United States Department of Agriculture

Natural Resources Conservation Service

In cooperation with the Minnesota Agricultural Experiment Station

Soil Survey of Otter Tail County, Minnesota

Part II

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How to Use This Soil Survey

This survey is divided into three parts. Part I includes general information about the survey area; descriptions of the general soil map units, detailed soil map units, and soil series in the area; and a description of how the soils formed. Part II describes the use and management of the soils and the major soil properties. This part may be updated as further information about soil management becomes available. Part III includes the maps.

On the **general soil map**, the survey area is divided into groups of associated soils called general soil map units. This map is useful in planning the use and management of large areas.

To find information about your area of interest, locate that area on the map, identify the name of the map unit in the area on the color-coded map legend, then refer to the section **General Soil Map Units** in Part I of this survey for a general description of the soils in your area.

The **detailed soil maps** can be useful in planning the use and management of small areas.

To find information about your area of interest, locate that area on the **Index to Map Sheets**. Note the number of the map sheet, and turn to that sheet.

Locate your area of interest on the map sheet. Note the map unit symbols that are in that area. Turn to the **Index to Map Units** in Part I of this survey, which lists the map units by symbol and name and shows the page where each map unit is described.

The **Contents** shows which table has data on a specific land use for each detailed soil map unit. Also, see the **Contents** in Part I and Part II for other sections of this publication that may address your specific needs.

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

Major fieldwork for this soil survey was completed in November 1994. Soil names and descriptions were approved in 1995. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1994. This survey was made cooperatively by the Natural Resources Conservation Service and the Minnesota Agricultural Experiment Station. It is part of the technical assistance furnished to the Otter Tail County Soil and Water Conservation Districts. Other assistance was provided by the Agricultural Extension Service, the Minnesota Department of Natural Resources, and the Board of Water and Soil Resources. The survey was partially funded by the Legislative Commission for Minnesota Resources and by Otter Tail County.

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

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Cover: *Upper left corner*—An area of the Snellman-Naytahwaush-Lida association. Most areas are used as woodland or pasture; the less sloping areas are used for crops. Controlling water erosion and maintaining water quality are the most critical concerns in this association. *Upper right corner*—An area of the Chapett-Sisseton-Friberg association. Cropland is the dominant land use in this area. *Lower right corner*—An area of the Blowers-Paddock-Cathro association. Most areas are used for forage crops or corn for the dairy operations in this part of the county. Because of the large number of stones in this association, rock removal is an important element in the management of the soils. *Lower left corner*—An area of the Kandota-Knute-Brandsvold association. Most areas are used for forage crops or corn for the dairy operations in this part of the county.

Additional information about the Nation's natural resources is available on the Natural Resources Conservation Service home page on the World Wide Web. The address is http://www.nrcs.usda.gov (click on "Technical Resources").

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W—Water

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Soil Survey of Otter Tail County, Minnesota

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

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

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

Interpretive ratings help engineers, planners, and others understand how soil properties influence important nonagricultural uses, such as building site development and construction materials. The ratings indicate the most restrictive soil features affecting the suitability of the soils for these uses.

Soils are rated in their natural state. No unusual modification of the soil site or material is made other than that which is considered normal practice for the rated use. Even though soils may have limitations, it is important to remember that engineers and others can modify soil features or can design or adjust the plans for a structure to compensate for most of the limitations. Most of these practices, however, are costly. The final decision in selecting a site for a particular use generally involves weighing the costs of site preparation and maintenance.

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

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

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

The classification and extent of the soils in this survey area are shown in the tables "Classification of the Soils" and "Acreage and Proportionate Extent of the Soils," which are at the end of this section.

Classification of the Soils

(An asterisk in the first column indicates a taxadjunct to the series. See text for a description of those characteristics that are outside the range of the series)

Soil name	Family or higher taxonomic class
Aazdahl	Aquic Haploborolls, fine-loamy, mixed
Abbeylake	Typic Udipsamments, mixed, frigid
Almora	Boralfic Udic Argiborolls, fine-loamy over sandy or sandy-skeletal, mixed
Aquolls	Aquolls
Arveson	Typic Calciaquolls, coarse-loamy, frigid
Arvilla	Udic Haploborolls, sandy, mixed
Barnes	Udic Haploborolls, fine-loamy, mixed
Becida	Mollic Glossaqualfs, coarse-loamy, mixed, frigid
Bemidji	Aquic Arenic Eutroboralfs, loamy, mixed
Blowers	Glossaquic Eutroboralfs, coarse-loamy, mixed
Bluffcreek	Oxyaquic Eutroboralfs, coarse-loamy, mixed
Bluffton	Typic Endoaquolls, fine-loamy, mixed, frigid
Borup	Typic Calciaquolls, coarse-silty, frigid
Brandsvold	Typic Argiaquolls, fine-loamy, mixed, frigid
Buse	Udic Calciborolls, fine-loamy, mixed
Bygland	Aquertic Argiborolls, fine, montmorillonitic
Cathro	Terric Borosaprists, loamy, mixed, euic
Chapett	Boralfic Udic Argiborolls, fine-loamy, mixed
Clearriver	Aquic Udipsamments, mixed, frigid
Clitherall	Aquic Argiborolls, coarse-loamy, mixed
Clontarf	Pachic Udic Haploborolls, coarse-loamy, mixed
Clotho	Typic Endoaquolls, coarse-loamy, mixed (calcareous), frigid
Corliss	Typic Udipsamments, mixed, frigid
Darnen	Pachic Udic Haploborolls, fine-loamy, mixed
Dent	Aquic Argiborolls, fine-silty, mixed
Dickey	Udorthentic Haploborolls, sandy over loamy, mixed
Doran	Aquertic Argiborolls, fine, montmorillonitic
Dorset	Udic Argiborolls, coarse-loamy, mixed
Duelm	Aquic Haploborolls, sandy, mixed
Eagleview	Argic Udipsamments, mixed, frigid
Egeland	Udic Haploborolls, coarse-loamy, mixed
Egglake	Mollic Endoaqualfs, fine-loamy, mixed, frigid
Epoufette	Mollic Endoaqualfs, coarse-loamy, mixed, frigid
Flaming	Aquic Haploborolls, sandy, mixed
Foldahl	Aquic Haploborolls, sandy over loamy, mixed
Forada	Typic Endoaquolls, coarse-loamy, mixed, frigid
Fordville	Pachic Udic Haploborolls, fine-loamy over sandy or sandy-skeletal, mixed
Forman	Udic Argiborolls, fine-loamy, mixed
Formdale	Udic Haploborolls, fine-loamy, mixed
Foxhome	Aquic Haploborolls, sandy-skeletal over loamy, mixed
Friberg	Typic Argiaquolls, fine-loamy, mixed, frigid
Glyndon	Aeric Calciaquolls, coarse-silty, frigid
Gonvick	Aquic Argiborolls, fine-loamy, mixed
Grimstad	Aeric Calciaquolls, sandy over loamy, frigid
Hamerly	Aeric Calciaquolls, fine-loamy, frigid
*Hangaard	Typic Endoaquolls, sandy, mixed, frigid
Hantho	Pachic Udic Haploborolls, coarse-silty, mixed
Haslie	Limnic Borosaprists, coprogenous, euic
Haug	Histic Humaquepts, coarse-loamy, mixed (calcareous), frigid
Heimdal	Udic Haploborolls, coarse-loamy, mixed
Hillview	Mollic Endoaqualfs, coarse-loamy, mixed, frigid
Hubbard	Udorthentic Haploborolls, sandy, mixed
Isan	Typic Endoaquolls, sandy, mixed, frigid
Kandota	Mollic Eutroboralfs, fine-loamy, mixed
Kittson	Aquic Haploborolls, fine-loamy, mixed
Knute	Aquic Argiborolls, fine-loamy, mixed
Kratka	Typic Epiaquolls, sandy over loamy, mixed, frigid
Lakepark	Cumulic Endoaquolls, fine-loamy, mixed, frigid
Lamoure	Cumulic Endoaquolls, fine-silty, mixed (calcareous), frigid
Langhei	Typic Eutrochrepts, fine-loamy, mixed, frigid

Classification of the Soils--Continued

Soil name	Family or higher taxonomic class
Leaflake	Arenic Eutroboralfs, loamy, mixed
Leafriver	Histic Humaquepts, sandy, mixed, frigid
Lida	Mollic Eutroboralfs, coarse-loamy, mixed
Lindaas	Typic Argiaquolls, fine, montmorillonitic, frigid
Lizzie	Boralfic Udic Argiborolls, fine-silty, mixed
Mahkonce	Aquic Eutroboralfs, fine, montmorillonitic
McIntosh	Aeric Calciaquolls, fine-silty, frigid
Meehan	Aquic Udipsamments, mixed, frigid
Mehurin	Aquertic Argiborolls, fine, montmorillonitic
Mustinka	Typic Argiaquolls, fine, montmorillonitic, frigid
Naytahwaush	Mollic Eutroboralfs, fine, montmorillonitic
Nidaros	Terric Borosaprists, loamy, mixed, euic
Nitche	Mollic Eutroboralfs, coarse-loamy, mixed
Oakcreek	Aquic Argiborolls, fine-loamy, mixed
Oylen	Aquic Argiborolls, coarse-loamy, mixed
Paddock	Udollic Epiaqualfs, coarse-loamy, mixed, frigid
Parnell	Vertic Argiaquolls, fine, montmorillonitic, frigid
Peever	Udic Argiborolls, fine, montmorillonitic
Pinelake	Typic Argiaquolls, coarse-loamy, mixed, frigid
Quam	Cumulic Endoaquolls, fine-silty, mixed, frigid
Radium	Aquic Haploborolls, sandy, mixed
Rifle	Typic Borohemists, euic
Rockwell	Typic Calciaquolls, coarse-loamy, frigid
Rockwood	Mollic Eutroboralfs, coarse-loamy, mixed
Roliss	Typic Endoaquolls, fine-loamy, mixed (calcareous), frigid
Roscommon	Mollic Psammaquents, mixed, frigid
Rosy	Glossaquic Eutroboralfs, coarse-loamy, mixed
Rothsay	Udic Haploborolls, coarse-silty, mixed
Runeberg	Typic Endoaquolls, coarse-loamy, mixed, frigid
Rushlake	Aquic Udipsamments, mixed, frigid
Sandberg	Udorthentic Haploborolls, sandy, mixed
Sedgeville	Fluvaquentic Endoaquolls, coarse-loamy, mixed, frigid
Seelyeville	Typic Borosaprists, euic
Sioux	Udorthentic Haploborolls, sandy-skeletal, mixed
Sisseton	Typic Eutrochrepts, coarse-loamy, mixed, frigid
Snellman	Typic Eutroboralfs, fine-loamy, mixed
Sugarbush	Typic Eutroboralfs, coarse-loamy, mixed
Sverdrup	Udic Haploborolls, sandy, mixed
Swenoda	Pachic Udic Haploborolls, coarse-loamy, mixed
Sybil	Mollic Eutroboralfs, coarse-loamy, mixed
Two Inlets	Psammentic Eutroboralfs, sandy, mixed
Udipsamments	Udipsamments
Udorthents	Udorthents
Urness	Mollic Fluvaquents, fine-silty, mixed (calcareous), frigid
Vallers	Typic Calciaquolls, fine-loamy, frigid
Verndale	Udic Argiborolls, coarse-loamy, mixed
Waukon	Mollic Eutroboralfs, fine-loamy, mixed
Weetown	Pachic Udic Argiborolls, fine-loamy, mixed
Winger	Typic Calciaquolls, fine-silty, frigid
Wolverton	Aquic Calciborolls, coarse-loamy, mixed
Wykeham	Aquic Eutroboralfs, fine-loamy, mixed
Wyndmere	Aeric Calciaquolls, coarse-loamy, frigid
Zell	Udic Calciborolls, coarse-silty, mixed

Acreage and Proportionate Extent of the Soils

Map symbol	Soil name	Acres	Percent
7A	Hubbard loamy sand, 0 to 2 percent slopes	7,740	0.5
7B	Hubbard loamy sand, 2 to 6 percent slopes	14,297	1.0
7C	Hubbard loamy sand, 6 to 12 percent slopes	4,362	0.3
26	Aazdahl clay loam	9,254	0.6
34	Parnell silty clay loam, depressional	6,362	0.4
38B	Waukon loam, 2 to 6 percent slopes	8,073	0.6
38C2	Waukon loam, 6 to 12 percent slopes, eroded	9,893	0.7
38D2	Waukon loam, 12 to 20 percent slopes, eroded	3,229	0.2
38E	Waukon loam, 20 to 30 percent slopes	2,506	0.2
46	Borup loam	271	*
53B	Kandota sandy loam, 2 to 6 percent slopes	29,873	2.1
53C	Kandota sandy loam, 6 to 12 percent slopes	10,893	0.8
53D	Kandota sandy loam, 12 to 20 percent slopes	1,909	0.1
58	Kittson loam	1,338	*
59	Grimstad fine sandy loam	548	*
61	Arveson loam	1,350	*
63	Rockwell loam	4,579	0.3
65	Foxhome sandy loam	484	*
66	Flaming loamy fine sand	102	*
68	Arveson loam, depressional	3,157	0.2
107	Winger silt loam	522	*
108	McIntosh silt loam	110	*
121	Wykeham fine sandy loam	6,652	0.5
127A	Sverdrup sandy loam, 0 to 2 percent slopes	1,147	*
127B	Sverdrup sandy loam, 2 to 6 percent slopes	3,663	0.2
127C	Sverdrup sandy loam, 6 to 12 percent slopes	1,064	*
141B	Egeland fine sandy loam, 1 to 6 percent slopes	2,771	0.2
141C	Egeland fine sandy loam, 6 to 12 percent slopes	1,450	0.1
141D	Egeland fine sandy loam, 12 to 20 percent slopes	428	*
168B	Forman clay loam, 2 to 6 percent slopes	7,929	0.6
180	Gonvick loam	4,483	0.3
184	Hamerly loam	2,066	0.1
187	Haug muck	407	*
191	Epoufette sandy loam	8,315	0.6
202	Meehan loamy sand	1,009	*
258A	Sandberg loamy sand, 0 to 2 percent slopes	10,194	0.7
258B	Sandberg loamy sand, 1 to 6 percent slopes	2,121	0.1
258C	Sandberg loamy sand, 6 to 12 percent slopes	1,735	0.1
260	Duelm loamy sand	2,217	0.2
267B	Snellman sandy loam, 2 to 8 percent slopes	13,321	0.9
267C	Snellman sandy loam, 8 to 15 percent slopes	15,906	1.1
267E	Snellman sandy loam, 15 to 30 percent slopes	10,315	0.7
267F	Snellman sandy loam, 30 to 45 percent slopes	3,470	0.2
290	Rothsay silt loam	1,179	*
293B	Swenoda fine sandy loam, 1 to 4 percent slopes	1,276	*
335	Urness mucky silt loam	5,181	0.4
339	Fordville loam	8,073	0.6
341A	Arvilla sandy loam, 0 to 2 percent slopes	2,217	0.2
341B	Arvilla sandy loam, 2 to 6 percent slopes	13,905	1.0
371	Clontarf sandy loam	2,552	0.2
375	Forada loam	1,796	0.1
402C	Sioux loamy sand, 2 to 12 percent slopes	700	*
402E	Sioux loamy sand, 12 to 40 percent slopes	782	*
406A	Dorset sandy loam, 0 to 2 percent slopes	6,898	0.5
406B	Dorset sandy loam, 2 to 6 percent slopes	12,887	0.9
418	Lamoure silty clay loam, occasionally flooded	343	*
422B	Bygland silty clay loam, 1 to 6 percent slopes	5,832	0.4
422C	Bygland silty clay loam, 6 to 15 percent slopes	622	*
426	Foldahl loamy fine sand	525	*
441A	Almora loam, 0 to 2 percent slopes	1,704	0.1
441B	Almora loam, 2 to 6 percent slopes	5,181	0.4
441C	Almora loam, 6 to 12 percent slopes	1,332	*

See footnote at end of table.

Acreage and Proportionate Extent of the Soils--Continued

Map symbol	Soil name	Acres	Percent
481	Kratka fine sandy loam	635	*
494	Darnen loam, moderately wet	7,616	0.5
497	Hantho silt loam	1,535	0.1
508	Wyndmere fine sandy loam	192	*
540	Seelyeville muck	33,476	2.4
541	Rifle mucky peat	1,345	*
544	Cathro muck	15,960	1.1
567A	Verndale sandy loam, 0 to 2 percent slopes	5,374	0.4
567B	Verndale sandy loam, 2 to 6 percent slopes	562	*
609B	Dickey loamy fine sand, 1 to 5 percent slopes	489	*
624	Rosy sandy loam	17	*
646C	Peever clay loam, 6 to 12 percent slopes	4,001	0.3
646D	Peever clay loam, 12 to 18 percent slopes	1,505	0.1
670	Knute fine sandy loam	864	*
680	Parnell silt loam	8,411	0.6
698	Doran clay loam	1,031	*
701	Runeberg mucky loam, depressional	6,254	0.4
705B	Nitche-Kandota-Lida complex, 1 to 6 percent slopes	11,857	0.8
705C	Nitche-Kandota-Lida complex, 6 to 12 percent slopes	3,121	0.2
707B	Lizzie silt loam, 2 to 6 percent slopes	5,543	0.4
707C2	Lizzie silt loam, 6 to 12 percent slopes, eroded	1,637	0.1
707D2	Lizzie silt loam, 12 to 20 percent slopes, eroded	387	*
710	Friberg-Weetown complex	10,598	0.7
711B	Arvilla-Sandberg complex, 2 to 6 percent slopes	948	*
711C	Arvilla-Sandberg complex, 6 to 12 percent slopes	15,906	1.1
715	Bluffcreek-Clearriver complex	16,484	1.2
716B	Leaflake-Eagleview complex, 1 to 6 percent slopes	5,326	0.4
716C	Leaflake-Eagleview complex, 6 to 12 percent slopes	777	*
716D	Leaflake-Eagleview complex, 12 to 20 percent slopes	300	*
718E	Naytahwaush loam, 15 to 30 percent slopes	4,218	0.3
721B	Corliss loamy sand, 2 to 6 percent slopes	4,290	0.3
721C	Corliss loamy sand, 6 to 12 percent slopes	1,808	0.1
721D	Corliss loamy sand, 12 to 20 percent slopes	4,410	0.3
721E	Corliss loamy sand, 20 to 35 percent slopes	1,826	0.1
726	Kratka sandy loam, thick solum, depressional	1,824	0.1
746	Haslie muck	7,712	0.5
760C2	Chapett-Sisseton complex, 6 to 12 percent slopes, eroded	36,561	2.6
760D2	Chapett-Sisseton complex, 12 to 20 percent slopes, eroded	13,568	1.0
769B	Mehurin clay loam, 1 to 4 percent slopes	1,940	0.1
776B	Snellman-Sugarbush complex, 2 to 8 percent slopes	14	*
776C	Snellman-Sugarbush complex, 8 to 15 percent slopes	218	*
776E	Snellman-Sugarbush complex, 15 to 30 percent slopes	95	*
777C2	Sisseton-Heimdal complex, 6 to 12 percent slopes, eroded	12,508	0.9
777D2	Sisseton-Heimdal complex, 12 to 20 percent slopes, eroded	4,531	0.3
777E	Sisseton-Heimdal complex, 20 to 30 percent slopes	1,257	*
778B	Dorset-Corliss complex, 1 to 6 percent slopes	34,537	2.4
778C	Dorset-Corliss complex, 6 to 12 percent slopes	18,654	1.3
779B	Peever-Mehurin complex, 2 to 6 percent slopes	2,335	0.2
902B	Barnes-Buse complex, 2 to 6 percent slopes	17,599	1.2
903C2	Barnes-Langhei complex, 6 to 12 percent slopes, eroded	16,843	1.2
915C2	Forman-Buse complex, 6 to 12 percent slopes, eroded	15,159	1.1
915D2	Forman-Buse complex, 12 to 20 percent slopes, eroded	5,832	0.4
931C2	Formdale-Langhei complex, 6 to 12 percent slopes, eroded	6,218	0.4
931D2	Formdale-Langhei complex, 12 to 20 percent slopes, eroded	806	*
942D2	Langhei-Barnes complex, 12 to 20 percent slopes, eroded	4,627	0.3
957B2	Rothsay-Zell complex, 2 to 6 percent slopes, eroded	6,025	0.4
969C2	Zell-Rothsay complex, 6 to 12 percent slopes, eroded	7,447	0.5
969D2	Zell-Rothsay complex, 12 to 20 percent slopes, eroded	636	*
1015	Udipsamments (cut and fill land)	952	*
1016	Udorthents, loamy (cut and fill land)	2,699	0.2
1027	Udorthents, wet substratum (fill land)	461	*
1030	Pits, gravel-Udipsamments complex	1,770	0.1

See footnote at end of table.

Acreage and Proportionate Extent of the Soils--Continued

Map symbol	Soil name	Acres	Percent
1077	Forada and Leafriver soils, depressional	12,265	0.9
1102B	Chapett-Dorset complex, 1 to 6 percent slopes	1,621	0.1
1102C	Chapett-Dorset complex, 6 to 12 percent slopes, eroded	2,988	0.2
1103	Clitherall sandy loam	1,975	0.1
1104B	Waukon-Dorset complex, 1 to 6 percent slopes	755	*
1104C	Waukon-Dorset complex, 6 to 12 percent slopes, eroded	3,663	0.2
1104D	Waukon-Dorset complex, 12 to 20 percent slopes, eroded	2,193	0.2
1105B	Dent silt loam, 1 to 6 percent slopes	3,880	0.3
1110	Isan sandy loam	1,603	0.1
1111	Nidaros muck, frequently flooded	8,941	0.6
1112D	Chapett-Corliss complex, 12 to 20 percent slopes, eroded	3,133	0.2
1112E	Chapett-Corliss complex, 20 to 30 percent slopes	1,185	*
1113	Haslie, Seelyeville, and Cathro soils, ponded	17,671	1.2
1114	Hangaard loamy sand, lake beaches	758	*
1120	Rushlake-Hangaard complex	3,013	0.2
1129	Lindaas silty clay loam, morainic	865	*
1131B	Verndale-Abbeylake complex, 1 to 6 percent slopes	8,098	0.6
1136	Nidaros muck	19,340	1.4
1149	Hamerly clay loam	1,685	0.1
1195A	Sybil-Eagleview complex, 0 to 2 percent slopes	984	*
1195B	Sybil-Eagleview complex, 2 to 8 percent slopes	9,736	0.7
1195C	Sybil-Eagleview complex, 8 to 15 percent slopes	4,531	0.3
1195E	Sybil-Eagleview complex, 15 to 30 percent slopes	1,492	0.1
1196B	Lida-Two Inlets complex, 1 to 8 percent slopes	19,778	1.4
1196C	Lida-Two Inlets complex, 8 to 15 percent slopes	22,365	1.6
1196E	Lida-Two Inlets complex, 15 to 30 percent slopes	3,273	0.2
1196F	Lida-Two Inlets complex, 30 to 50 percent slopes	604	*
1200	Egglake loam	812	*
1208B	Naytahwaush-Mahkonce complex, 1 to 8 percent slopes	6,555	0.5
1209C	Naytahwaush clay loam, 8 to 15 percent slopes, eroded	8,170	0.6
1212B	Mahkonce clay loam, 1 to 4 percent slopes	1,958	0.1
1214	Mustinka silty clay loam	580	*
1215	Pinelake sandy loam	8,140	0.6
1216B	Egglake-Wykeham complex, 0 to 5 percent slopes	4,655	0.3
1217E	Waukon-Lida complex, 20 to 35 percent slopes	1,238	*
1218B	Snellman-Lida complex, 1 to 8 percent slopes	3,244	0.2
1218C	Snellman-Lida complex, 8 to 15 percent slopes	7,941	0.6
1218E	Snellman-Lida complex, 15 to 30 percent slopes	5,398	0.4
1218F	Snellman-Lida complex, 30 to 45 percent slopes	928	*
1219C	Sandberg-Sverdrup complex, 6 to 12 percent slopes	2,772	0.2
1221B	Sverdrup-Sandberg complex, 2 to 6 percent slopes	2,664	0.2
1223D	Sandberg-Arvilla complex, 12 to 20 percent slopes	4,386	0.3
1227	Quam, Cathro, and Urness soils, ponded	15,492	1.1
1230	Haslie and Nidaros soils, ponded	26,101	1.8
1232B	Chapett loam, 2 to 6 percent slopes	18,027	1.3
1232E	Chapett loam, 20 to 30 percent slopes	1,552	0.1
1234B	Formdale-Buse complex, 2 to 6 percent slopes	20,738	1.4
1237	Lakepark loam	7,037	0.5
1239	Quam silt loam	10,218	0.7
1240	Roliss clay loam	6,170	0.4
1247D	Corliss-Dorset complex, 12 to 20 percent slopes	4,965	0.3
1250C	Abbeylake-Verndale complex, 6 to 12 percent slopes	680	*
1259	Hamerly-Mustinka complex	2,085	0.1
1275B	Kandota-Egglake, depressional, complex, 0 to 8 percent slopes	2,236	0.2
1275C	Kandota-Egglake, depressional, complex, 0 to 15 percent slopes	1,674	0.1
1276	Knute-Brandsvold complex, thick solum	5,736	0.4
1277D	Corliss-Sverdrup complex, 12 to 20 percent slopes	822	*
1289	Knute fine sandy loam, thick solum	5,374	0.4
1290	Brandsvold fine sandy loam, thick solum	4,242	0.3
1291	Sedgeville loam, frequently flooded	1,107	*
1293	Sedgeville fine sandy loam, rarely flooded	744	*
1304A	Glyndon very fine sandy loam	278	*

See footnote at end of table.

Acreage and Proportionate Extent of the Soils--Continued

Map symbol	Soil name	Acres	Percent
1307	Rushlake sand	1,854	0.1
1317	Vallers silty clay loam	524	*
1319B	Rockwood sandy loam, 2 to 6 percent slopes, stony	10,484	0.7
1319C	Rockwood sandy loam, 6 to 12 percent slopes, stony	2,069	0.1
1319D	Rockwood sandy loam, 12 to 20 percent slopes, stony	503	*
1320B	Blowers sandy loam, 1 to 5 percent slopes, stony	35,777	2.5
1321	Paddock-Becida complex, stony	23,196	1.6
1322	Wolverton very fine sandy loam	813	*
1324B	Heimdal-Sisseton complex, 2 to 6 percent slopes	8,025	0.6
1338	Oakcreek loam	1,557	0.1
1339	Borup mucky silt loam, depressional	345	*
1340	Bluffcreek-Epoufette complex	2,024	0.1
1341	Clitherall-Wykeham complex	5,061	0.4
1342	Pinelake, loamy substratum-Brandsvold complex	4,025	0.3
1343C	Lida-Almora-Lizzie complex, 8 to 15 percent slopes	1,332	*
1344B	Lida-Almora-Dent complex, 1 to 8 percent slopes	3,374	0.2
1345	Bluffcreek-Rosy complex	748	*
1346	Nidaros muck, calcareous	7,326	0.5
1347B	Kandota loam, 1 to 6 percent slopes	5,097	0.4
1348	Knute loam, thick solum	3,555	0.2
1349	Clotho loam, moderately permeable	300	*
1350	Brandsvold loam, thick solum	868	*
1351	Bluffton loam, moderately permeable	4,643	0.3
1356	Water, miscellaneous	177	*
1365	Hillview fine sandy loam	1,135	*
1396	Sedgeville, Nidaros, and Aquolls soils, channeled	1,757	0.1
1397	Bemidji loamy sand, moderately permeable	698	*
1825B	Seelyeville muck, seep land, 1 to 10 percent slopes	749	*
1874	Radium loamy sand	578	*
1943	Roscommon loamy sand	1,046	*
1975	Oylen sandy loam	11,303	0.8
W	Water	233,212	16.4
	Total	1,423,300	100.0

* Less than 0.1 percent.

