alder----- Bigleaf maple----- Western redcedar----- Pacific madrone-----	115 --- --- --- ---	11 --- --- --- ---	Douglas-fir, red alder.
31----- Eld	12A	Moderate	Slight	Slight	Severe	Douglas-fir----- Red alder----- Western redcedar----- Bigleaf maple-----	120 --- --- ---	12 --- --- ---	Douglas-fir, red alder.
32, 33, 34----- Everett	10F	Slight	Severe	Slight	Moderate	Douglas-fir----- Red alder----- Western hemlock----- Western redcedar----- Bigleaf maple-----	106 --- --- --- ---	10 --- --- --- ---	Douglas-fir, red alder.
35----- Everett	10R	Severe	Severe	Slight	Moderate	Douglas-fir----- Red alder----- Western hemlock----- Western redcedar----- Bigleaf maple-----	106 --- --- --- ---	10 --- --- --- ---	Douglas-fir, red alder.

See footnotes at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity			Trees to plant
		Equipment limitation	Seedling mortality	Wind-throw hazard	Plant competition	Common trees	Site index	Productivity class*	
36----- Everson	7W	Severe	Severe	Severe	Moderate	Red alder----- Western redcedar---- Bigleaf maple----- Western hemlock----- Douglas-fir-----	90 --- --- --- ---	7 --- --- --- ---	Western redcedar, red alder.
37----- Galvin	12W	Moderate	Moderate	Severe	Severe	Douglas-fir----- Red alder----- Western redcedar---- Oregon white oak----	120 --- --- ---	12 --- --- ---	Douglas-fir, red alder.
38, 39, 40----- Giles	13A	Moderate	Slight	Slight	Severe	Douglas-fir----- Red alder----- Western redcedar---- Bigleaf maple-----	130 --- --- ---	13 --- --- ---	Douglas-fir, red alder.
41----- Godfrey	7W	Severe	Severe	Severe	Moderate	Red alder----- Western redcedar---- Black cottonwood---- Bigleaf maple-----	90 --- --- ---	7 --- --- ---	Western redcedar, red alder.
42----- Grove	11F	Slight	Severe	Slight	Moderate	Douglas-fir----- Western hemlock---- Red alder----- Western redcedar---- Bigleaf maple-----	112 --- --- --- ---	11 --- --- --- ---	Douglas-fir, red alder.
43----- Hoogdal	12W	Moderate	Slight	Moderate	Severe	Douglas-fir----- Red alder----- Western redcedar---- Bigleaf maple-----	124 --- --- ---	12 --- --- ---	Douglas-fir, red alder.
44----- Hoogdal	12R	Severe	Slight	Moderate	Severe	Douglas-fir----- Red alder----- Western redcedar---- Bigleaf maple-----	124 --- --- ---	12 --- --- ---	Douglas-fir, red alder.
46, 47, 48----- Indianola	11S	Slight	Moderate	Slight	Moderate	Douglas-fir----- Red alder----- Bigleaf maple----- Western redcedar---- Western hemlock-----	115 --- --- --- ---	11 --- --- --- ---	Douglas-fir, red alder.
49----- Jonas	18R	Severe	Slight	Slight	Moderate	Douglas-fir----- Western hemlock---- Red alder----- Bigleaf maple----- Western redcedar----	121 110 --- --- ---	12 18 --- --- ---	Douglas-fir, western hemlock, red alder.
50, 51, 52----- Kapowsin	12W	Moderate	Slight	Moderate	Severe	Douglas-fir----- Red alder----- Western redcedar---- Western hemlock---- Bigleaf maple-----	123 --- --- --- ---	12 --- --- --- ---	Douglas-fir, red alder.
53----- Kapowsin	12R	Severe	Slight	Moderate	Severe	Douglas-fir----- Red alder----- Western redcedar---- Western hemlock---- Bigleaf maple-----	123 --- --- --- ---	12 --- --- --- ---	Douglas-fir, red alder.

See footnotes at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity			Trees to plant
		Equipment limitation	Seedling mortality	Wind-throw hazard	Plant competition	Common trees	Site index	Productivity class*	
54, 55----- Kapowsin	12W	Moderate	Slight	Moderate	Severe	Douglas-fir----- Red alder----- Western redcedar---- Western hemlock----- Bigleaf maple-----	123 --- --- --- ---	12 --- --- --- ---	Douglas-fir, red alder.
56----- Katula	16F	Slight	Moderate	Moderate	Severe	Douglas-fir----- Western hemlock----- Red alder----- Bigleaf maple----- Pacific silver fir--	108 104 --- --- ---	10 16 --- --- ---	Douglas-fir, noble fir, western hemlock, Pacific silver fir.
57----- Katula	16R	Severe	Moderate	Moderate	Severe	Douglas fir----- Western hemlock----- Red alder----- Bigleaf maple----- Pacific silver fir--	108 104 --- --- ---	10 16 --- --- ---	Douglas-fir, noble fir, western hemlock, Pacific silver fir.
58----- Lates	15D	Moderate	Slight	Moderate	Moderate	Western hemlock----- Douglas-fir----- Pacific silver fir-- Red alder----- Bigleaf maple----- Sitka spruce----- Western redcedar----	95 110 --- --- --- --- ---	15 10 --- --- --- --- ---	Douglas-fir, noble fir, western hemlock, Pacific silver fir.
59----- Lates	15R	Severe	Slight	Moderate	Moderate	Western hemlock----- Douglas-fir----- Pacific silver fir-- Red alder----- Bigleaf maple----- Sitka spruce----- Western redcedar----	95 110 --- --- --- --- ---	15 10 --- --- --- --- ---	Douglas-fir, noble fir, western hemlock, Pacific silver fir.
60----- Mal	9A	Moderate	Slight	Slight	Moderate	Douglas-fir----- Western hemlock----- Red alder----- Western redcedar---- Bigleaf maple-----	110 --- --- --- ---	9 --- --- --- ---	Douglas-fir, western hemlock, red alder.
61----- Mal	9R	Severe	Slight	Slight	Moderate	Douglas-fir----- Western hemlock----- Red alder----- Western redcedar---- Bigleaf maple-----	110 --- --- --- ---	9 --- --- --- ---	Douglas-fir, western hemlock, red alder.
62----- Mashel	12A	Moderate	Slight	Slight	Severe	Douglas-fir----- Red alder----- Western hemlock----- Western redcedar---- Bigleaf maple-----	123 --- --- --- ---	12 --- --- --- ---	Douglas-fir, red alder.
63----- Mashel	12R	Severe	Slight	Slight	Severe	Douglas-fir----- Red alder----- Western hemlock----- Western redcedar---- Bigleaf maple-----	123 --- --- --- ---	12 --- --- --- ---	Douglas-fir, red alder.

See footnotes at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity			Trees to plant
		Equipment limitation	Seedling mortality	Wind-throw hazard	Plant competition	Common trees	Site index	Productivity class*	
64----- Maytown	12W	Moderate	Moderate	Moderate	Severe	Douglas-fir----- Red alder----- Western redcedar----- Western hemlock----- Bigleaf maple-----	120 --- --- --- ---	12 --- --- --- ---	Douglas-fir, red alder.
65----- McKenna	7W	Severe	Severe	Severe	Moderate	Red alder----- Western redcedar----- Western hemlock-----	90 --- ---	7 --- ---	Western redcedar, red alder.
66----- Melbourne	13A	Moderate	Slight	Slight	Severe	Douglas-fir----- Red alder----- Western redcedar----- Western hemlock----- Bigleaf maple-----	132 98 --- --- ---	13 8 --- --- ---	Douglas-fir, red alder.
67, 68----- Melbourne	13R	Severe	Slight	Slight	Severe	Douglas-fir----- Red alder----- Western redcedar----- Western hemlock----- Bigleaf maple-----	132 98 --- --- ---	13 8 --- --- ---	Douglas-fir, red alder.
69----- Mukilteo	6W	Severe	Severe	Severe	Severe	Red alder-----	85	6	Western redcedar, red alder.
71, 72----- Newberg	12W	Moderate	Moderate	Slight	Severe	Douglas-fir----- Red alder----- Bigleaf maple----- Western redcedar----- Black cottonwood-----	120 --- --- --- ---	12 --- --- --- ---	Douglas-fir, red alder.
73, 74----- Nisqually	12S	Slight	Moderate	Slight	Moderate	Douglas-fir----- Red alder----- Bigleaf maple----- Western hemlock----- Western redcedar-----	125 --- --- --- ---	12 --- --- --- ---	Douglas-fir, red alder.
75, 76----- Norma	7W	Severe	Severe	Severe	Moderate	Red alder----- Western redcedar----- Western hemlock----- Bigleaf maple-----	90 --- --- ---	7 --- --- ---	Western redcedar, red alder.
77----- Olympic	13A	Moderate	Slight	Slight	Severe	Douglas-fir----- Red alder----- Western hemlock----- Bigleaf maple----- Western redcedar-----	133 --- --- --- ---	13 --- --- --- ---	Douglas-fir, red alder.
78----- Olympic	13R	Severe	Slight	Slight	Severe	Douglas-fir----- Red alder----- Western hemlock----- Bigleaf maple----- Western redcedar-----	133 --- --- --- ---	13 --- --- --- ---	Douglas-fir, red alder.
79----- Pheeny	13F	Moderate	Moderate	Moderate	Moderate	Douglas-fir----- Western hemlock----- Red alder----- Bigleaf maple----- Western redcedar-----	101 85 --- --- ---	10 13 --- --- ---	Douglas-fir, western hemlock.

See footnotes at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity			Trees to plant
		Equipment limitation	Seedling mortality	Wind-throw hazard	Plant competition	Common trees	Site index	Productivity class*	
80----- Pheenev	13R	Severe	Moderate	Moderate	Moderate	Douglas-fir-----	101	10	Douglas-fir, western hemlock.
						Western hemlock----	85	13	
						Red alder-----	---	---	
						Bigleaf maple-----	---	---	
81**: Pheenev-----	13R	Severe	Moderate	Moderate	Moderate	Douglas-fir-----	101	10	Douglas-fir, western hemlock.
						Western hemlock----	85	13	
						Red alder-----	---	---	
						Bigleaf maple-----	---	---	
Baumgard-----	12R	Severe	Slight	Slight	Severe	Douglas-fir-----	122	12	Douglas-fir, red alder.
						Red alder-----	---	---	
						Western hemlock----	---	---	
						Western redcedar----	---	---	
82**: Pheenev-----	13R	Severe	Moderate	Moderate	Moderate	Douglas-fir-----	101	10	Douglas-fir, western hemlock.
						Western hemlock----	85	13	
						Red alder-----	---	---	
						Bigleaf maple-----	---	---	
Rock outcrop.	83**: Pheenev-----	Severe	Moderate	Moderate	Moderate	Douglas-fir-----	101	10	Douglas-fir, western hemlock.
Western hemlock----						85	13		
Red alder-----						---	---		
Bigleaf maple-----						---	---		
Rock outcrop.	84----- Pilchuck	Moderate	Moderate	Slight	Moderate	Douglas-fir-----	114	11	Douglas-fir, black cottonwood, bigleaf maple.
Red alder-----						---	---		
Bigleaf maple-----						---	---		
Western redcedar----						---	---		
86, 87----- Prather	12W	Moderate	Slight	Moderate	Severe	Douglas-fir-----	120	12	Douglas-fir, red alder.
						Red alder-----	---	---	
						Western redcedar----	---	---	
						Bigleaf maple-----	---	---	
88----- Puget	7W	Severe	Severe	Severe	Moderate	Red alder-----	90	7	Western redcedar, red alder.
						Black cottonwood----	---	---	
						Western redcedar----	---	---	
						Willow-----	---	---	

See footnotes at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity			Trees to plant
		Equipment limitation	Seedling mortality	Wind-throw hazard	Plant competition	Common trees	Site index	Productivity class*	
89----- Puyallup	12W	Moderate	Moderate	Slight	Severe	Douglas-fir----- Red alder----- Western redcedar---- Bigleaf maple----- Black cottonwood---- Western hemlock-----	125 --- --- --- --- ---	12 --- --- --- --- ---	Douglas-fir, red alder.
90----- Rainier	9A	Moderate	Slight	Slight	Severe	Douglas-fir----- Red alder----- Western hemlock----- Western redcedar---- Bigleaf maple-----	95 --- --- --- ---	9 --- --- --- ---	Douglas-fir, red alder.
91----- Rainier	9R	Severe	Slight	Slight	Severe	Douglas-fir----- Red alder----- Western hemlock----- Western redcedar---- Bigleaf maple-----	95 --- --- --- ---	9 --- --- --- ---	Douglas-fir, red alder.
92**: Rainier----- Rock outcrop.	9R	Severe	Slight	Slight	Severe	Douglas-fir----- Red alder----- Western hemlock----- Western redcedar---- Bigleaf maple-----	95 --- --- --- ---	9 --- --- --- ---	Douglas-fir, red alder.
93----- Raught	18A	Moderate	Slight	Slight	Severe	Douglas-fir----- Western hemlock----- Red alder----- Bigleaf maple----- Western redcedar----	131 115 --- --- ---	13 18 --- --- ---	Douglas-fir, red alder, western hemlock.
94----- Raught	18R	Severe	Slight	Slight	Severe	Douglas-fir----- Western hemlock----- Red alder----- Bigleaf maple----- Western redcedar----	131 115 --- --- ---	13 18 --- --- ---	Douglas-fir, red alder, western hemlock.
96**: Rock outcrop. Pheeny-----	13R	Severe	Moderate	Moderate	Moderate	Douglas-fir----- Western hemlock----- Red alder----- Bigleaf maple----- Western redcedar----	101 85 --- --- ---	10 13 --- --- ---	Douglas-fir, western hemlock.
97, 98, 99----- Salkum	12A	Moderate	Slight	Slight	Severe	Douglas-fir----- Red alder----- Western hemlock----- Grand fir----- Bigleaf maple----- Western redcedar---- Bitter cherry-----	126 --- --- --- --- --- ---	12 --- --- --- --- --- ---	Douglas-fir, red alder.

See footnotes at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity			Trees to plant
		Equipment limitation	Seedling mortality	Wind-throw hazard	Plant competition	Common trees	Site index	Productivity class*	
100, 101----- Scamman	11W	Moderate	Moderate	Severe	Severe	Douglas-fir----- Western hemlock---- Red alder----- Western redcedar---- Bigleaf maple-----	116 --- --- --- ---	11 --- --- --- ---	Douglas-fir, red alder.
102----- Schneider	11F	Moderate	Moderate	Slight	Moderate	Douglas-fir----- Red alder----- Western hemlock---- Bigleaf maple----- Western redcedar----	113 --- --- --- ---	11 --- --- --- ---	Douglas-fir, red alder.
103----- Schneider	11R	Severe	Moderate	Slight	Moderate	Douglas-fir----- Red alder----- Western hemlock---- Bigleaf maple----- Western redcedar----	113 --- --- --- ---	11 --- --- --- ---	Douglas-fir, red alder.
104----- Semiahmoo	7W	Severe	Severe	Severe	Severe	Red alder-----	90	7	Western redcedar, red alder.
105----- Shalcar	6W	Severe	Severe	Severe	Severe	Red alder-----	85	6	Western redcedar, red alder.
107, 108----- Skipopa	11W	Moderate	Slight	Moderate	Severe	Douglas-fir----- Red alder----- Western redcedar---- Bigleaf maple-----	116 97 --- ---	11 8 --- ---	Douglas-fir, red alder.
109----- Spana	10W	Moderate	Moderate	Slight	Severe	Douglas-fir----- Red alder----- Western redcedar---- Bigleaf maple----- Black cottonwood----	110 --- --- --- ---	10 --- --- --- ---	Douglas-fir, red alder.
110, 111----- Spanaway	10F	Slight	Moderate	Slight	Moderate	Douglas-fir----- Oregon white oak---- Lodgepole pine----- Red alder-----	108 --- --- ---	10 --- --- ---	Douglas-fir, lodgepole pine, Oregon white oak.
115----- Sultan	12W	Moderate	Moderate	Slight	Severe	Douglas-fir----- Red alder----- Western redcedar----	120 --- ---	12 --- ---	Douglas-fir, red alder.
117, 118----- Tenino	11F	Moderate	Moderate	Moderate	Moderate	Douglas-fir----- Red alder----- Bigleaf maple----- Western redcedar----	122 --- --- ---	11 --- --- ---	Douglas-fir, red alder.
119----- Tenino	11R	Severe	Moderate	Moderate	Moderate	Douglas-fir----- Red alder----- Bigleaf maple----- Western redcedar----	122 --- --- ---	11 --- --- ---	Douglas-fir, red alder.
120----- Tisch	7W	Severe	Severe	Severe	Severe	Red alder----- Western redcedar----	90 ---	7 ---	Western redcedar, red alder.

See footnotes at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity			Trees to plant
		Equipment limitation	Seedling mortality	Wind-throw hazard	Plant competition	Common trees	Site index	Productivity class*	
121----- Vailton	16A	Moderate	Slight	Slight	Moderate	Douglas-fir-----	113	10	Douglas-fir, western hemlock, red alder.
						Western hemlock----	103	16	
						Red alder-----	---	---	
						Bigleaf maple-----	---	---	
Western redcedar----	---	---							
122----- Vailton	16R	Severe	Slight	Slight	Moderate	Douglas-fir-----	113	10	Douglas-fir, western hemlock, red alder.
						Western hemlock----	103	16	
						Red alder-----	---	---	
						Bigleaf maple-----	---	---	
						Western redcedar----	---	---	
123----- Wilkeson	12A	Moderate	Slight	Slight	Severe	Douglas-fir-----	122	12	Douglas-fir, red alder.
						Red alder-----	---	---	
						Western hemlock----	---	---	
						Bigleaf maple-----	---	---	
						Western redcedar----	---	---	
Bitter cherry-----	---	---							
124----- Wilkeson	12R	Severe	Slight	Slight	Severe	Douglas-fir-----	122	12	Douglas-fir, red alder.
						Red alder-----	---	---	
						Western hemlock----	---	---	
						Bigleaf maple-----	---	---	
						Western redcedar----	---	---	
Bitter cherry-----	---	---							
126, 127, 128--- Yelm	13A	Moderate	Slight	Slight	Severe	Douglas-fir-----	130	13	Douglas-fir, red alder.
						Red alder-----	---	---	
						Western redcedar----	---	---	
						Bigleaf maple-----	---	---	

* Productivity class is the yield in cubic meters per hectare per year calculated at the age of culmination of mean annual increment for fully stocked natural stands.

** See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 8.--RECREATIONAL DEVELOPMENT

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated)

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
1----- Alderwood	Moderate: wetness.	Moderate: wetness.	Severe: small stones.	Moderate: wetness.	Moderate: small stones, wetness, droughty.
2----- Alderwood	Moderate: slope, wetness.	Moderate: slope, wetness.	Severe: slope, small stones.	Moderate: wetness.	Moderate: small stones, wetness, droughty.
3----- Alderwood	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: wetness.	Moderate: small stones, wetness, droughty.
4----- Alderwood	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Moderate: small stones, wetness, droughty.
5----- Baldhill	Moderate: large stones, small stones.	Moderate: large stones, small stones.	Severe: large stones, small stones.	Moderate: large stones.	Severe: large stones.
6----- Baldhill	Moderate: slope, large stones, small stones.	Moderate: slope, large stones, small stones.	Severe: large stones, slope, small stones.	Moderate: large stones.	Severe: large stones.
7----- Baldhill	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Moderate: large stones, slope.	Severe: large stones, slope.
8----- Baldhill	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Severe: slope.	Severe: large stones, slope.
9, 10----- Baumgard	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
11*, 12*: Baumgard-----	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Pheeny-----	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.
13*: Baumgard-----	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Rock outcrop.					

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
14----- Bellingham	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: wetness.	Moderate: wetness.
15----- Boistfort	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight-----	Moderate: slope.
16----- Boistfort	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
17----- Bunker	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
18----- Bunker	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
19*: Bunker-----	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Boistfort-----	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
20----- Cagey	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.	Severe: erodes easily.	Moderate: wetness, droughty.
21----- Cathcart	Moderate: slope, small stones, dusty.	Moderate: slope, small stones, dusty.	Severe: slope, small stones.	Moderate: dusty.	Moderate: small stones, slope.
22----- Cathcart	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.
23----- Centralia	Moderate: slope, dusty.	Moderate: slope, dusty.	Severe: slope.	Moderate: dusty.	Moderate: slope.
24----- Centralia	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope, dusty.	Severe: slope.
25----- Centralia	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
26----- Chehalis	Severe: flooding.	Slight-----	Moderate: flooding.	Severe: erodes easily.	Moderate: flooding.
27----- Delphi	Severe: small stones.	Severe: small stones.	Severe: slope, small stones.	Severe: small stones.	Moderate: wetness, slope.
28----- Delphi	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Severe: small stones.	Severe: slope.