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Agronomy

General management needed for crops and for hay and pasture is suggested in this section. The system of land capability classification used by the Natural Resources Conservation Service is explained, and the estimated yields of the main crops and hay and pasture plants are listed for each soil.

Planners of management systems for individual fields or farms should consider obtaining specific information from the local office of the Natural Resources Conservation Service or the Cooperative Extension Service.

Crops and Pasture

Clarion J. Neseth, district conservationist, and John A. Schmidt, district conservationist, Natural Resources Conservation Service, helped prepare this section.

Many crops and pasture plants can be grown in Otter Tail County if proper management is applied. The main crops grown are alfalfa hay, corn, edible beans, barley, oats, potatoes, spring wheat, and soybeans. Small acreages of sunflowers, rye, buckwheat, and sugarbeets also are grown. Soil productivity within the county ranges from marginal to high.

The main concerns in managing the cropland in the county are water erosion, soil blowing (fig. 1), droughtiness, wetness, fertility, and water quality. Good management can increase productivity and at the same time conserve the soil.

As topsoil is removed by erosion, nutrients and organic matter are also removed. The eroding sediment settles at the base of slopes or in depressions or may enter streams, rivers, or lakes, where it can adversely affect water quality.

Soil blowing is most common in nearly level, unprotected areas of the Glacial Lake Agassiz basin and on the pitted outwash plains. Unprotected gently sloping to sloping areas on the till plains, stagnation moraines, and drumlin fields may also be susceptible to soil blowing. The soils that are most susceptible to soil blowing are those in wind erodibility groups 4L, 3, 2, and 1, which are described in the "Soil Properties" section.

The hazard of water erosion is most severe in areas of cropland that have gently sloping or moderately steep slopes on the pitted outwash plains, till plains, stagnation moraines, and drumlin fields. The soils most susceptible to water erosion are on long slopes and have the highest K factors and lowest T factors (see "Erosion Factors" on page 26 of this section).

Conserving the topsoil is important because the topsoil acts as a storage site for nutrients and water that are available for use by plants. Conservation practices reduce the hazard of surface runoff of fertilizers and farm chemicals, minimize soil crusting, increase the rate of water infiltration, keep the topsoil in place, and minimize the sedimentation caused by water and by soil blowing. Some common conservation practices that have been applied in the county are including grasses and legumes in the crop rotation; planting on the contour; contour stripcropping (fig. 2); applying a system of conservation tillage, such as no-till or minimum tillage; and establishing grassed waterways, field windbreaks, diversions, and sediment basins.

Cobbles, stones, and boulders that interfered with tillage operations have been removed from much of the cropland in the county. Periodically, rocks will surface because of tillage practices or frost action and must be removed. Wooded areas and pastures that are being converted to cropland are the most likely to have stones and boulders that can interfere with farming. Soils that formed in glacial till can contain cobbles, stones, or boulders that hinder tillage. Soils on the Wadena Drumlin Field are characterized by a large number of cobbles and stones in the soil and on the surface. Also, soils that formed in outwash materials in areas of the Alexandria Moraine Complex or within about a mile of the complex typically have rocks of a variety of sizes that can interfere with tillage. Areas that contain many rock fragments are better suited to permanent pasture, unless the removal of the stones and boulders is feasible.

Most of the soils in the pitted outwash plains are droughty and have been irrigated. Maintaining a cover of crop residue is important during the critical erosion periods of early spring and late fall. Keeping crop residue on the surface minimizes moisture loss by lowering the evaporation rate and increases moisture for spring planting by catching snow in the stubble

Figure 1.—Water erosion and soil blowing are hazards in areas of Dorset-Corliss complex, 6 to 12 percent slopes, and Dorset-Corliss complex, 1 to 6 percent slopes (background). Crop residue management and other conservation practices are needed in areas of these soils.

during the winter. Because of moderately rapid or rapid permeability, these outwash soils have a high potential for the leaching of nutrients into the ground water.

Many potholes and depressions in the county are difficult to drain because of a lack of suitable outlets. Excess surface water can be directed off some fields by shaping waterways and connecting them with natural drainageways or drainage outlets. Some poorly drained and very poorly drained areas may be suited to forage crops or can be used as pasture. Mixtures of reed canarygrass, timothy, alsike clover, or birdsfoot trefoil are most frequently planted. Wild meadow hay is harvested in some of the larger areas.

State and Federal regulations may restrict any changes in the natural drainage condition of a wetland or hydric soil area. Before any alterations are made to a wetland or within a hydric soil area, the landowner should consult with local, State, or Federal agencies, such as the Natural Resources Conservation Service, the U.S. Fish and Wildlife Service, the Minnesota Department of Natural Resources, the Land and Resource Office of Otter Tail County, or the local Soil and Water Conservation District.

Pastures in the county are generally in areas of poorly drained or very poorly drained soils, on the more sloping land, in areas with excessive stones or boulders, or on marginally productive soils. Pastures can be improved with proper management. Some general management practices, such as maintaining proper nutrient levels, using suitable forage plants, and using a system of rotation grazing, encourage forage growth. The use of wet pastures should be deferred until the sod is firm, the forage has reached a minimum height, and the plants are growing vigorously. Overgrazing reduces the quality of forage and the ability of the plants to recover after grazing. Improvement of pastures in some areas may be difficult because of excessive wetness or the large number of stones or boulders on the surface.

Nutrient levels of the soils in the county are extremely variable. Current fertility levels, recommended nutrient levels, and soil pH are determined by soil testing. Soil testing can be done by private agricultural consultants or with the help of the

County extension offices and the University of Minnesota. Past fertility practices and cropping history can influence the current fertility status of the soil. The kinds and amounts of fertilizer needed depend on the soil properties, the crop to be planted, the level of management, and the desired yields. Some crop yields could be increased by supplying needed micronutrients, such as iron, magnesium, boron, sulfur, or zinc (USDA/NRCS and Minnesota Agricultural Extension Service, 1990).

Soil texture, permeability, organic matter content, drainage, and soil reaction are properties that can affect the type, amounts, or method of application of fertilizers and pesticides. Recommended amounts of fertilizer should be used, and the instructions on pesticide labels should be followed. The potential for leaching fertilizers or agricultural chemicals into ground water exists in areas of soils that formed in outwash materials and that are moderately rapidly permeable or rapidly permeable. Applying recommended amounts of fertilizers and chemicals in a timely manner helps to achieve the optimum results and can minimize the potential for leaching (Durgan and others, 1995). Split applications of fertilizers enable the plants to utilize the nutrients effectively and can minimize leaching. Variable rate application technology based on soil topography and Geographic Positioning Systems (GPS) can maximize the use of the information provided by the soil maps.

The root zone of the soils in Otter Tail County generally has pH ranging from 5.0 to 7.8. The availability of nutrients to plants and the peak effectiveness of agricultural chemicals are influenced by the soil pH. Soil reaction with a pH near neutral is optimum. Most of the outwash soils and the soils that formed under forest vegetation are typically leached and are acid in the surface soil and subsoil. Periodic applications of lime as recommended by soil tests enhance the availability of plant nutrients. Some soils, such as Hamerly soils, have a high pH in the surface soil. Thus, nutrients are less available to plants and a nutrient deficiency may result. Applying additional fertilizers may be necessary to compensate for the nutrient deficiency. Also, some crops or windbreak

Figure 2.—Contour stripcropping in an area of Rockwood sandy loam, 2 to 6 percent slopes, stony.

species do not grow well in soils that have a high pH. Species that are tolerant of a high pH should be planted in areas of these soils.

Irrigation

Otter Tail County has about 45,000 acres under irrigation. This number represents the largest acreage of irrigated land in Minnesota. Approximately 300 irrigation systems are operating in the county. The majority of the irrigation systems are center-pivot, and a few traveling gun irrigation systems are also used. The major irrigated crops grown are potatoes, corn, soybeans, edible beans, and alfalfa hay. At present, yields of irrigated corn are typically 150 to 160 bushels per acre on a variety of soil types.

The largest irrigated areas are in the Hubbard-Duelm-Nidaros, Dorset-Corliss-Nidaros, and Arvilla-Sverdrup-Sandberg associations, which are described under the heading "General Soil Map Units" in Part I of this survey.

Annual precipitation in Otter Tail County ranges from 20 to 24 inches. About three-fourths of the precipitation falls from May to September; the growing season for most crops falls within this period.

An adequate supply of available water is needed for irrigation. Most of the ground-water aquifers in Otter Tail County are in the surficial deposits of sands and gravels. These aquifers are recharged annually by snowmelt and rainfall. Most of the irrigation systems in Otter Tail County use water from ground-water aquifers. A few systems use water from rivers or lakes.

Soil properties that can affect irrigation include available water capacity, the water intake rate, and the slope.

Soils that formed in glacial till, such as Barnes, Forman, Waukon, and Kandota soils, have a moderate or high available water capacity and typically can store from 9 to 12 inches of available water in the upper 60 inches of the soil profile. These soils have a sufficient water-holding capacity for achieving high yields in most years without irrigation.

Soils that formed in glacial outwash, such as Arvilla, Sverdrup, Dorset, Verndale, Lida, and Sybil soils, have a low or moderate available water capacity and typically can store from 2 to 4 inches of available water in the upper 18 to 24 inches of the soil profile. These soils typically have 1 to 2 feet of loamy sediments overlying sand or gravel. They have good potential for irrigation.

Other glacial outwash soils, such as Corliss, Hubbard, Sandberg, and Two Inlets soils, have a very low or low available water capacity and typically store less than 3 inches of available water in the upper 60 inches of the soil profile. These soils typically are coarse textured throughout. They are not well suited to irrigation because of rapid percolation rates and a poor ability to store water.

Typically, water storage in the upper 24 inches is considered when irrigation is planned for areas of outwash soils. The available water capacity below a depth of 24 inches is generally so low that it is not a consideration.

The intake rate is a measure of the soil's capacity to absorb water and to move water through the soil profile. The infiltration rate is the rate at which water enters the surface layer of the soil. Percolation is the rate at which water moves through the soil. The soil layer having the lowest transmission rate, either at the surface or below the surface, determines how fast water will move through the soil profile. Sealing or crusting of the soil surface may reduce the intake rate and increase the rate of water runoff. Leaving crop residue on the surface helps to prevent crusting, enhances the absorption of water, and reduces the potential for erosion.

The slope is an important consideration affecting irrigation because high yields of irrigated crops cannot be maintained on eroding land. Erosion-control measures are needed if sloping areas are irrigated. The rate at which water is applied and the ability of the soil to absorb the water are factors that affect water erosion and should be considered when the irrigation system is designed and utilized.

Soil types can influence the amount and type of management needed to achieve yield goals. Each crop has a certain rooting depth that governs how much water can be used from the soil. Because most roots are in the upper part of the root zone, applications of irrigation water are generally managed to a depth somewhat less than the total root depth.

A variety of water management systems are available to determine the amount of water to be applied. Most systems take into account the plant's demand for water at various stages of development and the amount of water currently in the soil in relation to rooting depth. Some systems utilize computer programs in combination with field sampling of soil moisture.

Many farmers and homeowners in these areas of irrigated cropland get their drinking water from the same aquifer as the irrigation water. If not properly managed, these aquifers are susceptible to contamination from manure, fertilizer, and certain pesticides. Chemicals and nutrients have the potential to move downward in the soil profile and eventually into the ground water. Proper and timely applications of chemicals and fertilizers can help to prevent the leaching of excess chemicals and nutrients or the

transportation of these substances in runoff water. Also, applying proper amounts of irrigation water reduces the runoff rate and the likelihood that nutrients will be flushed below the rooting zone.

Cropland Management Considerations

The management concerns affecting the use of the detailed soil map units in the survey area for crops are shown in the table "Cropland Management Considerations." The main concerns in managing nonirrigated cropland are conserving moisture, controlling soil blowing and water erosion, and maintaining soil fertility.

Conserving moisture consists primarily of reducing the evaporation and runoff rates and increasing the rate of water infiltration. Applying conservation tillage and conservation cropping systems, farming on the contour, stripcropping, establishing field windbreaks, and leaving crop residue on the surface conserve moisture.

Generally, a combination of several practices is needed to control *soil blowing* and *water erosion*. Conservation tillage, stripcropping, field windbreaks, contour farming, conservation cropping systems, crop residue management, terraces, diversions, and grassed waterways help to prevent excessive soil loss.

Measures that are effective in maintaining *soil fertility* include applying fertilizer, both organic and inorganic, including manure; incorporating crop residue or green manure crops into the soil; and using proper crop rotations. Controlling erosion helps to prevent the loss of organic matter and plant nutrients and thus helps to maintain productivity, although the level of fertility can be reduced even in areas where erosion is controlled. All soils used for nonirrigated crops respond well to applications of fertilizer.

Some of the considerations shown in the table cannot be easily overcome. These are *channels, flooding, gullies,* and *ponding*.

Additional considerations are as follows:

Lime content, limited available water capacity, potential poor tilth and compaction, and *restricted permeability.*—These limitations can be minimized by incorporating green manure crops, manure, or crop residue into the soil; applying a system of conservation tillage; and using conservation cropping systems. Also, crops may respond well to additions of phosphate fertilizer to soils that have a high content of lime.

Potential for ground-water contamination.—The proper use of nutrients and pesticides can reduce the risk of ground-water contamination.

Potential for surface-water contamination.—The risk of surface-water contamination can be reduced by the proper use of nutrients and pesticides and by conservation farming practices that reduce the runoff rate.

Surface rock fragments.—This limitation causes rapid wear of tillage equipment. It cannot be easily overcome.

Surface stones.—Stones or boulders on or near the surface can hinder normal tillage unless they are removed.

Salt content.—In areas where this is a limitation, only salt-tolerant crops should be grown.

On irrigated soils the main management concerns are *efficient water use, nutrient management, control of erosion, pest and weed control,* and *timely planting and harvesting* for a successful crop. An irrigation system that provides optimum control and distribution of water at minimum cost is needed. Overirrigation wastes water, leaches plant nutrients, and causes erosion. Also, it can create drainage problems, raise the water table, and increase soil salinity.

Explanation of Criteria

Acid soil.—The pH is less than 6.1.

Channeled.—The word "channeled" is included in the map unit name.

Dense layer.—The bulk density is 1.80 g/cc or greater within the soil profile.

Depth to rock.—The depth to bedrock is less than 40 inches.

Excessive permeability.—Permeability is 6 inches per hour or more within the soil profile.

Flooding.—Flooding is occasional or frequent.

Gullied.—The word "gullied" is included in the map unit name.

High organic matter content.—The surface layer has more than 20 percent organic matter.

Lime content.—The pH is 7.4 or more in the surface layer, or the wind erodibility group is 4L.

Limited available water capacity.—The available water capacity calculated to a depth of 60 inches or to a root-limiting layer is 6 inches or less.

Limited organic matter content.—The content of organic matter is 2 percent or less in the surface layer.

Ponding.—Ponding duration is assigned to the map unit component. The water table is above the surface.

Potential poor tilth and compaction.—The content of clay is 27 percent or more in the surface layer.

Potential for ground-water contamination (by

nutrients or pesticides).—Depth to the water table is 4 feet or less, the permeability of any layer is more than 6.0 inches per hour, or the depth to bedrock is less than 60 inches.

Potential for surface-water contamination (by nutrients or pesticides).—The map unit component is occasionally flooded or frequently flooded, is subject to ponding, is assigned to hydrologic group C or D and has a slope of more than 2 percent, is assigned to hydrologic group A and has a slope of more than 6 percent, or is assigned to hydrologic group B, has a slope of 3 percent or more, and has a K factor of more than 0.17.

Previously eroded.—The word "eroded" is included in the map unit name.

Restricted permeability.—Permeability is less than 0.06 inch per hour within the soil profile.

Salt content.—The electrical conductivity is 4 or more in the surface layer or 8 or more within a depth of 30 inches.

Slope (equipment limitation).—The slope is more than 15 percent.

Surface rock fragments (equipment limitation).—The terms describing the texture of the surface layer include any rock fragment modifier, except for gravelly, channery, stony, very stony, extremely stony, bouldery, very bouldery, and extremely bouldery.

Surface stones (equipment limitation).—The word "stony" or "bouldery" is included in the map unit name or in the description of the surface layer.

Water erosion.—Either the slope is 6 percent or more, or the slope is more than 3 percent and less than 6 percent and the surface layer is not sandy.

Water table.—A water table is within 2.5 feet of the surface.

Wind erosion.—The wind erodibility group is 1, 2, 3, or 4L.

Crop Yield Estimates

The average yields per acre that can be expected of the principal crops under a high level of management are shown in the table "Land Capability and Yields per Acre of Crops and Pasture." In any given year, yields may be higher or lower than those indicated in the table because of variations in rainfall and other climatic factors. The land capability classification of map units in the survey area also is shown in the table.

The yields are based mainly on the experience and records of farmers, conservationists, and extension agents. Available yield data from nearby counties and results of field trials and demonstrations also are considered.

The management needed to obtain the indicated yields of the various crops depends on the kind of soil and the crop. Management can include drainage, erosion control, and protection from flooding; the proper planting and seeding rates; suitable high-yielding crop varieties; appropriate and timely tillage; control of weeds, plant diseases, and harmful insects; favorable soil reaction and optimum levels of nitrogen, phosphorus, potassium, and trace elements for each crop; effective use of crop residue, barnyard manure, and green manure crops; and harvesting that ensures the smallest possible loss.

The estimated yields reflect the productive capacity of each soil for each of the principal crops. Yields are likely to increase as new production technology is developed. The productivity of a given soil compared with that of other soils, however, is not likely to change.

Crops other than those shown in the table are grown in the survey area, but estimated yields are not listed because the acreage of such crops is small. The local office of the Natural Resources Conservation Service or of the Cooperative Extension Service can provide information about the management and productivity of the soils for those crops.

Pasture and Hayland Interpretations

Under good management, proper grazing is essential for the production of high-quality forage, stand survival, and erosion control. Proper grazing helps plants to maintain sufficient and generally vigorous top growth during the growing season. Brush control is essential in many areas, and weed control generally is needed. Rotation grazing and renovation also are important management practices.

Yield estimates are often provided in animal unit months (AUM), or 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.

The local office of the Natural Resources Conservation Service or of the Cooperative Extension Service can provide information about forage yields other than those shown in the table "Land Capability and Yields per Acre of Crops and Pasture."

Land Capability Classification

Land capability classification shows, in a general way, the suitability of soils for most kinds of field crops Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. The

criteria used in grouping the soils do not take into account major and generally expensive landforming that would change slope, depth, or other characteristics of the soils, nor do they include possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for woodland or for engineering purposes.

In the capability system, soils generally are grouped at three levels—capability class, subclass, and unit (USDA, 1961). These categories indicate the degree and kinds of limitations affecting mechanized farming systems that produce the more commonly grown field crops, such as corn, small grain, cotton, hay, and field-grown vegetables. Only class and subclass are used in this survey.

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

If properly managed, soils in classes 1, 2, 3, and 4 are suitable for the mechanized production of commonly grown field crops and for pasture and woodland. The degree of the soil limitations affecting the production of cultivated crops increases progressively from class 1 to class 4. The limitations can affect levels of production and the risk of permanent soil deterioration caused by erosion and other factors.

Soils in classes 5, 6, and 7 are generally not suited to the mechanized production of commonly grown field crops without special management, but they are suitable for plants that provide a permanent cover, such as grasses and trees. The severity of the soil limitations affecting crops increases progressively from class 5 to class 7.

Areas in class 8 are generally not suitable for crops, pasture, or woodland without a level of management that is impractical. These areas may have potential for other uses, such as recreational facilities and wildlife habitat.

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

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

The capability classification of map units in the survey area is given in the table "Land Capability and Yields per Acre of Crops and Pasture" at the end of this section.

Prime Farmland

Prime farmland is of major importance in meeting the Nation's short- and long-range needs for food and fiber. The acreage of high-quality farmland is limited, and the U.S. Department of Agriculture recognizes that government at local, State, and Federal levels, as well as individuals, must encourage and facilitate the wise use of our Nation's prime farmland.

Prime farmland soils, as defined by the U.S. Department of Agriculture, are soils that are best suited to food, feed, forage, fiber, and oilseed crops. Such soils have properties that favor the economic production of sustained high yields of crops. The soils need only to be treated and managed by acceptable farming methods. An adequate moisture supply and a sufficiently long growing season are required. Prime farmland soils produce the highest yields with minimal expenditure of energy and economic resources, and farming these soils results in the least damage to the environment.

Prime farmland soils may presently be used as cropland, pasture, or woodland or for other purposes. They either are used for food and fiber or are available for these uses. Urban or built-up land, public land, and water areas cannot be considered prime farmland. Urban or built-up land is any contiguous unit of land 10 acres or more in size that is used for such purposes as housing, industrial, and commercial sites, sites for institutions or public buildings, small parks, golf courses, cemeteries, railroad yards, airports, sanitary landfills, sewage treatment plants, and water-control structures. Public land is land not available for farming in National forests, National parks, military reservations, and State parks.

Prime farmland soils commonly receive an adequate and dependable supply of moisture from precipitation or irrigation. The temperature and growing season are favorable, and the level of acidity or alkalinity and the content of salts and sodium are acceptable. The soils have few, if any, rocks and are permeable to water and air. They are not excessively

erodible or saturated with water for long periods, and they are not frequently flooded during the growing season or are protected from flooding. Slopes range mainly from 0 to 6 percent.

Soils that have a high water table or are subject to flooding may qualify as prime farmland where these limitations are overcome by drainage measures or flood control. Onsite evaluation is necessary to determine the effectiveness of corrective measures. More information about the criteria for prime farmland can be obtained at the local office of the Natural Resources Conservation Service.

A recent trend in land use has been the conversion of prime farmland to urban and industrial uses. The loss of prime farmland to other uses puts pressure on lands that are less productive than prime farmland.

About 364,664 acres, or nearly 26 percent of the survey area, meets the requirements for prime farmland.

The map units in the survey area that meet the requirements for prime farmland are listed in the table "Prime Farmland" at the end of this section. This list does not constitute a recommendation for a particular land use. On some soils included in the table, measures that overcome limitations are needed. The need for these measures is indicated in parentheses after the map unit name. The location of each map unit is shown on the detailed soil maps. The soil qualities that affect use and management are described in the section "Soil Series and Detailed Soil Map Units" in Part I of this survey.

Erosion Factors

Soil erodibility (K) and soil-loss tolerance (T) factors are used in an equation that predicts the amount of soil lost through water erosion in areas of cropland. The procedure for predicting soil loss is useful in guiding the selection of soil and water conservation practices. The erosion factors for the soils in the survey area are listed in the table "Physical Properties of the Soils."

Soil Erodibility (K) Factor

The soil erodibility (K) factor indicates the susceptibility of a soil to sheet and rill erosion by water. The soil properties that influence erodibility are those that affect the infiltration rate, the movement of water through the soil, and the water storage capacity of the soil and those that allow the soil to resist dispersion, splashing, abrasion, and the transporting forces of rainfall and runoff. The most important soil properties are the content of silt plus very fine sand, the content of sand coarser than very fine sand, the content of organic matter, soil structure, and permeability.

Fragment-Free Soil Erodibility (Kf) Factor

This is one of the factors used in the revised Universal Soil Loss Equation. It shows the erodibility of the fine-earth fraction, or the material less than 2 millimeters in size.

Soil-Loss Tolerance (T) Factor

The soil-loss tolerance (T) factor is an estimate of the maximum annual rate of soil erosion that can occur over a sustained period without affecting crop productivity. The rate is expressed in tons of soil loss per acre per year. Ratings of 1 to 5 are used, depending on soil properties and prior erosion. The criteria used in assigning a T factor to a soil include maintenance of an adequate rooting depth for crop production, potential reduction of crop yields, maintenance of water-control structures affected by sedimentation, prevention of gullying, and the value of nutrients lost through erosion.

Wind Erodibility Groups

Wind erodibility is directly related to the percentage of dry, nonerodible surface soil aggregates larger than 0.84 millimeter in diameter. From this percentage, the wind erodibility index (I) factor is determined. This factor is an expression of the stability of the soil aggregates, or the extent to which they are broken down by tillage and the abrasion caused by windblown soil particles. Soils are assigned to wind erodibility groups (WEG) having similar percentages of dry soil aggregates larger than 0.84 millimeter. The wind erodibility groups and wind erodibility index numbers are listed in the table "Physical Properties of the Soils."

Additional information about wind erodibility groups and K, Kf, T, and I factors can be obtained from local offices of the Natural Resources Conservation Service or the Cooperative Extension Service.

Windbreaks and Environmental Plantings

Windbreaks protect livestock, buildings, and yards from wind and snow. They also protect fruit trees and gardens, and they furnish habitat for wildlife. Several rows of low- and high-growing broadleaf and coniferous trees and shrubs provide the most protection (fig. 3).

Figure 3.—Windbreaks and shelterbelts minimize the effects of soil blowing in this area of Hubbard loamy sand, 0 to 2 percent slopes.

Field windbreaks are narrow plantings made at right angles to the prevailing wind and at specific intervals across the field. The interval depends on the erodibility of the soil. Field windbreaks protect cropland and crops from wind, help to keep snow on the fields, and provide food and cover for wildlife.

Environmental plantings help to beautify and screen houses and other buildings and to abate noise. The plants, mostly evergreen shrubs and trees, are closely spaced. To ensure plant survival, a healthy planting stock of suitable species should be planted properly on a well prepared site and maintained in good condition.

Windbreaks are often planted on land that did not originally support trees. Knowledge of how trees perform on such land can be gained only by observing and recording the performance of trees that have been planted and have survived. Many popular windbreak species are not indigenous to the areas in which they are planted.

Each tree or shrub species has certain climatic and physiographic limits. Within these parameters, a tree or shrub may grow well or grow poorly, depending on the characteristics of the soil. Each tree or shrub has definable potential heights in a given physiographic area and under a given climate. Accurate definitions of potential heights are necessary when a windbreak is planned and designed.

The table "Windbreaks and Environmental Plantings" shows the height that locally grown trees and shrubs are expected to reach in 20 years on various soils. The estimates in this table are based on

measurements and observation of established plantings that have been given adequate care. They can be used as a guide in planning windbreaks and screens. Additional information on planning windbreaks and screens and planting and caring for trees and shrubs can be obtained from local offices of the Natural Resources Conservation Service or the Cooperative Extension Service or from a nursery.

Windbreak Suitability Groups

Windbreak suitability groups consist of soils in which the kinds and degrees of the hazards and limitations that affect the survival and growth of trees and shrubs in windbreaks are about the same.

The windbreak suitability group for each soil in the survey area is listed in the table "Windbreak Suitability Groups" at the end of this section. The following paragraphs explain the characteristics of the soils in each group.

Group 1 consists of soils that are somewhat poorly drained or moderately well drained, are rapidly permeable to moderately slowly permeable, and do not have free carbonates in the upper 20 inches.

Group 1K consists of soils that are somewhat poorly drained or moderately well drained, are rapidly permeable to moderately slowly permeable, and have free carbonates within 20 inches of the surface. These soils may be very slightly saline or slightly saline (the electrical conductivity is 2 to 8).