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
29----- Dupont	Severe: wetness, excess humus.	Severe: wetness, excess humus.	Severe: excess humus, wetness.	Severe: wetness, excess humus.	Severe: wetness, excess humus.
30----- Dystric Xerochrepts	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Severe: small stones, slope.
31----- Eld	Severe: flooding.	Moderate: dusty.	Moderate: dusty.	Severe: erodes easily.	Slight.
32----- Everett	Severe: small stones.	Severe: small stones.	Severe: small stones.	Severe: small stones.	Severe: small stones, droughty.
33----- Everett	Severe: small stones.	Severe: small stones.	Severe: slope, small stones.	Severe: small stones.	Severe: small stones, droughty.
34----- Everett	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Severe: small stones.	Severe: small stones, droughty, slope.
35----- Everett	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Severe: small stones, droughty, slope.
36----- Everson	Severe: wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
37----- Galvin	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, erodes easily.	Severe: wetness.
38----- Giles	Moderate: dusty.	Moderate: dusty.	Moderate: dusty.	Moderate: dusty.	Slight.
39----- Giles	Moderate: slope, dusty.	Moderate: slope, dusty.	Severe: slope.	Moderate: dusty.	Moderate: slope.
40----- Giles	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope, dusty.	Severe: slope.
41----- Godfrey	Severe: flooding, wetness, percs slowly.	Severe: percs slowly.	Severe: wetness, percs slowly.	Moderate: wetness.	Moderate: wetness, flooding.
42----- Grove	Severe: small stones.	Severe: small stones.	Severe: slope, small stones.	Severe: small stones.	Severe: small stones, droughty.
43----- Hoogdal	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: wetness, slope, dusty.	Severe: slope.

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
44----- Hoogdal	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
45----- Hydraquents	Severe: flooding, ponding, excess salt.	Severe: ponding, excess salt.	Severe: ponding, flooding, excess salt.	Severe: ponding, erodes easily.	Severe: excess salt, ponding, flooding.
46----- Indianola	Slight-----	Slight-----	Moderate: small stones.	Slight-----	Moderate: droughty.
47----- Indianola	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight-----	Moderate: droughty, slope.
48----- Indianola	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
49----- Jonas	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
50----- Kapowsin	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
51----- Kapowsin	Severe: wetness.	Moderate: slope, wetness.	Severe: slope, wetness.	Moderate: wetness.	Moderate: wetness, slope.
52----- Kapowsin	Severe: slope, wetness.	Severe: slope.	Severe: slope, wetness.	Moderate: wetness, slope.	Severe: slope.
53----- Kapowsin	Severe: slope, wetness.	Severe: slope.	Severe: slope, wetness.	Severe: slope.	Severe: slope.
54----- Kapowsin	Severe: wetness.	Moderate: wetness, small stones.	Severe: small stones, wetness.	Moderate: wetness.	Moderate: small stones, large stones, wetness.
55----- Kapowsin	Severe: wetness.	Moderate: slope, wetness, small stones.	Severe: slope, small stones, wetness.	Moderate: wetness.	Moderate: small stones, large stones, wetness.
56, 57----- Katula	Severe: slope, large stones.	Severe: slope, large stones.	Severe: large stones, slope, small stones.	Severe: large stones, slope.	Severe: large stones, slope.
58----- Lates	Severe: slope, excess humus.	Severe: slope, excess humus.	Severe: slope, excess humus.	Severe: excess humus.	Severe: slope.
59----- Lates	Severe: slope, excess humus.	Severe: slope, excess humus.	Severe: slope, excess humus.	Severe: excess humus, slope.	Severe: slope.
60----- Mal	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
61----- Mal	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
62----- Mashel	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope, dusty.	Severe: slope.
63----- Mashel	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
64----- Maytown	Severe: flooding.	Moderate: dusty.	Moderate: flooding, dusty.	Severe: erodes easily.	Moderate: flooding.
65----- McKenna	Severe: ponding.	Severe: ponding.	Severe: small stones, ponding.	Severe: ponding.	Severe: ponding.
66----- Melbourne	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight-----	Moderate: slope.
67, 68----- Melbourne	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
69----- Mukilteo	Severe: ponding, excess humus.	Severe: ponding, excess humus.	Severe: excess humus, ponding.	Severe: ponding, excess humus.	Severe: ponding, excess humus.
70----- Mukilteo	Severe: excess humus.	Severe: excess humus.	Severe: excess humus.	Severe: excess humus.	Severe: excess humus.
71----- Newberg	Severe: flooding.	Slight-----	Moderate: flooding.	Slight-----	Moderate: flooding.
72----- Newberg	Severe: flooding.	Moderate: dusty.	Moderate: flooding, dusty.	Moderate: dusty.	Moderate: flooding.
73----- Nisqually	Slight-----	Slight-----	Slight-----	Slight-----	Moderate: droughty.
74----- Nisqually	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight-----	Moderate: droughty, slope.
75, 76----- Norma	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
77----- Olympic	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: dusty.	Moderate: slope.
78----- Olympic	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
79----- Pheeny	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope, dusty.	Severe: slope.
80----- Pheeny	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
81*: Pheaney-----	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.
Baumgard-----	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
82*, 83*: Pheaney-----	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.
Rock outcrop.					
84----- Pilchuck	Severe: flooding.	Moderate: wetness.	Severe: slope.	Slight-----	Moderate: droughty, flooding.
85*. Pits					
86----- Prather	Moderate: wetness.	Moderate: wetness.	Moderate: slope, wetness.	Moderate: wetness.	Moderate: wetness.
87----- Prather	Moderate: slope, wetness.	Moderate: slope, wetness.	Severe: slope.	Moderate: wetness.	Moderate: wetness, slope.
88----- Puget	Severe: flooding, wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.	Moderate: wetness, flooding.
89----- Puyallup	Severe: flooding.	Moderate: dusty.	Moderate: flooding, dusty.	Moderate: dusty.	Moderate: droughty, flooding.
90----- Rainier	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
91----- Rainier	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
92*: Rainier-----	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Rock outcrop.					
93----- Raught	Severe: slope, excess humus.	Severe: slope, excess humus.	Severe: slope, excess humus.	Severe: excess humus.	Severe: slope.
94----- Raught	Severe: slope, excess humus.	Severe: slope, excess humus.	Severe: slope, excess humus.	Severe: excess humus, slope.	Severe: slope.

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
95*. Riverwash					
96*: Rock outcrop.					
Pheeneey-----	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.
97----- Salkum	Slight-----	Slight-----	Moderate: slope.	Slight-----	Slight.
98----- Salkum	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight-----	Moderate: slope.
99----- Salkum	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
100----- Scamman	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
101----- Scamman	Severe: wetness.	Severe: wetness.	Severe: slope, wetness.	Severe: wetness.	Severe: wetness.
102, 103----- Schneider	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Severe: small stones, slope.
104----- Semiahmoo	Severe: flooding, excess humus.	Severe: excess humus.	Severe: excess humus.	Severe: excess humus.	Severe: excess humus.
105----- Shalcar	Severe: ponding, excess humus.	Severe: ponding, excess humus.	Severe: excess humus, ponding.	Severe: ponding, excess humus.	Severe: ponding, excess humus.
106----- Shalcar Variant	Severe: flooding, ponding, excess humus.	Severe: ponding, excess humus.	Severe: excess humus, ponding.	Severe: ponding, excess humus.	Severe: ponding, excess humus.
107----- Skipopa	Severe: wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Moderate: wetness, dusty.	Moderate: wetness.
108----- Skipopa	Severe: wetness.	Moderate: slope, wetness, percs slowly.	Severe: slope, wetness.	Moderate: wetness, dusty.	Moderate: wetness, slope.
109----- Spana	Severe: wetness.	Moderate: wetness, small stones, dusty.	Severe: small stones, wetness.	Moderate: wetness, dusty.	Moderate: small stones, wetness.
110----- Spanaway	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Slight-----	Moderate: small stones, droughty.

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
111----- Spanaway	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Slight-----	Moderate: small stones, droughty, slope.
112----- Spanaway	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Slight-----	Moderate: small stones, large stones, droughty.
113----- Spanaway	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Slight-----	Moderate: small stones, large stones, droughty.
114*: Spanaway-----	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Slight-----	Moderate: small stones, droughty.
Nisqually-----	Slight-----	Slight-----	Severe: slope.	Slight-----	Moderate: droughty.
115----- Sultan	Severe: flooding.	Moderate: wetness, dusty.	Moderate: wetness, flooding.	Severe: erodes easily.	Moderate: flooding.
116----- Tacoma	Severe: flooding, ponding.	Severe: ponding.	Severe: ponding, flooding.	Severe: ponding.	Severe: ponding, flooding.
117----- Tenino	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Slight-----	Moderate: small stones, large stones, slope.
118----- Tenino	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.	Severe: slope.
119----- Tenino	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.
120----- Tisch	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
121----- Vailton	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
122----- Vailton	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
123----- Wilkeson	Moderate: slope, dusty.	Moderate: slope, dusty.	Severe: slope.	Moderate: dusty.	Moderate: slope.
124----- Wilkeson	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
125----- Xerorthents	Severe: flooding.	Moderate: wetness.	Moderate: slope, wetness.	Slight-----	Slight.
126----- Yelm	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.
127----- Yelm	Moderate: slope, wetness.	Moderate: slope, wetness.	Severe: slope.	Moderate: wetness.	Moderate: wetness, slope.
128----- Yelm	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: wetness, slope.	Severe: slope.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 9.--WILDLIFE HABITAT

(See text for definitions of "good," "fair," "poor," and "very poor." Absence of an entry indicates that the soil was not rated)

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--			
	Grain and seed crops	Grasses and legumes	Wild herba- ceous plants	Hard- wood trees	Conif- erous plants	Shrubs	Wetland plants	Shallow water areas	Open- land wild- life	Wood- land wild- life	Wetland wild- life
1----- Alderwood	Poor	Fair	Good	Good	Good	Good	Poor	Poor	Fair	Good	Poor.
2, 3----- Alderwood	Poor	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
4----- Alderwood	Poor	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
5, 6, 7, 8----- Baldhill	Poor	Poor	Good	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
9----- Baumgard	Fair	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
10----- Baumgard	Very poor.	Very poor.	Good	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
11*: Baumgard-----	Fair	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Pheaney-----	Poor	Fair	Good	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
12*: Baumgard-----	Very poor.	Very poor.	Good	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
Pheaney-----	Very poor.	Very poor.	Good	Fair	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
13*: Baumgard-----	Very poor.	Very poor.	Good	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
Rock outcrop.											
14----- Bellingham	Fair	Fair	Good	Fair	Fair	Good	Good	Fair	Fair	Good	Fair.
15----- Boistfort	Fair	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
16----- Boistfort	Poor	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
17----- Bunker	Fair	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
18----- Bunker	Very poor.	Very poor.	Good	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
19*: Bunker-----	Very poor.	Very poor.	Good	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.

See footnote at end of table.

TABLE 9.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements								Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herba-ceous plants	Hard-wood trees	Conif-erous plants	Shrubs	Wetland plants	Shallow water areas	Open-land wild-life	Wood-land wild-life	Wetland wild-life
19*: Boistfort-----	Very poor.	Very poor.	Good	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
20----- Cagey	Fair	Fair	Good	Good	Good	Good	Poor	Poor	Fair	Good	Poor.
21, 22----- Cathcart	Fair	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
23, 24----- Centralia	Fair	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
25----- Centralia	Very poor.	Very poor.	Good	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
26----- Chehalis	Good	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
27, 28----- Delphi	Poor	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
29----- Dupont	Fair	Fair	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
30----- Dystric Xerochrepts	Very poor.	Very poor.	Good	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
31----- Eld	Good	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
32, 33, 34, 35----- Everett	Poor	Poor	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
36----- Everson	Fair	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Fair	Fair.
37----- Galvin	Fair	Fair	Good	Good	Good	Good	Fair	Poor	Fair	Good	Poor.
38----- Giles	Good	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
39, 40----- Giles	Fair	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
41----- Godfrey	Fair	Good	Good	Fair	Fair	Good	Good	Good	Good	Fair	Good.
42----- Grove	Poor	Poor	Good	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
43----- Hoogdal	Poor	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
44----- Hoogdal	Poor	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.

See footnote at end of table.

TABLE 9.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--			
	Grain and seed crops	Grasses and legumes	Wild herba- ceous plants	Hard- wood trees	Conif- erous plants	Shrubs	Wetland plants	Shallow water areas	Open- land wild- life	Wood- land wild- life	Wetland wild- life
45----- Hydraquents	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Fair	Good	Very poor.	Very poor.	Fair.
46, 47, 48----- Indianola	Poor	Poor	Fair	Fair	Fair	Good	Very poor.	Very poor.	Poor	Fair	Very poor.
49----- Jonas	Poor	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
50----- Kapowsin	Fair	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
51, 52----- Kapowsin	Fair	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
53----- Kapowsin	Poor	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
54----- Kapowsin	Poor	Fair	Good	Good	Good	Good	Poor	Poor	Fair	Good	Poor.
55----- Kapowsin	Poor	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
56----- Katula	Poor	Poor	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Poor	Very poor.
57----- Katula	Very poor.	Poor	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Poor	Poor	Very poor.
58----- Lates	Fair	Good	Good	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
59----- Lates	Very poor.	Poor	Good	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
60, 61----- Mal	Poor	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
62----- Mashel	Fair	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
63----- Mashel	Very poor.	Very poor.	Good	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
64----- Maytown	Good	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
65----- McKenna	Poor	Fair	Fair	Fair	Fair	Fair	Good	Poor	Fair	Fair	Fair.
66----- Melbourne	Fair	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
67----- Melbourne	Poor	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
68----- Melbourne	Very poor.	Very poor.	Good	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.

See footnote at end of table.

TABLE 9.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--			
	Grain and seed crops	Grasses and legumes	Wild herba- ceous plants	Hard- wood trees	Conif- erous plants	Shrubs	Wetland plants	Shallow water areas	Open- land wild- life	Wood- land wild- life	Wetland wild- life
69----- Mukilteo	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Good	Good	Very poor.	Very poor.	Good.
70----- Mukilteo	Good	Good	Good	Poor	Poor	Poor	Good	Good	Good	Poor	Good.
71, 72----- Newberg	Good	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
73, 74----- Nisqually	Poor	Poor	Fair	Fair	Good	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
75, 76----- Norma	Poor	Fair	Fair	Fair	Fair	Fair	Good	Fair	Fair	Fair	Fair.
77----- Olympic	Fair	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
78----- Olympic	Poor	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
79, 80----- Pheeny	Poor	Fair	Good	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
81*: Pheeny-----	Very poor.	Very poor.	Good	Fair	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
Baumgard-----	Very poor.	Very poor.	Good	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
82*, 83*: Pheeny-----	Very poor.	Very poor.	Good	Fair	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
Rock outcrop.											
84----- Pilchuck	Poor	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
85*. Pits											
86----- Prather	Good	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
87----- Prather	Fair	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
88----- Puget	Good	Good	Good	Fair	Fair	Good	Good	Fair	Good	Fair	Fair.
89----- Puyallup	Good	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
90, 91----- Rainier	Poor	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.

See footnote at end of table.

TABLE 9.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements								Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herba- ceous plants	Hard- wood trees	Conif- erous plants	Shrubs	Wetland plants	Shallow water areas	Open- land wild- life	Wood- land wild- life	Wetland wild- life
92*: Rainier----- Rock outcrop.	Poor	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
93----- Raught	Fair	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
94----- Raught	Very poor.	Very poor.	Good	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
95*----- Riverwash	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Poor	Very poor.	Very poor.	Poor.
96*: Rock outcrop. Pheeny-----	Very poor.	Very poor.	Good	Fair	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
97----- Salkum	Good	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
98, 99----- Salkum	Fair	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
100----- Scamman	Fair	Fair	Good	Good	Good	Good	Fair	Poor	Fair	Good	Poor.
101----- Scamman	Fair	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
102----- Schneider	Poor	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
103----- Schneider	Very poor.	Very poor.	Good	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
104----- Semiahmoo	Good	Good	Good	Poor	Poor	Poor	Good	Good	Good	Poor	Good.
105----- Shalcar	Poor	Poor	Good	Fair	Good	Good	Good	Fair	Fair	Good	Fair.
106----- Shalcar Variant	Very poor.	Poor	Good	Poor	Poor	Good	Good	Good	Poor	Fair	Good.
107----- Skipopa	Fair	Fair	Good	Good	Good	Good	Fair	Fair	Fair	Good	Fair.
108----- Skipopa	Fair	Fair	Good	Good	Good	Good	Poor	Very poor.	Fair	Good	Very poor.
109----- Spana	Fair	Fair	Good	Good	Good	Good	Fair	Poor	Good	Good	Poor.
110, 111, 112, 113- Spanaway	Poor	Poor	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.

See footnote at end of table.

TABLE 9.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--			
	Grain and seed crops	Grasses and legumes	Wild herba- ceous plants	Hard- wood trees	Conif- erous plants	Shrubs	Wetland plants	Shallow water areas	Open- land wild- life	Wood- land wild- life	Wetland wild- life
114*: Spanaway-----	Poor	Poor	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
Nisqually-----	Poor	Poor	Fair	Fair	Good	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
115----- Sultan	Good	Good	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
116----- Tacoma	Very poor.	Poor	Fair	Very poor.	Very poor.	Fair	Good	Fair	Fair	Poor	Fair.
117, 118, 119----- Tenino	Poor	Poor	Good	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
120----- Tisch	Fair	Fair	Fair	Fair	Fair	Good	Good	Good	Fair	Fair	Good.
121, 122----- Vailton	Poor	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
123----- Wilkeson	Fair	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
124----- Wilkeson	Poor	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
125----- Xerorthents	Very poor.	Very poor.	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
126----- Yelm	Good	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
127, 128----- Yelm	Fair	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 10.--BUILDING SITE DEVELOPMENT

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
1----- Alderwood	Severe: wetness.	Moderate: wetness, large stones.	Severe: wetness.	Moderate: wetness, large stones.	Moderate: wetness, large stones.	Moderate: small stones, wetness, droughty.
2----- Alderwood	Severe: wetness.	Moderate: wetness, slope, large stones.	Severe: wetness.	Severe: slope.	Moderate: wetness, slope, large stones.	Moderate: small stones, wetness, droughty.
3, 4----- Alderwood	Severe: wetness, slope.	Severe: slope.	Severe: wetness, slope.	Severe: slope.	Severe: slope.	Moderate: small stones, wetness, droughty.
5----- Baldhill	Severe: cutbanks cave, large stones.	Severe: large stones.	Severe: large stones.	Severe: large stones.	Severe: large stones.	Severe: large stones.
6----- Baldhill	Severe: cutbanks cave, large stones.	Severe: large stones.	Severe: large stones.	Severe: slope, large stones.	Severe: large stones.	Severe: large stones.
7, 8----- Baldhill	Severe: cutbanks cave, large stones, slope.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: large stones, slope.
9, 10----- Baumgard	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
11*, 12*: Baumgard-----	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
Pheeny-----	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.	Severe: slope.
13*: Baumgard-----	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
Rock outcrop.						
14----- Bellingham	Severe: wetness.	Severe: shrink-swell.	Severe: wetness, shrink-swell.	Severe: shrink-swell.	Severe: low strength, shrink-swell.	Moderate: wetness.

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
15----- Boistfort	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: low strength.	Moderate: slope.
16----- Boistfort	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
17, 18----- Bunker	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
19*: Bunker-----	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
Boistfort-----	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
20----- Cagey	Severe: cutbanks cave, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness, droughty.
21----- Cathcart	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: small stones, slope.
22----- Cathcart	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
23----- Centralia	Moderate: slope.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: slope.
24, 25----- Centralia	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
26----- Chehalis	Moderate: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: low strength, flooding.	Moderate: flooding.
27----- Delphi	Moderate: wetness, slope.	Moderate: slope.	Moderate: wetness, slope.	Severe: slope.	Moderate: slope.	Moderate: wetness, slope.
28----- Delphi	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
29----- Dupont	Severe: excess humus, wetness.	Severe: wetness, low strength.	Severe: wetness, low strength.	Severe: wetness, low strength.	Severe: wetness.	Severe: wetness, excess humus.
30----- Dystric Xerochrepts	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: small stones, slope.

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
31----- Eld	Slight-----	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: low strength, flooding, shrink-swell.	Slight.
32----- Everett	Severe: cutbanks cave.	Slight-----	Slight-----	Slight-----	Slight-----	Severe: small stones, droughty.
33----- Everett	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Severe: small stones, droughty.
34, 35----- Everett	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: small stones, droughty, slope.
36----- Everson	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
37----- Galvin	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, wetness.	Severe: wetness.
38----- Giles	Slight-----	Slight-----	Slight-----	Slight-----	Severe: low strength.	Slight.
39----- Giles	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: low strength.	Moderate: slope.
40----- Giles	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
41----- Godfrey	Severe: wetness.	Severe: flooding, wetness, shrink-swell.	Severe: flooding, wetness, shrink-swell.	Severe: flooding, wetness, shrink-swell.	Severe: low strength, flooding, shrink-swell.	Moderate: wetness, flooding.
42----- Grove	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Severe: small stones, droughty.
43, 44----- Hoogdal	Severe: wetness, slope.	Severe: slope.	Severe: wetness, slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
45----- Hydraquents	Severe: ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: ponding, flooding.	Severe: excess salt, ponding, flooding.
46----- Indianola	Severe: cutbanks cave.	Slight-----	Slight-----	Slight-----	Slight-----	Moderate: droughty.
47----- Indianola	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: droughty, slope.

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
48----- Indianola	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
49----- Jonas	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, frost action.	Severe: slope.
50----- Kapowsin	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
51----- Kapowsin	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, slope.	Moderate: wetness, slope.	Moderate: wetness, slope.
52, 53----- Kapowsin	Severe: wetness, slope.	Severe: wetness, slope.	Severe: wetness, slope.	Severe: wetness, slope.	Severe: slope.	Severe: slope.
54----- Kapowsin	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: small stones, large stones, wetness.
55----- Kapowsin	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, slope.	Moderate: wetness, slope.	Moderate: small stones, large stones, wetness.
56, 57----- Katula	Severe: depth to rock, large stones, slope.	Severe: slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: large stones, slope.
58, 59----- Lates	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope, frost action.	Severe: slope.
60, 61----- Mal	Severe: slope.	Severe: shrink-swell, slope.	Severe: slope, shrink-swell.	Severe: shrink-swell, slope.	Severe: low strength, slope, frost action.	Severe: slope.
62, 63----- Mashel	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
64----- Maytown	Moderate: wetness, flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: low strength, flooding.	Moderate: flooding.
65----- McKenna	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
66----- Melbourne	Moderate: too clayey, slope.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: slope.
67, 68----- Melbourne	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
69----- Mukilteo	Severe: excess humus, ponding.	Severe: ponding, low strength.	Severe: ponding, low strength.	Severe: ponding, low strength.	Severe: ponding.	Severe: ponding, excess humus.
70----- Mukilteo	Severe: excess humus, wetness.	Severe: low strength.	Severe: wetness.	Severe: low strength.	Moderate: wetness.	Severe: excess humus.
71, 72----- Newberg	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding.
73----- Nisqually	Severe: cutbanks cave.	Slight-----	Slight-----	Slight-----	Slight-----	Moderate: droughty.
74----- Nisqually	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: droughty, slope.
75, 76----- Norma	Severe: cutbanks cave, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
77----- Olympic	Moderate: too clayey, slope.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: slope.
78----- Olympic	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
79, 80----- Pheeny	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.	Severe: slope.
81*: Pheeny-----	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.	Severe: slope.
Baumgard-----	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
82*, 83*: Pheeny-----	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.	Severe: slope.
Rock outcrop.						
84----- Pilchuck	Severe: cutbanks cave, wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Severe: flooding.	Moderate: droughty, flooding.
85*. Pits						

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
86----- Prather	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: wetness.	Moderate: wetness, shrink-swell, slope.	Severe: low strength.	Moderate: wetness.
87----- Prather	Severe: wetness.	Moderate: wetness, shrink-swell, slope.	Severe: wetness.	Severe: slope.	Severe: low strength.	Moderate: wetness, slope.
88----- Puget	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, flooding.	Moderate: wetness, flooding.
89----- Puyallup	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: droughty, flooding.
90, 91----- Rainier	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
92*: Rainier----- Rock outcrop.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
93, 94----- Raught	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
95*----- Riverwash	Severe: cutbanks cave, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness, flooding.	Severe: small stones, wetness, droughty.
96*: Rock outcrop. Pheaney-----	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.	Severe: slope.
97----- Salkum	Moderate: too clayey.	Slight-----	Slight-----	Moderate: slope.	Severe: low strength.	Slight.
98----- Salkum	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: low strength.	Moderate: slope.
99----- Salkum	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
100----- Scamman	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: low strength, wetness.	Severe: wetness.

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
101----- Scamman	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell, slope.	Severe: low strength, wetness.	Severe: wetness.
102, 103----- Schneider	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: small stones, slope.
104----- Semiahmoo	Severe: excess humus, wetness.	Severe: flooding, low strength.	Severe: flooding, wetness, low strength.	Severe: flooding, low strength.	Moderate: wetness, flooding.	Severe: excess humus.
105----- Shalcar	Severe: cutbanks cave, excess humus, ponding.	Severe: ponding, low strength.	Severe: ponding.	Severe: ponding, low strength.	Severe: ponding.	Severe: ponding, excess humus.
106----- Shalcar Variant	Severe: ponding.	Severe: flooding, ponding, shrink-swell.	Severe: flooding, ponding, shrink-swell.	Severe: flooding, ponding, shrink-swell.	Severe: low strength, ponding, flooding.	Severe: ponding, excess humus
107----- Skipopa	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength.	Moderate: wetness.
108----- Skipopa	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, slope.	Severe: low strength.	Moderate: wetness, slope.
109----- Spana	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: small stones, wetness.
110----- Spanaway	Severe: cutbanks cave.	Slight-----	Slight-----	Slight-----	Slight-----	Moderate: small stones, droughty.
111----- Spanaway	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: small stones, droughty, slope.
112----- Spanaway	Severe: cutbanks cave.	Slight-----	Slight-----	Slight-----	Slight-----	Moderate: small stones, large stones, droughty.
113----- Spanaway	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: small stones, large stones, droughty.
114*: Spanaway-----	Severe: cutbanks cave.	Slight-----	Slight-----	Slight-----	Slight-----	Moderate: small stones, droughty.

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
114*: Nisqually-----	Severe: cutbanks cave.	Slight-----	Slight-----	Moderate: slope.	Slight-----	Moderate: droughty.
115----- Sultan	Severe: cutbanks cave, wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Severe: flooding.	Moderate: flooding.
116----- Tacoma	Severe: cutbanks cave, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: ponding, flooding.	Severe: ponding, flooding.
117----- Tenino	Severe: cutbanks cave.	Moderate: slope.	Moderate: cemented pan, slope.	Severe: slope.	Moderate: slope.	Moderate: small stones, large stones, slope.
118, 119----- Tenino	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
120----- Tisch	Severe: excess humus, wetness.	Severe: flooding, wetness, low strength.	Severe: flooding, wetness, low strength.	Severe: flooding, wetness, low strength.	Severe: low strength, wetness.	Severe: wetness.
121, 122----- Vailton	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope, frost action.	Severe: slope.
123----- Wilkeson	Moderate: slope.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Moderate: low strength, slope, shrink-swell.	Moderate: slope.
124----- Wilkeson	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
125----- Xerorthents	Severe: wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Moderate: wetness, flooding.	Slight.
126----- Yelm	Severe: cutbanks cave, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.
127----- Yelm	Severe: cutbanks cave, wetness.	Moderate: wetness, slope.	Severe: wetness.	Severe: slope.	Moderate: wetness, slope.	Moderate: wetness, slope.
128----- Yelm	Severe: cutbanks cave, wetness, slope.	Severe: slope.	Severe: wetness, slope.	Severe: slope.	Severe: slope.	Severe: slope.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 11.--SANITARY FACILITIES

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "fair," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
1----- Alderwood	Severe: cemented pan, wetness.	Severe: seepage, cemented pan.	Severe: seepage, wetness.	Severe: cemented pan, seepage.	Poor: cemented pan, small stones.
2----- Alderwood	Severe: cemented pan, wetness.	Severe: seepage, cemented pan, slope.	Severe: seepage, wetness.	Severe: cemented pan, seepage.	Poor: cemented pan, small stones.
3, 4----- Alderwood	Severe: cemented pan, wetness, slope.	Severe: seepage, cemented pan, slope.	Severe: seepage, wetness, slope.	Severe: cemented pan, seepage, slope.	Poor: cemented pan, small stones, slope.
5----- Baldhill	Severe: large stones.	Severe: seepage, large stones.	Severe: seepage, large stones.	Severe: seepage.	Poor: seepage, small stones.
6----- Baldhill	Severe: large stones.	Severe: seepage, slope, large stones.	Severe: seepage, large stones.	Severe: seepage.	Poor: seepage, small stones.
7, 8----- Baldhill	Severe: slope, large stones.	Severe: seepage, slope, large stones.	Severe: seepage, slope, large stones.	Severe: seepage, slope.	Poor: seepage, small stones, slope.
9, 10----- Baumgard	Severe: slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Poor: slope.
11*, 12*: Baumgard-----	Severe: slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Poor: slope.
Pheaney-----	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope.	Poor: depth to rock, small stones, slope.
13*: Baumgard-----	Severe: slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Poor: slope.
Rock outcrop.					
14----- Bellingham	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness, too clayey.	Moderate: wetness.	Poor: too clayey, hard to pack.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
15----- Boistfort	Moderate: percs slowly, slope.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Poor: too clayey, hard to pack.
16----- Boistfort	Severe: slope.	Severe: slope.	Severe: slope, too clayey.	Severe: slope.	Poor: too clayey, hard to pack, slope.
17, 18----- Bunker	Severe: slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Poor: hard to pack, slope.
19*: Bunker-----	Severe: slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Poor: hard to pack, slope.
Boistfort-----	Severe: slope.	Severe: slope.	Severe: slope, too clayey.	Severe: slope.	Poor: too clayey, hard to pack, slope.
20----- Cagey	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy.
21----- Cathcart	Moderate: depth to rock, percs slowly, slope.	Severe: slope.	Severe: depth to rock.	Moderate: depth to rock, slope.	Fair: depth to rock, small stones, slope.
22----- Cathcart	Severe: slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Poor: slope.
23----- Centralia	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, slope.
24, 25----- Centralia	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
26----- Chehalis	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Fair: too clayey, thin layer.
27----- Delphi	Severe: wetness.	Severe: slope.	Moderate: wetness, slope.	Moderate: slope.	Slight.
28----- Delphi	Severe: wetness, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
29----- Dupont	Severe: wetness.	Severe: excess humus, wetness.	Severe: wetness, excess humus.	Severe: wetness.	Poor: wetness, excess humus.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
30----- Dystric Xerochrepts	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: small stones, slope.
31----- Eld	Moderate: flooding, percs slowly.	Severe: flooding.	Moderate: flooding, too clayey.	Moderate: flooding.	Fair: too clayey.
32----- Everett	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy, small stones.
33----- Everett	Severe: poor filter.	Severe: seepage, slope.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy, small stones.
34, 35----- Everett	Severe: poor filter, slope.	Severe: seepage, slope.	Severe: seepage, slope, too sandy.	Severe: seepage, slope.	Poor: seepage, too sandy, small stones.
36----- Everson	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
37----- Galvin	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
38----- Giles	Moderate: percs slowly.	Moderate: seepage.	Moderate: too clayey.	Slight-----	Fair: too clayey, thin layer.
39----- Giles	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, slope, thin layer.
40----- Giles	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
41----- Godfrey	Severe: flooding, wetness, percs slowly.	Severe: flooding, wetness.	Severe: flooding, wetness, too clayey.	Severe: flooding, wetness.	Poor: too clayey, hard to pack, wetness.
42----- Grove	Severe: poor filter.	Severe: seepage, slope.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy, small stones.
43, 44----- Hoogdal	Severe: wetness, percs slowly, slope.	Severe: slope, wetness.	Severe: too clayey, wetness, slope.	Severe: slope.	Poor: too clayey, hard to pack, slope.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
45----- Hydraquents	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding, excess salt.	Severe: flooding, ponding.	Poor: ponding, excess salt.
46----- Indianola	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
47----- Indianola	Severe: poor filter.	Severe: seepage, slope.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
48----- Indianola	Severe: poor filter, slope.	Severe: seepage, slope.	Severe: seepage, slope, too sandy.	Severe: seepage, slope.	Poor: seepage, too sandy, slope.
49----- Jonas	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: hard to pack, large stones, slope.
50----- Kapowsin	Severe: cemented pan, wetness.	Severe: cemented pan, wetness.	Severe: wetness.	Severe: cemented pan, wetness.	Poor: cemented pan, small stones.
51----- Kapowsin	Severe: cemented pan, wetness.	Severe: cemented pan, slope, wetness.	Severe: wetness.	Severe: cemented pan, wetness.	Poor: cemented pan, small stones.
52, 53----- Kapowsin	Severe: cemented pan, wetness, slope.	Severe: cemented pan, slope, wetness.	Severe: wetness, slope.	Severe: cemented pan, wetness, slope.	Poor: cemented pan, small stones, slope.
54----- Kapowsin	Severe: cemented pan, wetness.	Severe: cemented pan, wetness.	Severe: wetness.	Severe: cemented pan, wetness.	Poor: cemented pan, small stones, wetness.
55----- Kapowsin	Severe: cemented pan, wetness.	Severe: cemented pan, slope, wetness.	Severe: wetness.	Severe: cemented pan, wetness.	Poor: cemented pan, small stones, wetness.
56, 57----- Katula	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope.	Poor: depth to rock, large stones, slope.
58, 59----- Lates	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: depth to rock, slope.
60, 61----- Mal	Severe: percs slowly, slope.	Severe: slope.	Severe: slope, too clayey.	Severe: slope.	Poor: too clayey, hard to pack, slope.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
62, 63----- Mashel	Severe: percs slowly, slope.	Severe: slope.	Severe: slope, too clayey.	Severe: slope.	Poor: too clayey, hard to pack, slope.
64----- Maytown	Severe: flooding, wetness, percs slowly.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Fair: too clayey, wetness.
65----- McKenna	Severe: ponding, percs slowly.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Poor: small stones, ponding.
66----- Melbourne	Severe: percs slowly.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Poor: too clayey, hard to pack.
67, 68----- Melbourne	Severe: percs slowly, slope.	Severe: slope.	Severe: slope, too clayey.	Severe: slope.	Poor: too clayey, hard to pack, slope.
69----- Mukilteo	Severe: ponding.	Severe: excess humus, ponding.	Severe: ponding, excess humus.	Severe: ponding.	Poor: ponding, excess humus.
70----- Mukilteo	Severe: wetness.	Severe: excess humus, wetness.	Severe: seepage, wetness, excess humus.	Severe: wetness.	Poor: excess humus.
71, 72----- Newberg	Severe: flooding, poor filter.	Severe: seepage, flooding.	Severe: flooding, seepage.	Severe: flooding, seepage.	Fair: too sandy.
73----- Nisqually	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
74----- Nisqually	Severe: poor filter.	Severe: seepage, slope.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
75, 76----- Norma	Severe: ponding.	Severe: seepage, ponding.	Severe: ponding.	Severe: seepage, ponding.	Poor: ponding.
77----- Olympic	Severe: percs slowly.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Poor: too clayey, hard to pack.
78----- Olympic	Severe: percs slowly, slope.	Severe: slope.	Severe: slope, too clayey.	Severe: slope.	Poor: too clayey, hard to pack, slope.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
79, 80----- Pheeneey	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope.	Poor: depth to rock, small stones, slope.
81*: Pheeneey-----	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope.	Poor: depth to rock, small stones, slope.
Baumgard-----	Severe: slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Poor: slope.
82*, 83*: Pheeneey-----	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope.	Poor: depth to rock, small stones, slope.
Rock outcrop.					
84----- Pilchuck	Severe: flooding, wetness, poor filter.	Severe: seepage, flooding, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage, wetness.	Poor: seepage, too sandy, small stones.
85*. Pits					
86----- Prather	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Moderate: wetness.	Fair: too clayey, hard to pack.
87----- Prather	Severe: wetness, percs slowly.	Severe: slope, wetness.	Severe: wetness.	Moderate: wetness, slope.	Fair: too clayey, hard to pack, slope.
88----- Puget	Severe: flooding, wetness, percs slowly.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
89----- Puyallup	Severe: flooding, poor filter.	Severe: seepage, flooding.	Severe: flooding, seepage, too sandy.	Severe: flooding, seepage.	Poor: too sandy.
90, 91----- Rainier	Severe: wetness, percs slowly, slope.	Severe: slope, wetness.	Severe: depth to rock, wetness, slope.	Severe: wetness, slope.	Poor: too clayey, slope.
92*: Rainier-----	Severe: wetness, percs slowly, slope.	Severe: slope, wetness.	Severe: depth to rock, wetness, slope.	Severe: wetness, slope.	Poor: too clayey, slope.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
92*: Rock outcrop.					
93, 94----- Raught	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: hard to pack, slope.
95*----- Riverwash	Severe: flooding, wetness, poor filter.	Severe: seepage, flooding, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage, wetness.	Poor: too sandy, small stones, wetness.
96*: Rock outcrop.					
Pheeny-----	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope.	Poor: depth to rock, small stones, slope.
97----- Salkum	Severe: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight-----	Fair: too clayey, hard to pack.
98----- Salkum	Severe: percs slowly.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, hard to pack, slope.
99----- Salkum	Severe: percs slowly, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
100----- Scamman	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack.
101----- Scamman	Severe: wetness, percs slowly.	Severe: slope, wetness.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack.
102, 103----- Schneider	Severe: slope.	Severe: slope.	Severe: depth to rock, slope, large stones.	Severe: slope.	Poor: small stones, slope.
104----- Semiahmoo	Severe: wetness, percs slowly.	Severe: flooding, excess humus, wetness.	Severe: wetness, excess humus.	Severe: wetness.	Poor: excess humus.
105----- Shalcar	Severe: ponding.	Severe: seepage, excess humus, ponding.	Severe: seepage, ponding, excess humus.	Severe: ponding.	Poor: ponding, excess humus.
106----- Shalcar Variant	Severe: flooding, ponding, percs slowly.	Severe: flooding, excess humus, ponding.	Severe: flooding, ponding, too clayey.	Severe: flooding, ponding.	Poor: too clayey, hard to pack, ponding.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
107----- Skipopa	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
108----- Skipopa	Severe: wetness, percs slowly.	Severe: slope, wetness.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
109----- Spana	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Poor: seepage, small stones, wetness.
110----- Spanaway	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy, small stones.
111----- Spanaway	Severe: poor filter.	Severe: seepage, slope.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy, small stones.
112----- Spanaway	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy, small stones.
113----- Spanaway	Severe: poor filter.	Severe: seepage, slope.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy, small stones.
114*: Spanaway-----	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy, small stones.
Nisqually-----	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
115----- Sultan	Severe: flooding, wetness, percs slowly.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Fair: too clayey, wetness, thin layer.
116----- Tacoma	Severe: flooding, ponding, percs slowly.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Poor: ponding.
117----- Tenino	Severe: cemented pan.	Severe: seepage, cemented pan, slope.	Severe: seepage.	Severe: cemented pan.	Poor: cemented pan, small stones.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
118, 119----- Tenino	Severe: cemented pan, slope.	Severe: seepage, cemented pan, slope.	Severe: seepage, slope.	Severe: cemented pan, slope.	Poor: cemented pan, small stones, slope.
120----- Tisch	Severe: wetness, percs slowly.	Severe: excess humus, wetness.	Severe: wetness, excess humus.	Severe: wetness.	Poor: hard to pack, wetness.
121, 122----- Vailton	Severe: slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Poor: hard to pack, slope.
123----- Wilkeson	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, small stones, slope.
124----- Wilkeson	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
125----- Xerorthents	Severe: wetness.	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.	Fair: wetness.
126----- Yelm	Severe: wetness.	Severe: seepage, wetness.	Severe: wetness.	Severe: seepage, wetness.	Fair: wetness.
127----- Yelm	Severe: wetness.	Severe: seepage, slope, wetness.	Severe: wetness.	Severe: seepage, wetness.	Fair: slope, wetness.
128----- Yelm	Severe: wetness, slope.	Severe: seepage, slope, wetness.	Severe: wetness, slope.	Severe: seepage, wetness, slope.	Poor: slope.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 12.--CONSTRUCTION MATERIALS

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "good," "fair," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
1, 2----- Alderwood	Fair: thin layer, large stones.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
3----- Alderwood	Fair: thin layer, large stones, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
4----- Alderwood	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
5, 6----- Baldhill	Poor: large stones.	Improbable: large stones.	Improbable: large stones.	Poor: small stones, area reclaim.
7----- Baldhill	Poor: large stones.	Improbable: large stones.	Improbable: large stones.	Poor: small stones, area reclaim, slope.
8----- Baldhill	Poor: large stones, slope.	Improbable: large stones.	Improbable: large stones.	Poor: small stones, area reclaim, slope.
9, 10----- Baumgard	Poor: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
11*, 12*: Baumgard-----	Poor: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
Pheaney-----	Poor: depth to rock, slope.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: small stones, slope.
13*: Baumgard-----	Poor: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
Rock outcrop.				
14----- Bellingham	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
15----- Boistfort	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
16----- Boistfort	Poor: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer, slope.
17----- Bunker	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
18----- Bunker	Poor: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
19*: Bunker-----	Poor: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Boistfort-----	Poor: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer, slope.
20----- Cagey	Fair: wetness.	Probable-----	Improbable: too sandy.	Poor: thin layer.
21----- Cathcart	Fair: depth to rock, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
22----- Cathcart	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
23----- Centralia	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: slope.
24----- Centralia	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
25----- Centralia	Poor: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
26----- Chehalis	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
27----- Delphi	Fair: thin layer.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
28----- Delphi	Fair: thin layer, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
29----- Dupont	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: excess humus, wetness.