Group 2 consists of poorly drained soils that have been artificially drained and do not have free carbonates in the upper 20 inches. Permeability varies.

Group 2K consists of poorly drained or very poorly drained soils that have been artificially drained and have free carbonates within 20 inches of the surface. Permeability varies. These soils may be very slightly saline or slightly saline (the electrical conductivity is 2 to 8).

Group 2H consists of very poorly drained soils that have been artificially drained and have more than 16 inches of organic material. Permeability varies.

Group 2W consists of very poorly drained soils that are subject to ponding and have been artificially drained. It includes soils that have an organic surface layer up to 16 inches thick. Permeability varies.

Group 3 consists of soils that are well drained or moderately well drained and are loamy or silty throughout. Permeability is moderate or moderately slow. These soils do not have free carbonates in the upper 20 inches.

Group 4 consists of soils that are well drained, moderately well drained, or somewhat poorly drained and have a silty or loamy surface layer and a clayey subsoil. Permeability is slow or very slow.

Group 4C consists of soils that are well drained, moderately well drained, or somewhat poorly drained and have a clayey surface layer and subsoil. Permeability is slow or very slow.

Group 4F consists of soils that are well drained, moderately well drained, or somewhat poorly drained and have a substratum of dense till. Permeability is slow or very slow.

Group 5 consists of soils that are excessively drained to moderately well drained and have a moderate available water capacity. These soils are dominantly fine sandy loam or sandy loam, but some are sandy in the upper part and loamy in the lower part.

Group 6G consists of excessively drained to moderately well drained soils that are loamy in the upper part and have sand or sand and gravel at a depth of 20 to 40 inches. These soils have a low or moderate available water capacity.

Group 6D consists of excessively drained to moderately well drained, loamy soils that have bedrock at a depth of 20 to 40 inches. These soils have a low or moderate available water capacity.

Group 7 consists of excessively drained to well drained soils that are dominantly loamy fine sand or coarser textured and are shallow to sand or to sand and gravel. These soils have a low available water capacity.

Group 8 consists of excessively drained to well drained, loamy soils that have free carbonates within 20 inches of the surface.

Group 9W consists of soils that are somewhat poorly drained, poorly drained, or very poorly drained and are moderately saline (the electrical conductivity is 8 to 16).

Group 10 consists of soils or miscellaneous land types that generally are not suitable for windbreaks. One or more characteristics, such as soil depth, texture, wetness, available water capacity, or slope, limit the planting, survival, or growth of trees and shrubs.

Cropland Management Considerations

(See text for a description of the considerations listed in this table)

Map symbol and soil name	Cropland management considerations
7A, 7B:	
Hubbard	Excessive permeability Limited available water capacity Potential for ground-water contamination Wind erosion
7C:	
Hubbard	Excessive permeability Limited available water capacity Potential for ground-water contamination Potential for surface-water contamination Water erosion Wind erosion
26:	
Aazdahl	Potential for ground-water contamination Potential poor tilth and compaction
34:	
Parnell	Ponding Potential for ground-water contamination Potential for surface-water contamination Potential poor tilth and compaction Water table
38B:	
Waukon	Potential for surface-water contamination Water erosion
38C2:	
Waukon	Potential for surface-water contamination Previously eroded Water erosion
38D2:	
Waukon	Potential for surface-water contamination Previously eroded Slope Water erosion
38E:	
Waukon	Potential for surface-water contamination Slope Water erosion
46:	
Borup	Lime content Potential for ground-water contamination Water table Wind erosion
53B, 53C:	
Kandota	Potential for surface-water contamination Water erosion Wind erosion

Cropland Management Considerations--Continued

Map symbol and soil name	Cropland management considerations
53D:	
Kandota	Potential for surface-water contamination Slope Water erosion Wind erosion
58:	
Kittson	Potential for ground-water contamination Potential for surface-water contamination
59:	
Grimstad	Excessive permeability Lime content Potential for ground-water contamination Wind erosion
61:	
Arveson	Lime content Potential for ground-water contamination Water table Wind erosion
63:	
Rockwell	Excessive permeability Lime content Potential for ground-water contamination Water table Wind erosion
65:	
Foxhome	Excessive permeability Potential for ground-water contamination Wind erosion
66:	
Flaming	Excessive permeability Limited available water capacity Potential for ground-water contamination Wind erosion
68:	
Arveson	Lime content Ponding Potential for ground-water contamination Potential for surface-water contamination Water table Wind erosion
107:	
Winger	Lime content Potential for ground-water contamination Water table Wind erosion
108:	
McIntosh	Lime content Potential for ground-water contamination Wind erosion
121:	
Wykeham	Potential for ground-water contamination Wind erosion

Cropland Management Considerations--Continued

Map symbol and soil name	Cropland management considerations
127A:	
Sverdrup	Excessive permeability Limited available water capacity Potential for ground-water contamination Wind erosion
127B, 127C:	
Sverdrup	Excessive permeability Limited available water capacity Potential for ground-water contamination Potential for surface-water contamination Water erosion Wind erosion
141B, 141C:	
Egeland	Potential for surface-water contamination Water erosion Wind erosion
141D:	
Egeland	Potential for surface-water contamination Slope Water erosion Wind erosion
168B:	
Forman	Potential for surface-water contamination Potential poor tilth and compaction Water erosion
180:	
Gonvick	Potential for ground-water contamination
184:	
Hamerly	Lime content Potential for ground-water contamination Potential for surface-water contamination Water table Wind erosion
187:	
Haug	High organic matter content Ponding Potential for ground-water contamination Potential for surface-water contamination Water table Wind erosion
191:	
Epoufette	Excessive permeability Limited available water capacity Potential for ground-water contamination Water table Wind erosion
202:	
Meehan	Excessive permeability Limited available water capacity Potential for ground-water contamination Water table Wind erosion

Cropland Management Considerations--Continued

Map symbol and soil name	Cropland management considerations
258A, 258B:	
Sandberg	Excessive permeability Limited available water capacity Potential for ground-water contamination Wind erosion
258C:	
Sandberg	Excessive permeability Limited available water capacity Potential for ground-water contamination Potential for surface-water contamination Water erosion Wind erosion
260:	
Duelm	Excessive permeability Limited available water capacity Potential for ground-water contamination Wind erosion
267B, 267C:	
Snellman	Potential for surface-water contamination Water erosion Wind erosion
267E, 267F:	
Snellman	Potential for surface-water contamination Slope Water erosion Wind erosion
290:	
Rothsay	No major limitations or hazards
293B:	
Swenoda	Potential for ground-water contamination Water erosion Wind erosion
335:	
Urness	High organic matter content Lime content Ponding Potential for ground-water contamination Potential for surface-water contamination Water table Wind erosion
339:	
Fordville	Excessive permeability Potential for ground-water contamination
341A:	
Arvilla	Excessive permeability Limited available water capacity Potential for ground-water contamination Wind erosion

Cropland Management Considerations--Continued

Map symbol and soil name	Cropland management considerations
341B:	
Arvilla	Excessive permeability Limited available water capacity Potential for ground-water contamination Potential for surface-water contamination Water erosion Wind erosion
371:	
Clontarf	Excessive permeability Potential for ground-water contamination Wind erosion
375:	
Forada	Excessive permeability Potential for ground-water contamination Water table
402C:	
Sioux	Excessive permeability Limited available water capacity Limited organic matter content Potential for ground-water contamination Potential for surface-water contamination Wind erosion
402E:	
Sioux	Excessive permeability Limited available water capacity Limited organic matter content Potential for ground-water contamination Potential for surface-water contamination Slope Water erosion Wind erosion
406A:	
Dorset	Excessive permeability Limited available water capacity Potential for ground-water contamination Wind erosion
406B:	
Dorset	Excessive permeability Limited available water capacity Potential for ground-water contamination Potential for surface-water contamination Water erosion Wind erosion
418:	
Lamoure	Flooding Lime content Potential for ground-water contamination Potential for surface-water contamination Potential poor tilth and compaction Water table Wind erosion

Cropland Management Considerations--Continued

Map symbol and soil name	Cropland management considerations
422B, 422C:	
Bygland	Potential for ground-water contamination Potential for surface-water contamination Potential poor tilth and compaction Water erosion
426:	
Foldahl	Excessive permeability Potential for ground-water contamination Wind erosion
441A:	
Almora	Excessive permeability Potential for ground-water contamination
441B, 441C:	
Almora	Excessive permeability Potential for ground-water contamination Potential for surface-water contamination Water erosion
481:	
Kratka	Excessive permeability Potential for ground-water contamination Water table Wind erosion
494:	
Darnen	Potential for ground-water contamination
497:	
Hantho	Potential for ground-water contamination
508:	
Wyndmere	Potential for ground-water contamination Potential for surface-water contamination Water table Wind erosion
540:	
Seelyeville	High organic matter content Ponding Potential for ground-water contamination Potential for surface-water contamination Water table Wind erosion
541:	
Rifle	High organic matter content Ponding Potential for ground-water contamination Potential for surface-water contamination Water table
544:	
Cathro	High organic matter content Ponding Potential for ground-water contamination Potential for surface-water contamination Water table Wind erosion

Cropland Management Considerations--Continued

Map symbol and soil name	Cropland management considerations
567A:	
Verndale	Excessive permeability Limited available water capacity Potential for ground-water contamination Wind erosion
567B:	
Verndale	Excessive permeability Limited available water capacity Potential for ground-water contamination Potential for surface-water contamination Water erosion Wind erosion
609B:	
Dickey	Excessive permeability Potential for ground-water contamination Potential for surface-water contamination Wind erosion
624:	
Rosy	Limited organic matter content Potential for ground-water contamination Wind erosion
646C:	
Peever	Potential for surface-water contamination Potential poor tilth and compaction Water erosion
646D:	
Peever	Potential for surface-water contamination Potential poor tilth and compaction Slope Water erosion
670:	
Knute	Potential for ground-water contamination Wind erosion
680:	
Parnell	Potential for ground-water contamination Water table
698:	
Doran	Potential for ground-water contamination Potential poor tilth and compaction
701:	
Runeberg	Ponding Potential for ground-water contamination Potential for surface-water contamination Water table
705B:	
Nitche	Excessive permeability Limited available water capacity Potential for ground-water contamination Potential for surface-water contamination Water erosion Wind erosion

Cropland Management Considerations--Continued

Map symbol and soil name	Cropland management considerations
705B:	
Kandota	Potential for surface-water contamination Water erosion Wind erosion
Lida	Excessive permeability Limited available water capacity Potential for ground-water contamination Water erosion Wind erosion
705C:	
Nitche	Excessive permeability Potential for ground-water contamination Potential for surface-water contamination Water erosion Wind erosion
Kandota	Potential for surface-water contamination Water erosion Wind erosion
Lida	Excessive permeability Limited available water capacity Potential for ground-water contamination Water erosion Wind erosion
707B:	
Lizzie	Potential for surface-water contamination Water erosion
707C2:	
Lizzie	Potential for surface-water contamination Previously eroded Water erosion
707D2:	
Lizzie	Potential for surface-water contamination Previously eroded Slope Water erosion
710:	
Friberg	Potential for ground-water contamination Water table
Weetown	Potential for ground-water contamination Wind erosion
711B:	
Arvilla	Excessive permeability Limited available water capacity Potential for ground-water contamination Potential for surface-water contamination Water erosion Wind erosion
Sandberg	Excessive permeability Limited available water capacity Potential for ground-water contamination Water erosion Wind erosion

Cropland Management Considerations--Continued

Map symbol and soil name	Cropland management considerations
711C:	
Arvilla	Excessive permeability Limited available water capacity Potential for ground-water contamination Potential for surface-water contamination Water erosion Wind erosion
Sandberg	Excessive permeability Limited available water capacity Potential for ground-water contamination Potential for surface-water contamination Water erosion Wind erosion
715:	
Bluffcreek	Excessive permeability Limited available water capacity Potential for ground-water contamination Wind erosion
Clearriver	Excessive permeability Limited available water capacity Limited organic matter content Potential for ground-water contamination Wind erosion
716B:	
Leaflake	Excessive permeability Potential for ground-water contamination Potential for surface-water contamination Wind erosion
Eagleview	Excessive permeability Limited available water capacity Limited organic matter content Potential for ground-water contamination Wind erosion
716C:	
Leaflake	Excessive permeability Potential for ground-water contamination Potential for surface-water contamination Water erosion Wind erosion
Eagleview	Excessive permeability Limited available water capacity Limited organic matter content Potential for ground-water contamination Potential for surface-water contamination Water erosion Wind erosion
716D:	
Leaflake	Excessive permeability Potential for ground-water contamination Potential for surface-water contamination Slope Water erosion Wind erosion

Cropland Management Considerations--Continued

Map symbol and soil name	Cropland management considerations
716D:	
Eagleview	Excessive permeability Limited available water capacity Limited organic matter content Potential for ground-water contamination Potential for surface-water contamination Slope Water erosion Wind erosion
718E:	
Naytahwaush	Potential for surface-water contamination Slope Water erosion
721B:	
Corliss	Excessive permeability Limited available water capacity Potential for ground-water contamination Wind erosion
721C:	
Corliss	Excessive permeability Limited available water capacity Potential for ground-water contamination Potential for surface-water contamination Water erosion Wind erosion
721D, 721E:	
Corliss	Excessive permeability Limited available water capacity Potential for ground-water contamination Potential for surface-water contamination Slope Water erosion Wind erosion
726:	
Kratka	Excessive permeability Ponding Potential for ground-water contamination Potential for surface-water contamination Water table Wind erosion
746:	
Haslie	High organic matter content Ponding Potential for ground-water contamination Potential for surface-water contamination Water table Wind erosion
760C2:	
Chapett	Potential for surface-water contamination Previously eroded Water erosion
Sisseton	Lime content Potential for surface-water contamination Previously eroded Water erosion Wind erosion

Cropland Management Considerations--Continued

Map symbol and soil name	Cropland management considerations
760D2:	
Chapett	Potential for surface-water contamination Previously eroded Slope Water erosion
Sisseton	Lime content Potential for surface-water contamination Previously eroded Slope Water erosion Wind erosion
769B:	
Mehurin	Potential for ground-water contamination Potential for surface-water contamination Potential poor tilth and compaction Water erosion
776B, 776C:	
Snellman	Potential for surface-water contamination Water erosion Wind erosion
Sugarbush	Excessive permeability Limited available water capacity Limited organic matter content Potential for ground-water contamination Potential for surface-water contamination Water erosion Wind erosion
776E:	
Snellman	Potential for surface-water contamination Slope Water erosion Wind erosion
Sugarbush	Excessive permeability Limited available water capacity Limited organic matter content Potential for ground-water contamination Potential for surface-water contamination Slope Water erosion Wind erosion
777C2:	
Sisseton	Lime content Potential for surface-water contamination Previously eroded Water erosion Wind erosion
Heimdal	Potential for surface-water contamination Previously eroded Water erosion

Cropland Management Considerations--Continued

Map symbol and soil name	Cropland management considerations
777D2:	
Sisseton	Lime content Potential for surface-water contamination Previously eroded Slope Water erosion Wind erosion
Heimdal	Potential for surface-water contamination Previously eroded Slope Water erosion
777E:	
Sisseton	Lime content Potential for surface-water contamination Slope Water erosion Wind erosion
Heimdal	Potential for surface-water contamination Slope Water erosion
778B:	
Dorset	Excessive permeability Limited available water capacity Potential for ground-water contamination Potential for surface-water contamination Water erosion Wind erosion
Corliss	Excessive permeability Limited available water capacity Potential for ground-water contamination Wind erosion
778C:	
Dorset	Excessive permeability Limited available water capacity Potential for ground-water contamination Potential for surface-water contamination Water erosion Wind erosion
Corliss	Excessive permeability Limited available water capacity Potential for ground-water contamination Potential for surface-water contamination Water erosion Wind erosion
779B:	
Peever	Potential for surface-water contamination Potential poor tilth and compaction Water erosion
Mehurin	Potential for ground-water contamination Potential for surface-water contamination Potential poor tilth and compaction Water erosion

Cropland Management Considerations--Continued

Map symbol and soil name	Cropland management considerations
902B:	
Barnes	Potential for surface-water contamination Water erosion
Buse	Lime content Potential for surface-water contamination Water erosion Wind erosion
903C2:	
Barnes	Potential for surface-water contamination Previously eroded Water erosion
Langhei	Lime content Potential for surface-water contamination Previously eroded Water erosion Wind erosion
915C2:	
Forman	Potential for surface-water contamination Potential poor tilth and compaction Previously eroded Water erosion
Buse	Lime content Potential for surface-water contamination Previously eroded Water erosion Wind erosion
915D2:	
Forman	Potential for surface-water contamination Potential poor tilth and compaction Previously eroded Slope Water erosion
Buse	Lime content Potential for surface-water contamination Previously eroded Slope Water erosion Wind erosion
931C2:	
Formdale	Potential for surface-water contamination Potential poor tilth and compaction Previously eroded Water erosion
Langhei	Lime content Potential for surface-water contamination Potential poor tilth and compaction Previously eroded Water erosion Wind erosion

Cropland Management Considerations--Continued

Map symbol and soil name	Cropland management considerations
931D2:	
Formdale	Potential for surface-water contamination Potential poor tilth and compaction Previously eroded Slope Water erosion
Langhei	Lime content Potential for surface-water contamination Potential poor tilth and compaction Previously eroded Slope Water erosion Wind erosion
942D2:	
Langhei	Lime content Potential for surface-water contamination Previously eroded Slope Water erosion Wind erosion
Barnes	Potential for surface-water contamination Previously eroded Slope Water erosion
957B2:	
Rothsay	Potential for surface-water contamination Previously eroded Water erosion
Zell	Lime content Potential for surface-water contamination Previously eroded Water erosion Wind erosion
969C2:	
Zell	Lime content Potential for surface-water contamination Previously eroded Water erosion Wind erosion
Rothsay	Potential for surface-water contamination Previously eroded Water erosion
969D2:	
Zell	Lime content Potential for surface-water contamination Previously eroded Slope Water erosion Wind erosion
Rothsay	Potential for surface-water contamination Previously eroded Slope Water erosion

Cropland Management Considerations--Continued

Map symbol and soil name	Cropland management considerations
1015:	
Udipsamments	Excessive permeability Limited available water capacity Potential for ground-water contamination Potential for surface-water contamination Wind erosion
1016:	
Udorthents	Limited available water capacity Slope Water erosion Wind erosion
1027:	
Udorthents	Potential for ground-water contamination
1030:	
Pits	Nonsoil material
Udipsamments	Excessive permeability Limited available water capacity Potential for ground-water contamination Potential for surface-water contamination Slope Wind erosion
1077:	
Forada	Excessive permeability Ponding Potential for ground-water contamination Potential for surface-water contamination Water table
Leafriver	Excessive permeability High organic matter content Ponding Potential for ground-water contamination Potential for surface-water contamination Water table Wind erosion
1102B:	
Chapett	Potential for surface-water contamination Water erosion
Dorset	Excessive permeability Limited available water capacity Potential for ground-water contamination Potential for surface-water contamination Water erosion Wind erosion
1102C:	
Chapett	Potential for surface-water contamination Previously eroded Water erosion
Dorset	Excessive permeability Limited available water capacity Potential for ground-water contamination Potential for surface-water contamination Previously eroded Water erosion Wind erosion

Cropland Management Considerations--Continued

Map symbol and soil name	Cropland management considerations
1103:	
Clitherall	Excessive permeability Potential for ground-water contamination Wind erosion
1104B:	
Waukon	Potential for surface-water contamination Water erosion
Dorset	Excessive permeability Limited available water capacity Potential for ground-water contamination Potential for surface-water contamination Water erosion Wind erosion
1104C:	
Waukon	Potential for surface-water contamination Previously eroded Water erosion
Dorset	Excessive permeability Limited available water capacity Potential for ground-water contamination Potential for surface-water contamination Previously eroded Water erosion Wind erosion
1104D:	
Waukon	Potential for surface-water contamination Previously eroded Slope Water erosion
Dorset	Excessive permeability Limited available water capacity Potential for ground-water contamination Potential for surface-water contamination Previously eroded Slope Water erosion Wind erosion
1105B:	
Dent	Potential for ground-water contamination Potential for surface-water contamination Water erosion
1110:	
Isan	Excessive permeability Limited available water capacity Potential for ground-water contamination Water table Wind erosion

Cropland Management Considerations--Continued

Map symbol and soil name	Cropland management considerations
1111:	
Nidaros	Excessive permeability Flooding High organic matter content Ponding Potential for ground-water contamination Potential for surface-water contamination Water table Wind erosion
1112D:	
Chapett	Potential for surface-water contamination Previously eroded Slope Water erosion
Corliss	Excessive permeability Limited available water capacity Potential for ground-water contamination Potential for surface-water contamination Previously eroded Slope Water erosion Wind erosion
1112E:	
Chapett	Potential for surface-water contamination Slope Water erosion
Corliss	Excessive permeability Limited available water capacity Potential for ground-water contamination Potential for surface-water contamination Slope Water erosion Wind erosion
1113:	
Haslie	High organic matter content Ponding Potential for ground-water contamination Potential for surface-water contamination Water table
Seelyeville	High organic matter content Ponding Potential for ground-water contamination Potential for surface-water contamination Water table
Cathro	High organic matter content Ponding Potential for ground-water contamination Potential for surface-water contamination Water table
1114:	
Hangaard	Excessive permeability Limited available water capacity Potential for ground-water contamination Water table Wind erosion

Cropland Management Considerations--Continued

Map symbol and soil name	Cropland management considerations
1120:	
Rushlake	Excessive permeability Limited available water capacity Potential for ground-water contamination Wind erosion
Hangaard	Excessive permeability Limited available water capacity Potential for ground-water contamination Water table Wind erosion
1129:	
Lindaas	Potential for ground-water contamination Potential poor tilth and compaction Water table
1131B:	
Verndale	Excessive permeability Limited available water capacity Potential for ground-water contamination Potential for surface-water contamination Water erosion Wind erosion
Abbeylake	Excessive permeability Limited available water capacity Potential for ground-water contamination Wind erosion
1136:	
Nidaros	Excessive permeability High organic matter content Ponding Potential for ground-water contamination Potential for surface-water contamination Water table Wind erosion
1149:	
Hamerly	Lime content Potential for ground-water contamination Potential poor tilth and compaction Water table Wind erosion
1195A:	
Sybil	Excessive permeability Limited available water capacity Potential for ground-water contamination Wind erosion
Eagleview	Excessive permeability Limited available water capacity Limited organic matter content Potential for ground-water contamination Wind erosion
1195B:	
Sybil	Excessive permeability Limited available water capacity Potential for ground-water contamination Potential for surface-water contamination Wind erosion

Cropland Management Considerations--Continued

Map symbol and soil name	Cropland management considerations
1195B:	
Eagleview	Excessive permeability Limited available water capacity Limited organic matter content Potential for ground-water contamination Potential for surface-water contamination Wind erosion
1195C:	
Sybil	Excessive permeability Limited available water capacity Potential for ground-water contamination Potential for surface-water contamination Water erosion Wind erosion
Eagleview	Excessive permeability Limited available water capacity Limited organic matter content Potential for ground-water contamination Potential for surface-water contamination Water erosion Wind erosion
1195E:	
Sybil	Excessive permeability Potential for ground-water contamination Potential for surface-water contamination Slope Water erosion Wind erosion
Eagleview	Excessive permeability Limited available water capacity Limited organic matter content Potential for ground-water contamination Potential for surface-water contamination Slope Water erosion Wind erosion
1196B, 1196C:	
Lida	Excessive permeability Limited available water capacity Potential for ground-water contamination Water erosion Wind erosion
Two Inlets	Excessive permeability Limited available water capacity Limited organic matter content Potential for ground-water contamination Potential for surface-water contamination Water erosion Wind erosion

Cropland Management Considerations--Continued

Map symbol and soil name	Cropland management considerations
1196E, 1196F:	
Lida	Excessive permeability Limited available water capacity Potential for ground-water contamination Slope Water erosion Wind erosion
Two Inlets	Excessive permeability Limited available water capacity Limited organic matter content Potential for ground-water contamination Potential for surface-water contamination Slope Water erosion Wind erosion
1200:	
Egglake	Potential for ground-water contamination Water table
1208B:	
Naytahwaush	Potential for surface-water contamination Potential poor tilth and compaction Water erosion
Mahkonce	Potential for ground-water contamination Potential for surface-water contamination Water erosion
1209C:	
Naytahwaush	Potential for surface-water contamination Potential poor tilth and compaction Previously eroded Water erosion
1212B:	
Mahkonce	Potential for ground-water contamination Potential for surface-water contamination Water erosion
1214:	
Mustinka	Potential for ground-water contamination Potential poor tilth and compaction Water table
1215:	
Pinelake	Excessive permeability Limited available water capacity Potential for ground-water contamination Water table Wind erosion
1216B:	
Egglake	Potential for ground-water contamination Water table Wind erosion
Wykeham	Potential for ground-water contamination Potential for surface-water contamination Water erosion Wind erosion

Cropland Management Considerations--Continued

Map symbol and soil name	Cropland management considerations
1217E:	
Waukon	Potential for surface-water contamination Slope Water erosion
Lida	Excessive permeability Limited available water capacity Potential for ground-water contamination Slope Water erosion Wind erosion
1218B, 1218C:	
Snellman	Potential for surface-water contamination Water erosion Wind erosion
Lida	Excessive permeability Limited available water capacity Potential for ground-water contamination Water erosion Wind erosion
1218E, 1218F:	
Snellman	Potential for surface-water contamination Slope Water erosion Wind erosion
Lida	Excessive permeability Limited available water capacity Potential for ground-water contamination Slope Water erosion Wind erosion
1219C:	
Sandberg	Excessive permeability Limited available water capacity Potential for ground-water contamination Potential for surface-water contamination Water erosion Wind erosion
Sverdrup	Excessive permeability Limited available water capacity Potential for ground-water contamination Potential for surface-water contamination Water erosion Wind erosion
1221B:	
Sverdrup	Excessive permeability Limited available water capacity Potential for ground-water contamination Potential for surface-water contamination Water erosion Wind erosion
Sandberg	Excessive permeability Limited available water capacity Potential for ground-water contamination Water erosion Wind erosion

Cropland Management Considerations--Continued

Map symbol and soil name	Cropland management considerations
1223D:	
Sandberg	Excessive permeability Limited available water capacity Potential for ground-water contamination Potential for surface-water contamination Slope Water erosion Wind erosion
Arvilla	Excessive permeability Limited available water capacity Potential for ground-water contamination Potential for surface-water contamination Slope Water erosion Wind erosion
1227:	
Quam	Ponding Potential for ground-water contamination Potential for surface-water contamination Water table
Cathro	High organic matter content Ponding Potential for ground-water contamination Potential for surface-water contamination Water table
Urness	High organic matter content Lime content Ponding Potential for ground-water contamination Potential for surface-water contamination Water table
1230:	
Haslie	High organic matter content Ponding Potential for ground-water contamination Potential for surface-water contamination Water table
Nidaros	Excessive permeability High organic matter content Ponding Potential for ground-water contamination Potential for surface-water contamination Water table
1232B:	
Chapett	Potential for surface-water contamination Water erosion
1232E:	
Chapett	Potential for surface-water contamination Slope Water erosion