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
30----- Dystric Xerochrepts	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
31----- Eld	Fair: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
32, 33----- Everett	Good-----	Probable-----	Probable-----	Poor: small stones, area reclaim.
34----- Everett	Fair: slope.	Probable-----	Probable-----	Poor: small stones, area reclaim, slope.
35----- Everett	Poor: slope.	Probable-----	Probable-----	Poor: small stones, area reclaim, slope.
36----- Everson	Fair: wetness.	Probable-----	Probable-----	Poor: area reclaim.
37----- Galvin	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
38----- Giles	Good-----	Improbable: excess fines.	Improbable: excess fines.	Good.
39----- Giles	Good-----	Improbable: excess fines.	Improbable: excess fines.	Fair: slope.
40----- Giles	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
41----- Godfrey	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
42----- Grove	Good-----	Probable-----	Probable-----	Poor: small stones, area reclaim.
43----- Hoogdal	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer, slope.
44----- Hoogdal	Poor: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer, slope.
45----- Hydraquents	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: excess salt, wetness.

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
46, 47----- Indianola	Good-----	Probable-----	Improbable: too sandy.	Fair: too sandy, small stones.
48----- Indianola	Fair: slope.	Probable-----	Improbable: too sandy.	Poor: slope.
49----- Jonas	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
50, 51----- Kapowsin	Poor: thin layer.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
52----- Kapowsin	Poor: thin layer.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
53----- Kapowsin	Poor: thin layer, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
54, 55----- Kapowsin	Fair: thin layer, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
56, 57----- Katula	Poor: depth to rock, large stones, slope.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: small stones, slope.
58----- Lates	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
59----- Lates	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
60----- Mal	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer, slope.
61----- Mal	Poor: low strength, slope, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer, slope.
62----- Mashel	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer, slope.
63----- Mashel	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer, slope.
64----- Maytown	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
65----- McKenna	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, wetness.
66----- Melbourne	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
67, 68----- Melbourne	Poor: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer, slope.
69----- Mukilteo	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: excess humus, wetness.
70----- Mukilteo	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: excess humus.
71, 72----- Newberg	Good-----	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
73----- Nisqually	Good-----	Probable-----	Improbable: too sandy.	Fair: too sandy, thin layer.
74----- Nisqually	Good-----	Probable-----	Improbable: too sandy.	Fair: too sandy, thin layer, slope.
75, 76----- Norma	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
77----- Olympic	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
78----- Olympic	Poor: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer, slope.
79----- Pheeny	Poor: depth to rock.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: small stones, slope.
80----- Pheeny	Poor: depth to rock, slope.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: small stones, slope.
81*: Pheeny-----	Poor: depth to rock, slope.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: small stones, slope.
Baumgard-----	Poor: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
82*, 83*: Pheeny----- Rock outcrop.	Poor: depth to rock, slope.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: small stones, slope.
84----- Pilchuck	Fair: wetness.	Improbable: thin layer.	Improbable: thin layer.	Poor: small stones, area reclaim.
85*. Pits				
86, 87----- Prather	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
88----- Puget	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
89----- Puyallup	Good-----	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
90----- Rainier	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer, slope.
91----- Rainier	Poor: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer, slope.
92*: Rainier----- Rock outcrop.	Poor: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer, slope.
93----- Raught	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, slope.
94----- Raught	Poor: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, slope.
95*----- Riverwash	Poor: wetness.	Probable-----	Probable-----	Poor: too sandy, small stones, area reclaim.
96*: Rock outcrop. Pheeny-----	Poor: depth to rock, slope.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: small stones, slope.

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
97, 98----- Salkum	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
99----- Salkum	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer, slope.
100, 101----- Scamman	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, wetness.
102, 103----- Schneider	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
104----- Semiahmoo	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: excess humus.
105----- Shalcar	Poor: wetness.	Probable-----	Probable-----	Poor: excess humus, wetness.
106----- Shalcar Variant	Poor: low strength, wetness, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: excess humus, wetness.
107, 108----- Skipopa	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
109----- Spana	Fair: wetness.	Probable-----	Probable-----	Poor: small stones, area reclaim.
110, 111, 112, 113----- Spanaway	Good-----	Probable-----	Probable-----	Poor: small stones, area reclaim.
114*: Spanaway-----	Good-----	Probable-----	Probable-----	Poor: small stones, area reclaim.
Nisqually-----	Good-----	Probable-----	Improbable: too sandy.	Fair: too sandy, thin layer.
115----- Sultan	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Good.
116----- Tacoma	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
117----- Tenino	Good-----	Improbable: small stones.	Probable-----	Poor: small stones, area reclaim.
118----- Tenino	Fair: slope.	Improbable: small stones.	Probable-----	Poor: small stones, area reclaim, slope.

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
119----- Tenino	Poor: slope.	Improbable: small stones.	Probable-----	Poor: small stones, area reclaim, slope.
120----- Tisch	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
121----- Vailton	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
122----- Vailton	Poor: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
123----- Wilkeson	Fair: shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
124----- Wilkeson	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
125----- Xerorthents	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Good.
126----- Yelm	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Good.
127----- Yelm	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: slope.
128----- Yelm	Fair: wetness, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 13.--WATER MANAGEMENT

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not evaluated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Limitations for--			Features affecting--		
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Grassed waterways
1----- Alderwood	Severe: seepage.	Severe: seepage.	Severe: no water.	Cemented pan, large stones.	Large stones, wetness, droughty.	Large stones.
2, 3, 4----- Alderwood	Severe: seepage, slope.	Severe: seepage.	Severe: no water.	Cemented pan, large stones, slope.	Large stones, wetness, droughty.	Large stones, slope.
5----- Baldhill	Severe: seepage.	Severe: seepage, large stones.	Severe: no water.	Deep to water	Large stones, droughty.	Large stones, droughty.
6, 7, 8----- Baldhill	Severe: seepage, slope.	Severe: seepage, large stones.	Severe: no water.	Deep to water	Large stones, droughty, slope.	Large stones, slope, droughty.
9, 10----- Baumgard	Severe: slope.	Moderate: thin layer.	Severe: no water.	Deep to water	Slope-----	Slope.
11*, 12*: Baumgard-----	Severe: slope.	Moderate: thin layer.	Severe: no water.	Deep to water	Slope-----	Slope.
Pheaney-----	Severe: slope.	Severe: seepage, large stones.	Severe: no water.	Deep to water	Large stones, depth to rock, slope.	Large stones, slope, depth to rock.
13*: Baumgard----- Rock outcrop.	Severe: slope.	Moderate: thin layer.	Severe: no water.	Deep to water	Slope-----	Slope.
14----- Bellingham	Slight-----	Moderate: hard to pack, wetness.	Severe: no water.	Percs slowly---	Wetness, percs slowly.	Percs slowly.
15, 16----- Boistfort	Severe: slope.	Severe: hard to pack.	Severe: no water.	Deep to water	Slope-----	Slope.
17, 18----- Bunker	Severe: slope.	Severe: piping, hard to pack.	Severe: no water.	Deep to water	Slope-----	Slope.
19*: Bunker-----	Severe: slope.	Severe: piping, hard to pack.	Severe: no water.	Deep to water	Slope-----	Slope.
Boistfort-----	Severe: slope.	Severe: hard to pack.	Severe: no water.	Deep to water	Slope-----	Slope.
20----- Cagey	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Erodes easily, droughty.

See footnote at end of table.

TABLE 13.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--			Features affecting--		
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Grassed waterways
21, 22----- Cathcart	Severe: slope.	Severe: piping.	Severe: no water.	Deep to water	Slope-----	Slope.
23, 24, 25----- Centralia	Severe: slope.	Slight-----	Severe: no water.	Deep to water	Slope-----	Slope.
26----- Chehalis	Moderate: seepage.	Severe: piping.	Severe: no water.	Deep to water	Flooding-----	Erodes easily.
27, 28----- Delphi	Severe: slope.	Severe: seepage.	Severe: no water.	Deep to water	Slope-----	Slope.
29----- Dupont	Moderate: seepage.	Severe: excess humus, wetness.	Severe: slow refill.	Subsides-----	Wetness-----	Wetness, erodes easily.
30----- Dystric Xerochrepts	Severe: slope.	Severe: seepage.	Severe: no water.	Deep to water	Droughty, slope.	Slope, droughty.
31----- Eld	Moderate: seepage.	Moderate: piping.	Severe: no water.	Deep to water	Erodes easily	Erodes easily.
32----- Everett	Severe: seepage.	Severe: seepage.	Severe: no water.	Deep to water	Droughty-----	Large stones, droughty.
33, 34, 35----- Everett	Severe: seepage, slope.	Severe: seepage.	Severe: no water.	Deep to water	Droughty, slope.	Large stones, slope, droughty.
36----- Everson	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: slow refill, cutbanks cave.	Percs slowly, cutbanks cave.	Wetness, percs slowly.	Wetness, percs slowly.
37----- Galvin	Slight-----	Severe: thin layer, wetness.	Severe: slow refill.	Favorable-----	Wetness, percs slowly.	Wetness, erodes easily.
38----- Giles	Moderate: seepage.	Severe: piping.	Severe: no water.	Deep to water	Favorable-----	Favorable.
39, 40----- Giles	Severe: slope.	Severe: piping.	Severe: no water.	Deep to water	Slope-----	Slope.
41----- Godfrey	Slight-----	Severe: hard to pack, wetness.	Severe: slow refill.	Percs slowly, flooding.	Wetness, percs slowly.	Wetness, percs slowly.
42----- Grove	Severe: seepage, slope.	Severe: seepage.	Severe: no water.	Deep to water	Droughty, slope.	Slope, droughty.
43, 44----- Hoogdal	Severe: slope.	Severe: hard to pack.	Severe: no water.	Percs slowly, slope.	Wetness, percs slowly, slope.	Slope, percs slowly.
45----- Hydraquents	Moderate: seepage.	Severe: piping, ponding, excess salt.	Severe: salty water.	Ponding, flooding, excess salt.	Ponding, erodes easily, flooding.	Wetness, excess salt, erodes easily.

See footnote at end of table.

TABLE 13.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--			Features affecting--		
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Grassed waterways
46----- Indianola	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Deep to water	Droughty, fast intake.	Droughty.
47, 48----- Indianola	Severe: seepage, slope.	Severe: seepage, piping.	Severe: no water.	Deep to water	Droughty, fast intake, slope.	Slope, droughty.
49----- Jonas	Severe: slope.	Severe: piping, hard to pack.	Severe: no water.	Deep to water	Large stones, droughty, slope.	Large stones, slope, droughty.
50----- Kapowsin	Moderate: seepage, cemented pan.	Severe: thin layer.	Severe: no water.	Cemented pan---	Wetness, cemented pan.	Wetness, cemented pan.
51, 52, 53----- Kapowsin	Severe: slope.	Severe: thin layer.	Severe: no water.	Cemented pan, slope.	Wetness, cemented pan, slope.	Wetness, slope, cemented pan.
54----- Kapowsin	Moderate: seepage, cemented pan.	Severe: thin layer.	Severe: no water.	Cemented pan---	Wetness, cemented pan.	Wetness, cemented pan.
55----- Kapowsin	Severe: slope.	Severe: thin layer.	Severe: no water.	Cemented pan, slope.	Wetness, cemented pan, slope.	Wetness, slope, cemented pan.
56, 57----- Katula	Severe: slope.	Severe: seepage, large stones.	Severe: no water.	Deep to water	Large stones, droughty, depth to rock.	Large stones, slope, droughty.
58, 59----- Lates	Severe: slope.	Severe: thin layer.	Severe: no water.	Deep to water	Depth to rock, slope.	Slope, depth to rock.
60, 61----- Mal	Severe: slope.	Moderate: hard to pack.	Severe: no water.	Deep to water	Slope-----	Slope.
62, 63----- Mashel	Severe: slope.	Severe: hard to pack.	Severe: no water.	Deep to water	Slope-----	Slope.
64----- Maytown	Slight-----	Moderate: piping, wetness.	Severe: slow refill.	Flooding-----	Wetness, erodes easily, flooding.	Erodes easily.
65----- McKenna	Slight-----	Severe: thin layer, ponding.	Severe: no water.	Ponding, percs slowly.	Ponding, percs slowly.	Wetness, percs slowly.
66, 67, 68----- Melbourne	Severe: slope.	Severe: hard to pack.	Severe: no water.	Deep to water	Slope-----	Slope.
69----- Mukilteo	Moderate: seepage.	Severe: excess humus, ponding.	Moderate: slow refill.	Ponding, subsides.	Ponding-----	Wetness.
70----- Mukilteo	Moderate: seepage.	Severe: excess humus, wetness.	Moderate: slow refill.	Subsides-----	Wetness-----	Favorable.

See footnote at end of table.

TABLE 13.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--			Features affecting--		
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Grassed waterways
71, 72----- Newberg	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Deep to water	Flooding-----	Favorable.
73----- Nisqually	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Deep to water	Droughty, fast intake.	Droughty.
74----- Nisqually	Severe: seepage, slope.	Severe: seepage, piping.	Severe: no water.	Deep to water	Droughty, fast intake, slope.	Slope, droughty.
75, 76----- Norma	Severe: seepage.	Severe: piping, ponding.	Severe: cutbanks cave.	Ponding, cutbanks cave.	Ponding-----	Wetness.
77, 78----- Olympic	Severe: slope.	Severe: hard to pack.	Severe: no water.	Deep to water	Slope-----	Slope.
79, 80----- Pheeny	Severe: slope.	Severe: seepage, large stones.	Severe: no water.	Deep to water	Large stones, depth to rock, slope.	Large stones, slope, depth to rock.
81*: Pheeny-----	Severe: slope.	Severe: seepage, large stones.	Severe: no water.	Deep to water	Large stones, depth to rock, slope.	Large stones, slope, depth to rock.
Baumgard-----	Severe: slope.	Moderate: thin layer.	Severe: no water.	Deep to water	Slope-----	Slope.
82*, 83*: Pheeny-----	Severe: slope.	Severe: seepage, large stones.	Severe: no water.	Deep to water	Large stones, depth to rock, slope.	Large stones, slope, depth to rock.
Rock outcrop.						
84----- Pilchuck	Severe: seepage.	Severe: seepage.	Severe: cutbanks cave.	Flooding, cutbanks cave.	Wetness, droughty, fast intake.	Droughty.
85*. Pits						
86----- Prather	Moderate: seepage, slope.	Severe: hard to pack.	Severe: no water.	Percs slowly, slope.	Wetness, percs slowly, slope.	Percs slowly.
87----- Prather	Severe: slope.	Severe: hard to pack.	Severe: no water.	Percs slowly, slope.	Wetness, percs slowly, slope.	Slope, percs slowly.
88----- Puget	Slight-----	Severe: piping, wetness.	Severe: slow refill.	Flooding-----	Wetness, percs slowly, flooding.	Wetness.
89----- Puyallup	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Deep to water	Droughty, flooding.	Droughty.

See footnote at end of table.

TABLE 13.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--			Features affecting--		
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Grassed waterways
90, 91----- Rainier	Severe: slope.	Moderate: thin layer, wetness.	Severe: slow refill.	Deep to water	Slope-----	Slope, erodes easily.
92*: Rainier----- Rock outcrop.	Severe: slope.	Moderate: thin layer, wetness.	Severe: slow refill.	Deep to water	Slope-----	Slope, erodes easily.
93, 94----- Raught	Severe: slope.	Severe: piping, hard to pack.	Severe: no water.	Deep to water	Slope-----	Slope.
95*----- Riverwash	Severe: seepage.	Severe: wetness.	Severe: cutbanks cave.	Flooding, cutbanks cave.	Wetness, droughty, fast intake.	Large stones, wetness, droughty.
96*: Rock outcrop. Pheaney-----	Severe: slope.	Severe: seepage, large stones.	Severe: no water.	Deep to water	Large stones, depth to rock, slope.	Large stones, slope, depth to rock.
97----- Salkum	Moderate: seepage, slope.	Severe: hard to pack.	Severe: no water.	Deep to water	Slope-----	Favorable.
98, 99----- Salkum	Severe: slope.	Severe: hard to pack.	Severe: no water.	Deep to water	Slope-----	Slope.
100----- Scamman	Moderate: seepage.	Severe: wetness.	Severe: no water.	Percs slowly---	Wetness, percs slowly.	Wetness, percs slowly.
101----- Scamman	Severe: slope.	Severe: wetness.	Severe: no water.	Percs slowly, slope.	Wetness, percs slowly, slope.	Wetness, slope, percs slowly.
102, 103----- Schneider	Severe: slope.	Severe: seepage, large stones.	Severe: no water.	Deep to water	Large stones, droughty, slope.	Large stones, slope, droughty.
104----- Semiahmoo	Moderate: seepage.	Severe: excess humus, wetness.	Severe: slow refill.	Subsides-----	Wetness-----	Favorable.
105----- Shalcar	Moderate: seepage.	Severe: excess humus, ponding.	Severe: cutbanks cave.	Ponding, subsides.	Ponding-----	Wetness, erodes easily.
106----- Shalcar Variant	Slight-----	Severe: ponding.	Severe: slow refill.	Ponding, percs slowly, flooding.	Ponding, percs slowly, flooding.	Wetness, percs slowly.
107----- Skipopa	Slight-----	Moderate: hard to pack, wetness.	Severe: no water.	Percs slowly---	Wetness, percs slowly.	Wetness, percs slowly.

See footnote at end of table.

TABLE 13.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--			Features affecting--		
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Grassed waterways
108----- Skipopa	Severe: slope.	Moderate: hard to pack, wetness.	Severe: no water.	Percs slowly, slope.	Wetness, percs slowly, slope.	Wetness, slope, percs slowly.
109----- Spana	Severe: seepage.	Severe: seepage, wetness.	Severe: cutbanks cave.	Cutbanks cave	Wetness-----	Wetness.
110----- Spanaway	Severe: seepage.	Severe: seepage.	Severe: no water.	Deep to water	Droughty-----	Large stones, droughty.
111----- Spanaway	Severe: seepage, slope.	Severe: seepage.	Severe: no water.	Deep to water	Droughty, slope.	Large stones, slope, droughty.
112----- Spanaway	Severe: seepage.	Severe: seepage.	Severe: no water.	Deep to water	Droughty-----	Large stones, droughty.
113----- Spanaway	Severe: seepage, slope.	Severe: seepage.	Severe: no water.	Deep to water	Droughty, slope.	Large stones, slope, droughty.
114*: Spanaway-----	Severe: seepage.	Severe: seepage.	Severe: no water.	Deep to water	Droughty, slope.	Large stones, droughty.
Nisqually-----	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Deep to water	Droughty, fast intake, slope.	Droughty.
115----- Sultan	Moderate: seepage.	Severe: piping.	Severe: slow refill, cutbanks cave.	Flooding-----	Wetness, erodes easily, flooding.	Erodes easily.
116----- Tacoma	Slight-----	Severe: piping, ponding.	Severe: slow refill, cutbanks cave.	Ponding, flooding.	Ponding, flooding, excess salt.	Wetness, excess salt.
117, 118, 119----- Tenino	Severe: slope.	Severe: seepage.	Severe: no water.	Deep to water	Cemented pan, slope.	Slope, cemented pan.
120----- Tisch	Moderate: seepage.	Severe: piping, excess humus, hard to pack.	Severe: slow refill.	Subsides-----	Wetness-----	Wetness.
121, 122----- Vailton	Severe: slope.	Severe: piping, hard to pack.	Severe: no water.	Deep to water	Slope-----	Slope.
123, 124----- Wilkeson	Severe: slope.	Severe: piping.	Severe: no water.	Deep to water	Slope-----	Slope.
125----- Xerorthents	Slight-----	Moderate: wetness.	Moderate: deep to water.	Favorable-----	Wetness-----	Favorable.

See footnote at end of table.

TABLE 13.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--			Features affecting--		
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Grassed waterways
126----- Yelm	Severe: seepage.	Severe: piping, wetness.	Severe: slow refill, cutbanks cave.	Favorable-----	Wetness-----	Favorable.
127, 128----- Yelm	Severe: seepage, slope.	Severe: piping, wetness.	Severe: slow refill, cutbanks cave.	Slope-----	Wetness, slope.	Slope.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 14.--ENGINEERING INDEX PROPERTIES

(The symbol < means less than; > means more than. Absence of an entry indicates that data were not estimated)

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
1, 2, 3, 4----- Alderwood	0-15	Gravelly sandy loam.	GM	A-2, A-4, A-1	0-5	55-70	50-65	35-55	20-40	15-25	NP-5
	15-30	Very gravelly loam, very gravelly sandy loam, very cobbly sandy loam.	GM	A-1, A-2	0-40	35-70	30-60	20-50	10-35	15-25	NP-5
	30	Cemented-----	---	---	---	---	---	---	---	---	---
5, 6, 7, 8----- Baldhill	0-4	Very stony sandy loam.	SM, GM	A-2	20-40	60-80	50-75	40-55	25-35	---	NP
	4-54	Very gravelly sandy loam, extremely gravelly sandy loam, very stony sandy loam.	GP-GM, GM	A-1	15-55	20-50	15-40	10-25	5-20	---	NP
	54-60	Very gravelly loamy sand, very cobbly loamy sand, extremely gravelly loamy sand.	GP, GP-GM	A-1	10-40	25-45	20-40	10-15	0-10	---	NP
9, 10----- Baumgard	0-14	Loam-----	ML	A-4	0	95-100	85-90	80-85	60-70	30-40	5-10
	14-30	Clay loam, silty clay loam, gravelly clay loam.	CL	A-6, A-7	0-10	75-90	65-85	60-80	50-75	35-45	15-20
	30-45	Gravelly clay loam, gravelly silty clay loam, very gravelly clay loam.	GM, ML, SM	A-6, A-7	0-25	55-85	45-75	40-70	35-65	35-45	10-15
	45	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
11*, 12*: Baumgard-----	0-14	Loam-----	ML	A-4	0	95-100	85-90	80-85	60-70	30-40	5-10
	14-30	Clay loam, silty clay loam, gravelly clay loam.	CL	A-6, A-7	0-10	75-90	65-85	60-80	50-75	35-45	15-20
	30-45	Gravelly clay loam, gravelly silty clay loam, very gravelly clay loam.	GM, ML, SM	A-6, A-7	0-25	55-85	45-75	40-70	35-65	35-45	10-15
	45	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
11*, 12*: Pheenev	0-6	Gravelly loam	SM, ML, MH	A-5, A-7	0	70-80	55-75	50-70	35-55	40-60	5-20
	6-10	Gravelly silt loam, gravelly loam.	SM, ML, MH	A-5, A-7	0	70-80	55-75	50-70	35-55	40-60	5-20
	10-30	Very gravelly loam, extremely cobbly silt loam, extremely gravelly loam.	GM	A-5, A-2, A-1, A-7	15-65	35-65	25-60	20-55	15-45	40-60	5-20
	30	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
13*: Baumgard	0-14	Loam	ML	A-4	0	95-100	85-90	80-85	60-70	30-40	5-10
	14-30	Clay loam, silty clay loam, gravelly clay loam.	CL	A-6, A-7	0-10	75-90	65-85	60-80	50-75	35-45	15-20
	30-45	Gravelly clay loam, gravelly silty clay loam, very gravelly clay loam.	GM, ML, SM	A-6, A-7	0-25	55-85	45-75	40-70	35-65	35-45	10-15
	45	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Rock outcrop.											
14----- Bellingham	0-5	Silty clay loam	MH, ML	A-7	0	100	100	95-100	90-100	40-55	15-25
	5-60	Silty clay, clay, silty clay loam.	CL, CH	A-7	0	100	95-100	95-100	85-100	45-65	20-40
15, 16----- Boistfort	0-9	Silt loam	ML, MH, OL, OH	A-5, A-7	0	90-100	85-100	75-85	60-85	45-65	5-20
	9-19	Clay loam, silty clay loam.	MH, ML	A-5, A-7	0	90-100	85-100	80-95	60-90	45-65	5-20
	19-60	Silty clay, clay loam, silty clay loam.	MH, ML	A-7	0-10	90-100	85-100	75-95	65-90	40-60	10-20
17, 18----- Bunker	0-10	Gravelly silt loam.	ML, GM, OL, OH	A-7, A-5	0-5	65-85	55-75	50-70	40-65	45-65	5-20
	10-30	Gravelly loam, gravelly clay loam, gravelly silt loam.	ML, GM, MH	A-5, A-7	0-5	65-75	55-70	50-65	40-55	40-60	5-20
	30-54	Loam, clay loam, gravelly silt loam.	ML, MH	A-5, A-7	0-5	80-95	70-90	65-85	50-75	40-60	5-20
	54	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments > 3 inches Pct	Percentage passing sieve number--				Liquid limit Pct	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
19*: Bunker-----	0-10	Gravelly silt loam.	ML, GM, OL, OH	A-7, A-5	0-5	65-85	55-75	50-70	40-65	45-65	5-20
	10-30	Gravelly loam, gravelly clay loam, gravelly silt loam.	ML, GM, MH	A-5, A-7	0-5	65-75	55-70	50-65	40-55	40-60	5-20
	30-54	Loam, clay loam, gravelly silt loam.	ML, MH	A-5, A-7	0-5	80-95	70-90	65-85	50-75	40-60	5-20
	54	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Boistfort-----	0-9	Silt loam-----	ML, MH, OL, OH	A-5, A-7	0	90-100	85-100	75-85	60-85	45-65	5-20
	9-19	Clay loam, silty clay loam.	MH, ML	A-5, A-7	0	90-100	85-100	80-95	60-90	45-65	5-20
	19-60	Silty clay, clay loam, silty clay loam.	MH, ML	A-7	0-10	90-100	85-100	75-95	65-90	40-60	10-20
20----- Cagey	0-6	Loamy sand-----	SM	A-2	0	100	100	50-75	15-30	---	NP
	6-28	Sand, fine sand, loamy sand.	SM, SP-SM	A-3, A-2	0	100	100	50-70	5-25	---	NP
	28-60	Sand, fine sand	SP, SP-SM, SM	A-3, A-2	0	100	100	50-70	0-15	---	NP
21, 22----- Cathcart	0-12	Gravelly loam----	GM, SM	A-4, A-5	0	60-85	50-75	40-60	35-50	35-45	NP-10
	12-33	Loam, silt loam, gravelly loam.	ML, SM	A-4, A-5	0	80-100	70-95	55-75	40-60	35-45	NP-10
	33-44	Clay loam, sandy loam, silt loam.	ML	A-4, A-5	0	85-100	75-100	60-90	50-80	30-45	NP-10
	44	Weathered bedrock	---	---	---	---	---	---	---	---	---
23, 24, 25----- Centralia	0-10	Silt loam-----	CL	A-6	0	100	95-100	85-95	70-85	25-35	10-20
	10-42	Silty clay loam, clay loam.	CL	A-7	0	100	95-100	90-95	65-85	40-50	15-25
	42-60	Silty clay loam, clay loam, loam.	CL	A-7	0	100	95-100	90-95	65-85	40-50	15-25
26----- Chehalis	0-7	Silt loam-----	ML	A-4	0	100	100	95-100	80-90	25-35	NP-10
	7-44	Silt loam, silty clay loam.	ML	A-4, A-6, A-7	0	100	100	95-100	85-95	35-45	5-15
	44-60	Silt loam, loam, silty clay.	CL	A-6, A-7	0	100	100	90-100	70-90	30-45	10-20
27, 28----- Delphi	0-8	Very gravelly loam.	GM	A-2, A-5, A-7	0-15	45-70	30-50	25-45	20-40	40-65	5-20
	8-13	Very gravelly loam, very gravelly silt loam.	GM	A-2, A-5, A-7	0-15	40-70	30-50	25-45	20-50	40-60	5-20
	13-48	Extremely gravelly silt loam, very gravelly loam, extremely gravelly loam.	GM	A-2	0-15	20-50	15-45	15-40	10-35	40-60	5-20

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
29----- Dupont	0-7	Muck-----	PT	A-8	---	---	---	---	---	---	---
	7-17	Diatomaceous earth.	ML	A-5	0	100	100	95-100	85-95	40-50	NP-5
	17-60	Sapric material	PT	A-8	---	---	---	---	---	---	---
30----- Dystric Xerochrepts	0-4	Very gravelly sandy loam.	GM	A-1	0-5	40-60	30-50	20-35	10-20	15-25	NP-5
	4-30	Very gravelly loam, very gravelly sandy loam, gravelly loam.	SM, GM	A-1, A-2, A-4	0-5	40-80	30-75	20-50	10-40	15-25	NP-5
31----- Eld	0-7	Loam-----	CL	A-6	0	100	100	85-95	60-75	25-35	10-15
	7-22	Loam, silt loam	CL	A-6	0	90-100	75-100	70-90	60-80	25-35	10-15
	22-35	Loam, silt loam	CL	A-6	0	90-100	75-100	70-90	60-80	25-35	10-15
	35-60	Silt loam, silty clay loam.	CL	A-6	0	90-100	75-100	70-95	60-85	30-40	10-15
32, 33, 34, 35--- Everett	0-3	Very gravelly sandy loam.	SM, GM	A-2, A-1	0-10	40-60	30-50	15-40	10-30	15-30	NP-5
	3-20	Very gravelly sandy loam, extremely gravelly sandy loam, very gravelly loam.	GP-GM, GM	A-1	5-10	30-60	20-50	10-30	5-25	20-30	NP-5
	20-60	Very gravelly coarse sand, very gravelly loamy sand, extremely gravelly sand.	GP-GM, GP	A-1	5-20	25-50	15-45	5-25	0-10	---	NP
36----- Everson	0-6	Clay loam-----	CL	A-6, A-7	0	100	100	75-90	60-80	35-45	15-20
	6-30	Silty clay, clay loam, silty clay loam.	CL	A-7	0	100	100	85-95	70-90	40-50	20-25
	30-60	Loamy sand, sand	SM, SP-SM	A-2, A-3	0	95-100	90-100	50-70	5-20	---	NP
37----- Galvin	0-12	Silt loam-----	ML	A-4	0	100	100	90-100	70-90	30-40	5-10
	12-35	Silty clay loam, loam, silt loam.	ML, CL	A-6, A-7	0	100	100	90-100	80-90	35-45	10-20
	35-60	Silty clay, clay, silty clay loam.	MH	A-7	0	100	100	95-100	85-95	50-65	10-20
38, 39, 40----- Giles	0-10	Silt loam-----	ML, MH	A-5, A-7	0	100	100	95-100	80-90	40-60	5-20
	10-48	Silty clay loam, silt loam.	ML	A-4, A-5, A-7	0	100	100	95-100	85-95	35-50	5-15
	48-60	Silt loam, sandy loam.	ML	A-4	0	100	100	60-90	50-85	20-40	NP-10
41----- Godfrey	0-8	Silty clay loam	ML	A-6, A-7	0	100	100	90-100	80-95	35-50	10-20
	8-52	Silty clay loam, clay loam, clay.	ML, MH	A-7	0	100	100	90-100	80-95	40-55	15-25
	52-60	Sandy clay, silty clay loam, clay.	ML, MH	A-7	0	100	100	80-95	50-90	40-55	15-25

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
42----- Grove	0-6	Very gravelly sandy loam.	GM	A-1	0-5	30-40	25-35	20-30	10-20	---	NP
	6-21	Very gravelly coarse sand, very gravelly loamy sand, extremely gravelly sand.	GP-GM	A-1	0-5	25-35	15-30	5-15	0-10	---	NP
	21-60	Very gravelly sand, very gravelly coarse sand, extremely gravelly coarse sand.	GP	A-1	0-5	35-50	15-30	5-15	0-5	---	NP
43, 44----- Hoogdal	0-5	Silt loam-----	CL, CL-ML	A-6, A-4	0	95-100	85-100	80-95	70-85	20-35	5-15
	5-10	Silt loam, silty clay loam.	CL, CL-ML	A-6, A-4	0	95-100	85-100	80-100	70-90	25-40	5-20
	10-25	Silty clay, silty clay loam.	CL	A-7, A-6	0	95-100	85-100	85-100	80-95	30-50	15-25
	25-60	Silty clay, clay	MH	A-7	0	95-100	85-100	85-100	85-100	50-70	20-30
45----- Hydraquents	0-6	Fine sandy loam	ML	A-4	0	100	90-100	75-85	50-60	15-25	NP-5
	6-60	Stratified silty clay loam to fine sandy loam.	ML, CL, CL-ML	A-4, A-6	0	100	90-100	85-95	60-90	15-35	NP-15
46, 47, 48----- Indianola	0-6	Loamy sand-----	SM	A-2	0	80-100	75-100	50-75	20-35	---	NP
	6-25	Loamy fine sand, loamy sand.	SM	A-2	0	80-100	75-100	50-75	20-35	---	NP
	25-60	Sand, loamy fine sand, fine sand.	SM, SP-SM, SP	A-2, A-3, A-1	0	80-100	75-100	40-75	0-30	---	NP
49----- Jonas	0-4	Silt loam-----	ML, MH	A-5, A-7	0-5	90-100	85-100	75-90	60-85	40-65	5-20
	4-14	Very cobbly silt loam, very cobbly loam, very gravelly silt loam.	GM, SM	A-2, A-5, A-7	20-45	50-75	45-60	40-55	30-45	40-65	5-20
	14-60	Cobbly loam, cobbly clay loam, gravelly clay loam.	ML, MH	A-5, A-7	10-30	90-95	70-80	65-75	50-65	40-60	5-20
50, 51, 52, 53--- Kapowsin	0-4	Silt loam-----	ML	A-4, A-5	0	90-100	80-95	75-90	70-85	30-50	NP-10
	4-22	Gravelly loam, silt loam, loam.	SM, ML	A-4, A-5	0-5	75-90	65-85	50-75	40-70	30-45	NP-10
	22-30	Gravelly loam, gravelly sandy loam, loam.	SM	A-4, A-2, A-1	0-10	65-90	55-85	35-65	20-50	15-25	NP-5
	30	Cemented-----	---	---	---	---	---	---	---	---	---
54, 55----- Kapowsin	0-6	Stony loam-----	SM, ML, GM	A-4, A-5	10-25	65-85	55-75	50-65	35-60	30-50	NP-10
	6-15	Gravelly loam, silt loam, loam.	SM, ML	A-4, A-5	0-5	75-90	65-85	50-75	40-70	30-45	NP-10
	15-30	Gravelly loam, gravelly sandy loam, loam.	SM	A-4, A-2, A-1	0-10	65-90	55-85	35-65	20-50	15-25	NP-5
	30	Cemented-----	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
56, 57----- Katula	0-5	Very cobbly loam	GM, SM	A-5, A-7	50-60	60-80	55-75	50-70	35-50	45-65	5-20
	5-14	Very cobbly loam, very cobbly clay loam, extremely cobbly loam.	GM	A-2, A-5, A-7	50-60	35-60	20-55	15-45	15-40	45-65	5-20
	14-32	Extremely cobbly clay loam, extremely cobbly loam.	GM	A-2, A-5, A-7	55-80	30-60	20-50	15-45	15-40	40-60	5-20
	32	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
58, 59----- Lates	0-12	Silt loam-----	ML, MH, OL, OH	A-5, A-7	0	95-100	95-100	85-95	65-85	45-65	5-20
	12-32	Gravelly silt loam, gravelly loam.	GM, SM	A-5, A-7	0	65-75	65-75	55-60	45-50	45-60	5-20
	32	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
60, 61----- Mal	0-7	Clay loam-----	CL	A-7	0	100	100	90-100	70-80	40-45	15-20
	7-60	Clay loam, silty clay, clay.	CL, CH	A-7	0	100	100	90-100	75-95	45-70	20-40
62, 63----- Mashel	0-8	Loam-----	ML	A-4	0	95-100	85-100	80-95	60-75	30-40	5-10
	8-16	Loam, silt loam	ML	A-4	0	95-100	85-100	80-95	50-85	30-40	5-10
	16-55	Silty clay, silty clay loam, clay loam.	ML, MH	A-7	0	95-100	85-100	75-100	65-95	45-55	10-20
	55-60	Loam-----	ML	A-4	0	95-100	85-100	75-95	55-75	30-40	5-10
64----- Maytown	0-16	Silt loam-----	CL, CL-ML	A-4, A-6	0	100	100	95-100	70-90	25-35	5-15
	16-28	Silt loam, silty clay loam.	CL	A-6	0	100	100	95-100	80-95	30-40	10-20
	28-60	Silty clay loam, silt loam.	CL	A-6	0	100	100	95-100	80-95	30-40	10-20
65----- McKenna	0-9	Gravelly silt loam.	ML, GM	A-4	0-5	60-80	55-75	55-65	40-60	20-40	NP-10
	9-13	Gravelly silt loam, gravelly clay loam, gravelly loam.	GM-GC, GC, CL-ML, CL	A-4, A-6	0-5	65-90	55-75	45-65	40-60	25-40	5-15
	13-36	Very gravelly silt loam, very gravelly clay loam, very gravelly loam.	GM-GC, GC	A-2, A-4, A-6, A-7	0-5	30-60	25-50	20-50	20-45	25-45	5-20
66, 67, 68----- Melbourne	0-6	Silty clay loam	ML, MH	A-7	0	95-100	95-100	95-100	80-95	45-60	10-20
	6-11	Clay loam, silty clay loam.	ML, MH	A-7	0	95-100	95-100	95-100	80-95	45-60	10-20
	11-54	Silty clay, clay, silty clay loam.	MH, ML	A-7	0	95-100	95-100	95-100	80-95	45-60	10-20
	54-60	Silty clay loam, clay loam, silty clay.	ML, MH	A-7	0	95-100	95-100	95-100	80-95	40-55	10-20
69, 70----- Mukilteo	0-6	Muck-----	PT	A-8	0	---	---	---	---	---	---
	6-60	Hemic material---	PT	A-8	0	---	---	---	---	---	---