Cropland Management Considerations--Continued

Map symbol and soil name	Cropland management considerations
1234B:	
Formdale	Potential for surface-water contamination Potential poor tilth and compaction Water erosion
Buse	Lime content Potential for surface-water contamination Potential poor tilth and compaction Water erosion Wind erosion
1237:	
Lakepark	Potential for ground-water contamination Water table
1239:	
Quam	Ponding Potential for ground-water contamination Potential for surface-water contamination Water table
1240:	
Roliss	Lime content Potential for ground-water contamination Potential poor tilth and compaction Water table Wind erosion
1247D:	
Corliss	Excessive permeability Limited available water capacity Potential for ground-water contamination Potential for surface-water contamination Slope Water erosion Wind erosion
Dorset	Excessive permeability Limited available water capacity Potential for ground-water contamination Potential for surface-water contamination Slope Water erosion Wind erosion
1250C:	
Abbeylake	Excessive permeability Limited available water capacity Potential for ground-water contamination Potential for surface-water contamination Water erosion Wind erosion
Verndale	Excessive permeability Limited available water capacity Potential for ground-water contamination Potential for surface-water contamination Water erosion Wind erosion

Cropland Management Considerations--Continued

Map symbol and soil name	Cropland management considerations
1259:	
Hamerly	Lime content Potential for ground-water contamination Potential poor tilth and compaction Water table Wind erosion
Mustinka	Potential for ground-water contamination Potential poor tilth and compaction Water table
1275B, 1275C:	
Kandota	Potential for surface-water contamination Water erosion Wind erosion
Egglake	Ponding Potential for ground-water contamination Potential for surface-water contamination Water table
1276:	
Knute	Potential for ground-water contamination Wind erosion
Brandsvold	Potential for ground-water contamination Water table Wind erosion
1277D:	
Corliss	Excessive permeability Limited available water capacity Potential for ground-water contamination Potential for surface-water contamination Slope Water erosion Wind erosion
Sverdrup	Excessive permeability Limited available water capacity Potential for ground-water contamination Potential for surface-water contamination Slope Water erosion Wind erosion
1289:	
Knute	Potential for ground-water contamination Wind erosion
1290:	
Brandsvold	Potential for ground-water contamination Water table Wind erosion
1291:	
Sedgeville	Excessive permeability Flooding Ponding Potential for ground-water contamination Potential for surface-water contamination Water table

Cropland Management Considerations--Continued

Map symbol and soil name	Cropland management considerations
1293:	
Sedgeville	Excessive permeability Potential for ground-water contamination Water table
1304A:	
Glyndon	Lime content Potential for ground-water contamination Water table Wind erosion
1307:	
Rushlake	Excessive permeability Limited available water capacity Potential for ground-water contamination Wind erosion
1317:	
Vallers	Lime content Potential for ground-water contamination Potential poor tilth and compaction Water table Wind erosion
1319B:	
Rockwood	Dense layer Potential for surface-water contamination Restricted permeability Surface stones Water erosion Wind erosion
1319C:	
Rockwood	Dense layer Limited available water capacity Potential for surface-water contamination Restricted permeability Surface stones Water erosion Wind erosion
1319D:	
Rockwood	Dense layer Potential for surface-water contamination Restricted permeability Slope Surface stones Water erosion Wind erosion
1320B:	
Blowers	Dense layer Potential for ground-water contamination Potential for surface-water contamination Restricted permeability Surface stones Water erosion Wind erosion

Cropland Management Considerations--Continued

Map symbol and soil name	Cropland management considerations
1321:	
Paddock	Dense layer Potential for ground-water contamination Restricted permeability Surface stones Water table Wind erosion
Becida	Dense layer Limited available water capacity Potential for ground-water contamination Restricted permeability Surface stones Water table
1322:	
Wolverton	Lime content Potential for ground-water contamination Wind erosion
1324B:	
Heimdal	Potential for surface-water contamination Water erosion
Sisseton	Lime content Potential for surface-water contamination Water erosion Wind erosion
1338:	
Oakcreek	Excessive permeability Potential for ground-water contamination
1339:	
Borup	Lime content Ponding Potential for ground-water contamination Potential for surface-water contamination Water table Wind erosion
1340:	
Bluffcreek	Excessive permeability Limited available water capacity Potential for ground-water contamination Wind erosion
Epoufette	Excessive permeability Limited available water capacity Potential for ground-water contamination Water table Wind erosion
1341:	
Clitherall	Excessive permeability Potential for ground-water contamination Wind erosion
Wykeham	Potential for ground-water contamination Wind erosion

Cropland Management Considerations--Continued

Map symbol and soil name	Cropland management considerations
1342:	
Pinelake	Excessive permeability Potential for ground-water contamination Water table Wind erosion
Brandsvold	Potential for ground-water contamination Water table Wind erosion
1343C:	
Lida	Excessive permeability Limited available water capacity Potential for ground-water contamination Water erosion Wind erosion
Almora	Excessive permeability Limited available water capacity Potential for ground-water contamination Potential for surface-water contamination Water erosion Wind erosion
Lizzie	Potential for surface-water contamination Water erosion Wind erosion
1344B:	
Lida	Excessive permeability Limited available water capacity Potential for ground-water contamination Water erosion Wind erosion
Almora	Excessive permeability Potential for ground-water contamination Potential for surface-water contamination Water erosion Wind erosion
Dent	Potential for ground-water contamination Potential for surface-water contamination Water erosion Wind erosion
1345:	
Bluffcreek	Excessive permeability Potential for ground-water contamination Wind erosion
Rosy	Limited organic matter content Potential for ground-water contamination Wind erosion
1346:	
Nidaros	Excessive permeability High organic matter content Lime content Ponding Potential for ground-water contamination Potential for surface-water contamination Water table Wind erosion

Cropland Management Considerations--Continued

Map symbol and soil name	Cropland management considerations
1347B:	
Kandota	Potential for surface-water contamination Water erosion
1348:	
Knute	Potential for ground-water contamination
1349:	
Clotho	Lime content Potential for ground-water contamination Water table Wind erosion
1350:	
Brandsvold	Potential for ground-water contamination Water table
1351:	
Bluffton	Ponding Potential for ground-water contamination Potential for surface-water contamination Water table
1365:	
Hillview	Potential for ground-water contamination Water table Wind erosion
1396:	
Sedgeville	Channeled Excessive permeability Flooding Ponding Potential for ground-water contamination Potential for surface-water contamination Water table
Nidaros	Channeled Excessive permeability High organic matter content Ponding Potential for ground-water contamination Potential for surface-water contamination Water table Wind erosion
Aquolls	Channeled Ponding Potential for ground-water contamination Potential for surface-water contamination Water table Wind erosion
1397:	
Bemidji	Excessive permeability Potential for ground-water contamination Wind erosion

Cropland Management Considerations--Continued

Map symbol and soil name	Cropland management considerations
1825B:	
Seelyeville	High organic matter content Potential for ground-water contamination Potential for surface-water contamination Water erosion Water table
1874:	
Radium	Excessive permeability Limited available water capacity Potential for ground-water contamination Wind erosion
1943:	
Roscommon	Excessive permeability Limited available water capacity Potential for ground-water contamination Water table Wind erosion
1975:	
Oylen	Excessive permeability Limited available water capacity Potential for ground-water contamination Potential for surface-water contamination Wind erosion

Land Capability and Yields per Acre of Crops and Pasture

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

Map symbol and soil name	Land capability	Alfalfa hay	Corn	Corn silage	Kentucky bluegrass	Soybeans	Spring wheat	Oats
		Tons	Bu	Tons	AUM*	Bu	Bu	Bu
7A---------- Hubbard	4s	3.0	55	12.0	1.5	21	24	48
7B---------- Hubbard	4s	2.5	45	11.0	1.5	17	20	39
7C---------- Hubbard	6s	1.5	35	10.0	1.0	13	15	30
26---------- Aazdahl	1	5.7	130	17.0	3.0	45	50	85
34---------- Parnell	3w	5.2	90	15.0	3.5	31	35	59
38B---------- Waukon	2e	5.6	115	16.0	3.0	40	45	75
38C2---------- Waukon	3e	5.5	100	15.0	2.8	35	39	65
38D2---------- Waukon	4e	4.2	75	14.0	2.0	26	29	49
38E---------- Waukon	7e	2.0	---	---	1.5	---	---	---
46---------- Borup	2w	4.5	85	14.0	4.0	29	33	56
53B---------- Kandota	2e	5.5	95	15.0	3.0	35	39	75
53C---------- Kandota	3e	4.5	80	14.0	2.8	29	33	63
53D---------- Kandota	4e	4.0	70	13.0	2.0	25	29	55
58---------- Kittson	1	5.7	120	17.0	3.3	42	45	78

See footnote at end of table.

Land Capability and Yields per Acre of Crops and Pasture--Continued

Map symbol and soil name	Land capability	Alfalfa hay	Corn	Corn silage	Kentucky bluegrass	Soybeans	Spring wheat	Oats
		Tons	Bu	Tons	AUM*	Bu	Bu	Bu
59---------- Grimstad	2s	5.0	85	14.0	3.0	29	33	56
61---------- Arveson	3w	4.0	85	14.0	3.8	28	33	66
63---------- Rockwell	2w	5.2	90	15.0	3.8	31	35	59
65---------- Foxhome	3s	4.5	80	14.0	3.0	28	31	52
66---------- Flaming	4s	3.5	60	13.0	2.0	23	26	53
68---------- Arveson	6w	---	---	---	3.5	---	---	---
107---------- Winger	2w	5.5	105	16.0	3.8	36	40	69
108---------- McIntosh	2s	5.6	110	16.0	3.3	38	42	72
121---------- Wykeham	1	5.5	95	15.0	3.3	35	39	75
127A---------- Sverdrup	3s	4.0	70	13.0	2.0	26	31	61
127B---------- Sverdrup	3e	3.5	65	13.0	2.0	24	29	57
127C---------- Sverdrup	4e	3.0	50	12.0	1.5	19	22	44
141B---------- Egeland	3e	4.5	80	14.0	2.0	30	35	70
141C---------- Egeland	4e	4.0	70	13.0	1.8	26	31	61
141D---------- Egeland	6e	3.0	55	12.0	1.5	21	21	48

See footnote at end of table.

Land Capability and Yields per Acre of Crops and Pasture--Continued

Map symbol and soil name	Land capability	Alfalfa hay	Corn	Corn silage	Kentucky bluegrass	Soybeans	Spring wheat	Oats
		Tons	Bu	Tons	AUM*	Bu	Bu	Bu
168B---------- Forman	2e	5.6	115	16.0	3.0	40	45	75
180---------- Gonvick	1	5.7	120	17.0	3.3	42	46	78
184---------- Hamerly	2s	5.6	110	16.0	3.3	38	42	72
187---------- Haug	3w	---	---	---	3.5	---	---	---
191---------- Epoufette	4w	3.0	65	13.0	3.8	24	29	57
202---------- Meehan	4w	3.0	60	13.0	2.5	20	25	50
258A---------- Sandberg	4s	3.0	55	12.0	1.5	21	24	48
258B---------- Sandberg	4s	2.5	45	11.0	1.5	17	20	39
258C---------- Sandberg	6s	1.5	35	10.0	1.0	13	15	30
260---------- Duelm	4s	3.0	60	13.0	2.0	23	25	50
267B---------- Snellman	2e	5.2	90	15.0	3.0	33	37	71
267C---------- Snellman	3e	4.2	75	14.0	2.8	27	31	59
267E---------- Snellman	6e	3.0	50	11.0	1.5	---	21	40
267F---------- Snellman	7e	---	---	---	1.0	---	---	---
290---------- Rothsay	2e	5.6	115	16.0	3.0	40	45	75

See footnote at end of table.

Land Capability and Yields per Acre of Crops and Pasture--Continued

Map symbol and soil name	Land capability	Alfalfa hay	Corn	Corn silage	Kentucky bluegrass	Soybeans	Spring wheat	Oats
		Tons	Bu	Tons	AUM*	Bu	Bu	Bu
293B---------- Swenoda	2e	5.5	95	15.0	3.0	33	37	62
335---------- Urness	3w	4.2	75	14.0	3.5	22	29	49
339---------- Fordville	2s	4.2	75	14.0	2.8	28	33	66
341A---------- Arvilla	3s	4.0	70	13.0	2.0	26	31	61
341B---------- Arvilla	4s	3.5	65	13.0	2.0	24	29	57
371---------- Clontarf	3s	4.5	80	14.0	2.8	30	35	70
375---------- Forada	2w	3.5	75	14.0	3.8	28	33	66
402C---------- Sioux	6s	1.0	25	8.0	1.0	9	11	20
402E---------- Sioux	7s	---	---	---	0.5	---	---	---
406A---------- Dorset	3s	4.0	70	13.0	2.0	26	31	61
406B---------- Dorset	3s	3.5	65	13.0	2.0	24	29	57
418---------- Lamoure	2w	4.5	80	14.0	4.0	28	31	52
422B---------- Bygland	2e	5.5	105	16.0	3.3	36	40	69
422C---------- Bygland	3e	5.5	95	14.0	2.8	33	37	62
426---------- Foldahl	3s	5.0	85	14.0	3.0	29	33	56

See footnote at end of table.

Land Capability and Yields per Acre of Crops and Pasture--Continued

Map symbol and soil name	Land capability	Alfalfa hay	Corn	Corn silage	Kentucky bluegrass	Soybeans	Spring wheat	Oats
		Tons	Bu	Tons	AUM*	Bu	Bu	Bu
441A---------- Almora	2s	4.2	75	14.0	2.8	28	33	66
441B---------- Almora	2e	4.0	70	13.0	2.0	26	31	61
441C---------- Almora	3e	3.5	60	13.0	2.0	23	26	53
481---------- Kratka	3w	3.5	80	14.0	4.0	30	35	70
494---------- Darnen	1	5.9	115	16.0	3.3	40	45	75
497---------- Hantho	1	5.7	120	17.0	3.3	42	46	78
508---------- Wyndmere	2s	5.5	100	15.0	3.3	35	39	65
540---------- Seelyeville	6w	---	---	---	---	---	---	---
541---------- Rifle	6w	---	---	---	---	---	---	---
544---------- Cathro	6w	---	---	---	---	---	---	---
567A---------- Verndale	3s	4.0	70	13.0	2.0	26	31	61
567B---------- Verndale	3s	3.5	65	13.0	2.0	24	29	57
609B---------- Dickey	3e	4.2	75	14.0	2.0	26	29	49
624---------- Rosy	1	4.2	75	14.0	3.3	28	33	66
646C---------- Peever	3e	5.2	90	15.0	2.8	31	35	59

See footnote at end of table.

Land Capability and Yields per Acre of Crops and Pasture--Continued

Map symbol and soil name	Land capability	Alfalfa hay	Corn	Corn silage	Kentucky bluegrass	Soybeans	Spring wheat	Oats
		Tons	Bu	Tons	AUM*	Bu	Bu	Bu
646D---------- Peever	4e	4.0	75	14.0	1.5	26	29	49
670---------- Knute	1	5.6	110	16.0	3.3	38	42	72
680---------- Parnell	2w	4.0	100	15.0	4.0	35	39	65
698---------- Doran	1	5.5	105	16.0	3.3	36	40	69
701---------- Runeberg	6w	---	---	---	3.5	---	---	---
705B----------		4.6	85	14.0	2.3	30	34	66
Nitche----------	3s							
Kandota---------	2e							
Lida----------	3s							
705C----------		3.9	70	13.0	2.2	25	29	55
Nitche----------	4e							
Kandota---------	3e							
Lida----------	4e							
707B---------- Lizzie	2e	5.5	100	14.0	3.0	36	41	76
707C2---------- Lizzie	3e	5.2	90	15.0	2.8	33	37	71
707D2---------- Lizzie	4e	4.0	70	13.0	2.0	25	29	55
710----------		4.7	100	15.0	3.7	36	41	75
Friberg---------	2w							
Weetown---------	2e							
711B---------- Arvilla-Sandberg	4s	3.2	60	12.0	1.9	22	26	52

See footnote at end of table.

Land Capability and Yields per Acre of Crops and Pasture--Continued

Map symbol and soil name	Land capability	Alfalfa hay	Corn	Corn silage	Kentucky bluegrass	Soybeans	Spring wheat	Oats
		Tons	Bu	Tons	AUM*	Bu	Bu	Bu
711C		2.3	45	11.0	1.4	16	19	38
Arvilla	4e							
Sandberg	6s							
715		3.9	65	13.0	2.3	25	29	58
Bluffcreek	3s							
Clearriver	4s							
716B		3.7	65	13.0	1.9	24	27	53
Leaflake	3s							
Eagleview	4s							
716C		3.1	55	12.0	1.5	20	23	45
Leaflake	4e							
Eagleview	4s							
716D		2.3	45	9.0	0.9	15	17	33
Leaflake	6e							
Eagleview	6s							
718E	6e	3.0	---	---	1.5	---	19	33
Naytahwaush								
721B	4s	2.5	45	11.0	1.5	17	20	39
Corliss								
721C	4s	1.5	35	10.0	1.0	13	15	30
Corliss								
721D	6e	1.0	25	8.0	0.8	9	11	20
Corliss								
721E	7e	---	---	---	0.8	---	---	---
Corliss								
726	6w	---	---	---	3.5	---	---	---
Kratka								

See footnote at end of table.

Land Capability and Yields per Acre of Crops and Pasture--Continued

Map symbol and soil name	Land capability	Alfalfa hay	Corn	Corn silage	Kentucky bluegrass	Soybeans	Spring wheat	Oats
		Tons	Bu	Tons	AUM*	Bu	Bu	Bu
746 Haslie	6w	---	---	---	---	---	---	---
760C2 Chapett Sisseton	3e 6e	5.0	85	15.0	2.7	32	36	68
760D2 Chapett Sisseton	4e 6e	3.8	65	13.0	1.9	24	27	52
769B Mehurin	2e	5.6	110	16.0	3.3	38	42	72
776B Snellman Sugarbush	2e 3s	4.6	80	14.0	2.7	30	33	65
776C Snellman Sugarbush	3e 4e	3.8	65	13.0	2.5	24	28	58
776E Snellman-Sugarbush	6e	2.4	40	10.0	1.2	4	18	34
777C2 Sisseton Heimdal	6e 3e	4.8	85	14.0	2.6	28	35	66
777D2 Sisseton Heimdal	6e 4e	3.7	65	13.0	1.9	22	26	50
777E Sisseton-Heimdal	7e	---	---	---	1.5	---	---	---

See footnote at end of table.

Land Capability and Yields per Acre of Crops and Pasture--Continued

Map symbol and soil name	Land capability	Alfalfa hay	Corn	Corn silage	Kentucky bluegrass	Soybeans	Spring wheat	Oats
		Tons	Bu	Tons	AUM*	Bu	Bu	Bu
778B		3.2	60	12.0	1.9	25	27	52
Dorset	3s							
Corliss	4s							
778C		2.4	45	11.0	1.5	17	19	38
Dorset	4e							
Corliss	4s							
779B	2e	5.5	105	16.0	3.1	36	40	68
Peever-Mehurin								
902B	2e	5.6	110	16.0	2.9	37	43	72
Barnes-Buse								
903C2		5.1	90	15.0	2.7	30	35	58
Barnes	3e							
Langhei	4e							
915C2	3e	5.3	90	15.0	2.7	30	36	60
Forman-Buse								
915D2	4e	4.1	75	14.0	1.9	24	28	48
Forman-Buse								
931C2		5.3	100	15.0	2.7	32	37	64
Formdale	3e							
Langhei	4e							
931D2		4.1	80	14.0	1.9	25	30	52
Formdale	4e							
Langhei	6e							
942D2		3.2	70	13.0	1.9	20	27	45
Langhei	6e							
Barnes	4e							

See footnote at end of table.

Land Capability and Yields per Acre of Crops and Pasture--Continued

Map symbol and soil name	Land capability	Alfalfa hay	Corn	Corn silage	Kentucky bluegrass	Soybeans	Spring wheat	Oats
		Tons	Bu	Tons	AUM*	Bu	Bu	Bu
957B2		5.6	110	16.0	3.0	36	43	73
Rothsay	2e							
Zell	3e							
969C2		5.2	90	14.0	2.6	29	36	60
Zell	6e							
Rothsay	3e							
969D2		3.7	75	13.0	1.9	23	28	48
Zell	6e							
Rothsay	4e							
1015	8s	---	---	---	---	---	---	---
Udipsamments								
1016, 1027	6s	---	---	---	---	---	---	---
Udorthents								
1030:								
Pits.								
Udipsamments	8s	---	---	---	---	---	---	---
1077	6w	---	---	---	3.5	---	---	---
Forada and Leafriver								
1102B		4.7	90	15.0	2.6	32	37	69
Chapett	2e							
Dorset	3s							
1102C		4.3	75	14.0	2.4	27	31	60
Chapett	3e							
Dorset	4e							

See footnote at end of table.

Land Capability and Yields per Acre of Crops and Pasture--Continued

Map symbol and soil name	Land capability	Alfalfa hay	Corn	Corn silage	Kentucky bluegrass	Soybeans	Spring wheat	Oats
		Tons	Bu	Tons	AUM*	Bu	Bu	Bu
1103---------- Clitherall	3s	4.5	80	14.0	2.5	29	33	63
1104B---------- Waukon----------	2e	4.8	95	15.0	2.6	34	39	68
Dorset----------	3s							
1104C---------- Waukon----------	3e	4.5	80	14.0	2.4	29	32	57
Dorset----------	4e							
1104D---------- Waukon----------	4e	3.1	55	12.0	1.5	20	23	39
Dorset----------	6e							
1105B---------- Dent	2e	5.5	100	15.0	3.3	36	41	76
1110---------- Isan	4w	3.0	60	13.0	3.8	23	26	53
1111---------- Nidaros	6w	---	---	---	---	---	---	---
1112D---------- Chapett----------	4e	2.7	50	11.0	1.5	18	21	40
Corliss---------	6e							
1112E---------- Chapett-Corliss	7e	---	---	---	1.2	---	---	---
1113---------- Haslie, Seelyeville, and Cathro	8w	---	---	---	---	---	---	---
1114---------- Hangaard	4w	---	---	---	2.5	---	---	---

See footnote at end of table.

Land Capability and Yields per Acre of Crops and Pasture--Continued

Map symbol and soil name	Land capability	Alfalfa hay	Corn	Corn silage	Kentucky bluegrass	Soybeans	Spring wheat	Oats
		Tons	Bu	Tons	AUM*	Bu	Bu	Bu
1120----------		---	---	---	2.1	---	---	---
Rushlake---------	4s							
Hangaard---------	4w							
1129----------	2w	3.5	95	15.0	4.0	33	37	62
Lindaas								
1131B----------		3.3	60	13.0	1.9	22	26	53
Verndale---------	3s							
Abbeylake--------	4s							
1136----------	6w	---	---	---	---	---	---	---
Nidaros								
1149----------	2s	5.6	115	16.0	3.3	40	45	75
Hamerly								
1195A----------		3.4	60	13.0	1.9	24	27	55
Sybil----------	3s							
Eagleview--------	4s							
1195B----------		3.1	55	12.0	1.9	21	24	49
Sybil----------	3s							
Eagleview--------	4s							
1195C----------		2.7	45	11.0	1.5	17	20	39
Sybil----------	4e							
Eagleview--------	4s							
1195E----------		1.0	25	7.0	0.8	9	12	22
Sybil----------	6e							
Eagleview--------	6s							
1196B----------		3.2	55	12.0	1.9	21	24	51
Lida----------	3s							
Two Inlets------	4s							

See footnote at end of table.

Land Capability and Yields per Acre of Crops and Pasture--Continued

Map symbol and soil name	Land capability	Alfalfa hay	Corn	Corn silage	Kentucky bluegrass	Soybeans	Spring wheat	Oats
		Tons	Bu	Tons	AUM*	Bu	Bu	Bu
1196C----------		2.7	45	11.0	1.5	17	20	40
Lida----------	4e							
Two Inlets------	4s							
1196E----------		1.3	25	7.0	0.8	9	12	22
Lida----------	6e							
Two Inlets------	6s							
1196F----------		---	---	---	0.5	---	---	---
Lida----------	7e							
Two Inlets------	7s							
1200----------	2w	3.0	80	14.0	4.0	29	33	63
Egglake								
1208B----------		5.6	105	16.0	3.1	36	40	68
Naytahwaush-----	3e							
Mahkonce--------	2s							
1209C----------	3e	5.2	90	15.0	2.8	31	35	59
Naytahwaush								
1212B----------	2s	5.6	110	16.0	3.3	38	42	72
Mahkonce								
1214----------	2w	4.5	115	16.0	4.0	40	45	75
Mustinka								
1215----------	2w	3.0	75	14.0	3.8	28	33	66
Pinelake								
1216B----------		3.9	85	14.0	3.8	31	35	67
Egglake---------	2w							
Wykeham---------	2e							
1217E----------		1.8	---	---	1.2	---	---	---
Waukon----------	7e							
Lida----------	6e							

See footnote at end of table.

Land Capability and Yields per Acre of Crops and Pasture--Continued

Map symbol and soil name	Land capability	Alfalfa hay	Corn	Corn silage	Kentucky bluegrass	Soybeans	Spring wheat	Oats
		Tons	Bu	Tons	AUM*	Bu	Bu	Bu
1218B---------- Snellman---------	2e	4.6	80	14.0	2.6	29	33	65
Lida----------	3s							
1218C---------- Snellman---------	3e	3.6	65	13.0	2.3	23	27	52
Lida----------	4e							
1218E---------- Snellman-Lida	6e	2.5	45	10.0	1.2	4	18	35
1218F---------- Snellman-Lida	7e	---	---	---	1.2	---	---	---
1219C---------- Sandberg---------	6s	2.1	40	11.0	1.3	15	18	36
Sverdrup---------	4e							
1221B---------- Sverdrup---------	3e	3.1	60	12.0	1.8	25	25	49
Sandberg---------	4s							
1223D---------- Sandberg-Arvilla	6e	1.2	25	8.0	0.9	10	12	22
1227---------- Quam, Cathro, and Urness	8w	---	---	---	---	---	---	---
1230---------- Haslie and Nidaros	8w	---	---	---	---	---	---	---
1232B---------- Chapett	2e	5.5	105	16.0	3.0	38	43	78
1232E---------- Chapett	7e	---	---	---	1.5	---	---	---

See footnote at end of table.

Land Capability and Yields per Acre of Crops and Pasture--Continued

Map symbol and soil name	Land capability	Alfalfa hay	Corn	Corn silage	Kentucky bluegrass	Soybeans	Spring wheat	Oats
		Tons	Bu	Tons	AUM*	Bu	Bu	Bu
1234B---------- Formdale-Buse	2e	5.7	120	17.0	2.9	40	46	79
1237---------- Lakepark	2w	4.0	105	16.0	4.0	36	40	69
1239---------- Quam	3w	3.5	85	14.0	4.0	29	33	56
1240---------- Roliss	2w	5.5	105	16.0	3.3	32	40	69
1247D---------- Corliss-Dorset	6e	1.2	25	8.0	0.9	10	12	22
1250C----------		2.9	40	11.0	1.3	15	18	35
Abbeylake-------	4s							
Verndale--------	4e							
1259----------		5.3	115	16.0	3.5	37	45	75
Hamerly---------	2s							
Mustinka--------	2w							
1275B----------		3.7	65	10.0	3.2	24	27	51
Kandota---------	2e							
Egglake---------	6w							
1275C----------		2.8	50	9.0	3.1	18	21	40
Kandota---------	3e							
Egglake---------	6w							
1276----------		4.6	95	15.0	3.6	34	38	72
Knute-----------	1							
Brandsvold------	2w							
1277D---------- Corliss-Sverdrup	6e	1.2	25	8.0	0.9	10	12	22

See footnote at end of table.

Land Capability and Yields per Acre of Crops and Pasture--Continued

Map symbol and soil name	Land capability	Alfalfa hay	Corn	Corn silage	Kentucky bluegrass	Soybeans	Spring wheat	Oats
		Tons	Bu	Tons	AUM*	Bu	Bu	Bu
1289---------- Knute	1	5.5	100	15.0	3.3	36	41	76
1290---------- Brandsvold	2w	3.0	80	14.0	4.0	29	33	63
1291---------- Sedgeville	6w	---	---	---	3.8	---	---	---
1293---------- Sedgeville	2w	3.0	70	13.0	3.8	26	31	61
1304A---------- Glyndon	2s	5.6	110	16.0	3.0	38	42	72
1307---------- Rushlake	4s	2.5	45	11.0	2.0	17	20	39
1317---------- Vallers	2w	5.5	100	15.0	3.3	35	39	65
1319B---------- Rockwood	2e	5.2	90	15.0	3.0	33	37	71
1319C---------- Rockwood	3e	4.0	75	14.0	2.8	25	30	59
1319D---------- Rockwood	4e	3.0	60	13.0	2.0	20	25	45
1320B---------- Blowers	2e	5.2	90	15.0	3.0	33	37	71
1321---------- Paddock-Becida	2w	4.0	80	14.0	3.7	29	33	65
1322---------- Wolverton	2s	5.2	90	15.0	3.0	31	35	59
1324B---------- Heimdal---------	2e	5.3	100	15.0	3.0	35	40	74
Sisseton--------	3e							

See footnote at end of table.

Land Capability and Yields per Acre of Crops and Pasture--Continued

Map symbol and soil name	Land capability	Alfalfa hay	Corn	Corn silage	Kentucky bluegrass	Soybeans	Spring wheat	Oats
		Tons	Bu	Tons	AUM*	Bu	Bu	Bu
1338---------- Oakcreek	2s	4.5	80	14.0	2.8	30	35	70
1339---------- Borup	6w	---	---	---	3.5	---	---	---
1340----------		3.7	70	13.0	2.9	25	30	60
Bluffcreek------	3s							
Epoufette-------	4w							
1341----------		4.9	85	14.0	2.8	31	35	67
Clitherall------	3s							
Wykeham---------	1							
1342---------- Pinelake-Brandsvold	2w	3.0	75	14.0	3.9	28	33	65
1343C----------		3.7	65	13.0	2.1	24	27	54
Lida----------	4e							
Almora----------	3e							
Lizzie----------	3e							
1344B----------		4.2	75	14.0	2.3	27	32	62
Lida----------	3s							
Almora----------	2e							
Dent----------	2e							
1345----------		4.1	70	13.0	2.8	27	32	63
Bluffcreek------	3s							
Rosy----------	1							
1346---------- Nidaros	6w	---	---	---	---	---	---	---

See footnote at end of table.

Land Capability and Yields per Acre of Crops and Pasture--Continued

Map symbol and soil name	Land capability	Alfalfa hay	Corn	Corn silage	Kentucky bluegrass	Soybeans	Spring wheat	Oats
		Tons	Bu	Tons	AUM*	Bu	Bu	Bu
1347B---------- Kandota	2e	5.5	95	15.0	3.0	35	39	75
1348---------- Knute	1	5.5	100	15.0	3.3	36	41	76
1349---------- Clotho	2w	3.0	80	14.0	4.0	25	33	63
1350---------- Brandsvold	2w	3.0	80	14.0	4.0	30	33	63
1351---------- Bluffton	6w	---	---	---	3.5	---	---	---
1365---------- Hillview	2w	3.5	75	14.0	3.8	28	33	66
1396----------		---	---	---	3.9	---	---	---
Sedgeville------	6w							
Nidaros---------	6w							
Aquolls---------	5w							
1397---------- Bemidji	3s	4.5	75	14.0	2.0	30	33	65
1825B---------- Seelyeville	6w	---	---	---	---	---	---	---
1874---------- Radium	4s	3.0	55	12.0	2.0	20	24	48
1943---------- Roscommon	4w	2.5	55	12.0	3.8	20	24	48
1975---------- Oylen	3s	4.0	70	13.0	2.5	26	31	61

* 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.

Prime Farmland

(Only the soils considered prime farmland are listed. Urban or built-up areas of the soils listed are not considered prime farmland. If a soil is prime farmland only under certain conditions, the conditions are specified in parentheses after the soil name)

Map symbol	Soil name
26	Aazdahl clay loam
38B	Waukon loam, 2 to 6 percent slopes
46	Borup loam (where drained)
53B	Kandota sandy loam, 2 to 6 percent slopes
58	Kittson loam
59	Grimstad fine sandy loam
61	Arveson loam (where drained)
63	Rockwell loam (where drained)
107	Winger silt loam (where drained)
108	McIntosh silt loam
121	Wykeham fine sandy loam
141B	Egeland fine sandy loam, 1 to 6 percent slopes
168B	Forman clay loam, 2 to 6 percent slopes
180	Gonvick loam
184	Hamerly loam
267B	Snellman sandy loam, 2 to 8 percent slopes
290	Rothsay silt loam
293B	Swenoda fine sandy loam, 1 to 4 percent slopes
339	Fordville loam
371	Clontarf sandy loam
375	Forada loam (where drained)
418	Lamoure silty clay loam, occasionally flooded (where drained)
422B	Bygland silty clay loam, 1 to 6 percent slopes
426	Foldahl loamy fine sand
441A	Almora loam, 0 to 2 percent slopes
441B	Almora loam, 2 to 6 percent slopes
481	Kratka fine sandy loam (where drained)
494	Darnen loam, moderately wet
497	Hantho silt loam
508	Wyndmere fine sandy loam
624	Rosy sandy loam
670	Knute fine sandy loam
680	Parnell silt loam (where drained)
698	Doran clay loam
707B	Lizzie silt loam, 2 to 6 percent slopes
710	Friberg-Weetown complex (where drained)
769B	Mehurin clay loam, 1 to 4 percent slopes
779B	Peever-Mehurin complex, 2 to 6 percent slopes
902B	Barnes-Buse complex, 2 to 6 percent slopes
957B2	Rothsay-Zell complex, 2 to 6 percent slopes, eroded
1105B	Dent silt loam, 1 to 6 percent slopes
1129	Lindaas silty clay loam, morainic (where drained)
1149	Hamerly clay loam
1200	Egglake loam (where drained)
1208B	Naytahwaush-Mahkonce complex, 1 to 8 percent slopes
1212B	Mahkonce clay loam, 1 to 4 percent slopes
1214	Mustinka silty clay loam (where drained)
1215	Pinelake sandy loam (where drained)
1216B	Egglake-Wykeham complex, 0 to 5 percent slopes (where drained)
1232B	Chapett loam, 2 to 6 percent slopes
1234B	Formdale-Buse complex, 2 to 6 percent slopes
1237	Lakepark loam (where drained)
1240	Roliss clay loam (where drained)
1259	Hamerly-Mustinka complex (where drained)
1276	Knute-Brandsvold complex, thick solum (where drained)
1289	Knute fine sandy loam, thick solum
1290	Brandsvold fine sandy loam, thick solum (where drained)

Prime Farmland--Continued

Map symbol	Soil name
1293	Sedgeville fine sandy loam, rarely flooded (where drained)
1304A	Glyndon very fine sandy loam
1317	Vallers silty clay loam (where drained)
1319B	Rockwood sandy loam, 2 to 6 percent slopes, stony
1320B	Blowers sandy loam, 1 to 5 percent slopes, stony
1321	Paddock-Becida complex, stony (where drained)
1322	Wolverton very fine sandy loam
1324B	Heimdal-Sisseton complex, 2 to 6 percent slopes
1338	Oakcreek loam
1342	Pinelake, loamy substratum-Brandsvold complex (where drained)
1347B	Kandota loam, 1 to 6 percent slopes
1348	Knute loam, thick solum
1349	Clotho loam, moderately permeable (where drained)
1350	Brandsvold loam, thick solum (where drained)
1365	Hillview fine sandy loam (where drained)

Windbreaks and Environmental Plantings

(Absence of an entry indicates that trees generally do not grow to the given height)

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
7A, 7B, 7C: Hubbard	---	Siberian peashrub, eastern redcedar, common chokecherry, silver buffaloberry, lilac.	Green ash, white spruce, ponderosa pine, red pine, Scotch pine.	Jack pine, eastern cottonwood.	---
26: Aazdahl	Nanking cherry	Amur maple, Siberian peashrub, lilac.	Hackberry, Russian-olive, green ash, white spruce, ponderosa pine, common chokecherry.	---	Carolina poplar, Siouxland cottonwood.
34: Parnell	---	Gray dogwood, redosier dogwood, silver buffaloberry.	Black ash, green ash, tamarack, white spruce, black spruce, northern whitecedar.	Eastern cottonwood, golden willow.	Robusta cottonwood.
38B, 38C2, 38D2, 38E: Waukon	Peking cotoneaster, Nanking cherry.	Amur maple, Siberian peashrub, lilac.	Sugar maple, hackberry, Russian-olive, Black Hills spruce.	Silver maple, green ash.	Carolina poplar.
46: Borup	Redosier dogwood	American plum, common chokecherry, silver buffaloberry, lilac, northern whitecedar.	Hackberry, Russian-olive, white spruce.	Green ash, golden willow.	Siouxland cottonwood.
53B, 53C, 53D: Kandota	Peking cotoneaster, Nanking cherry.	Amur maple, Siberian peashrub, lilac.	Sugar maple, hackberry, Russian-olive, Black Hills spruce.	Silver maple, green ash.	Carolina poplar.
58: Kittson	Nanking cherry	Amur maple, Siberian peashrub, lilac.	Hackberry, Russian-olive, green ash, white spruce, ponderosa pine, common chokecherry.	---	Carolina poplar, Siouxland cottonwood.

Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
59:					
Grimstad	---	Siberian peashrub, sargent crabapple, common chokecherry, lilac, northern whitecedar.	Hackberry, Russian-olive, white spruce, ponderosa pine.	Green ash	Eastern cottonwood, Siouxland cottonwood.
61:					
Arveson	Redosier dogwood	American plum, common chokecherry, silver buffaloberry, lilac.	Hackberry, Russian-olive, green ash, white spruce, northern whitecedar.	Golden willow	Siouxland cottonwood.
63:					
Rockwell	Redosier dogwood	American plum, common chokecherry, silver buffaloberry, lilac.	Hackberry, Russian-olive, green ash, white spruce, northern whitecedar.	Golden willow	Siouxland cottonwood.
65:					
Foxhome	Hedge cotoneaster, lilac.	Siberian peashrub, eastern redcedar, American plum, bur oak.	Russian-olive, green ash, white spruce, ponderosa pine, common chokecherry.	---	Eastern cottonwood.
66:					
Flaming	Nanking cherry	Amur maple, Siberian peashrub, lilac.	Hackberry, Russian-olive, green ash, white spruce, ponderosa pine, common chokecherry.	---	Carolina poplar, Siouxland cottonwood.
68:					
Arveson	---	Gray dogwood, redosier dogwood, silver buffaloberry.	Black ash, green ash, tamarack, white spruce, black spruce, northern whitecedar.	Eastern cottonwood, golden willow.	Robusta cottonwood.
107:					
Winger	Redosier dogwood	American plum, common chokecherry, silver buffaloberry, lilac.	Hackberry, Russian-olive, green ash, white spruce, northern whitecedar.	Golden willow	Siouxland cottonwood.
108:					
McIntosh	---	Siberian peashrub, sargent crabapple, common chokecherry, lilac, northern whitecedar.	Hackberry, Russian-olive, white spruce, ponderosa pine.	Green ash	Eastern cottonwood, Siouxland cottonwood.

Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
121:					
Wykeham	Peking cotoneaster, Nanking cherry.	Amur maple, Siberian peashrub, lilac.	Sugar maple, hackberry, Russian-olive, Black Hills spruce.	Silver maple, green ash.	Carolina poplar.
127A, 127B, 127C:					
Sverdrup	Hedge cotoneaster, lilac.	Siberian peashrub, eastern redcedar, American plum, bur oak.	Russian-olive, green ash, white spruce, ponderosa pine, common chokecherry.	---	Eastern cottonwood.
141B, 141C, 141D:					
Egeland	Peking cotoneaster	Amur maple, Siberian peashrub, lilac.	Hackberry, white spruce, Black Hills spruce, red pine.	Green ash, eastern white pine.	Silver maple, eastern cottonwood.
168B:					
Forman	Peking cotoneaster, Nanking cherry.	Siberian peashrub, American plum, lilac.	Russian-olive, green ash, Black Hills spruce.	Hackberry	Silver maple, Carolina poplar, Siouxland cottonwood.
180:					
Gonvick	Peking cotoneaster, Nanking cherry.	Amur maple, Siberian peashrub, lilac.	Sugar maple, hackberry, Russian-olive, Black Hills spruce.	Silver maple, green ash.	Carolina poplar.
184:					
Hamerly	---	Siberian peashrub, sargent crabapple, common chokecherry, lilac, northern whitecedar.	Hackberry, Russian-olive, white spruce, ponderosa pine.	Green ash	Eastern cottonwood, Siouxland cottonwood.
187:					
Haug	Redosier dogwood	Siberian peashrub, gray dogwood, silver buffaloberry.	Hackberry, Russian-olive, white spruce, northern whitecedar.	White willow, golden willow, Siberian elm.	Eastern cottonwood.
191:					
Epoufette	Peking cotoneaster, Nanking cherry.	Redosier dogwood, lilac.	Hackberry, white spruce, Black Hills spruce, northern whitecedar.	Green ash, golden willow.	Carolina poplar, Siouxland cottonwood.
202:					
Meehan	Nanking cherry	Siberian peashrub, lilac.	Amur maple, hackberry, Russian-olive, Black Hills spruce, red pine.	Green ash	Silver maple, Carolina poplar, Siouxland cottonwood.

Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
258A, 258B, 258C: Sandberg	---	Siberian peashrub, eastern redcedar, common chokecherry, silver buffaloberry, lilac.	Green ash, white spruce, ponderosa pine, red pine, Scotch pine.	Jack pine, eastern cottonwood.	---
260: Duelm	Nanking cherry	Siberian peashrub, lilac.	Amur maple, hackberry, Russian-olive, Black Hills spruce, red pine.	Green ash	Silver maple, Carolina poplar, Siouxland cottonwood.
267B, 267C, 267E: Snellman	Peking cotoneaster, Nanking cherry.	Amur maple, Siberian peashrub, lilac.	Sugar maple, hackberry, Russian-olive, Black Hills spruce.	Silver maple, green ash.	Carolina poplar.
290: Rothsay	Peking cotoneaster, Nanking cherry.	Siberian peashrub, American plum, lilac.	Russian-olive, green ash, Black Hills spruce.	Hackberry	Silver maple, Carolina poplar, Siouxland cottonwood.
293B: Swenoda	Peking cotoneaster	Siberian peashrub, American plum, lilac.	Amur maple, hackberry, white spruce, Black Hills spruce, ponderosa pine.	Green ash	Silver maple, eastern cottonwood.
335: Urness	Redosier dogwood	Siberian peashrub, gray dogwood, silver buffaloberry.	Hackberry, Russian-olive, white spruce, northern whitecedar.	White willow, golden willow, Siberian elm.	Eastern cottonwood.
339: Fordville	Hedge cotoneaster, lilac.	Siberian peashrub, eastern redcedar, American plum, common chokecherry, bur oak.	Russian-olive, white spruce, red pine.	Green ash	Eastern cottonwood.
341A, 341B: Arvilla	Hedge cotoneaster, lilac.	Siberian peashrub, eastern redcedar, American plum, common chokecherry, bur oak.	Russian-olive, white spruce, red pine.	Green ash	Eastern cottonwood.

Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
371:					
Clontarf	Hedge cotoneaster, lilac.	Siberian peashrub, eastern redcedar, American plum, common chokecherry, bur oak.	Russian-olive, white spruce, red pine.	Green ash	Eastern cottonwood.
375:					
Forada	Peking cotoneaster, Nanking cherry.	Redosier dogwood, lilac.	Hackberry, white spruce, Black Hills spruce, northern whitecedar.	Green ash, golden willow.	Carolina poplar, Siouxland cottonwood.
402C, 402E:					
Sioux	---	Siberian peashrub, eastern redcedar, common chokecherry, silver buffaloberry, lilac.	Green ash, white spruce, ponderosa pine, red pine, Scotch pine.	Jack pine, eastern cottonwood.	---
406A, 406B:					
Dorset	Hedge cotoneaster, lilac.	Siberian peashrub, eastern redcedar, American plum, common chokecherry, bur oak.	Russian-olive, white spruce, red pine.	Green ash	Eastern cottonwood.
418:					
Lamoure	Peking cotoneaster, Nanking cherry.	Redosier dogwood, lilac.	White spruce, Black Hills spruce, northern whitecedar.	Hackberry, green ash, golden willow.	Carolina poplar, Siouxland cottonwood.
422B, 422C:					
Bygland	Hedge cotoneaster, Nanking cherry.	Amur maple, Siberian peashrub, American plum, lilac.	Hackberry, Russian-olive, Black Hills spruce.	Silver maple, green ash.	Eastern cottonwood.
426:					
Foldahl	Nanking cherry	Amur maple, Siberian peashrub, lilac.	Hackberry, Russian-olive, green ash, white spruce, ponderosa pine, common chokecherry.	---	Carolina poplar, Siouxland cottonwood.
441A, 441B, 441C:					
Almora	Hedge cotoneaster, lilac.	Siberian peashrub, eastern redcedar, American plum, common chokecherry, bur oak.	Russian-olive, white spruce, red pine.	Green ash	Eastern cottonwood.

Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
481:					
Kratka	Peking cotoneaster, Nanking cherry.	Redosier dogwood, lilac.	White spruce, Black Hills spruce, northern whitecedar.	Hackberry, green ash, golden willow.	Carolina poplar, Siouxland cottonwood.
494:					
Darnen	Peking cotoneaster, Nanking cherry.	Amur maple, Siberian peashrub, lilac.	Sugar maple, hackberry, Russian-olive, Black Hills spruce.	Silver maple, green ash.	Carolina poplar.
497:					
Hantho	Peking cotoneaster, Nanking cherry.	Siberian peashrub, American plum, lilac.	Russian-olive, green ash, Black Hills spruce.	Hackberry	Silver maple, Carolina poplar, Siouxland cottonwood.
508:					
Wyndmere	---	Siberian peashrub, sargent crabapple, common chokecherry, lilac, northern whitecedar.	Hackberry, Russian-olive, white spruce, ponderosa pine.	Green ash	Eastern cottonwood, Siouxland cottonwood.
567A, 567B:					
Verndale	---	Siberian peashrub, eastern redcedar, common chokecherry, silver buffaloberry, lilac.	Green ash, white spruce, ponderosa pine, red pine, Scotch pine.	Jack pine, eastern cottonwood.	---
609B:					
Dickey	Peking cotoneaster	Siberian peashrub, American plum, lilac.	Amur maple, hackberry, white spruce, Black Hills spruce, ponderosa pine.	Green ash	Silver maple, eastern cottonwood.
624:					
Rosy	Peking cotoneaster	Amur maple, Siberian peashrub, lilac.	Hackberry, white spruce, Black Hills spruce, red pine.	Green ash, eastern white pine.	Silver maple, eastern cottonwood.
646C, 646D:					
Peever	Hedge cotoneaster, American plum, Nanking cherry.	Amur maple, Siberian peashrub, lilac.	Hackberry, Russian-olive, green ash, Black Hills spruce.	Silver maple	Eastern cottonwood.
670:					
Knute	Peking cotoneaster, Nanking cherry.	Amur maple, Siberian peashrub, lilac.	Sugar maple, hackberry, Russian-olive, Black Hills spruce.	Silver maple, green ash.	Carolina poplar.

Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
680:					
Parnell---------	Peking cotoneaster, Nanking cherry.	Redosier dogwood, lilac.	White spruce, Black Hills spruce, northern whitecedar.	Hackberry, green ash, golden willow.	Carolina poplar, Siouxland cottonwood.
698:					
Doran----------	Hedge cotoneaster, American plum, Nanking cherry.	Amur maple, Siberian peashrub, lilac.	Hackberry, Russian-olive, green ash, Black Hills spruce.	Silver maple------	Eastern cottonwood.
701:					
Runeberg--------	---	Gray dogwood, redosier dogwood, silver buffaloberry.	Black ash, green ash, tamarack, white spruce, black spruce, northern whitecedar.	Eastern cottonwood, golden willow.	Robusta cottonwood.
705B, 705C:					
Nitche----------	Peking cotoneaster	Amur maple, Siberian peashrub, lilac.	Hackberry, white spruce, Black Hills spruce, red pine.	Green ash, eastern white pine.	Silver maple, eastern cottonwood.
Kandota---------	Peking cotoneaster, Nanking cherry.	Amur maple, Siberian peashrub, lilac.	Sugar maple, hackberry, Russian-olive, Black Hills spruce.	Silver maple, green ash.	Carolina poplar.
Lida----------	Hedge cotoneaster, lilac.	Siberian peashrub, eastern redcedar, American plum, common chokecherry, bur oak.	Russian-olive, white spruce, red pine.	Green ash---------	Eastern cottonwood.
707B, 707C2, 707D2:					
Lizzie---------	Peking cotoneaster, Nanking cherry.	Amur maple, Siberian peashrub, lilac.	Sugar maple, hackberry, Russian-olive, Black Hills spruce.	Silver maple, green ash.	Carolina poplar.
710:					
Friberg---------	Peking cotoneaster, Nanking cherry.	Redosier dogwood, lilac.	Hackberry, white spruce, Black Hills spruce, northern whitecedar.	Green ash, golden willow.	Carolina poplar, Siouxland cottonwood.
Weetown---------	Peking cotoneaster, Nanking cherry.	Amur maple, Siberian peashrub, lilac.	Sugar maple, hackberry, Russian-olive, Black Hills spruce.	Silver maple, green ash.	Carolina poplar.

Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
711B, 711C:					
Arvilla	Hedge cotoneaster, lilac.	Siberian peashrub, eastern redcedar, American plum, common chokecherry, bur oak.	Russian-olive, white spruce, red pine.	Green ash	Eastern cottonwood.
Sandberg	---	Siberian peashrub, eastern redcedar, common chokecherry, silver buffaloberry, lilac.	Green ash, white spruce, ponderosa pine, red pine, Scotch pine.	Jack pine, eastern cottonwood.	---
715:					
Bluffcreek	Hedge cotoneaster, lilac.	Siberian peashrub, eastern redcedar, American plum, common chokecherry, bur oak.	Russian-olive, white spruce, red pine.	Green ash	Eastern cottonwood.
Clearriver	---	Siberian peashrub, eastern redcedar, common chokecherry, silver buffaloberry, lilac.	Green ash, white spruce, ponderosa pine, red pine, Scotch pine.	Jack pine, eastern cottonwood.	---
716B, 716C, 716D:					
Leaflake	Peking cotoneaster	Amur maple, Siberian peashrub, lilac.	Hackberry, white spruce, Black Hills spruce, red pine.	Green ash, eastern white pine.	Silver maple, eastern cottonwood.
Eagleview	---	Siberian peashrub, eastern redcedar, common chokecherry, silver buffaloberry, lilac.	Green ash, white spruce, ponderosa pine, red pine, Scotch pine.	Jack pine, eastern cottonwood.	---
718E:					
Naytahwaush	Hedge cotoneaster, Nanking cherry.	Amur maple, Siberian peashrub, American plum, lilac.	Hackberry, Russian-olive, Black Hills spruce.	Silver maple, green ash.	Eastern cottonwood.
721B, 721C, 721D, 721E:					
Corliss	---	Siberian peashrub, eastern redcedar, common chokecherry, silver buffaloberry, lilac.	Green ash, white spruce, ponderosa pine, red pine, Scotch pine.	Jack pine, eastern cottonwood.	---

Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
726:					
Kratka	---	Gray dogwood, redosier dogwood, silver buffaloberry, lilac.	Black ash, tamarack, white spruce, black spruce, northern whitecedar.	Golden willow	Eastern cottonwood, robusta cottonwood.
760C2, 760D2:					
Chapett	Peking cotoneaster, Nanking cherry.	Siberian peashrub, American plum, lilac.	Russian-olive, green ash, Black Hills spruce.	Hackberry	Silver maple, Carolina poplar, Siouxland cottonwood.
Sisseton	Siberian peashrub, lilac.	Hackberry, gray dogwood, Russian-olive, eastern redcedar, ponderosa pine, American plum, silver buffaloberry.	Green ash, Siberian elm.	Siouxland cottonwood.	---
769B:					
Mehurin	Hedge cotoneaster, American plum, Nanking cherry.	Amur maple, Siberian peashrub, lilac.	Hackberry, Russian-olive, green ash, Black Hills spruce.	Silver maple	Eastern cottonwood.
776B, 776C, 776E:					
Snellman	Peking cotoneaster, Nanking cherry.	Amur maple, Siberian peashrub, lilac.	Sugar maple, hackberry, Russian-olive, Black Hills spruce.	Silver maple, green ash.	Carolina poplar.
Sugarbush	Hedge cotoneaster, lilac.	Siberian peashrub, eastern redcedar, American plum, common chokecherry, bur oak.	Russian-olive, white spruce, red pine.	Green ash	Eastern cottonwood.
777C2, 777D2, 777E:					
Sisseton	Siberian peashrub, lilac.	Hackberry, gray dogwood, Russian-olive, eastern redcedar, ponderosa pine, American plum, silver buffaloberry.	Green ash, Siberian elm.	Siouxland cottonwood.	---
Heimdal	Peking cotoneaster, Nanking cherry.	Siberian peashrub, American plum, lilac.	Russian-olive, green ash, Black Hills spruce.	Hackberry	Silver maple, Carolina poplar, Siouxland cottonwood.

Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
778B, 778C:					
Dorset	Hedge cotoneaster, lilac.	Siberian peashrub, eastern redcedar, American plum, common chokecherry, bur oak.	Russian-olive, white spruce, red pine.	Green ash	Eastern cottonwood.
Corliss	---	Siberian peashrub, eastern redcedar, common chokecherry, silver buffaloberry, lilac.	Green ash, white spruce, ponderosa pine, red pine, Scotch pine.	Jack pine, eastern cottonwood.	---
779B:					
Peever	Hedge cotoneaster, American plum, Nanking cherry.	Amur maple, Siberian peashrub, lilac.	Hackberry, Russian-olive, green ash, Black Hills spruce.	Silver maple	Eastern cottonwood.
Mehurin	Hedge cotoneaster, American plum, Nanking cherry.	Amur maple, Siberian peashrub, lilac.	Hackberry, Russian-olive, green ash, Black Hills spruce.	Silver maple	Eastern cottonwood.
902B:					
Barnes	Peking cotoneaster, Nanking cherry.	Siberian peashrub, American plum, lilac.	Russian-olive, green ash, Black Hills spruce.	Hackberry	Silver maple, Carolina poplar, Siouxland cottonwood.
Buse	Siberian peashrub, lilac.	Hackberry, gray dogwood, Russian-olive, eastern redcedar, ponderosa pine, American plum, silver buffaloberry.	Green ash, Siberian elm.	Siouxland cottonwood.	---
903C2:					
Barnes	Peking cotoneaster, Nanking cherry.	Siberian peashrub, American plum, lilac.	Russian-olive, green ash, Black Hills spruce.	Hackberry	Silver maple, Carolina poplar, Siouxland cottonwood.
Langhei	Siberian peashrub, lilac.	Hackberry, gray dogwood, Russian-olive, eastern redcedar, ponderosa pine, American plum, silver buffaloberry.	Green ash, Siberian elm.	Siouxland cottonwood.	---

Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
915C2, 915D2:					
Forman	Peking cotoneaster, Nanking cherry.	Siberian peashrub, American plum, lilac.	Russian-olive, green ash, Black Hills spruce.	Hackberry	Silver maple, Carolina poplar, Siouxland cottonwood.
Buse	Siberian peashrub, lilac.	Hackberry, gray dogwood, Russian-olive, eastern redcedar, ponderosa pine, American plum, silver buffaloberry.	Green ash, Siberian elm.	Siouxland cottonwood.	---
931C2, 931D2:					
Formdale	Peking cotoneaster, Nanking cherry.	Siberian peashrub, American plum, lilac.	Russian-olive, green ash, Black Hills spruce.	Hackberry	Silver maple, Carolina poplar, Siouxland cottonwood.
Langhei	Siberian peashrub, lilac.	Hackberry, gray dogwood, Russian-olive, eastern redcedar, ponderosa pine, American plum, silver buffaloberry.	Green ash, Siberian elm.	Siouxland cottonwood.	---
942D2:					
Langhei	Siberian peashrub, lilac.	Hackberry, gray dogwood, Russian-olive, eastern redcedar, ponderosa pine, American plum, silver buffaloberry.	Green ash, Siberian elm.	Siouxland cottonwood.	---
Barnes	Peking cotoneaster, Nanking cherry.	Siberian peashrub, American plum, lilac.	Russian-olive, green ash, Black Hills spruce.	Hackberry	Silver maple, Carolina poplar, Siouxland cottonwood.
957B2:					
Rothsay	Peking cotoneaster, Nanking cherry.	Siberian peashrub, American plum, lilac.	Russian-olive, green ash, Black Hills spruce.	Hackberry	Silver maple, Carolina poplar, Siouxland cottonwood.
Zell	Siberian peashrub, lilac.	Hackberry, gray dogwood, Russian-olive, eastern redcedar, ponderosa pine, American plum, silver buffaloberry.	Green ash, Siberian elm.	Siouxland cottonwood.	---

Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
969C2, 969D2:					
Zell	Siberian peashrub, lilac.	Hackberry, gray dogwood, Russian-olive, eastern redcedar, ponderosa pine, American plum, silver buffaloberry.	Green ash, Siberian elm.	Siouxland cottonwood.	---
Rothsay	Peking cotoneaster, Nanking cherry.	Siberian peashrub, American plum, lilac.	Russian-olive, green ash, Black Hills spruce.	Hackberry	Silver maple, Carolina poplar, Siouxland cottonwood.
1077:					
Forada	---	Gray dogwood, redosier dogwood, silver buffaloberry.	Black ash, green ash, tamarack, white spruce, black spruce, northern whitecedar.	Eastern cottonwood, golden willow.	Robusta cottonwood.
Leafriver	---	Gray dogwood, redosier dogwood, silver buffaloberry.	Black ash, tamarack, white spruce, black spruce, northern whitecedar.	Eastern cottonwood, golden willow.	Robusta cottonwood.
1102B, 1102C:					
Chapett	Peking cotoneaster, Nanking cherry.	Amur maple, Siberian peashrub, lilac.	Sugar maple, hackberry, Russian-olive, Black Hills spruce.	Silver maple, green ash.	Carolina poplar.
Dorset	Hedge cotoneaster, lilac.	Siberian peashrub, eastern redcedar, American plum, common chokecherry, bur oak.	Russian-olive, white spruce, red pine.	Green ash	Eastern cottonwood.
1103:					
Clitherall	Peking cotoneaster	Amur maple, Siberian peashrub, lilac.	Hackberry, white spruce, Black Hills spruce, red pine.	Green ash, eastern white pine.	Silver maple, eastern cottonwood.
1104B, 1104C, 1104D:					
Waukon	Peking cotoneaster, Nanking cherry.	Amur maple, Siberian peashrub, lilac.	Sugar maple, hackberry, Russian-olive, Black Hills spruce.	Silver maple, green ash.	Carolina poplar.
Dorset	Hedge cotoneaster, lilac.	Siberian peashrub, eastern redcedar, American plum, common chokecherry, bur oak.	Russian-olive, white spruce, red pine.	Green ash	Eastern cottonwood.

Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
1105B:					
Dent	Peking cotoneaster, Nanking cherry.	Amur maple, Siberian peashrub, lilac.	Sugar maple, hackberry, Russian-olive, Black Hills spruce.	Silver maple, green ash.	Carolina poplar.
1110:					
Isan	Peking cotoneaster, Nanking cherry.	Redosier dogwood, lilac.	Hackberry, white spruce, Black Hills spruce, northern whitecedar.	Green ash, golden willow.	Carolina poplar, Siouxland cottonwood.
1112D, 1112E:					
Chapett	Peking cotoneaster, Nanking cherry.	Amur maple, Siberian peashrub, lilac.	Sugar maple, hackberry, Russian-olive, Black Hills spruce.	Silver maple, green ash.	Carolina poplar.
Corliss	---	Siberian peashrub, eastern redcedar, common chokecherry, silver buffaloberry, lilac.	Green ash, white spruce, ponderosa pine, red pine, Scotch pine.	Jack pine, eastern cottonwood.	---
1114:					
Hangaard	Redosier dogwood	American plum, common chokecherry, silver buffaloberry, lilac, northern whitecedar.	Hackberry, Russian-olive, white spruce.	Green ash, golden willow.	Siouxland cottonwood.
1120:					
Rushlake	Nanking cherry	Siberian peashrub, lilac.	Amur maple, hackberry, Russian-olive, Black Hills spruce, red pine.	Green ash	Silver maple, Carolina poplar, Siouxland cottonwood.
Hangaard	Redosier dogwood	American plum, common chokecherry, silver buffaloberry, lilac, northern whitecedar.	Hackberry, Russian-olive, white spruce.	Green ash, golden willow.	Siouxland cottonwood.
1129:					
Lindaas	Peking cotoneaster, Nanking cherry.	Redosier dogwood, lilac.	Hackberry, white spruce, Black Hills spruce, northern whitecedar.	Green ash, golden willow.	Carolina poplar, Siouxland cottonwood.

Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
1131B:					
Verndale--------	---	Siberian peashrub, eastern redcedar, common chokecherry, silver buffaloberry, lilac.	Green ash, white spruce, ponderosa pine, red pine, Scotch pine.	Jack pine, eastern cottonwood.	---
Abbeylake-------	---	Siberian peashrub, eastern redcedar, common chokecherry, silver buffaloberry, lilac.	Green ash, white spruce, ponderosa pine, red pine, Scotch pine.	Jack pine, eastern cottonwood.	---
1149:					
Hamerly---------	---	Siberian peashrub, sargent crabapple, common chokecherry, lilac, northern whitecedar.	Hackberry, Russian-olive, white spruce, ponderosa pine.	Green ash---------	Eastern cottonwood, Siouxland cottonwood.
1195A, 1195B, 1195C, 1195E:					
Sybil----------	Hedge cotoneaster, lilac.	Siberian peashrub, eastern redcedar, American plum, common chokecherry, bur oak.	Russian-olive, white spruce, red pine.	Green ash---------	Eastern cottonwood.
Eagleview------	---	Siberian peashrub, eastern redcedar, common chokecherry, silver buffaloberry, lilac.	Green ash, white spruce, ponderosa pine, red pine, Scotch pine.	Jack pine, eastern cottonwood.	---
1196B, 1196C, 1196E:					
Lida----------	Hedge cotoneaster, lilac.	Siberian peashrub, eastern redcedar, American plum, common chokecherry, bur oak.	Russian-olive, white spruce, red pine.	Green ash---------	Eastern cottonwood.
Two Inlets-----	---	Siberian peashrub, eastern redcedar, common chokecherry, silver buffaloberry, lilac.	Green ash, white spruce, ponderosa pine, red pine, Scotch pine.	Jack pine, eastern cottonwood.	---

Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
1200:					
Egglake	Peking cotoneaster, Nanking cherry.	Redosier dogwood, lilac.	Hackberry, white spruce, Black Hills spruce, northern whitecedar.	Green ash, golden willow.	Carolina poplar, Siouxland cottonwood.
1208B:					
Naytahwaush	Hedge cotoneaster, Nanking cherry.	Amur maple, Siberian peashrub, American plum, lilac.	Hackberry, Russian-olive, Black Hills spruce.	Silver maple, green ash.	Eastern cottonwood.
Mahkonce	Hedge cotoneaster, Nanking cherry.	Amur maple, Siberian peashrub, American plum, lilac.	Hackberry, Russian-olive, Black Hills spruce.	Silver maple, green ash.	Eastern cottonwood.
1209C:					
Naytahwaush	Hedge cotoneaster, Nanking cherry.	Amur maple, Siberian peashrub, American plum, lilac.	Hackberry, Russian-olive, Black Hills spruce.	Silver maple, green ash.	Eastern cottonwood.
1212B:					
Mahkonce	Hedge cotoneaster, Nanking cherry.	Amur maple, Siberian peashrub, American plum, lilac.	Hackberry, Russian-olive, Black Hills spruce.	Silver maple, green ash.	Eastern cottonwood.
1214:					
Mustinka	Peking cotoneaster, Nanking cherry.	Redosier dogwood, lilac.	White spruce, Black Hills spruce, northern whitecedar.	Hackberry, green ash, golden willow.	Carolina poplar, Siouxland cottonwood.
1215:					
Pinelake	Peking cotoneaster, Nanking cherry.	Redosier dogwood, lilac.	Hackberry, white spruce, Black Hills spruce, northern whitecedar.	Green ash, golden willow.	Carolina poplar, Siouxland cottonwood.
1216B:					
Egglake	Peking cotoneaster, Nanking cherry.	Amur maple, Siberian peashrub, lilac.	Sugar maple, hackberry, Russian-olive, Black Hills spruce.	Silver maple, green ash.	Carolina poplar.
Wykeham	Peking cotoneaster, Nanking cherry.	Redosier dogwood, lilac.	Hackberry, white spruce, Black Hills spruce, northern whitecedar.	Green ash, golden willow.	Carolina poplar, Siouxland cottonwood.

Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
1217E:					
Waukon	Peking cotoneaster, Nanking cherry.	Amur maple, Siberian peashrub, lilac.	Sugar maple, hackberry, Russian-olive, Black Hills spruce.	Silver maple, green ash.	Carolina poplar.
Lida	Hedge cotoneaster, lilac.	Siberian peashrub, eastern redcedar, American plum, common chokecherry, bur oak.	Russian-olive, white spruce, red pine.	Green ash	Eastern cottonwood.
1218B, 1218C, 1218E:					
Snellman	Peking cotoneaster, Nanking cherry.	Amur maple, Siberian peashrub, lilac.	Sugar maple, hackberry, Russian-olive, Black Hills spruce.	Silver maple, green ash.	Carolina poplar.
Lida	Hedge cotoneaster, lilac.	Siberian peashrub, eastern redcedar, American plum, common chokecherry, bur oak.	Russian-olive, white spruce, red pine.	Green ash	Eastern cottonwood.
1219C:					
Sandberg	---	Siberian peashrub, eastern redcedar, common chokecherry, silver buffaloberry, lilac.	Green ash, white spruce, ponderosa pine, red pine, Scotch pine.	Jack pine, eastern cottonwood.	---
Sverdrup	Hedge cotoneaster, lilac.	Siberian peashrub, eastern redcedar, American plum, common chokecherry, bur oak.	Russian-olive, white spruce, red pine.	Green ash	Eastern cottonwood.
1221B:					
Sverdrup	Hedge cotoneaster, lilac.	Siberian peashrub, eastern redcedar, American plum, common chokecherry, bur oak.	Russian-olive, white spruce, red pine.	Green ash	Eastern cottonwood.
Sandberg	---	Siberian peashrub, eastern redcedar, common chokecherry, silver buffaloberry, lilac.	Green ash, white spruce, ponderosa pine, red pine, Scotch pine.	Jack pine, eastern cottonwood.	---

Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
1223D:					
Sandberg--------	---	Siberian peashrub, eastern redcedar, common chokecherry, silver buffaloberry, lilac.	Green ash, white spruce, ponderosa pine, red pine, Scotch pine.	Jack pine, eastern cottonwood.	---
Arvilla---------	Hedge cotoneaster, lilac.	Siberian peashrub, eastern redcedar, American plum, common chokecherry, bur oak.	Russian-olive, white spruce, red pine.	Green ash---------	Eastern cottonwood.
1232B, 1232E:					
Chapett---------	Peking cotoneaster, Nanking cherry.	Siberian peashrub, American plum, lilac.	Russian-olive, green ash, Black Hills spruce.	Hackberry---------	Silver maple, Carolina poplar, Siouxland cottonwood.
1234B:					
Formdale--------	Peking cotoneaster, Nanking cherry.	Siberian peashrub, American plum, lilac.	Russian-olive, green ash, Black Hills spruce.	Hackberry---------	Silver maple, Carolina poplar, Siouxland cottonwood.
Buse------------	Siberian peashrub, lilac.	Hackberry, gray dogwood, Russian-olive, eastern redcedar, ponderosa pine, American plum, silver buffaloberry.	Green ash, Siberian elm.	Siouxland cottonwood.	---
1237:					
Lakepark--------	Peking cotoneaster, Nanking cherry.	Redosier dogwood, lilac.	Hackberry, white spruce, Black Hills spruce, northern whitecedar.	Green ash, golden willow.	Carolina poplar, Siouxland cottonwood.
1239:					
Quam------------	Redosier dogwood	Gray dogwood, silver buffaloberry.	Hackberry, Russian-olive, green ash, white spruce, northern whitecedar.	White willow, golden willow, Siberian elm.	Eastern cottonwood.
1240:					
Roliss----------	Redosier dogwood	American plum, common chokecherry, silver buffaloberry, lilac.	Hackberry, Russian-olive, green ash, white spruce, northern whitecedar.	Golden willow-----	Siouxland cottonwood.

Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
1247D:					
Corliss	---	Siberian peashrub, eastern redcedar, common chokecherry, silver buffaloberry, lilac.	Green ash, white spruce, ponderosa pine, red pine, Scotch pine.	Jack pine, eastern cottonwood.	---
Dorset	Hedge cotoneaster, lilac.	Siberian peashrub, eastern redcedar, American plum, common chokecherry, bur oak.	Russian-olive, white spruce, red pine.	Green ash	Eastern cottonwood.
1250C:					
Abbeylake	---	Siberian peashrub, eastern redcedar, common chokecherry, silver buffaloberry, lilac.	Green ash, white spruce, ponderosa pine, red pine, Scotch pine.	Jack pine, eastern cottonwood.	---
Verndale	---	Siberian peashrub, eastern redcedar, common chokecherry, silver buffaloberry, lilac.	Green ash, white spruce, ponderosa pine, red pine, Scotch pine.	Jack pine, eastern cottonwood.	---
1259:					
Hamerly	---	Siberian peashrub, sargent crabapple, common chokecherry, lilac, northern whitecedar.	Hackberry, Russian-olive, white spruce, ponderosa pine.	Green ash	Eastern cottonwood, Siouxland cottonwood.
Mustinka	Peking cotoneaster, Nanking cherry.	Redosier dogwood, lilac.	White spruce, Black Hills spruce, northern whitecedar.	Hackberry, green ash, golden willow.	Carolina poplar, Siouxland cottonwood.
1275B, 1275C:					
Kandota	Peking cotoneaster, Nanking cherry.	Amur maple, Siberian peashrub, lilac.	Sugar maple, hackberry, Russian-olive, Black Hills spruce.	Silver maple, green ash.	Carolina poplar.
Egglake	---	Gray dogwood, redosier dogwood, silver buffaloberry.	Black ash, green ash, tamarack, white spruce, black spruce, northern whitecedar.	Eastern cottonwood, golden willow.	Robusta cottonwood.

Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
1276:					
Knute	Peking cotoneaster, Nanking cherry.	Amur maple, Siberian peashrub, lilac.	Sugar maple, hackberry, Russian-olive, Black Hills spruce.	Silver maple, green ash.	Carolina poplar.
Brandsvold	Peking cotoneaster, Nanking cherry.	Redosier dogwood, lilac.	Hackberry, white spruce, Black Hills spruce, northern whitecedar.	Green ash, golden willow.	Carolina poplar, Siouxland cottonwood.
1277D:					
Corliss	---	Siberian peashrub, eastern redcedar, common chokecherry, silver buffaloberry, lilac.	Green ash, white spruce, ponderosa pine, red pine, Scotch pine.	Jack pine, eastern cottonwood.	---
Sverdrup	Hedge cotoneaster, lilac.	Siberian peashrub, eastern redcedar, American plum, common chokecherry, bur oak.	Russian-olive, white spruce, red pine.	Green ash	Eastern cottonwood.
1289:					
Knute	Peking cotoneaster, Nanking cherry.	Amur maple, Siberian peashrub, lilac.	Sugar maple, hackberry, Russian-olive, Black Hills spruce.	Silver maple, green ash.	Carolina poplar.
1290:					
Brandsvold	Peking cotoneaster, Nanking cherry.	Redosier dogwood, lilac.	Hackberry, white spruce, Black Hills spruce, northern whitecedar.	Green ash, golden willow.	Carolina poplar, Siouxland cottonwood.
1304A:					
Glyndon	Lilac	Siberian peashrub, eastern redcedar, common chokecherry.	Russian-olive, white spruce, blue spruce, bur oak.	Golden willow, Siberian elm.	Eastern cottonwood.
1307:					
Rushlake	Nanking cherry	Siberian peashrub, lilac.	Amur maple, hackberry, Russian-olive, Black Hills spruce, red pine.	Green ash	Silver maple, Carolina poplar, Siouxland cottonwood.

Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
1317:					
Vallers	Redosier dogwood	American plum, common chokecherry, silver buffaloberry, lilac, northern whitecedar.	Hackberry, Russian-olive, white spruce.	Green ash, golden willow.	Siouxland cottonwood.
1319B, 1319C, 1319D:					
Rockwood	Hedge cotoneaster, Nanking cherry.	Amur maple, Siberian peashrub, American plum, lilac.	Hackberry, Russian-olive, Black Hills spruce.	Silver maple, green ash.	Eastern cottonwood.
1320B:					
Blowers	Hedge cotoneaster, Nanking cherry.	Amur maple, Siberian peashrub, American plum, lilac.	Hackberry, Russian-olive, Black Hills spruce.	Silver maple, green ash.	Eastern cottonwood.
1321:					
Paddock	Hedge cotoneaster, Nanking cherry.	Amur maple, Siberian peashrub, American plum, lilac.	Hackberry, Russian-olive, Black Hills spruce.	Silver maple, green ash.	Eastern cottonwood.
Becida	Peking cotoneaster, Nanking cherry.	Redosier dogwood, lilac.	Hackberry, white spruce, Black Hills spruce, northern whitecedar.	Green ash, golden willow.	Carolina poplar, Siouxland cottonwood.
1322:					
Wolverton	---	Siberian peashrub, sargent crabapple, common chokecherry, lilac, northern whitecedar.	Hackberry, Russian-olive, white spruce, ponderosa pine.	Green ash	Eastern cottonwood, Siouxland cottonwood.
1324B:					
Heimdal	Peking cotoneaster, Nanking cherry.	Siberian peashrub, American plum, lilac.	Russian-olive, green ash, Black Hills spruce.	Hackberry	Silver maple, Carolina poplar, Siouxland cottonwood.
Sisseton	Siberian peashrub, lilac.	Hackberry, gray dogwood, Russian-olive, eastern redcedar, ponderosa pine, American plum, silver buffaloberry.	Green ash, Siberian elm.	Siouxland cottonwood.	---

Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
1338:					
Oakcreek--------	Hedge cotoneaster, lilac.	Siberian peashrub, eastern redcedar, American plum, common chokecherry, bur oak.	Russian-olive, white spruce, red pine.	Green ash---------	Eastern cottonwood.
1339:					
Borup-----------	Redosier dogwood	Siberian peashrub, gray dogwood, silver buffaloberry.	Hackberry, Russian-olive, white spruce, northern whitecedar.	White willow, golden willow, Siberian elm.	Eastern cottonwood.
1340:					
Bluffcreek------	Hedge cotoneaster, lilac.	Siberian peashrub, eastern redcedar, American plum, common chokecherry, bur oak.	Russian-olive, white spruce, red pine.	Green ash---------	Eastern cottonwood.
Epoufette-------	Peking cotoneaster, Nanking cherry.	Redosier dogwood, lilac.	Hackberry, white spruce, Black Hills spruce, northern whitecedar.	Green ash, golden willow.	Carolina poplar, Siouxland cottonwood.
1341:					
Clitherall------	Peking cotoneaster	Amur maple, Siberian peashrub, lilac.	Hackberry, white spruce, Black Hills spruce, red pine.	Green ash, eastern white pine.	Silver maple, eastern cottonwood.
Wykeham---------	Peking cotoneaster, Nanking cherry.	Amur maple, Siberian peashrub, lilac.	Sugar maple, hackberry, Russian-olive, Black Hills spruce.	Silver maple, green ash.	Carolina poplar.
1342:					
Pinelake--------	Peking cotoneaster, Nanking cherry.	Redosier dogwood, lilac.	Hackberry, white spruce, Black Hills spruce, northern whitecedar.	Green ash, golden willow.	Carolina poplar, Siouxland cottonwood.
Brandsvold------	Peking cotoneaster, Nanking cherry.	Redosier dogwood, lilac.	Hackberry, white spruce, Black Hills spruce, northern whitecedar.	Green ash, golden willow.	Carolina poplar, Siouxland cottonwood.
1343C:					
Lida------------	Hedge cotoneaster, lilac.	Siberian peashrub, eastern redcedar, American plum, common chokecherry, bur oak.	Russian-olive, white spruce, red pine.	Green ash---------	Eastern cottonwood.

Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
1343C:					
Almora	Hedge cotoneaster, lilac.	Siberian peashrub, eastern redcedar, American plum, common chokecherry, bur oak.	Russian-olive, white spruce, red pine.	Green ash	Eastern cottonwood.
Lizzie	Peking cotoneaster, Nanking cherry.	Amur maple, Siberian peashrub, lilac.	Sugar maple, hackberry, Russian-olive, Black Hills spruce.	Silver maple, green ash.	Carolina poplar.
1344B:					
Lida	Hedge cotoneaster, lilac.	Siberian peashrub, eastern redcedar, American plum, common chokecherry, bur oak.	Russian-olive, white spruce, red pine.	Green ash	Eastern cottonwood.
Almora	Hedge cotoneaster, lilac.	Siberian peashrub, eastern redcedar, American plum, common chokecherry, bur oak.	Russian-olive, white spruce, red pine.	Green ash	Eastern cottonwood.
Dent	Peking cotoneaster, Nanking cherry.	Amur maple, Siberian peashrub, lilac.	Sugar maple, hackberry, Russian-olive, Black Hills spruce.	Silver maple, green ash.	Carolina poplar.
1345:					
Bluffcreek	Hedge cotoneaster, lilac.	Siberian peashrub, eastern redcedar, American plum, common chokecherry, bur oak.	Russian-olive, white spruce, red pine.	Green ash	Eastern cottonwood.
Rosy	Peking cotoneaster	Amur maple, Siberian peashrub, lilac.	Hackberry, white spruce, Black Hills spruce, red pine.	Green ash, eastern white pine.	Silver maple, eastern cottonwood.
1347B:					
Kandota	Peking cotoneaster, Nanking cherry.	Amur maple, Siberian peashrub, lilac.	Sugar maple, hackberry, Russian-olive, Black Hills spruce.	Silver maple, green ash.	Carolina poplar.
1348:					
Knute	Peking cotoneaster, Nanking cherry.	Amur maple, Siberian peashrub, lilac.	Sugar maple, hackberry, Russian-olive, Black Hills spruce.	Silver maple, green ash.	Carolina poplar.

Windbreaks and Environmental Plantings--Continued

Map symbol and soil name	Trees having predicted 20-year average height, in feet, of--				
	<8	8-15	16-25	26-35	>35
1349: Clotho	Redosier dogwood	American plum, common chokecherry, silver buffaloberry, lilac, northern whitecedar.	Hackberry, Russian-olive, white spruce.	Green ash, golden willow.	Siouxland cottonwood.
1350: Brandsvold	Peking cotoneaster, Nanking cherry.	Redosier dogwood, lilac.	Hackberry, white spruce, Black Hills spruce, northern whitecedar.	Green ash, golden willow.	Carolina poplar, Siouxland cottonwood.
1351: Bluffton	---	Gray dogwood, redosier dogwood, silver buffaloberry.	Black ash, green ash, tamarack, white spruce, black spruce, northern whitecedar.	Eastern cottonwood, golden willow.	Robusta cottonwood.
1365: Hillview	Peking cotoneaster, Nanking cherry.	Redosier dogwood, lilac.	Hackberry, white spruce, Black Hills spruce, northern whitecedar.	Green ash, golden willow.	Carolina poplar, Siouxland cottonwood.
1397: Bemidji	Peking cotoneaster	Amur maple, Siberian peashrub, lilac.	Hackberry, white spruce, Black Hills spruce, red pine.	Green ash, eastern white pine.	Silver maple, eastern cottonwood.
1874: Radium	---	Siberian peashrub, eastern redcedar, common chokecherry, silver buffaloberry, lilac.	Green ash, white spruce, ponderosa pine, red pine, Scotch pine.	Jack pine, eastern cottonwood.	---
1943: Roscommon	Peking cotoneaster, Nanking cherry.	Redosier dogwood, lilac.	Hackberry, white spruce, Black Hills spruce, northern whitecedar.	Green ash, golden willow.	Carolina poplar, Siouxland cottonwood.
1975: Oylen	Hedge cotoneaster, lilac.	Siberian peashrub, eastern redcedar, American plum, common chokecherry, bur oak.	Russian-olive, white spruce, red pine.	Green ash---	Eastern cottonwood.