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
71----- Newberg	0-8	Fine sandy loam	SM	A-4, A-2	0	100	100	60-85	30-50	20-25	NP-5
	8-60	Sandy loam, fine sandy loam, coarse sandy loam.	SM	A-2, A-4	0	75-100	75-100	40-85	25-50	20-25	NP-5
72----- Newberg	0-8	Loam-----	ML	A-4	0	100	100	90-100	65-85	30-35	NP-5
	8-60	Sandy loam, fine sandy loam, coarse sandy loam.	SM	A-2, A-4	0	75-100	75-100	40-85	25-50	20-25	NP-5
73, 74----- Nisqually	0-5	Loamy fine sand	SM	A-2	0	100	100	50-80	15-30	---	NP
	5-31	Loamy sand, loamy fine sand.	SM	A-2	0	100	100	60-80	20-30	---	NP
	31-60	Loamy fine sand, loamy sand, sand.	SP-SM, SM	A-3, A-2	0	100	100	65-75	5-20	---	NP
75----- Norma	0-7	Fine sandy loam	SM	A-2	0	100	100	70-90	20-35	---	NP
	7-25	Sandy loam, fine sandy loam, silt loam.	SM, ML	A-2, A-4	0	95-100	75-100	50-85	25-65	---	NP
	25-60	Sandy loam, loamy sand.	SM	A-2	0	90-100	75-100	60-80	20-35	---	NP
76----- Norma	0-8	Silt loam-----	ML	A-4	0	100	100	95-100	80-90	20-30	NP-5
	8-30	Sandy loam, fine sandy loam, silt loam.	SM, ML	A-2, A-4	0	95-100	75-100	50-85	25-65	---	NP
	30-60	Sandy loam, loamy sand.	SM	A-2	0	90-100	75-100	60-80	20-35	---	NP
77, 78----- Olympic	0-12	Silt loam-----	ML, CL-ML	A-4	0	100	100	90-100	75-95	25-35	5-10
	12-24	Silt loam, clay loam, silty clay loam.	CL, ML	A-6, A-7	0	100	100	90-100	70-95	35-45	10-20
	24-60	Silty clay loam, silty clay, clay.	ML, MH	A-7	0	95-100	95-100	90-100	70-95	45-70	10-25
79, 80----- Pheaney	0-6	Gravelly loam----	SM, ML, MH	A-5, A-7	0	70-80	55-75	50-70	35-55	40-60	5-20
	6-10	Gravelly silt loam, gravelly loam.	SM, ML, MH	A-5, A-7	0	70-80	55-75	50-70	35-55	40-60	5-20
	10-30	Very gravelly loam, extremely cobbly silt loam, extremely gravelly loam.	GM	A-5, A-2, A-1, A-7	15-65	35-65	25-60	20-55	15-45	40-60	5-20
	30	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
81*: Pheeneey-----	0-6	Gravelly loam----	SM, ML, MH	A-5, A-7	0	70-80	55-75	50-70	35-55	40-60	5-20
	6-10	Gravelly silt loam, gravelly loam.	SM, ML, MH	A-5, A-7	0	70-80	55-75	50-70	35-55	40-60	5-20
	10-30	Very gravelly loam, extremely cobbly silt loam, extremely gravelly loam.	GM	A-5, A-2, A-1, A-7	15-65	35-65	25-60	20-55	15-45	40-60	5-20
	30	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Baumgard-----	0-14	Loam-----	ML	A-4	0	95-100	85-90	80-85	60-70	30-40	5-10
	14-30	Clay loam, silty clay loam, gravelly clay loam.	CL	A-6, A-7	0-10	75-90	65-85	60-80	50-75	35-45	15-20
	30-45	Gravelly clay loam, gravelly silty clay loam, very gravelly clay loam.	GM, ML, SM	A-6, A-7	0-25	55-85	45-75	40-70	35-65	35-45	10-15
	45	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
82*, 83*: Pheeneey-----	0-6	Gravelly loam----	SM, ML, MH	A-5, A-7	0	70-80	55-75	50-70	35-55	40-60	5-20
	6-10	Gravelly silt loam, gravelly loam.	SM, ML, MH	A-5, A-7	0	70-80	55-75	50-70	35-55	40-60	5-20
	10-30	Very gravelly loam, extremely cobbly silt loam, extremely gravelly loam.	GM	A-5, A-2, A-1, A-7	15-65	35-65	25-60	20-55	15-45	40-60	5-20
	30	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Rock outcrop.											
84----- Pilchuck	0-6	Loamy sand-----	SM	A-1, A-2	0	80-100	75-100	45-65	10-30	---	NP
	6-60	Sand, fine sand, loamy fine sand.	SM	A-2	0	80-100	75-100	50-80	10-35	---	NP
85*. Pits											
86, 87----- Prather	0-12	Silty clay loam	ML, CL	A-6, A-7	0	100	100	95-100	85-95	35-45	10-20
	12-29	Silty clay, clay, silty clay loam.	ML, MH	A-7	0	100	100	95-100	85-95	45-55	10-20
	29-42	Silty clay, clay, silty clay loam.	ML, MH	A-7	0	100	100	95-100	85-95	45-75	10-30
	42-60	Silty clay, clay	MH	A-7	0	100	100	95-100	85-95	50-70	10-25
88----- Puget	0-9	Silt loam-----	CL-ML, CL	A-4, A-6	0	100	100	95-100	85-95	25-35	5-15
	9-60	Silty clay loam, silt loam.	CL-ML, CL	A-4, A-6	0	100	100	95-100	85-95	25-40	5-20

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
89----- Puyallup	0-10	Silt loam-----	ML	A-4	0	100	100	85-95	70-85	20-30	NP-5
	10-19	Fine sandy loam, loam.	ML	A-4	0	100	100	85-95	50-70	20-30	NP-5
	19-60	Loamy sand, gravelly sand, sand.	SM	A-1	0	75-100	70-100	40-50	10-20	---	NP
90, 91----- Rainier	0-8	Clay loam-----	CL	A-6	0	85-100	75-100	60-80	50-70	35-40	15-20
	8-14	Loam, clay loam	CL	A-6	0	85-100	75-100	60-80	50-70	30-40	10-20
	14-45	Clay, clay loam, silty clay loam.	CL	A-7	0	85-100	75-100	60-95	50-85	40-50	20-30
	45	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
92*: Rainier-----	0-8	Clay loam-----	CL	A-6	0	85-100	75-100	60-80	50-70	35-40	15-20
	8-14	Loam, clay loam	CL	A-6	0	85-100	75-100	60-80	50-70	30-40	10-20
	14-45	Clay, clay loam, silty clay loam.	CL	A-7	0	85-100	75-100	60-95	50-85	40-50	20-30
	45	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Rock outcrop.											
93, 94----- Raught	0-11	Silt loam-----	ML, MH, OL, OH	A-5, A-7	0	100	100	95-100	85-95	40-60	5-20
	11-60	Silt loam, silty clay loam.	ML, MH	A-5, A-7	0	95-100	90-100	90-100	85-95	40-60	5-20
95*----- Riverwash	0-6	Very gravelly sand.	GP, GW	A-1	0-15	25-55	25-50	10-30	0-5	---	NP
	6-60	Stratified gravelly sand to extremely gravelly coarse sand.	GP, SP, GW, SW	A-1	0-25	25-55	25-50	10-30	0-5	---	NP
96*: Rock outcrop.											
Pheaney-----	0-6	Gravelly loam----	SM, ML, MH	A-5, A-7	0	70-80	55-75	50-70	35-55	40-60	5-20
	6-10	Gravelly silt loam, gravelly loam.	SM, ML, MH	A-5, A-7	0	70-80	55-75	50-70	35-55	40-60	5-20
	10-30	Very gravelly loam, extremely cobble silt loam, extremely gravelly loam.	GM	A-5, A-2, A-1, A-7	15-65	35-65	25-60	20-55	15-45	40-60	5-20
	30	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
97, 98, 99----- Salkum	0-12	Silty clay loam	CL	A-7	0	100	100	95-100	85-95	40-45	15-20
	12-51	Silty clay, clay	MH	A-7	0	100	85-100	80-95	65-90	50-65	15-25
	51-60	Silty clay, silty clay loam, clay.	ML, MH	A-7	0	100	90-100	80-95	65-90	45-60	15-25

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
100, 101----- Scamman	0-5	Silty clay loam	CL	A-7	0-5	90-100	85-95	80-90	75-85	40-50	15-25
	5-11	Silty clay loam, silt loam.	CL	A-6, A-7	0-5	90-100	85-95	80-90	75-85	30-45	15-25
	11-24	Silty clay loam, silty clay.	CL, CH	A-7	0-5	90-100	85-95	80-90	75-85	45-55	20-30
	24-60	Silty clay, clay	CH	A-7	0-20	75-90	75-85	70-85	70-80	50-70	25-40
102, 103----- Schneider	0-6	Very gravelly loam.	GM	A-1, A-2	0-20	30-60	30-50	20-40	15-30	40-60	5-20
	6-32	Extremely gravelly loam, very gravelly silt loam, very cobbly silt loam.	GM	A-1, A-2	0-40	30-55	25-50	20-40	15-30	35-55	5-15
	32-55	Extremely gravelly loam, extremely gravelly silt loam, extremely cobbly silt loam.	GM	A-1, A-2	35-45	30-50	20-35	20-35	15-30	35-55	5-15
	55	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
104----- Semiahmoo	0-6	Muck-----	PT	A-8	0	---	---	---	---	---	---
	6-60	Sapric material	PT	A-8	0	---	---	---	---	---	---
105----- Shalcar	0-24	Muck-----	PT	A-8	0	---	---	---	---	---	---
	24-60	Silt loam, silty clay loam, sandy loam.	ML, CL	A-4, A-6, A-7	0	100	100	80-100	50-90	25-45	NP-20
106----- Shalcar Variant	0-6	Muck-----	PT	A-8	0	---	---	---	---	---	---
	6-20	Sapric material	PT	A-8	0	---	---	---	---	---	---
	20-60	Clay, silty clay	CL, CH	A-7	0	100	100	90-100	75-95	45-60	20-30
107, 108----- Skipopa	0-8	Silt loam-----	ML, MH	A-5	0	95-100	85-100	80-95	70-85	40-60	NP-10
	8-18	Silt loam, silty clay loam.	ML	A-5, A-4	0	95-100	85-100	85-100	75-90	30-50	NP-10
	18-60	Silty clay, silty clay loam, clay.	CL, CH	A-7	0	95-100	85-100	85-100	80-95	40-60	20-30
109----- Spana	0-22	Gravelly loam----	GM, ML, SM	A-4	0-5	65-80	60-75	55-70	40-55	15-25	NP-5
	22-26	Gravelly loam, loam, gravelly sandy loam.	SM, GM	A-4, A-2	0-10	60-85	55-80	40-60	25-45	15-25	NP-5
	26-38	Gravelly loam, very gravelly sandy loam, gravelly sandy loam.	SM, GM	A-4, A-2, A-1	0-15	55-75	45-65	35-55	20-40	15-25	NP-5
	38-60	Extremely gravelly coarse sandy loam, extremely gravelly loamy sand, very gravelly sandy loam.	GM, GP-GM	A-1	5-25	40-50	25-40	10-25	5-15	---	NP

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments > 3 inches Pct	Percentage passing sieve number--				Liquid limit Pct	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
110, 111----- Spanaway	0-15	Gravelly sandy loam.	GM, SM	A-1, A-2	0-5	55-85	50-75	30-50	15-25	35-50	NP-10
	15-20	Very gravelly loam, very gravelly sandy loam, extremely gravelly sandy loam.	GM	A-1, A-2	0-10	35-55	25-50	15-45	10-35	35-50	NP-10
	20-60	Extremely gravelly sand, extremely gravelly loamy sand.	GP, GW	A-1	10-25	25-35	20-30	10-20	0-5	---	NP
112, 113----- Spanaway	0-16	Stony sandy loam	SM	A-2	5-20	70-90	60-80	40-50	25-35	35-50	NP-10
	16-22	Very gravelly loam, very gravelly sandy loam, extremely gravelly sandy loam.	GM	A-1, A-2	0-10	35-55	25-50	20-40	10-30	35-50	NP-10
	22-60	Extremely gravelly sand, extremely gravelly loamy sand.	GP, GW	A-1	10-25	25-35	20-30	10-20	0-5	---	NP
114*: Spanaway-----	0-15	Gravelly sandy loam.	GM, SM	A-1, A-2	0-5	55-85	50-75	30-50	15-25	35-50	NP-10
	15-20	Very gravelly loam, very gravelly sandy loam, extremely gravelly sandy loam.	GM	A-1, A-2	0-10	35-55	25-50	15-45	10-35	35-50	NP-10
	20-60	Extremely gravelly sand, extremely gravelly loamy sand.	GP, GW	A-1	10-25	25-35	20-30	10-20	0-5	---	NP
Nisqually-----	0-5	Loamy fine sand	SM	A-2	0	100	100	50-80	15-30	---	NP
	5-31	Loamy sand, loamy fine sand.	SM	A-2	0	100	100	60-80	20-30	---	NP
	31-60	Loamy fine sand, loamy sand, sand.	SP-SM, SM	A-3, A-2	0	100	100	65-75	5-20	---	NP
115----- Sultan	0-7	Silt loam-----	ML	A-4	0	100	100	80-90	70-80	20-30	NP-5
	7-60	Silt loam, silty clay loam.	CL-ML, CL	A-4, A-6	0	100	100	95-100	80-90	25-35	5-15
116----- Tacoma	0-7	Silt loam-----	ML, OL	A-4	0	100	100	90-100	70-90	30-40	NP-10
	7-50	Silt loam, very fine sandy loam.	ML	A-4	0	100	100	95-100	85-95	25-35	NP-10
	50-60	Silt loam, silty clay loam, clay.	CL	A-6, A-7	0	100	100	95-100	90-100	30-50	10-25

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	<u>In</u>				<u>Pct</u>					<u>Pct</u>	
117, 118, 119--- Tenino	0-11	Gravelly loam---	GM, SM	A-2, A-4	0-10	60-80	55-75	40-50	30-40	20-30	NP-5
	11-36	Gravelly loam, gravelly sandy loam.	SM	A-1, A-2, A-4	0-10	60-75	55-70	30-50	15-40	20-25	NP-5
	36-40	Cemented-----	---	---	---	---	---	---	---	---	---
	40-60	Extremely gravelly sandy loam, extremely gravelly loamy sand.	GP-GM, GP	A-1	0-10	10-30	5-20	5-15	0-10	---	NP
120----- Tisch	0-11	Silt loam-----	ML	A-4	0	100	100	100	95-100	30-40	NP-10
	11-50	Diatomaceous earth, silt, silt loam.	OH, MH, ML, OL	A-5, A-4	0	100	100	90-100	85-100	35-55	NP-10
	50-60	Muck-----	PT	A-8	0	---	---	---	---	---	---
121, 122----- Vailton	0-10	Silt loam-----	ML, MH	A-5, A-7	0	100	100	90-100	70-90	45-65	5-20
	10-15	Silty clay loam	ML, MH	A-5, A-7	0	100	100	95-100	85-95	40-60	5-20
	15-48	Silty clay loam, clay loam.	ML, MH	A-7, A-5	0	100	100	90-100	70-95	40-60	5-20
	48	Weathered bedrock	---	---	---	---	---	---	---	---	---
123, 124----- Wilkeson	0-11	Silt loam-----	CL-ML, ML	A-4	0-5	90-100	85-100	75-90	55-70	20-30	NP-10
	11-47	Gravelly loam, loam, gravelly silty clay loam.	CL, GC, SC	A-6	0-5	70-95	60-90	50-85	45-65	30-40	10-20
	47-60	Gravelly loam, loam, gravelly clay loam.	CL-ML, CL, GC, GM-GC	A-4, A-6	0-5	65-85	55-80	50-70	40-60	25-40	5-20
125. Xerorthents											
126, 127, 128---- Yelm	0-8	Fine sandy loam	SM	A-2, A-4	0	100	100	70-90	30-45	20-35	NP-10
	8-46	Fine sandy loam, loam.	SM, ML	A-4	0	100	100	50-85	35-65	20-40	NP-10
	46-60	Loamy sand-----	SM	A-2	0	100	100	60-70	20-30	---	NP

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS

(The symbol < means less than; > means more than. Entries under "Erosion factors -T" apply to the entire profile. Entries under "Organic matter" apply only to the surface layer. Absence of an entry indicates that data were not available or were not estimated)

Soil name and map symbol	Depth	Clay	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
							K	T	
	In	Pct	In/hr	In/in	pH				Pct
1, 2, 3, 4----- Alderwood	0-15 15-30 30	5-10 5-10 ---	2.0-6.0 2.0-6.0 ---	0.07-0.11 0.07-0.11 ---	5.1-6.5 5.1-6.5 ---	Low----- Low----- ---	0.15 0.10 ---	2	3-10
5, 6, 7, 8----- Baldhill	0-4 4-54 54-60	5-10 2-10 0-5	2.0-6.0 2.0-6.0 >20	0.07-0.09 0.06-0.08 0.04-0.06	5.6-6.5 5.6-6.5 6.1-7.3	Low----- Low----- Low-----	0.02 0.05 0.02	5	5-10
9, 10----- Baumgard	0-14 14-30 30-45 45	18-25 27-35 27-35 ---	0.6-2.0 0.6-2.0 0.6-2.0 ---	0.16-0.18 0.16-0.18 0.11-0.14 ---	5.1-6.5 5.1-6.5 5.1-6.5 ---	Low----- Low----- Low----- ---	0.28 0.20 0.15 ---	3	5-10
11*, 12*: Baumgard-----	0-14 14-30 30-45 45	18-25 27-35 27-35 ---	0.6-2.0 0.6-2.0 0.6-2.0 ---	0.16-0.18 0.16-0.18 0.11-0.14 ---	5.1-6.5 5.1-6.5 5.1-6.5 ---	Low----- Low----- Low----- ---	0.28 0.20 0.15 ---	3	5-10
Pheeney-----	0-6 6-10 10-30 30	--- --- --- ---	0.6-2.0 0.6-2.0 0.6-2.0 ---	0.20-0.30 0.20-0.30 0.08-0.15 ---	5.1-6.0 5.1-6.0 5.1-6.0 ---	Low----- Low----- Low----- ---	0.17 0.10 0.05 ---	2	5-10
13*: Baumgard-----	0-14 14-30 30-45 45	18-25 27-35 27-35 ---	0.6-2.0 0.6-2.0 0.6-2.0 ---	0.16-0.18 0.16-0.18 0.11-0.14 ---	5.1-6.5 5.1-6.5 5.1-6.5 ---	Low----- Low----- Low----- ---	0.28 0.20 0.15 ---	3	5-10
Rock outcrop.									
14----- Bellingham	0-5 5-60	27-40 35-60	0.6-2.0 0.06-0.2	0.30-0.40 0.15-0.20	5.6-6.5 6.1-8.4	Moderate----- High-----	0.28 0.32	5	3-9
15, 16----- Boistfort	0-9 9-19 19-60	--- --- ---	0.6-2.0 0.6-2.0 0.6-2.0	0.20-0.24 0.19-0.21 0.15-0.17	4.5-5.5 4.5-5.5 3.6-5.5	Low----- Low----- Low-----	0.28 0.24 0.24	5	10-15
17, 18----- Bunker	0-10 10-30 30-54 54	--- --- --- ---	0.6-2.0 0.6-2.0 0.6-2.0 ---	0.16-0.19 0.16-0.20 0.16-0.20 ---	4.5-6.0 4.5-6.0 4.5-6.0 ---	Low----- Low----- Low----- ---	0.20 0.20 0.28 ---	3	5-15
19*: Bunker-----	0-10 10-30 30-54 54	--- --- --- ---	0.6-2.0 0.6-2.0 0.6-2.0 ---	0.16-0.19 0.16-0.20 0.16-0.20 ---	4.5-6.0 4.5-6.0 4.5-6.0 ---	Low----- Low----- Low----- ---	0.20 0.20 0.28 ---	3	5-15
Boistfort-----	0-9 9-19 19-60	--- --- ---	0.6-2.0 0.6-2.0 0.6-2.0	0.20-0.24 0.19-0.21 0.15-0.17	4.5-5.5 4.5-5.5 3.6-5.5	Low----- Low----- Low-----	0.28 0.24 0.24	5	10-15

See footnote at end of table.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
							K	T	
	In	Pct	In/hr	In/in	pH				Pct
20----- Cagey	0-6	1-5	6.0-20	0.07-0.10	6.1-7.3	Low-----	0.37	4	2-5
	6-28	0-5	6.0-20	0.06-0.08	6.1-7.3	Low-----	0.20		
	28-60	0-2	6.0-20	0.05-0.07	6.1-7.3	Low-----	0.15		
21, 22----- Cathcart	0-12	---	0.6-2.0	0.15-0.20	4.5-6.0	Low-----	0.20	4	2-8
	12-33	---	0.6-2.0	0.10-0.20	5.1-6.5	Low-----	0.32		
	33-44	---	0.6-2.0	0.10-0.15	5.1-6.5	Low-----	0.32		
	44	---	---	---	---	---	---		
23, 24, 25----- Centralia	0-10	15-25	0.6-2.0	0.19-0.21	5.1-6.5	Low-----	0.32	5	3-8
	10-42	27-35	0.6-2.0	0.19-0.21	5.1-6.0	Moderate-----	0.28		
	42-60	22-30	0.6-2.0	0.18-0.21	4.5-5.5	Moderate-----	0.32		
26----- Chehalis	0-7	15-25	0.6-2.0	0.19-0.21	5.6-6.5	Low-----	0.37	5	5-10
	7-44	25-35	0.6-2.0	0.17-0.21	5.6-7.3	Moderate-----	0.28		
	44-60	25-45	0.6-2.0	0.19-0.21	5.6-7.3	Low-----	0.32		
27, 28----- Delphi	0-8	---	0.6-2.0	0.12-0.15	5.1-6.0	Low-----	0.15	4	5-10
	8-13	15-25	0.6-2.0	0.12-0.15	5.1-6.0	Low-----	0.20		
	13-48	15-27	0.6-2.0	0.09-0.14	5.1-5.5	Low-----	0.10		
29----- Dupont	0-7	---	0.6-2.0	0.25-0.35	4.5-5.5	Low-----	0.00	5	30-50
	7-17	---	0.2-0.6	0.15-0.20	4.5-5.5	Low-----	0.55		
	17-60	---	0.6-2.0	0.25-0.35	4.5-5.5	Low-----	0.00		
30----- Dystric Xerochrepts	0-4	5-15	0.6-2.0	0.05-0.08	5.6-6.5	Low-----	0.10	5	2-4
	4-30	5-15	0.6-2.0	0.05-0.09	6.1-7.3	Low-----	0.15		
31----- Eld	0-7	18-27	0.6-2.0	0.16-0.20	5.6-6.5	Moderate-----	0.37	5	5-10
	7-22	18-27	0.6-2.0	0.18-0.22	5.6-6.5	Moderate-----	0.32		
	22-35	18-27	0.6-2.0	0.16-0.20	5.6-6.5	Moderate-----	0.32		
	35-60	18-30	0.6-2.0	0.15-0.19	5.6-6.5	Moderate-----	0.28		
32, 33, 34, 35--- Everett	0-3	---	0.6-2.0	0.08-0.13	5.6-6.5	Low-----	0.20	1	3-9
	3-20	---	6.0-20	0.08-0.13	5.6-6.5	Low-----	0.10		
	20-60	0-5	>20	0.02-0.05	5.6-6.5	Low-----	0.10		
36----- Everson	0-6	27-35	0.6-2.0	0.25-0.35	5.1-6.0	Moderate-----	0.28	2	3-9
	6-30	35-45	0.06-0.2	0.20-0.30	5.6-6.0	Moderate-----	0.28		
	30-60	0-5	6.0-20	0.05-0.10	5.6-6.0	Low-----	0.20		
37----- Galvin	0-12	10-25	0.6-2.0	0.19-0.21	5.6-6.5	Low-----	0.37	5	5-10
	12-35	23-35	0.2-0.6	0.19-0.21	4.5-6.5	Moderate-----	0.32		
	35-60	30-50	0.06-0.2	0.14-0.17	4.5-6.5	Moderate-----	0.24		
38, 39, 40----- Giles	0-10	---	0.6-2.0	0.25-0.35	5.1-6.0	Low-----	0.32	5	2-10
	10-48	---	0.6-2.0	0.20-0.30	5.6-6.5	Low-----	0.32		
	48-60	---	0.6-2.0	0.15-0.20	5.6-6.5	Low-----	0.43		
41----- Godfrey	0-8	27-40	0.2-0.6	0.18-0.22	4.5-6.0	Moderate-----	0.32	5	.5-2
	8-52	35-50	0.06-0.2	0.14-0.18	5.6-6.5	High-----	0.24		
	52-60	35-50	<0.06	0.13-0.15	6.1-7.3	High-----	0.24		
42----- Grove	0-6	5-10	2.0-6.0	0.05-0.08	5.1-6.0	Low-----	0.05	2	2-10
	6-21	2-7	6.0-20	0.03-0.05	5.1-6.0	Low-----	0.02		
	21-60	0-6	>20	0.02-0.05	5.1-6.0	Low-----	0.02		