Windbreak Suitability Groups

(Suitable shrubs and trees with their mature heights are listed in the table "Windbreaks and Environmental Plantings." See text for descriptions of the suitability groups. Absence of an entry indicates that a windbreak suitability group is not assigned)

Map symbol and soil name	Windbreak suitability group
7A, 7B, 7C----- Hubbard	7
26---------- Aazdahl	1
34---------- Parnell	2W
38B, 38C2, 38D2, 38E----- Waukon	3
46---------- Borup	2K
53B, 53C, 53D-- Kandota	3
58---------- Kittson	1
59---------- Grimstad	1K
61---------- Arveson	2K
63---------- Rockwell	2K
65---------- Foxhome	6G
66---------- Flaming	1
68---------- Arveson	2W
107---------- Winger	2K
108---------- McIntosh	1K
127A, 127B, 127C---------- Sverdrup	6G
141B, 141C, 141D---------- Egeland	5
168B---------- Forman	3

Windbreak Suitability Groups--Continued

Map symbol and soil name	Windbreak suitability group
180--Gonvick	1
184--Hamerly	1K
187--Haug	2H
191--Epoufette	2
202--Meehan	1
258A, 258B, 258C--Sandberg	7
260--Duelm	1
267B, 267C, 267E, 267F--Snellman	3
290--Rothsay	3
293B--Swenoda	5
335--Urness	2W
339--Fordville	6G
341A, 341B--Arvilla	6G
371--Clontarf	1
375--Forada	2
402C, 402E--Sioux	10
406A, 406B--Dorset	6G
418--Lamoure	2K
422B, 422C--Bygland	4
426--Foldahl	1

Windbreak Suitability Groups--Continued

Map symbol and soil name	Windbreak suitability group
441A, 441B, 441C---------- Almora	6G
481---------- Kratka	2
494---------- Darnen	3
497---------- Hantho	3
508---------- Wyndmere	1K
540---------- Seelyeville	2H
541---------- Rifle	2H
544---------- Cathro	2H
567A, 567B----- Verndale	7
609B---------- Dickey	5
624---------- Rosy	1
646C, 646D----- Peever	4C
670---------- Knute	1
680---------- Parnell	2
698---------- Doran	1
701---------- Runeberg	2W
705B, 705C:	
Nitche--------	5
Kandota-------	3
Lida----------	7
707B, 707C2, 707D2--------- Lizzie	3

Windbreak Suitability Groups--Continued

Map symbol and soil name	Windbreak suitability group
710:	
Friberg	2
Weetown	1
711B, 711C:	
Arvilla	6G
Sandberg	7
715:	
Bluffcreek	6G
Clearriver	7
716B, 716C, 716D:	
Leaflake	5
Eagleview	7
718E--Naytahwaush	4C
721B, 721C, 721D, 721E--Corliss	7
726--Kratka	10
746--Haslie	2H
760C2:	
Chapett	3
Sisseton	8
760D2:	
Chapett	3
Sisseton	10
776B, 776C, 776E:	
Snellman	3
Sugarbush	6G
777C2:	
Sisseton	8
Heimdal	3
777D2, 777E:	
Sisseton	10
Heimdal	3

Windbreak Suitability Groups--Continued

Map symbol and soil name	Windbreak suitability group
778B, 778C:	
Dorset	6G
Corliss	7
779B:	
Peever	4C
Mehurin.	
902B:	
Barnes	3
Buse	8
903C2:	
Barnes	3
Langhei	8
915C2, 915D2:	
Forman	3
Buse	8
931C2, 931D2:	
Formdale	3
Langhei	8
942D2:	
Langhei	8
Barnes	3
957B2:	
Rothsay	3
Zell	8
969C2:	
Zell	8
Rothsay	3
969D2:	
Zell	10
Rothsay	3
1077:	
Forada	10
Leafriver	10
1102B, 1102C:	
Chapett	3
Dorset	6G
1103	5
Clitherall	

Windbreak Suitability Groups--Continued

Map symbol and soil name	Windbreak suitability group
1104B, 1104C, 1104D:	
Waukon	3
Dorset	6G
1105B Dent	3
1112D, 1112E:	
Chapett	3
Corliss	7
1113:	
Haslie	10
Seelyeville	10
Cathro	10
1114 Hangaard	2K
1120:	
Rushlake	1
Hangaard	2K
1129 Lindaas	2
1131B:	
Verndale	7
Abbeylake	7
1136 Nidaros	10
1149 Hamerly	1K
1195A, 1195B, 1195C, 1195E:	
Sybil	6G
Eagleview	7
1196B, 1196C, 1196E, 1196F:	
Lida	7
Two Inlets	7
1200 Egglake	2
1208B:	
Naytahwaush	4C
Mahkonce	4C

Windbreak Suitability Groups--Continued

Map symbol and soil name	Windbreak suitability group
1209C---------- Naytahwaush	4C
1212B---------- Mahkonce	4C
1214---------- Mustinka	2
1215---------- Pinelake	2
1216B: Egglake-------	2
Wykeham.	
1217E: Waukon--------	3
Lida----------	7
1218B, 1218C, 1218E, 1218F: Snellman-----	3
Lida---------	7
1219C: Sandberg------	7
Sverdrup------	6G
1221B: Sverdrup------	6G
Sandberg------	7
1223D: Sandberg------	7
Arvilla-------	6G
1227: Quam----------	10
Cathro--------	10
Urness--------	10
1230: Haslie--------	10
Nidaros-------	10
1232B, 1232E--- Chapett	3
1234B: Formdale------	3
Buse----------	8

Windbreak Suitability Groups--Continued

Map symbol and soil name	Windbreak suitability group
1237--- Lakepark	2
1239--- Quam	2W
1240--- Roliss	2K
1247D:	
Corliss---	7
Dorset---	6G
1250C:	
Abbeylake---	7
Verndale---	7
1259:	
Hamerly---	1K
Mustinka---	2
1275B, 1275C:	
Kandota---	3
Egglake---	10
1276:	
Knute---	1
Brandsvold---	2
1277D:	
Corliss---	7
Sverdrup---	6G
1289--- Knute	1
1290--- Brandsvold	2
1291--- Sedgeville	10
1293--- Sedgeville	2
1304A--- Glyndon	1K
1307--- Rushlake	1
1317--- Vallers	2K
1319B, 1319C, 1319D--- Rockwood	4F

Windbreak Suitability Groups--Continued

Map symbol and soil name	Windbreak suitability group
1320B---------- Blowers	4F
1321: Paddock-------	1
Becida--------	2
1322---------- Wolverton	1K
1324B: Heimdal-------	3
Sisseton------	8
1338---------- Oakcreek	5
1339---------- Borup	10
1340: Bluffcreek----	6G
Epoufette-----	2
1341: Clitherall----	5
Wykeham.	
1342: Pinelake------	2
Brandsvold----	2
1343C: Lida----------	7
Almora--------	6G
Lizzie--------	3
1344B: Lida----------	7
Almora--------	6G
Dent----------	3
1345: Bluffcreek----	6G
Rosy----------	1
1346---------- Nidaros	10
1347B---------- Kandota	3

Windbreak Suitability Groups--Continued

Map symbol and soil name	Windbreak suitability group
1348--- Knute	1
1349--- Clotho	2K
1350--- Brandsvold	2
1351--- Bluffton	10
1365--- Hillview	2
1396:	
Sedgeville---	10
Nidaros---	10
Aquolls---	10
1397--- Bemidji	5
1874--- Radium	1
1943--- Roscommon	2

Forest Land

Chuck Cornelius, private forest management specialist, Minnesota Department of Natural Resources, helped prepare this section.

Forested areas cover approximately 200,500 acres in Otter Tail County, or about 16 percent of the total land area. About 82 percent of the forest land is privately owned, and 18 percent is publicly owned. Of the publicly owned lands, about 8,200 acres is county owned; 24,700 acres is owned by the State of Minnesota; 800 acres is Indian land; and 500 acres is Federal land.

The highly variable soil types and terrain conditions in Otter Tail County support a variety of timber types. Most tree species can grow under a wide variety of soil conditions. Aspen is the dominant tree species in Otter Tail County. This species makes up 38 percent of the commercial forest land. Hardwood forest types, which include aspen, maple, basswood, red oak, bur oak, paper birch, elm, and ash, make up 95 percent of the commercial forest land. Softwood forest types, which include tamarack, jack pine, balsam fir, black spruce, white spruce, red pine, and white pine, make up 5 percent of the commercial forest land.

Information about the hazards and limitations that should be considered in areas used as forest land are given in the tables "Forest Land Harvest Equipment Considerations," "Forest Haul Road Considerations," "Forest Log Landing Considerations," and "Forest Land Site Preparation and Planting Considerations."

Forest Land Harvest Equipment Considerations

For most soils spring is the most limiting season. Alternate thawing and freezing during snowmelt cause saturation and low strength of the surface soil layers. When thawing is complete, saturation continues for short periods in well drained soils to nearly all year in very poorly drained depressional soils. Degrees of wetness are generally proportionate to water table height and duration. The water table generally is lower in the summer during the heavy use of moisture by vegetation and is nearer the surface during periods when absorbed precipitation is greater than the vegetation requires. Harvesting during periods of saturation usually results in severe soil damage, except when the soil is frozen. The preferred season for timber harvest on many soils is winter, when wetness and low soil strength can be overcome by freezing.

Considerations shown in the table are as follows:

Slope.—The upper slope limit is more than 15 percent.

Flooding.—The map unit component is frequently flooded.

Wetness.—The map unit component is somewhat poorly drained, poorly drained, or very poorly drained or has a perched water table (any drainage class).

Depth to hard rock.—The depth to hard bedrock is less than 10 inches.

Rubbly surface.—The word "rubbly" is in the map unit name.

Surface stones.—The words "extremely stony" are in the map unit name.

Surface boulders.—The word "bouldery" is in the map unit name.

Areas of rock outcrop.—The words "Rock outcrop" are in the map unit name.

Susceptible to rutting and wheel slippage (low strength).—The AASHTO classification is A-6, A-7, or A-8 in any layer at a depth of 20 inches or less.

Poor traction (loose sandy material).—The USDA texture includes sands or loamy sands in any layer at a depth of 10 inches or less.

Forest Haul Road Considerations

Haul roads serve as transportation routes from log landings to primary roads. Generally, haul roads are unpaved, but some are graveled.

Considerations shown in the table are as follows:

Slope.—The slope is 8 percent or more.

Flooding.—The map unit component is frequently flooded.

Wetness.—The map unit component is somewhat poorly drained, poorly drained, or very poorly drained or has a perched water table (any drainage class).

Depth to hard rock.—The depth to hard bedrock is less than 20 inches.

Depth to soft rock.—The depth to soft bedrock is less than 20 inches.

Surface boulders.—The word "bouldery" is in the map unit name.

Areas of rock outcrop.—The words "Rock outcrop" are in the map unit name.

Low bearing strength.—The AASHTO classification is A-6, A-7, or A-8 in any layer at a depth of 20 inches or less.

Rubbly surface.—The word "rubbly" is in the map unit name.

Forest Log Landing Considerations

Log landings are areas where logs are assembled for transportation. Areas that require little or no cutting, filling, or surface preparation are desired.

Considerations shown in the table are as follows:

Slope.—The slope is more than 3 percent.

Flooding.—The map unit component is occasionally flooded or frequently flooded.

Wetness.—The map unit component is somewhat poorly drained, poorly drained, or very poorly drained or has a perched water table (any drainage class).

Surface boulders.—The word "bouldery" is in the map unit name.

Areas of rock outcrop.—The words "Rock outcrop" are in the map unit name.

Susceptible to rutting and wheel slippage (low strength).—The AASHTO classification is A-6, A-7, or A-8 in any layer at a depth of 20 inches or less.

Rubbly surface.—The word "rubbly" is in the map unit name.

Forest Land Site Preparation and Planting Considerations

Considerations shown in this table are as follows:

Slope.—The upper slope limit is more than 15 percent.

Flooding.—The map unit component is frequently flooded.

Wetness.—The map unit component is somewhat poorly drained, poorly drained, or very poorly drained or has a perched water table (any drainage class).

Depth to hard rock.—The depth to hard bedrock is less than 20 inches.

Surface stones.—The word "stony" is in the map unit name.

Surface boulders.—The word "bouldery" is in the map unit name.

Areas of rock outcrop.—The words "Rock outcrop" are in the map unit name.

Water erosion.—The slope is 8 percent or more.

Potential poor tilth and compaction.—The AASHTO classification is A-6 or A-7 in the upper 10 inches.

Rubbly surface.—The word "rubbly" is in the map unit name.

Cobbly surface.—The word "cobbly" is in the map unit name.

Forest Land Harvest Equipment Considerations

(Only the soils suitable for production of commercial trees are listed. See text for a description of the considerations listed in this table)

Map symbol and soil name	Forest land harvest equipment considerations
7A, 7B, 7C:	
Hubbard	Poor traction (loose sandy material)
38B, 38C2:	
Waukon	Susceptible to rutting and wheel slippage
38D2, 38E:	
Waukon	Slope Susceptible to rutting and wheel slippage
53B, 53C:	
Kandota	Susceptible to rutting and wheel slippage
53D:	
Kandota	Slope Susceptible to rutting and wheel slippage
121:	
Wykeham	Susceptible to rutting and wheel slippage
168B:	
Forman	Susceptible to rutting and wheel slippage
180:	
Gonvick	Susceptible to rutting and wheel slippage
191:	
Epoufette	Poor traction (loose sandy material) Wetness
202:	
Meehan	Poor traction (loose sandy material) Wetness
260:	
Duelm	Poor traction (loose sandy material)
267B, 267C:	
Snellman	Susceptible to rutting and wheel slippage
267E, 267F:	
Snellman	Slope Susceptible to rutting and wheel slippage
406A, 406B:	
Dorset	Susceptible to rutting and wheel slippage
422B, 422C:	
Bygland	Susceptible to rutting and wheel slippage
441A, 441B, 441C:	
Almora	Susceptible to rutting and wheel slippage
540:	
Seelyeville	Susceptible to rutting and wheel slippage Wetness
541:	
Rifle	Susceptible to rutting and wheel slippage Wetness

Forest Land Harvest Equipment Considerations--Continued

Map symbol and soil name	Forest land harvest equipment considerations
567A, 567B:	
Verndale	No major considerations or hazards
624:	
Rosy	Susceptible to rutting and wheel slippage
646C:	
Peever	Susceptible to rutting and wheel slippage
646D:	
Peever	Slope Susceptible to rutting and wheel slippage
670:	
Knute	Susceptible to rutting and wheel slippage
701:	
Runeberg	Susceptible to rutting and wheel slippage Wetness
705B, 705C:	
Nitche	Susceptible to rutting and wheel slippage
Kandota	Susceptible to rutting and wheel slippage
Lida	No major considerations or hazards
707B, 707C2:	
Lizzie	Susceptible to rutting and wheel slippage
707D2:	
Lizzie	Slope Susceptible to rutting and wheel slippage
710:	
Friberg	Susceptible to rutting and wheel slippage Wetness
Weetown	Susceptible to rutting and wheel slippage
715:	
Bluffcreek	Poor traction (loose sandy material)
Clearriver	Poor traction (loose sandy material)
716B, 716C:	
Leaflake	Poor traction (loose sandy material)
Eagleview	Poor traction (loose sandy material)
716D:	
Leaflake	Poor traction (loose sandy material) Slope
Eagleview	Poor traction (loose sandy material) Slope
718E:	
Naytahwaush	Slope Susceptible to rutting and wheel slippage
721B, 721C:	
Corliss	Poor traction (loose sandy material)

Forest Land Harvest Equipment Considerations--Continued

Map symbol and soil name	Forest land harvest equipment considerations
721D, 721E:	
Corliss	Poor traction (loose sandy material) Slope
760C2:	
Chapett	Susceptible to rutting and wheel slippage
Sisseton	Susceptible to rutting and wheel slippage
760D2:	
Chapett	Slope Susceptible to rutting and wheel slippage
Sisseton	Slope Susceptible to rutting and wheel slippage
769B:	
Mehurin	Susceptible to rutting and wheel slippage
776B, 776C:	
Snellman	Susceptible to rutting and wheel slippage
Sugarbush	Poor traction (loose sandy material)
776E:	
Snellman	Slope Susceptible to rutting and wheel slippage
Sugarbush	Poor traction (loose sandy material) Slope
778B, 778C:	
Dorset	Susceptible to rutting and wheel slippage
Corliss	Poor traction (loose sandy material)
779B:	
Peever	Susceptible to rutting and wheel slippage
Mehurin	Susceptible to rutting and wheel slippage
915C2:	
Forman	Susceptible to rutting and wheel slippage
Buse	Susceptible to rutting and wheel slippage
915D2:	
Forman	Slope Susceptible to rutting and wheel slippage
Buse	Slope Susceptible to rutting and wheel slippage
1102B, 1102C:	
Chapett	Susceptible to rutting and wheel slippage
Dorset	Susceptible to rutting and wheel slippage
1103:	
Clitherall	No major considerations or hazards

Forest Land Harvest Equipment Considerations--Continued

Map symbol and soil name	Forest land harvest equipment considerations
1104B, 1104C:	
Waukon	Susceptible to rutting and wheel slippage
Dorset	Susceptible to rutting and wheel slippage
1104D:	
Waukon	Slope Susceptible to rutting and wheel slippage
Dorset	Slope Susceptible to rutting and wheel slippage
1105B:	
Dent	Susceptible to rutting and wheel slippage
1111:	
Nidaros	Flooding Susceptible to rutting and wheel slippage Wetness
1112D, 1112E:	
Chapett	Slope Susceptible to rutting and wheel slippage
Corliss	Poor traction (loose sandy material) Slope
1120:	
Rushlake	Poor traction (loose sandy material)
Hangaard	Poor traction (loose sandy material) Wetness
1129:	
Lindaas	Susceptible to rutting and wheel slippage Wetness
1131B:	
Verndale	No major considerations or hazards
Abbeylake	Poor traction (loose sandy material)
1136:	
Nidaros	Susceptible to rutting and wheel slippage Wetness
1195A, 1195B, 1195C:	
Sybil	Poor traction (loose sandy material)
Eagleview	Poor traction (loose sandy material)
1195E:	
Sybil	Slope
Eagleview	Poor traction (loose sandy material) Slope
1196B:	
Lida	No major considerations or hazards
Two Inlets	No major considerations or hazards

Forest Land Harvest Equipment Considerations--Continued

Map symbol and soil name	Forest land harvest equipment considerations
1196C:	
Lida	No major considerations or hazards
Two Inlets	Poor traction (loose sandy material)
1196E, 1196F:	
Lida	Slope
Two Inlets	Poor traction (loose sandy material) Slope
1200:	
Egglake	Susceptible to rutting and wheel slippage Wetness
1208B:	
Naytahwaush	Susceptible to rutting and wheel slippage
Mahkonce	Susceptible to rutting and wheel slippage
1209C:	
Naytahwaush	Susceptible to rutting and wheel slippage
1212B:	
Mahkonce	Susceptible to rutting and wheel slippage
1215:	
Pinelake	Wetness
1216B:	
Egglake	Susceptible to rutting and wheel slippage Wetness
Wykeham	Susceptible to rutting and wheel slippage
1217E:	
Waukon	Slope Susceptible to rutting and wheel slippage
Lida	Slope
1218B, 1218C:	
Snellman	Susceptible to rutting and wheel slippage
Lida	No major considerations or hazards
1218E, 1218F:	
Snellman	Slope Susceptible to rutting and wheel slippage
Lida	Slope
1232B:	
Chapett	Susceptible to rutting and wheel slippage
1232E:	
Chapett	Slope Susceptible to rutting and wheel slippage

Forest Land Harvest Equipment Considerations--Continued

Map symbol and soil name	Forest land harvest equipment considerations
1247D:	
Corliss	Poor traction (loose sandy material) Slope
Dorset	Slope Susceptible to rutting and wheel slippage
1250C:	
Abbeylake	Poor traction (loose sandy material)
Verndale	No major considerations or hazards
1275B, 1275C:	
Kandota	Susceptible to rutting and wheel slippage
Egglake	Susceptible to rutting and wheel slippage Wetness
1276:	
Knute	Susceptible to rutting and wheel slippage
Brandsvold	Susceptible to rutting and wheel slippage Wetness
1277D:	
Corliss	Poor traction (loose sandy material) Slope
Sverdrup	Poor traction (loose sandy material) Slope
1289:	
Knute	Susceptible to rutting and wheel slippage
1290:	
Brandsvold	Susceptible to rutting and wheel slippage Wetness
1291:	
Sedgeville	Flooding Susceptible to rutting and wheel slippage Wetness
1307:	
Rushlake	Poor traction (loose sandy material)
1319B, 1319C:	
Rockwood	Poor traction (loose sandy material)
1319D:	
Rockwood	Poor traction (loose sandy material) Slope
1320B:	
Blowers	Wetness
1321:	
Paddock	Wetness
Becida	Susceptible to rutting and wheel slippage Wetness

Forest Land Harvest Equipment Considerations--Continued

Map symbol and soil name	Forest land harvest equipment considerations
1338:	
Oakcreek	No major considerations or hazards
1340:	
Bluffcreek	No major considerations or hazards
Epoufette	Poor traction (loose sandy material) Wetness
1341:	
Clitherall	No major considerations or hazards
Wykeham	Susceptible to rutting and wheel slippage
1342:	
Pinelake	Susceptible to rutting and wheel slippage Wetness
Brandsvold	Susceptible to rutting and wheel slippage Wetness
1343C:	
Lida	No major considerations or hazards
Almora	Susceptible to rutting and wheel slippage
Lizzie	Susceptible to rutting and wheel slippage
1344B:	
Lida	No major considerations or hazards
Almora	Susceptible to rutting and wheel slippage
Dent	Susceptible to rutting and wheel slippage
1345:	
Bluffcreek	Poor traction (loose sandy material)
Rosy	Susceptible to rutting and wheel slippage
1347B:	
Kandota	Susceptible to rutting and wheel slippage
1348:	
Knute	Susceptible to rutting and wheel slippage
1349:	
Clotho	Susceptible to rutting and wheel slippage Wetness
1350:	
Brandsvold	Susceptible to rutting and wheel slippage Wetness
1351:	
Bluffton	Susceptible to rutting and wheel slippage Wetness
1365:	
Hillview	Poor traction (loose sandy material) Wetness

Forest Land Harvest Equipment Considerations--Continued

Map symbol and soil name	Forest land harvest equipment considerations
1396:	
Sedgeville	Flooding Susceptible to rutting and wheel slippage Wetness
Nidaros	Susceptible to rutting and wheel slippage Wetness
Aquolls	Susceptible to rutting and wheel slippage Wetness
1397:	
Bemidji	Poor traction (loose sandy material)
1943:	
Roscommon	Poor traction (loose sandy material) Wetness
1975:	
Oylen	No major considerations or hazards

Forest Haul Road Considerations

(Only the soils suitable for production of commercial trees are listed. See text for a description of the considerations listed in this table)

Map symbol and soil name	Forest haul road considerations
7A, 7B: Hubbard	No major considerations or hazards
7C: Hubbard	Slope
38B: Waukon	Low bearing strength
38C2, 38D2, 38E: Waukon	Low bearing strength Slope
53B: Kandota	Low bearing strength
53C, 53D: Kandota	Low bearing strength Slope
121: Wykeham	Low bearing strength
168B: Forman	Low bearing strength
180: Gonvick	Low bearing strength
191: Epoufette	Wetness
202: Meehan	Wetness
260: Duelm	No major considerations or hazards
267B, 267C, 267E, 267F: Snellman	Low bearing strength Slope
406A, 406B: Dorset	Low bearing strength
422B: Bygland	Low bearing strength
422C: Bygland	Low bearing strength Slope
441A, 441B: Almora	Low bearing strength
441C: Almora	Low bearing strength Slope

Forest Haul Road Considerations--Continued

Map symbol and soil name	Forest haul road considerations
540:	
Seelyeville	Low bearing strength Wetness
541:	
Rifle	Low bearing strength Wetness
567A, 567B:	
Verndale	No major considerations or hazards
624:	
Rosy	Low bearing strength
646C, 646D:	
Peever	Low bearing strength Slope
670:	
Knute	Low bearing strength
701:	
Runeberg	Low bearing strength Wetness
705B:	
Nitche	Low bearing strength
Kandota	Low bearing strength
Lida	No major considerations or hazards
705C:	
Nitche	Low bearing strength Slope
Kandota	Low bearing strength Slope
Lida	Slope
707B:	
Lizzie	Low bearing strength
707C2, 707D2:	
Lizzie	Low bearing strength Slope
710:	
Friberg	Low bearing strength Wetness
Weetown	Low bearing strength
715:	
Bluffcreek	No major considerations or hazards
Clearriver	No major considerations or hazards
716B:	
Leaflake	No major considerations or hazards
Eagleview	No major considerations or hazards

Forest Haul Road Considerations--Continued

Map symbol and soil name	Forest haul road considerations
716C, 716D:	
Leaflake	Slope
Eagleview	Slope
718E:	
Naytahwaush	Low bearing strength Slope
721B:	
Corliss	No major considerations or hazards
721C, 721D, 721E:	
Corliss	Slope
760C2, 760D2:	
Chapett	Low bearing strength Slope
Sisseton	Low bearing strength Slope
769B:	
Mehurin	Low bearing strength
776B, 776C, 776E:	
Snellman	Low bearing strength Slope
Sugarbush	Slope
778B:	
Dorset	Low bearing strength
Corliss	No major considerations or hazards
778C:	
Dorset	Low bearing strength Slope
Corliss	Slope
779B:	
Peever	Low bearing strength
Mehurin	Low bearing strength
915C2, 915D2:	
Forman	Low bearing strength Slope
Buse	Low bearing strength Slope
1102B:	
Chapett	Low bearing strength
Dorset	Low bearing strength

Forest Haul Road Considerations--Continued

Map symbol and soil name	Forest haul road considerations
1102C:	
Chapett	Low bearing strength Slope
Dorset	Low bearing strength Slope
1103:	
Clitherall	No major considerations or hazards
1104B:	
Waukon	Low bearing strength
Dorset	Low bearing strength
1104C, 1104D:	
Waukon	Low bearing strength Slope
Dorset	Low bearing strength Slope
1105B:	
Dent	Low bearing strength
1111:	
Nidaros	Flooding Low bearing strength Wetness
1112D, 1112E:	
Chapett	Low bearing strength Slope
Corliss	Slope
1120:	
Rushlake	No major considerations or hazards
Hangaard	Wetness
1129:	
Lindaas	Low bearing strength Wetness
1131B:	
Verndale	No major considerations or hazards
Abbeylake	No major considerations or hazards
1136:	
Nidaros	Low bearing strength Wetness
1195A:	
Sybil	No major considerations or hazards
Eagleview	No major considerations or hazards
1195B, 1195C, 1195E:	
Sybil	Slope
Eagleview	Slope

Forest Haul Road Considerations--Continued

Map symbol and soil name	Forest haul road considerations
1196B, 1196C, 1196E, 1196F:	
Lida	Slope
Two Inlets	Slope
1200:	
Egglake	Low bearing strength Wetness
1208B:	
Naytahwaush	Low bearing strength Slope
Mahkonce	Low bearing strength
1209C:	
Naytahwaush	Low bearing strength Slope
1212B:	
Mahkonce	Low bearing strength
1215:	
Pinelake	Wetness
1216B:	
Egglake	Low bearing strength Wetness
Wykeham	Low bearing strength
1217E:	
Waukon	Low bearing strength Slope
Lida	Slope
1218B, 1218C, 1218E, 1218F:	
Snellman	Low bearing strength Slope
Lida	Slope
1232B:	
Chapett	Low bearing strength
1232E:	
Chapett	Low bearing strength Slope
1247D:	
Corliss	Slope
Dorset	Low bearing strength Slope
1250C:	
Abbeylake	Slope
Verndale	Slope

Forest Haul Road Considerations--Continued

Map symbol and soil name	Forest haul road considerations
1275B, 1275C:	
Kandota	Low bearing strength Slope
Egglake	Low bearing strength Wetness
1276:	
Knute	Low bearing strength
Brandsvold	Low bearing strength Wetness
1277D:	
Corliss	Slope
Sverdrup	Slope
1289:	
Knute	Low bearing strength
1290:	
Brandsvold	Low bearing strength Wetness
1291:	
Sedgeville	Flooding Low bearing strength Wetness
1307:	
Rushlake	No major considerations or hazards
1319B:	
Rockwood	No major considerations or hazards
1319C, 1319D:	
Rockwood	Slope
1320B:	
Blowers	Wetness
1321:	
Paddock	Wetness
Becida	Low bearing strength Wetness
1338:	
Oakcreek	No major considerations or hazards
1340:	
Bluffcreek	No major considerations or hazards
Epoufette	Wetness
1341:	
Clitherall	No major considerations or hazards
Wykeham	Low bearing strength