See footnote at end of table.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
							K	T	
	In	Pct	In/hr	In/in	pH				Pct
43, 44----- Hoogdal	0-5	10-25	0.6-2.0	0.19-0.21	5.6-6.0	Low-----	0.24	2	3-6
	5-10	13-33	0.6-2.0	0.19-0.21	5.1-6.0	Low-----	0.32		
	10-25	20-42	0.06-0.2	0.17-0.21	5.1-6.0	Moderate-----	0.32		
	25-60	45-60	<0.06	0.14-0.17	6.1-6.5	Moderate-----	0.28		
45----- Hydraquents	0-6	2-15	0.6-2.0	0.13-0.15	3.6-5.0	Low-----	0.49	5	0-2
	6-60	2-30	0.6-2.0	0.13-0.20	3.6-5.0	Low-----	0.49		
46, 47, 48----- Indianola	0-6	0-5	2.0-6.0	0.08-0.13	5.1-7.3	Low-----	0.15	5	3-9
	6-25	0-5	6.0-20	0.05-0.10	5.1-7.3	Low-----	0.15		
	25-60	0-5	>20	0.05-0.10	5.1-7.3	Low-----	0.05		
49----- Jonas	0-4	---	0.6-2.0	0.25-0.35	5.1-6.0	Low-----	0.32	5	5-10
	4-14	---	0.6-2.0	0.07-0.10	5.1-6.0	Low-----	0.10		
	14-60	---	0.6-2.0	0.10-0.15	5.1-6.0	Low-----	0.20		
50, 51, 52, 53--- Kapowsin	0-4	---	0.6-2.0	0.20-0.30	5.6-6.5	Low-----	0.32	2	3-9
	4-22	---	0.6-2.0	0.18-0.25	5.1-6.5	Low-----	0.24		
	22-30	5-15	0.6-2.0	0.12-0.20	5.1-6.5	Low-----	0.20		
	30	---	---	---	---	---	---		
54, 55----- Kapowsin	0-6	---	0.6-2.0	0.16-0.18	5.6-6.5	Low-----	0.20	2	2-8
	6-15	---	0.6-2.0	0.15-0.18	5.1-6.5	Low-----	0.24		
	15-30	5-15	0.6-2.0	0.12-0.14	5.1-6.5	Low-----	0.20		
	30	---	---	---	---	---	---		
56, 57----- Katula	0-5	---	0.6-2.0	0.07-0.11	5.6-6.0	Low-----	0.10	2	5-10
	5-14	---	0.6-2.0	0.07-0.11	5.6-6.0	Low-----	0.05		
	14-32	---	0.6-2.0	0.05-0.09	3.6-6.0	Low-----	0.05		
	32	---	---	---	---	---	---		
58, 59----- Lates	0-12	---	0.6-2.0	0.20-0.24	4.5-5.5	Low-----	0.28	2	10-15
	12-32	---	0.6-2.0	0.12-0.14	5.1-6.0	Low-----	0.24		
	32	---	---	---	---	---	---		
60, 61----- Mal	0-7	27-35	0.2-0.6	0.19-0.22	4.5-5.5	Moderate-----	0.24	5	5-10
	7-60	35-60	0.2-0.6	0.14-0.17	4.5-5.5	High-----	0.20		
62, 63----- Mashel	0-8	18-27	0.6-2.0	0.16-0.19	4.5-5.5	Low-----	0.28	5	3-8
	8-16	18-27	0.6-2.0	0.16-0.19	4.5-5.5	Low-----	0.28		
	16-55	35-45	0.2-0.6	0.15-0.18	4.5-5.5	Moderate-----	0.28		
	55-60	18-25	0.2-0.6	0.16-0.18	4.5-5.5	Low-----	0.32		
64----- Maytown	0-16	20-25	0.6-2.0	0.19-0.21	5.1-6.0	Low-----	0.43	5	5-10
	16-28	20-35	0.6-2.0	0.19-0.21	5.1-6.0	Moderate-----	0.37		
	28-60	20-35	0.2-0.6	0.15-0.20	4.5-6.0	Moderate-----	0.37		
65----- McKenna	0-9	10-25	0.6-2.0	0.16-0.19	4.5-6.0	Low-----	0.24	3	3-15
	9-13	20-35	0.06-0.2	0.12-0.16	5.1-6.0	Moderate-----	0.20		
	13-36	20-35	0.06-0.2	0.12-0.15	5.1-6.0	Moderate-----	0.15		
66, 67, 68----- Melbourne	0-6	27-35	0.6-2.0	0.18-0.22	5.6-6.5	Moderate-----	0.24	5	3-8
	6-11	27-35	0.6-2.0	0.20-0.22	5.6-6.5	Moderate-----	0.24		
	11-54	35-60	0.2-0.6	0.16-0.20	5.1-6.0	Moderate-----	0.24		
	54-60	30-45	0.2-0.6	0.18-0.22	4.5-6.0	Moderate-----	0.24		
69----- Mukilteo	0-6	---	0.6-2.0	0.30-0.34	4.5-5.0	Low-----	0.00	5	30-50
	6-60	---	0.6-2.0	0.32-0.40	4.5-5.0	Low-----	0.00		

See footnote at end of table.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
							K	T	
	In	Pct	In/hr	In/in	pH				Pct
70----- Mukilteo	0-6	---	0.6-2.0	0.30-0.34	4.5-5.0	Low-----	0.00	5	30-50
	6-60	---	0.6-2.0	0.30-0.34	4.5-5.5	Low-----	0.00		
71----- Newberg	0-8	7-15	2.0-6.0	0.12-0.15	5.6-6.5	Low-----	0.28	5	5-10
	8-60	5-10	2.0-6.0	0.12-0.15	5.6-6.5	Low-----	0.24		
72----- Newberg	0-8	7-15	0.6-2.0	0.20-0.23	5.6-6.5	Low-----	0.32	5	5-10
	8-60	5-10	2.0-6.0	0.12-0.15	5.6-6.5	Low-----	0.24		
73, 74----- Nisqually	0-5	0-5	2.0-6.0	0.09-0.12	5.6-6.5	Low-----	0.20	5	3-10
	5-31	0-5	2.0-6.0	0.08-0.12	5.6-6.5	Low-----	0.28		
	31-60	0-5	>20	0.04-0.07	6.1-7.3	Low-----	0.24		
75----- Norma	0-7	5-10	2.0-6.0	0.12-0.15	4.5-6.5	Low-----	0.32	5	5-10
	7-25	5-10	2.0-6.0	0.12-0.15	5.6-6.5	Low-----	0.32		
	25-60	3-10	2.0-6.0	0.12-0.15	5.6-6.5	Low-----	0.24		
76----- Norma	0-8	10-15	0.6-2.0	0.19-0.21	4.5-6.5	Low-----	0.32	5	5-10
	8-30	5-10	2.0-6.0	0.12-0.15	5.6-6.5	Low-----	0.32		
	30-60	3-10	2.0-6.0	0.12-0.15	5.6-6.5	Low-----	0.24		
77, 78----- Olympic	0-12	15-27	0.6-2.0	0.20-0.22	4.5-6.5	Low-----	0.32	5	3-8
	12-24	25-35	0.6-2.0	0.19-0.21	4.5-6.5	Moderate-----	0.24		
	24-60	35-60	0.2-0.6	0.17-0.19	4.5-6.5	Moderate-----	0.20		
79, 80----- Pheeny	0-6	---	0.6-2.0	0.20-0.30	5.1-6.0	Low-----	0.17	2	5-10
	6-10	---	0.6-2.0	0.20-0.30	5.1-6.0	Low-----	0.10		
	10-30	---	0.6-2.0	0.08-0.15	5.1-6.0	Low-----	0.05		
	30	---	---	---	---	---	---		
81*: Pheeny-----	0-6	---	0.6-2.0	0.20-0.30	5.1-6.0	Low-----	0.17	2	5-10
	6-10	---	0.6-2.0	0.20-0.30	5.1-6.0	Low-----	0.10		
	10-30	---	0.6-2.0	0.08-0.15	5.1-6.0	Low-----	0.05		
	30	---	---	---	---	---	---		
Baumgard-----	0-14	18-25	0.6-2.0	0.16-0.18	5.1-6.5	Low-----	0.28	3	5-10
	14-30	27-35	0.6-2.0	0.16-0.18	5.1-6.5	Low-----	0.20		
	30-45	27-35	0.6-2.0	0.11-0.14	5.1-6.5	Low-----	0.15		
	45	---	---	---	---	---	---		
82*, 83*: Pheeny-----	0-6	---	0.6-2.0	0.20-0.30	5.1-6.0	Low-----	0.17	2	5-10
	6-10	---	0.6-2.0	0.20-0.30	5.1-6.0	Low-----	0.10		
	10-30	---	0.6-2.0	0.08-0.15	5.1-6.0	Low-----	0.05		
	30	---	---	---	---	---	---		
Rock outcrop.									
84----- Pilchuck	0-6	0-5	6.0-20	0.05-0.07	6.1-7.3	Low-----	0.10	5	1-2
	6-60	0-5	6.0-20	0.05-0.08	5.6-7.3	Low-----	0.10		
85*. Pits									
86, 87----- Prather	0-12	27-35	0.6-2.0	0.16-0.19	5.6-6.5	Low-----	0.28	5	2-6
	12-29	35-50	0.6-2.0	0.13-0.15	5.1-6.0	Low-----	0.24		
	29-42	35-65	0.06-0.2	0.13-0.15	5.1-6.0	Moderate-----	0.24		
	42-60	40-60	0.06-0.2	0.08-0.10	5.1-6.0	Low-----	0.20		

See footnote at end of table.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
							K	T	
	In	Pct	In/hr	In/in	pH				Pct
88----- Puget	0-9	18-27	0.6-2.0	0.19-0.21	5.6-7.3	Moderate-----	0.28	5	3-9
	9-60	18-35	0.2-0.6	0.19-0.21	4.5-6.5	Moderate-----	0.32		
89----- Puyallup	0-10	5-15	0.6-2.0	0.19-0.21	5.6-7.3	Low-----	0.28	5	3-9
	10-19	5-15	2.0-6.0	0.13-0.15	5.6-7.3	Low-----	0.28		
	19-60	0-5	6.0-20	0.06-0.08	5.6-7.3	Low-----	0.10		
90, 91----- Rainier	0-8	27-35	0.6-2.0	0.18-0.21	5.1-6.0	Moderate-----	0.32	4	5-10
	8-14	20-35	0.6-2.0	0.18-0.22	5.1-6.0	Moderate-----	0.37		
	14-45	35-45	0.2-0.6	0.17-0.20	4.5-5.5	Moderate-----	0.24		
	45	---	---	---	---	-----	---		
92*: Rainier-----	0-8	27-35	0.6-2.0	0.18-0.21	5.1-6.0	Moderate-----	0.32	4	5-10
	8-14	20-35	0.6-2.0	0.18-0.22	5.1-6.0	Moderate-----	0.37		
	14-45	35-45	0.2-0.6	0.17-0.20	4.5-5.5	Moderate-----	0.24		
	45	---	---	---	---	-----	---		
Rock outcrop.									
93, 94----- Raught	0-11	---	2.0-6.0	0.19-0.21	5.1-6.0	Low-----	0.32	3	5-15
	11-60	---	0.6-2.0	0.19-0.21	4.5-5.5	Low-----	0.28		
95*----- Riverwash	0-6	0-1	>6.0	0.02-0.03	---	Low-----	---	---	<.1
	6-60	0-1	>6.0	0.02-0.03	---	Low-----	---		
96*: Rock outcrop.									
Pheeny-----	0-6	---	0.6-2.0	0.20-0.30	5.1-6.0	Low-----	0.17	2	5-10
	6-10	---	0.6-2.0	0.20-0.30	5.1-6.0	Low-----	0.10		
	10-30	---	0.6-2.0	0.08-0.15	5.1-6.0	Low-----	0.05		
	30	---	---	---	---	-----	---		
97, 98, 99----- Salkum	0-12	27-35	0.6-2.0	0.19-0.21	5.6-6.5	Low-----	0.28	5	2-6
	12-51	40-55	0.6-2.0	0.15-0.17	4.5-6.0	Low-----	0.24		
	51-60	35-50	0.2-0.6	0.15-0.17	4.5-6.0	Low-----	0.24		
100, 101----- Scamman	0-5	27-35	0.6-2.0	0.20-0.24	6.1-7.3	Low-----	0.28	5	3-8
	5-11	20-35	0.6-2.0	0.20-0.24	5.6-7.3	Low-----	0.28		
	11-24	35-45	0.6-2.0	0.18-0.22	5.6-6.5	High-----	0.24		
	24-60	40-60	0.06-0.2	0.15-0.18	5.1-6.5	High-----	0.24		
102, 103----- Schneider	0-6	---	0.6-2.0	0.08-0.13	5.1-6.5	Low-----	0.10	3	5-10
	6-32	---	0.6-2.0	0.07-0.10	5.1-6.5	Low-----	0.10		
	32-55	---	0.6-2.0	0.05-0.08	5.6-6.5	Low-----	0.10		
	55	---	---	---	---	-----	---		
104----- Semiahmoo	0-6	---	0.6-2.0	0.25-0.30	4.5-6.5	Low-----	0.00	5	30-60
	6-60	---	0.6-2.0	0.25-0.30	4.5-6.5	Low-----	0.00		
105----- Shalcar	0-24	---	0.6-2.0	0.40-0.50	4.5-5.5	Low-----	0.00	5	40-90
	24-60	10-35	0.6-2.0	0.19-0.21	5.6-6.5	Low-----	0.49		
106----- Shalcar Variant	0-6	---	0.6-2.0	0.25-0.30	4.5-6.5	Low-----	0.00	5	40-70
	6-20	---	0.6-2.0	0.25-0.30	4.5-6.5	Low-----	0.00		
	20-60	40-60	0.06-0.2	0.14-0.18	4.5-6.5	High-----	0.20		
107, 108----- Skipopa	0-8	---	0.6-2.0	0.30-0.40	5.6-6.5	Low-----	0.32	2	3-9
	8-18	---	0.6-2.0	0.20-0.30	5.1-6.0	Low-----	0.32		
	18-60	35-60	<0.06	0.15-0.20	5.6-7.3	Moderate-----	0.28		

See footnote at end of table.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
							K	T	
	In	Pct	In/hr	In/in	pH				Pct
109----- Spana	0-22	7-15	2.0-6.0	0.12-0.14	5.6-6.0	Low-----	0.24	5	5-15
	22-26	5-15	2.0-6.0	0.14-0.17	5.6-6.0	Low-----	0.17		
	26-38	5-15	2.0-6.0	0.09-0.12	5.6-6.0	Low-----	0.10		
	38-60	2-5	6.0-20	0.05-0.08	5.6-6.0	Low-----	0.05		
110, 111----- Spanaway	0-15	---	2.0-6.0	0.11-0.13	5.1-6.0	Low-----	0.15	2	5-15
	15-20	---	2.0-6.0	0.09-0.12	5.1-6.5	Low-----	0.10		
	20-60	0-5	>20	0.03-0.05	6.1-7.3	Low-----	0.02		
112, 113----- Spanaway	0-16	---	2.0-6.0	0.11-0.13	5.1-6.0	Low-----	0.15	2	5-15
	16-22	---	2.0-6.0	0.09-0.12	5.1-6.5	Low-----	0.10		
	22-60	0-5	>20	0.03-0.05	6.1-7.3	Low-----	0.02		
114*: Spanaway-----	0-15	---	2.0-6.0	0.11-0.13	5.1-6.0	Low-----	0.15	2	5-15
	15-20	---	2.0-6.0	0.09-0.12	5.1-6.5	Low-----	0.10		
	20-60	0-5	>20	0.03-0.05	6.1-7.3	Low-----	0.02		
Nisqually-----	0-5	0-5	2.0-6.0	0.09-0.12	5.6-6.5	Low-----	0.20	5	3-10
	5-31	0-5	2.0-6.0	0.08-0.12	5.6-6.5	Low-----	0.28		
	31-60	0-5	>20	0.04-0.07	6.1-7.3	Low-----	0.24		
115----- Sultan	0-7	15-20	0.6-2.0	0.18-0.20	6.1-7.3	Low-----	0.37	5	5-10
	7-60	20-30	0.6-2.0	0.18-0.20	6.1-7.3	Moderate-----	0.32		
116----- Tacoma	0-7	5-18	0.6-2.0	0.25-0.35	3.6-5.5	Low-----	0.28	5	10-20
	7-50	5-18	0.2-0.6	0.20-0.30	3.6-5.5	Low-----	0.32		
	50-60	20-50	0.2-0.6	0.19-0.21	3.6-5.0	Moderate-----	0.32		
117, 118, 119---- Tenino	0-11	10-15	0.6-2.0	0.12-0.14	5.1-6.0	Low-----	0.20	2	5-10
	11-36	10-15	0.6-2.0	0.12-0.14	5.1-6.0	Low-----	0.20		
	36-40	---	---	---	---	---	---		
	40-60	2-10	>20	0.06-0.07	5.1-6.0	Low-----	0.02		
120----- Tisch	0-11	---	0.6-2.0	0.25-0.35	5.6-7.3	Low-----	0.28	5	3-10
	11-50	---	0.2-0.6	0.25-0.35	5.6-7.3	Low-----	0.28		
	50-60	---	0.6-2.0	0.30-0.40	5.6-7.3	Low-----	0.00		
121, 122----- Vailton	0-10	---	0.6-2.0	0.25-0.35	5.1-6.0	Low-----	0.24	3	5-10
	10-15	---	0.6-2.0	0.25-0.35	5.1-6.0	Low-----	0.24		
	15-48	---	0.6-2.0	0.20-0.30	5.1-6.0	Low-----	0.15		
	48	---	---	---	---	---	---		
123, 124----- Wilkeson	0-11	10-25	0.6-2.0	0.17-0.20	5.1-6.0	Low-----	0.32	5	5-10
	11-47	25-35	0.6-2.0	0.12-0.17	5.1-6.0	Moderate-----	0.20		
	47-60	18-35	0.6-2.0	0.15-0.20	5.1-6.0	Moderate-----	0.20		
125. Xerorthents									
126, 127, 128---- Yelm	0-8	---	2.0-6.0	0.25-0.35	5.6-6.5	Low-----	0.32	5	3-9
	8-46	---	2.0-6.0	0.15-0.25	5.6-6.5	Low-----	0.32		
	46-60	0-5	6.0-20	0.04-0.09	5.6-6.5	Low-----	0.10		

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 16.--WATER FEATURES

("Flooding" and "water table" and terms such as "rare," "brief," "apparent," and "perched" are explained in the text. The symbol < means less than; > means more than. Absence of an entry indicates that the feature is not a concern or that data were not estimated)

Soil name and map symbol	Hydrologic group	Flooding			High water table		
		Frequency	Duration	Months	Depth Ft	Kind	Months
1, 2, 3, 4----- Alderwood	C	None-----	---	---	1.5-3.0	Perched	Jan-Mar
5, 6, 7, 8----- Baldhill	B	None-----	---	---	>6.0	---	---
9, 10----- Baumgard	B	None-----	---	---	>6.0	---	---
11*, 12*: Baumgard-----	B	None-----	---	---	>6.0	---	---
Pheeneey-----	C	None-----	---	---	>6.0	---	---
13*: Baumgard-----	B	None-----	---	---	>6.0	---	---
Rock outcrop.							
14----- Bellingham	C	None-----	---	---	1.5-3.0	Perched	Nov-Apr
15, 16----- Boistfort	B	None-----	---	---	>6.0	---	---
17, 18----- Bunker	B	None-----	---	---	>6.0	---	---
19*: Bunker-----	B	None-----	---	---	>6.0	---	---
Boistfort-----	B	None-----	---	---	>6.0	---	---
20----- Cagey	C	None-----	---	---	1.5-2.5	Apparent	Nov-Apr
21, 22----- Cathcart	B	None-----	---	---	>6.0	---	---
23, 24, 25----- Centralia	B	None-----	---	---	>6.0	---	---
26----- Chehalis	B	Occasional-----	Brief-----	Nov-Mar	>6.0	---	---
27, 28----- Delphi	B	None-----	---	---	3.5-4.5	Perched	Oct-Apr
29----- Dupont	D	None-----	---	---	0.5-2.0	Apparent	Oct-May
30----- Dystric Xerochrepts	C	None-----	---	---	>6.0	---	---
31----- Eld	B	Rare-----	---	---	>6.0	---	---

See footnote at end of table.

TABLE 16.--WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table		
		Frequency	Duration	Months	Depth Ft	Kind	Months
32, 33, 34, 35----- Everett	A	None-----	---	---	>6.0	---	---
36----- Everson	D	None-----	---	---	1.0-3.0	Apparent	Nov-Apr
37----- Galvin	D	None-----	---	---	0.5-1.5	Apparent	Nov-Apr
38, 39, 40----- Giles	B	None-----	---	---	>6.0	---	---
41----- Godfrey	D	Occasional-----	Brief-----	Nov-Mar	1.0-2.0	Apparent	Oct-Mar
42----- Grove	A	None-----	---	---	>6.0	---	---
43, 44----- Hoogdal	C	None-----	---	---	1.5-2.0	Perched	Dec-Mar
45----- Hydraquents	D	Frequent-----	Brief-----	Jan-Dec	+1-0	Apparent	Jan-Dec
46, 47, 48----- Indianola	A	None-----	---	---	>6.0	---	---
49----- Jonas	B	None-----	---	---	>6.0	---	---
50, 51, 52, 53, 54, 55-- Kapowsin	D	None-----	---	---	1.0-2.0	Perched	Dec-Jun
56, 57----- Katula	C	None-----	---	---	>6.0	---	---
58, 59----- Lates	C	None-----	---	---	>6.0	---	---
60, 61----- Mal	C	None-----	---	---	>6.0	---	---
62, 63----- Mashel	B	None-----	---	---	>6.0	---	---
64----- Maytown	C	Occasional-----	Brief-----	Nov-Mar	2.5-3.5	Apparent	Nov-Apr
65----- McKenna	D	None-----	---	---	+1-0.5	Perched	Nov-Apr
66, 67, 68----- Melbourne	B	None-----	---	---	>6.0	---	---
69----- Mukilteo	D	None-----	---	---	+1-0	Apparent	Oct-Apr
70----- Mukilteo	C	None-----	---	---	1.5-3.0	Apparent	Oct-May

See footnote at end of table.

TABLE 16.--WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table		
		Frequency	Duration	Months	Depth Ft	Kind	Months
71, 72----- Newberg	B	Occasional-----	Brief-----	Dec-Mar	>6.0	---	---
73, 74----- Nisqually	B	None-----	---	---	>6.0	---	---
75, 76----- Norma	D	None-----	---	---	+1-1.0	Apparent	Nov-Apr
77, 78----- Olympic	B	None-----	---	---	>6.0	---	---
79, 80----- Pheeny	C	None-----	---	---	>6.0	---	---
81*: Pheeny-----	C	None-----	---	---	>6.0	---	---
Baumgard-----	B	None-----	---	---	>6.0	---	---
82*, 83*: Pheeny-----	C	None-----	---	---	>6.0	---	---
Rock outcrop.							
84----- Pilchuck	C	Occasional-----	Brief-----	Nov-Apr	2.0-4.0	Apparent	Nov-Apr
85*. Pits							
86, 87----- Prather	C	None-----	---	---	1.5-3.0	Perched	Nov-Apr
88----- Puget	D	Occasional-----	Brief-----	Nov-Apr	1.0-3.0	Apparent	Nov-Apr
89----- Puyallup	B	Occasional-----	Brief-----	Nov-Apr	>6.0	---	---
90, 91----- Rainier	C	None-----	---	---	3.0-3.5	Apparent	Nov-Apr
92*: Rainier-----	C	None-----	---	---	3.0-3.5	Apparent	Nov-Apr
Rock outcrop.							
93, 94----- Raught	B	None-----	---	---	>6.0	---	---
95*----- Riverwash	D	Frequent-----	Long to very long.	Oct-Jul	0-2.0	Apparent	Jan-Dec
96*: Rock outcrop.							
Pheeny-----	C	None-----	---	---	>6.0	---	---
97, 98, 99----- Salkum	B	None-----	---	---	>6.0	---	---

See footnote at end of table.

TABLE 16.--WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table		
		Frequency	Duration	Months	Depth	Kind	Months
100, 101----- Scamman	D	None-----	---	---	<u>Ft</u> 0.5-1.5	Perched	Nov-Mar
102, 103----- Schneider	B	None-----	---	---	>6.0	---	---
104----- Semiahmoo	C	Rare-----	---	---	1.5-3.0	Apparent	Nov-May
105----- Shalcar	D	None-----	---	---	+1-0	Apparent	Oct-May
106----- Shalcar Variant	D	Occasional-----	Long-----	Nov-May	+1-0	Apparent	Oct-May
107, 108----- Skipopa	D	None-----	---	---	1.0-2.0	Perched	Nov-May
109----- Spana	D	None-----	---	---	1.0-3.0	Apparent	Nov-Apr
110, 111, 112, 113----- Spanaway	B	None-----	---	---	>6.0	---	---
114*: Spanaway-----	B	None-----	---	---	>6.0	---	---
Nisqually-----	B	None-----	---	---	>6.0	---	---
115----- Sultan	C	Occasional-----	Brief-----	Nov-Apr	2.0-4.0	Apparent	Nov-Apr
116----- Tacoma	D	Frequent-----	Brief-----	Nov-Jun	+1-0	Apparent	Nov-Jun
117, 118, 119----- Tenino	C	None-----	---	---	>6.0	---	---
120----- Tisch	D	Rare-----	---	---	0-1.0	Apparent	Dec-Apr
121, 122----- Vailton	B	None-----	---	---	>6.0	---	---
123, 124----- Wilkeson	B	None-----	---	---	>6.0	---	---
125----- Xerorthents	C	Rare-----	---	---	>2.0	Apparent	Nov-Mar
126, 127, 128----- Yelm	C	None-----	---	---	1.5-3.0	Apparent	Dec-Mar

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 17.--SOIL FEATURES

(The symbol < means less than; > means more than. Absence of an entry indicates that the feature is not a concern or that data were not estimated)

Soil name and map symbol	Bedrock		Cemented pan		Subsidence		Potential frost action	Risk of corrosion	
	Depth	Hardness	Depth	Hardness	Initial	Total		Uncoated steel	Concrete
	In		In		In	In			
1, 2, 3, 4 Alderwood	>60	---	20-40	Thin	---	---	---	Moderate	Moderate.
5, 6, 7, 8 Baldhill	>60	---	---	---	---	---	Low	Moderate	Moderate.
9, 10 Baumgard	40-60	Hard	---	---	---	---	---	Moderate	Moderate.
11*, 12*: Baumgard	40-60	Hard	---	---	---	---	---	Moderate	Moderate.
Pheeny	20-40	Hard	---	---	---	---	Moderate	Moderate	Moderate.
13*: Baumgard	40-60	Hard	---	---	---	---	---	Moderate	Moderate.
Rock outcrop.									
14 Bellingham	>60	---	---	---	---	---	---	Moderate	Moderate.
15, 16 Boistfort	>60	---	---	---	---	---	---	High	High.
17, 18 Bunker	40-60	Hard	---	---	---	---	---	High	High.
19*: Bunker	40-60	Hard	---	---	---	---	---	High	High.
Boistfort	>60	---	---	---	---	---	---	High	High.
20 Cagey	>60	---	---	---	---	---	---	Moderate	Low.
21, 22 Cathcart	40-60	Soft	---	---	---	---	---	High	High.
23, 24, 25 Centralia	>60	---	---	---	---	---	---	High	High.
26 Chehalis	>60	---	---	---	---	---	---	Moderate	Moderate.
27, 28 Delphi	>60	---	---	---	---	---	Low	Moderate	Moderate.
29 Dupont	>60	---	---	---	6-12	>60	---	High	High.
30 Dystric Xerochrepts	>60	---	---	---	---	---	---	Moderate	Moderate.
31 Eld	>60	---	---	---	---	---	---	Moderate	Moderate.

See footnote at end of table.

TABLE 17.--SOIL FEATURES--Continued

Soil name and map symbol	Bedrock		Cemented pan		Subsidence		Potential frost action	Risk of corrosion	
	Depth	Hardness	Depth	Hardness	Initial	Total		Uncoated steel	Concrete
					In	In			
32, 33, 34, 35----- Everett	>60	---	---	---	---	---	---	Moderate	Moderate.
36----- Everson	>60	---	---	---	---	---	Low-----	Moderate	Moderate.
37----- Galvin	>60	---	---	---	---	---	---	High-----	High.
38, 39, 40----- Giles	>60	---	---	---	---	---	---	Moderate	Moderate.
41----- Godfrey	>60	---	---	---	---	---	---	High-----	High.
42----- Grove	>60	---	---	---	---	---	Low-----	Moderate	Moderate.
43, 44----- Hoogdal	>60	---	---	---	---	---	---	Moderate	Moderate.
45----- Hydraquents	>60	---	---	---	---	---	---	High-----	High.
46, 47, 48----- Indianola	>60	---	---	---	---	---	---	Moderate	Moderate.
49----- Jonas	>60	---	---	---	---	---	High-----	Moderate	Moderate.
50, 51, 52, 53, 54, 55-- Kapowsin	>60	---	20-30	Thin	---	---	---	Moderate	Moderate.
56, 57----- Katula	20-40	Hard	---	---	---	---	---	High-----	High.
58, 59----- Lates	20-40	Hard	---	---	---	---	High-----	High-----	High.
60, 61----- Mal	>60	---	---	---	---	---	High-----	High-----	High.
62, 63----- Mashel	>60	---	---	---	---	---	---	High-----	High.
64----- Maytown	>60	---	---	---	---	---	Low-----	High-----	High.
65----- McKenna	>60	---	---	---	---	---	Low-----	High-----	High.
66, 67, 68----- Melbourne	>60	---	---	---	---	---	---	High-----	High.
69----- Mukilteo	>60	---	---	---	4-12	>60	---	High-----	High.
70----- Mukilteo	>60	---	---	---	4-10	>60	---	High-----	High.

See footnote at end of table.

TABLE 17.--SOIL FEATURES--Continued

Soil name and map symbol	Bedrock		Cemented pan		Subsidence		Potential frost action	Risk of corrosion	
	Depth	Hardness	Depth	Hardness	Initial	Total		Uncoated steel	Concrete
71, 72----- Newberg	>60	---	---	---	---	---	---	Moderate	Moderate.
73, 74----- Nisqually	>60	---	---	---	---	---	---	Moderate	Moderate.
75, 76----- Norma	>60	---	---	---	---	---	---	High-----	High.
77, 78----- Olympic	>60	---	---	---	---	---	---	High-----	High.
79, 80----- Pheenev	20-40	Hard	---	---	---	---	Moderate	Moderate	Moderate.
81*: Pheenev-----	20-40	Hard	---	---	---	---	Moderate	Moderate	Moderate.
Baumgard-----	40-60	Hard	---	---	---	---	---	Moderate	Moderate.
82*, 83*: Pheenev-----	20-40	Hard	---	---	---	---	Moderate	Moderate	Moderate.
Rock outcrop.									
84----- Pilchuck	>60	---	---	---	---	---	---	Moderate	Moderate.
85*. Pits									
86, 87----- Prather	>60	---	---	---	---	---	---	Moderate	Moderate.
88----- Puget	>60	---	---	---	---	---	---	High-----	High.
89----- Puyallup	>60	---	---	---	---	---	---	Moderate	Moderate.
90, 91----- Rainier	40-60	Hard	---	---	---	---	---	High-----	High.
92*: Rainier-----	40-60	Hard	---	---	---	---	---	High-----	High.
Rock outcrop.									
93, 94----- Raught	>60	---	---	---	---	---	---	High-----	High.
95*----- Riverwash	>60	---	---	---	---	---	---	---	---
96*: Rock outcrop.									
Pheenev-----	20-40	Hard	---	---	---	---	Moderate	Moderate	Moderate.
97, 98, 99----- Salkum	>60	---	---	---	---	---	---	High-----	High.

See footnote at end of table.

TABLE 17.--SOIL FEATURES--Continued

Soil name and map symbol	Bedrock		Cemented pan		Subsidence		Potential frost action	Risk of corrosion	
	Depth	Hardness	Depth	Hardness	Initial	Total		Uncoated steel	Concrete
					In	In			
100, 101----- Scamman	>60	---	---	---	---	---	---	High-----	Moderate.
102, 103----- Schneider	40-60	Hard	---	---	---	---	---	Moderate	Moderate.
104----- Semiahmoo	>60	---	---	---	6-12	60-80	---	High-----	High.
105----- Shalcar	>60	---	---	---	6-10	16-51	---	High-----	High.
106----- Shalcar Variant	>60	---	---	---	6-10	16-30	---	High-----	High.
107, 108----- Skipopa	>60	---	---	---	---	---	---	High-----	Moderate.
109----- Spana	>60	---	---	---	---	---	---	Moderate	Moderate.
110, 111, 112, 113----- Spanaway	>60	---	---	---	---	---	---	Moderate	Moderate.
114*: Spanaway-----	>60	---	---	---	---	---	---	Moderate	Moderate.
Nisqually-----	>60	---	---	---	---	---	---	Moderate	Moderate.
115----- Sultan	>60	---	---	---	---	---	---	High-----	High.
116----- Tacoma	>60	---	---	---	---	---	---	High-----	High.
117, 118, 119----- Tenino	>60	---	25-40	Thin	---	---	Low-----	Moderate	Moderate.
120----- Tisch	>60	---	---	---	3-10	>60	---	Moderate	Moderate.
121, 122----- Vailton	40-60	Soft	---	---	---	---	High-----	Moderate	Moderate.
123, 124----- Wilkeson	>60	---	---	---	---	---	---	Moderate	Moderate.
125----- Xerorthents	>60	---	---	---	---	---	---	Moderate	Moderate.
126, 127, 128----- Yelm	>60	---	---	---	---	---	---	Moderate	Moderate.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 18.--CLASSIFICATION OF THE SOILS

(An asterisk in the first column indicates that the soil is a taxadjunct to the series. See text for a description of those characteristics of the soil that are outside the range of the series)

Soil name	Family or higher taxonomic class
Alderwood-----	Loamy-skeletal, mixed, mesic Dystric Entic Durochrepts
Baldhill-----	Loamy-skeletal, mixed, mesic Dystric Xerochrepts
Baumgard-----	Fine-loamy, mixed, mesic Typic Xerumbrepts
Bellingham-----	Fine, mixed, nonacid, mesic Mollic Haplaquepts
Boistfort-----	Medial, mesic Andic Haplumbrepts
Bunker-----	Medial, mesic Andic Haplumbrepts
Cagey-----	Mixed, mesic Aquic Xeropsamments
Cathcart-----	Medial, mesic Andic Xerochrepts
Centralia-----	Fine-loamy, mixed, mesic Ultic Haploxeralfs
Chehalis-----	Fine-silty, mixed, mesic Cumulic Ultic Haploxerolls
Delphi-----	Medial-skeletal, mesic Andic Xerumbrepts
Dupont-----	Diatomaceous, euic, mesic Limnic Medisaprists
Dystric Xerochrepts-----	Dystric Xerochrepts
Eld-----	Fine-loamy, mixed, mesic Cumulic Ultic Haploxerolls
Everett-----	Sandy-skeletal, mixed, mesic Andic Xerochrepts
Everson-----	Clayey over sandy or sandy-skeletal, mixed, nonacid, mesic Typic Humaquepts
Galvin-----	Fine-silty, mixed, mesic Aquic Palexeralfs
Giles-----	Medial, mesic Andic Xerochrepts
Godfrey-----	Fine, mixed, nonacid, mesic Typic Fluvaquents
Grove-----	Sandy-skeletal, mixed, mesic Dystric Xerorthents
Hoogdal-----	Fine, mixed, mesic Aquic Dystric Xerochrepts
Hydraquents-----	Hydraquents
Indianola-----	Mixed, mesic Dystric Xeropsamments
Jonas-----	Medial, frigid Andic Haplumbrepts
Kapowsin-----	Medial over loamy, mixed, mesic Dystric Entic Durochrepts
Katula-----	Medial-skeletal, mesic Andic Haplumbrepts
Lates-----	Medial, frigid Andic Haplumbrepts
Mal-----	Fine, mixed, frigid Ultic Haploxeralfs
Mashel-----	Fine, halloysitic, mesic Ultic Haploxeralfs
Maytown-----	Fine-silty, mixed, mesic Fluventic Haploxerolls
McKenna-----	Loamy-skeletal, mixed, nonacid, mesic Mollic Haplaquepts
Melbourne-----	Fine, mixed, mesic Ultic Haploxeralfs
Mukilteo-----	Dysic, mesic Typic Medihemists
Newberg-----	Coarse-loamy, mixed, mesic Fluventic Haploxerolls
Nisqually-----	Sandy, mixed, mesic Pachic Xerumbrepts
Norma-----	Coarse-loamy, mixed, nonacid, mesic Mollic Haplaquepts
Olympic-----	Clayey, mixed, mesic Xeric Haplohumults
Pheenev-----	Medial-skeletal, frigid Andic Xerumbrepts
Pilchuck-----	Mixed, mesic Dystric Xeropsamments
Prather-----	Clayey, kaolinitic, mesic Xeric Haplohumults
Puget-----	Fine-silty, mixed, nonacid, mesic Aeric Fluvaquents
Puyallup-----	Coarse-loamy over sandy or sandy-skeletal, mixed, mesic Fluventic Haploxerolls
Rainier-----	Fine, mixed, mesic Ultic Haploxeralfs
Raught-----	Medial, mesic Andic Xerumbrepts
Salkum-----	Clayey, kaolinitic, mesic Xeric Haplohumults
Scamman-----	Fine, mixed, mesic Aquic Palexeralfs
Schneider-----	Medial-skeletal, mesic Andic Xerumbrepts
Semiahmoo-----	Euic, mesic Typic Medisaprists
Shalcar-----	Loamy, mixed, euic, mesic Terric Medisaprists
Shalcar Variant-----	Clayey, mixed, euic, mesic Terric Medisaprists
Skipopa-----	Medial over clayey, mixed, mesic Aquic Xerochrepts
Spana-----	Loamy-skeletal, mixed, mesic Pachic Xerumbrepts
Spanaway-----	Sandy-skeletal, mixed, mesic Andic Xerumbrepts
Sultan-----	Fine-silty, mixed, nonacid, mesic Aquic Xerofluvents
Tacoma-----	Coarse-silty, mixed, acid, mesic Sulfic Fluvaquents
Tenino-----	Coarse-loamy, mixed, mesic Dystric Entic Durochrepts

TABLE 18.--CLASSIFICATION OF THE SOILS--Continued

Soil name	Family or higher taxonomic class
Tisch-----	Medial, nonacid, mesic Mollic Andaquepts
Vailton-----	Medial, frigid Andic Haplumbrepts
Wilkeson-----	Fine-loamy, mixed, mesic Ultic Haploxeralfs
Xerorthents-----	
Yelm-----	Medial, mesic Aquic Dystric Xerochrepts

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