Forest Haul Road Considerations--Continued

Map symbol and soil name	Forest haul road considerations
1342:	
Pinelake	Low bearing strength Wetness
Brandsvold	Low bearing strength Wetness
1343C:	
Lida	Slope
Almora	Low bearing strength Slope
Lizzie	Low bearing strength Slope
1344B:	
Lida	Slope
Almora	Low bearing strength Slope
Dent	Low bearing strength
1345:	
Bluffcreek	No major considerations or hazards
Rosy	Low bearing strength
1347B:	
Kandota	Low bearing strength
1348:	
Knute	Low bearing strength
1349:	
Clotho	Low bearing strength Wetness
1350:	
Brandsvold	Low bearing strength Wetness
1351:	
Bluffton	Low bearing strength Wetness
1365:	
Hillview	Wetness
1396:	
Sedgeville	Flooding Low bearing strength Wetness
Nidaros	Low bearing strength Wetness
Aquolls	Low bearing strength Wetness

Forest Haul Road Considerations--Continued

Map symbol and soil name	Forest haul road considerations
1397:	
Bemidji	No major considerations or hazards
1943:	
Roscommon	Wetness
1975:	
Oylen	No major considerations or hazards

Forest Log Landing Considerations

(Only the soils suitable for production of commercial trees are listed. See text for a description of the considerations listed in this table)

Map symbol and soil name	Forest log landing considerations
7A:	
Hubbard	No major considerations or hazards
7B, 7C:	
Hubbard	Slope
38B, 38C2, 38D2, 38E:	
Waukon	Slope Susceptible to rutting and wheel slippage
53B, 53C, 53D:	
Kandota	Slope Susceptible to rutting and wheel slippage
121:	
Wykeham	Susceptible to rutting and wheel slippage
168B:	
Forman	Slope Susceptible to rutting and wheel slippage
180:	
Gonvick	Susceptible to rutting and wheel slippage
191:	
Epoufette	Wetness
202:	
Meehan	Wetness
260:	
Duelm	No major considerations or hazards
267B, 267C, 267E, 267F:	
Snellman	Slope Susceptible to rutting and wheel slippage
406A:	
Dorset	Susceptible to rutting and wheel slippage
406B:	
Dorset	Slope Susceptible to rutting and wheel slippage
422B, 422C:	
Bygland	Slope Susceptible to rutting and wheel slippage
441A:	
Almora	Susceptible to rutting and wheel slippage
441B, 441C:	
Almora	Slope Susceptible to rutting and wheel slippage
540:	
Seelyeville	Susceptible to rutting and wheel slippage Wetness

Forest Log Landing Considerations--Continued

Map symbol and soil name	Forest log landing considerations
541:	
Rifle	Susceptible to rutting and wheel slippage Wetness
567A:	
Verndale	No major considerations or hazards
567B:	
Verndale	Slope
624:	
Rosy	Susceptible to rutting and wheel slippage
646C, 646D:	
Peever	Slope Susceptible to rutting and wheel slippage
670:	
Knute	Susceptible to rutting and wheel slippage
701:	
Runeberg	Susceptible to rutting and wheel slippage Wetness
705B, 705C:	
Nitche	Slope Susceptible to rutting and wheel slippage
Kandota	Slope Susceptible to rutting and wheel slippage
Lida	Slope
707B, 707C2, 707D2:	
Lizzie	Slope Susceptible to rutting and wheel slippage
710:	
Friberg	Susceptible to rutting and wheel slippage Wetness
Weetown	Susceptible to rutting and wheel slippage
715:	
Bluffcreek	No major considerations or hazards
Clearriver	No major considerations or hazards
716B, 716C, 716D:	
Leaflake	Slope
Eagleview	Slope
718E:	
Naytahwaush	Slope Susceptible to rutting and wheel slippage
721B, 721C, 721D, 721E:	
Corliss	Slope

Forest Log Landing Considerations--Continued

Map symbol and soil name	Forest log landing considerations
760C2, 760D2:	
Chapett	Slope Susceptible to rutting and wheel slippage
Sisseton	Slope Susceptible to rutting and wheel slippage
769B:	
Mehurin	Slope Susceptible to rutting and wheel slippage
776B, 776C, 776E:	
Snellman	Slope Susceptible to rutting and wheel slippage
Sugarbush	Slope
778B, 778C:	
Dorset	Slope Susceptible to rutting and wheel slippage
Corliss	Slope
779B:	
Peever	Slope Susceptible to rutting and wheel slippage
Mehurin	Slope Susceptible to rutting and wheel slippage
915C2, 915D2:	
Forman	Slope Susceptible to rutting and wheel slippage
Buse	Slope Susceptible to rutting and wheel slippage
1102B, 1102C:	
Chapett	Slope Susceptible to rutting and wheel slippage
Dorset	Slope Susceptible to rutting and wheel slippage
1103:	
Clitherall	No major considerations or hazards
1104B, 1104C, 1104D:	
Waukon	Slope Susceptible to rutting and wheel slippage
Dorset	Slope Susceptible to rutting and wheel slippage
1105B:	
Dent	Slope Susceptible to rutting and wheel slippage
1111:	
Nidaros	Flooding Susceptible to rutting and wheel slippage Wetness

Forest Log Landing Considerations--Continued

Map symbol and soil name	Forest log landing considerations
1112D, 1112E:	
Chapett	Slope Susceptible to rutting and wheel slippage
Corliss	Slope
1120:	
Rushlake	No major considerations or hazards
Hangaard	Wetness
1129:	
Lindaas	Susceptible to rutting and wheel slippage Wetness
1131B:	
Verndale	Slope
Abbeylake	Slope
1136:	
Nidaros	Susceptible to rutting and wheel slippage Wetness
1195A:	
Sybil	No major considerations or hazards
Eagleview	No major considerations or hazards
1195B, 1195C, 1195E:	
Sybil	Slope
Eagleview	Slope
1196B, 1196C, 1196E, 1196F:	
Lida	Slope
Two Inlets	Slope
1200:	
Egglake	Susceptible to rutting and wheel slippage Wetness
1208B:	
Naytahwaush	Slope Susceptible to rutting and wheel slippage
Mahkonce	Slope Susceptible to rutting and wheel slippage
1209C:	
Naytahwaush	Slope Susceptible to rutting and wheel slippage
1212B:	
Mahkonce	Slope Susceptible to rutting and wheel slippage
1215:	
Pinelake	Wetness

Forest Log Landing Considerations--Continued

Map symbol and soil name	Forest log landing considerations
1216B:	
Egglake	Susceptible to rutting and wheel slippage Wetness
Wykeham	Slope Susceptible to rutting and wheel slippage
1217E:	
Waukon	Slope Susceptible to rutting and wheel slippage
Lida	Slope
1218B, 1218C, 1218E, 1218F:	
Snellman	Slope Susceptible to rutting and wheel slippage
Lida	Slope
1232B, 1232E:	
Chapett	Slope Susceptible to rutting and wheel slippage
1247D:	
Corliss	Slope
Dorset	Slope Susceptible to rutting and wheel slippage
1250C:	
Abbeylake	Slope
Verndale	Slope
1275B, 1275C:	
Kandota	Slope Susceptible to rutting and wheel slippage
Egglake	Susceptible to rutting and wheel slippage Wetness
1276:	
Knute	Susceptible to rutting and wheel slippage
Brandsvold	Susceptible to rutting and wheel slippage Wetness
1277D:	
Corliss	Slope
Sverdrup	Slope
1289:	
Knute	Susceptible to rutting and wheel slippage
1290:	
Brandsvold	Susceptible to rutting and wheel slippage Wetness

Forest Log Landing Considerations--Continued

Map symbol and soil name	Forest log landing considerations
1291:	
Sedgeville	Flooding Susceptible to rutting and wheel slippage Wetness
1307:	
Rushlake	No major considerations or hazards
1319B, 1319C, 1319D:	
Rockwood	Slope
1320B:	
Blowers	Slope Wetness
1321:	
Paddock	Wetness
Becida	Susceptible to rutting and wheel slippage Wetness
1338:	
Oakcreek	No major considerations or hazards
1340:	
Bluffcreek	No major considerations or hazards
Epoufette	Wetness
1341:	
Clitherall	No major considerations or hazards
Wykeham	Susceptible to rutting and wheel slippage
1342:	
Pinelake	Susceptible to rutting and wheel slippage Wetness
Brandsvold	Susceptible to rutting and wheel slippage Wetness
1343C:	
Lida	Slope
Almora	Slope Susceptible to rutting and wheel slippage
Lizzie	Slope Susceptible to rutting and wheel slippage
1344B:	
Lida	Slope
Almora	Slope Susceptible to rutting and wheel slippage
Dent	Slope Susceptible to rutting and wheel slippage
1345:	
Bluffcreek	No major considerations or hazards
Rosy	Susceptible to rutting and wheel slippage

Forest Log Landing Considerations--Continued

Map symbol and soil name	Forest log landing considerations
1347B:	
Kandota	Slope Susceptible to rutting and wheel slippage
1348:	
Knute	Susceptible to rutting and wheel slippage
1349:	
Clotho	Susceptible to rutting and wheel slippage Wetness
1350:	
Brandsvold	Susceptible to rutting and wheel slippage Wetness
1351:	
Bluffton	Susceptible to rutting and wheel slippage Wetness
1365:	
Hillview	Wetness
1396:	
Sedgeville	Flooding Susceptible to rutting and wheel slippage Wetness
Nidaros	Susceptible to rutting and wheel slippage Wetness
Aquolls	Susceptible to rutting and wheel slippage Wetness
1397:	
Bemidji	No major considerations or hazards
1943:	
Roscommon	Wetness
1975:	
Oylen	No major considerations or hazards

Forest Land Site Preparation and Planting Considerations

(Only the soils suitable for production of commercial trees are listed. See text for a description of the considerations listed in this table)

Map symbol and soil name	Site preparation and planting considerations
7A, 7B: Hubbard	No major considerations or hazards
7C: Hubbard	Water erosion
38B: Waukon	Potential poor tilth and compaction
38C2: Waukon	Potential poor tilth and compaction Water erosion
38D2, 38E: Waukon	Potential poor tilth and compaction Slope Water erosion
53B: Kandota	Potential poor tilth and compaction
53C: Kandota	Potential poor tilth and compaction Water erosion
53D: Kandota	Potential poor tilth and compaction Slope Water erosion
121: Wykeham	No major considerations or hazards
168B: Forman	Potential poor tilth and compaction
180: Gonvick	No major considerations or hazards
191: Epoufette	Wetness
202: Meehan	Wetness
260: Duelm	No major considerations or hazards
267B, 267C: Snellman	Water erosion
267E, 267F: Snellman	Slope Water erosion
406A, 406B: Dorset	No major considerations or hazards
422B: Bygland	Potential poor tilth and compaction

Forest Land Site Preparation and Planting Considerations--Continued

Map symbol and soil name	Site preparation and planting considerations
422C:	
Bygland	Potential poor tilth and compaction Water erosion
441A, 441B:	
Almora	No major considerations or hazards
441C:	
Almora	Water erosion
540:	
Seelyeville	Wetness
541:	
Rifle	Wetness
567A, 567B:	
Verndale	No major considerations or hazards
624:	
Rosy	No major considerations or hazards
646C:	
Peever	Potential poor tilth and compaction Water erosion
646D:	
Peever	Potential poor tilth and compaction Slope Water erosion
670:	
Knute	No major considerations or hazards
701:	
Runeberg	Potential poor tilth and compaction Wetness
705B:	
Nitche	No major considerations or hazards
Kandota	Potential poor tilth and compaction
Lida	No major considerations or hazards
705C:	
Nitche	Water erosion
Kandota	Potential poor tilth and compaction Water erosion
Lida	Water erosion
707B:	
Lizzie	Potential poor tilth and compaction
707C2:	
Lizzie	Potential poor tilth and compaction Water erosion
707D2:	
Lizzie	Potential poor tilth and compaction Slope Water erosion

Forest Land Site Preparation and Planting Considerations--Continued

Map symbol and soil name	Site preparation and planting considerations
710:	
Friberg	Wetness
Weetown	No major considerations or hazards
715:	
Bluffcreek	No major considerations or hazards
Clearriver	No major considerations or hazards
716B:	
Leaflake	No major considerations or hazards
Eagleview	No major considerations or hazards
716C:	
Leaflake	Water erosion
Eagleview	Water erosion
716D:	
Leaflake	Slope Water erosion
Eagleview	Slope Water erosion
718E:	
Naytahwaush	Potential poor tilth and compaction Slope Water erosion
721B:	
Corliss	No major considerations or hazards
721C:	
Corliss	Water erosion
721D, 721E:	
Corliss	Slope Water erosion
760C2:	
Chapett	Potential poor tilth and compaction Water erosion
Sisseton	Potential poor tilth and compaction Water erosion
760D2:	
Chapett	Potential poor tilth and compaction Slope Water erosion
Sisseton	Potential poor tilth and compaction Slope Water erosion
769B:	
Mehurin	No major considerations or hazards

Forest Land Site Preparation and Planting Considerations--Continued

Map symbol and soil name	Site preparation and planting considerations
776B, 776C:	
Snellman	Water erosion
Sugarbush	Water erosion
776E:	
Snellman	Slope Water erosion
Sugarbush	Slope Water erosion
778B:	
Dorset	No major considerations or hazards
Corliss	No major considerations or hazards
778C:	
Dorset	Water erosion
Corliss	Water erosion
779B:	
Peever	No major considerations or hazards
Mehurin	No major considerations or hazards
915C2:	
Forman	Potential poor tilth and compaction Water erosion
Buse	Potential poor tilth and compaction Water erosion
915D2:	
Forman	Potential poor tilth and compaction Slope Water erosion
Buse	Potential poor tilth and compaction Slope Water erosion
1102B:	
Chapett	Potential poor tilth and compaction
Dorset	No major considerations or hazards
1102C:	
Chapett	Potential poor tilth and compaction Water erosion
Dorset	Water erosion
1103:	
Clitherall	No major considerations or hazards
1104B:	
Waukon	Potential poor tilth and compaction
Dorset	No major considerations or hazards

Forest Land Site Preparation and Planting Considerations--Continued

Map symbol and soil name	Site preparation and planting considerations
1104C:	
Waukon	Potential poor tilth and compaction Water erosion
Dorset	Water erosion
1104D:	
Waukon	Potential poor tilth and compaction Slope Water erosion
Dorset	Slope Water erosion
1105B:	
Dent	No major considerations or hazards
1111:	
Nidaros	Flooding Wetness
1112D, 1112E:	
Chapett	Potential poor tilth and compaction Slope Water erosion
Corliss	Slope Water erosion
1120:	
Rushlake	No major considerations or hazards
Hangaard	Wetness
1129:	
Lindaas	Wetness
1131B:	
Verndale	No major considerations or hazards
Abbeylake	No major considerations or hazards
1136:	
Nidaros	Wetness
1195A:	
Sybil	No major considerations or hazards
Eagleview	No major considerations or hazards
1195B, 1195C:	
Sybil	Water erosion
Eagleview	Water erosion
1195E:	
Sybil	Slope Water erosion
Eagleview	Slope Water erosion

Forest Land Site Preparation and Planting Considerations--Continued

Map symbol and soil name	Site preparation and planting considerations
1196B, 1196C:	
Lida	Water erosion
Two Inlets	Water erosion
1196E, 1196F:	
Lida	Slope Water erosion
Two Inlets	Slope Water erosion
1200:	
Egglake	Wetness
1208B:	
Naytahwaush	Potential poor tilth and compaction Water erosion
Mahkonce	Potential poor tilth and compaction
1209C:	
Naytahwaush	Potential poor tilth and compaction Water erosion
1212B:	
Mahkonce	Potential poor tilth and compaction
1215:	
Pinelake	Wetness
1216B:	
Egglake	Wetness
Wykeham	No major considerations or hazards
1217E:	
Waukon	Potential poor tilth and compaction Slope Water erosion
Lida	Slope Water erosion
1218B, 1218C:	
Snellman	Water erosion
Lida	Water erosion
1218E, 1218F:	
Snellman	Slope Water erosion
Lida	Slope Water erosion
1232B:	
Chapett	Potential poor tilth and compaction
1232E:	
Chapett	Potential poor tilth and compaction Slope Water erosion

Forest Land Site Preparation and Planting Considerations--Continued

Map symbol and soil name	Site preparation and planting considerations
1247D:	
Corliss	Slope Water erosion
Dorset	Slope Water erosion
1250C:	
Abbeylake	Water erosion
Verndale	Water erosion
1275B, 1275C:	
Kandota	Potential poor tilth and compaction Water erosion
Egglake	Potential poor tilth and compaction Wetness
1276:	
Knute	No major considerations or hazards
Brandsvold	Wetness
1277D:	
Corliss	Slope Water erosion
Sverdrup	Slope Water erosion
1289:	
Knute	No major considerations or hazards
1290:	
Brandsvold	Wetness
1291:	
Sedgeville	Flooding Potential poor tilth and compaction Wetness
1307:	
Rushlake	No major considerations or hazards
1319B:	
Rockwood	Surface stones
1319C:	
Rockwood	Surface stones Water erosion
1319D:	
Rockwood	Slope Surface stones Water erosion
1320B:	
Blowers	Surface stones Wetness

Forest Land Site Preparation and Planting Considerations--Continued

Map symbol and soil name	Site preparation and planting considerations
1321:	
Paddock	Surface stones Wetness
Becida	Potential poor tilth and compaction Surface stones Wetness
1338:	
Oakcreek	No major considerations or hazards
1340:	
Bluffcreek	No major considerations or hazards
Epoufette	Wetness
1341:	
Clitherall	No major considerations or hazards
Wykeham	No major considerations or hazards
1342:	
Pinelake	Wetness
Brandsvold	Potential poor tilth and compaction Wetness
1343C:	
Lida	Water erosion
Almora	Water erosion
Lizzie	Water erosion
1344B:	
Lida	Water erosion
Almora	Water erosion
Dent	No major considerations or hazards
1345:	
Bluffcreek	No major considerations or hazards
Rosy	No major considerations or hazards
1347B:	
Kandota	Potential poor tilth and compaction
1348:	
Knute	No major considerations or hazards
1349:	
Clotho	Wetness
1350:	
Brandsvold	Wetness
1351:	
Bluffton	Potential poor tilth and compaction Wetness

Forest Land Site Preparation and Planting Considerations--Continued

Map symbol and soil name	Site preparation and planting considerations
1365:	
Hillview	Wetness
1396:	
Sedgeville	Flooding Potential poor tilth and compaction Wetness
Nidaros	Wetness
Aquolls	Potential poor tilth and compaction Wetness
1397:	
Bemidji	No major considerations or hazards
1943:	
Roscommon	Wetness
1975:	
Oylen	No major considerations or hazards

Recreation

Otter Tail County offers a variety of recreational opportunities. Camping, canoeing, boating, hunting, fishing, horseback riding, golfing, bicycling, cross-country skiing, snowmobiling, and swimming are most common. Most of the major recreational areas in the county are associated with the many lakes. There are more than 1,000 lakes in the county. Most of the popular lakes have public access points, and most have boat launching ramps. Some lake access points are privately controlled. Glendalough State Park, Inspiration Peak State Park, and Maplewood State Park offer camping, scenic hiking, horseback riding trails, swimming, and fishing. Phelps Mill is known for its picnicking areas and cultural value. Inspiration Peak is the second highest point in Minnesota. An area called Seven Sisters Prairie abruptly rises 200 feet above the north shore of Lake Christina along the Otter Tail County and Douglas County line. This landform feature supports an unusual number of distinctly different western plants not commonly found in Minnesota. Also, there are numerous city and county parks throughout the county. The Otter Tail River provides scenic canoeing and tubing opportunities along its course. The many waterfowl production areas and wildlife management areas are open to public hunting. Information on additional recreational opportunities can be obtained at the Fergus Falls Chamber of Commerce or the tourist information centers in Battle Lake, Perham, and other area communities.

The soils of the survey area are rated in the table "Recreational Development" according to limitations that affect their suitability for recreation. The ratings are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, the ability of the soil to support vegetation, access to water, potential water impoundment sites, and either access to public sewer lines or the capacity of the soil to absorb septic tank effluent. Soils subject to flooding are limited, in varying degrees, for recreational uses by the duration of flooding and the season when it occurs. Onsite assessment of the height, duration, intensity, and frequency of flooding is essential in planning recreational facilities.

Camp areas are tracts of land used intensively as sites for tents, trailers, and campers and for outdoor activities that accompany such sites (fig. 4). These areas require site preparation, such as shaping and leveling the tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The soils are rated on the basis of soil properties that influence the ease of developing camp areas and performance of the areas after development. Also considered are the soil properties that influence trafficability and promote the growth of vegetation after heavy use.

Picnic areas are natural or landscaped tracts of land that are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The soils are rated on the basis of soil properties that influence the cost of shaping the site, trafficability, and the growth of vegetation after development. The surface of picnic areas should absorb rainfall readily, remain firm under heavy foot traffic, and not be dusty when dry.

Playgrounds are areas used intensively for baseball, football, or similar activities. These areas require a nearly level soil that is free of stones and that can withstand heavy foot traffic and maintain an adequate cover of vegetation. The soils are rated on the basis of soil properties that influence the cost of shaping the site, trafficability, and the growth of vegetation. Slope and stoniness are the main concerns in developing playgrounds. The surface of the playgrounds should absorb rainfall readily, remain firm under heavy foot traffic, and not be dusty when dry.

Paths and trails are areas used for hiking and horseback riding. The areas should require little or no cutting and filling during site preparation. The soils are rated on the basis of soil properties that influence trafficability and erodibility. Paths and trails should remain firm under foot traffic and not be dusty when dry.

Golf fairways are subject to heavy foot traffic and

Figure 4.—A campground in an area of Rushlake-Hangaard complex. Areas of these soils are commonly developed as homesites or campgrounds.

some light vehicular traffic. Cutting or filling may be required. The best soils for use as golf fairways are firm when wet, are not dusty when dry, and are not subject to prolonged flooding during the period of use. They have moderate slopes and no stones or boulders on the surface. The suitability of the soil for tees or greens is not considered in rating the soils.

The interpretive ratings in this table help engineers, planners, and others to understand how soil properties influence recreational uses. Ratings for proposed uses are given in terms of limitations. Only the most restrictive features are listed. Other features may limit a specific recreational use.

The degree of soil limitation is expressed as slight, moderate, or severe.

Slight means that soil properties are favorable for the rated use. The limitations are minor and can be easily overcome. Good performance and low maintenance are expected.

Moderate means that soil properties are moderately favorable for the rated use. The limitations can be overcome or modified by special planning, design, or maintenance. During some part of the year, the expected performance may be less desirable than that of soils rated *slight*.

Severe means that soil properties are unfavorable for the rated use. Examples of limitations are slope, bedrock near the surface, flooding, and a seasonal high water table. These limitations generally require major soil reclamation, special design, or intensive

maintenance. Overcoming the limitations generally is difficult and costly.

The information in the table "Recreational Development" can be supplemented by other information in this survey, for example, interpretations for dwellings without basements and for local roads and streets in the table "Building Site Development" and interpretations for septic tank absorption fields in the table "Sanitary Facilities."

Recreational Development

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. See text for definitions of terms used in this table. Absence of an entry indicates that no rating is applicable)

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
7A:					
Hubbard	Moderate: too sandy.	Moderate: too sandy.	Moderate: too sandy.	Moderate: too sandy.	Moderate: droughty.
7B:					
Hubbard	Moderate: too sandy.	Moderate: too sandy.	Moderate: slope, too sandy.	Moderate: too sandy.	Moderate: droughty.
7C:					
Hubbard	Moderate: slope, too sandy.	Moderate: slope, too sandy.	Severe: slope.	Moderate: too sandy.	Moderate: droughty, slope.
26:					
Aazdahl	Slight	Slight	Slight	Slight	Slight.
34:					
Parnell	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
38B:					
Waukon	Slight	Slight	Moderate: slope.	Slight	Slight.
38C2:					
Waukon	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
38D2:					
Waukon	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
38E:					
Waukon	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
46:					
Borup	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
53B:					
Kandota	Slight	Slight	Moderate: slope, small stones.	Slight	Slight.
53C:					
Kandota	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
53D:					
Kandota	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
58:					
Kittson	Slight	Slight	Slight	Slight	Slight.

Recreational Development--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
59: Grimstad	Slight	Slight	Slight	Slight	Slight.
61: Arveson	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
63: Rockwell	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
65: Foxhome	Slight	Slight	Slight	Slight	Slight.
66: Flaming	Moderate: too sandy.	Moderate: too sandy.	Moderate: too sandy.	Moderate: too sandy.	Moderate: droughty.
68: Arveson	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
107: Winger	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
108: McIntosh	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: percs slowly.	Slight	Slight.
121: Wykeham	Slight	Slight	Moderate: slope, small stones.	Slight	Slight.
127A: Sverdrup	Slight	Slight	Slight	Slight	Moderate: droughty.
127B: Sverdrup	Slight	Slight	Moderate: slope.	Slight	Moderate: droughty.
127C: Sverdrup	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: droughty, slope.
141B: Egeland	Slight	Slight	Moderate: slope.	Slight	Moderate: droughty.
141C: Egeland	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: droughty, slope.
141D: Egeland	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.

Recreational Development--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
168B: Forman	Slight	Slight	Moderate: slope.	Slight	Slight.
180: Gonvick	Slight	Slight	Moderate: slope.	Slight	Slight.
184: Hamerly	Moderate: wetness.	Moderate: wetness.	Moderate: slope, wetness.	Slight	Slight.
187: Haug	Severe: ponding, excess humus.	Severe: ponding, excess humus.	Severe: excess humus, ponding.	Severe: ponding, excess humus.	Severe: ponding, excess humus.
191: Epoufette	Severe: wetness.	Severe: wetness.	Severe: small stones, wetness.	Severe: wetness.	Severe: wetness.
202: Meehan	Severe: wetness, too acid.	Severe: too acid.	Severe: wetness, too acid.	Moderate: wetness, too sandy.	Severe: too acid.
258A, 258B: Sandberg	Moderate: droughty.	Moderate: droughty.	Severe: small stones.	Slight	Severe: droughty.
258C: Sandberg	Moderate: slope.	Moderate: slope.	Severe: slope, small stones.	Slight	Severe: droughty.
260: Duelm	Slight	Slight	Moderate: small stones, wetness.	Slight	Moderate: droughty.
267B: Snellman	Slight	Slight	Moderate: slope, small stones.	Slight	Moderate: large stones.
267C: Snellman	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: large stones, slope.
267E: Snellman	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
267F: Snellman	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.

Recreational Development--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
290:					
Rothsay	Slight	Slight	Moderate: slope.	Slight	Slight.
293B:					
Swenoda	Slight	Slight	Moderate: slope.	Slight	Slight.
335:					
Urness	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
339:					
Fordville	Slight	Slight	Slight	Slight	Slight.
341A:					
Arvilla	Slight	Slight	Slight	Slight	Moderate: droughty.
341B:					
Arvilla	Slight	Slight	Moderate: slope.	Slight	Moderate: droughty.
371:					
Clontarf	Slight	Slight	Slight	Slight	Moderate: droughty.
375:					
Forada	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
402C:					
Sioux	Moderate: too sandy.	Moderate: too sandy.	Severe: slope.	Moderate: too sandy.	Severe: droughty.
402E:					
Sioux	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: droughty, slope.
406A:					
Dorset	Slight	Slight	Moderate: small stones.	Slight	Moderate: droughty.
406B:					
Dorset	Slight	Slight	Moderate: slope, small stones.	Slight	Moderate: droughty.
418:					
Lamoure	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
422B:					
Bygland	Slight	Slight	Moderate: slope.	Slight	Slight.
422C:					
Bygland	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.

Recreational Development--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
426: Foldahl	Slight	Slight	Slight	Slight	Moderate: droughty.
441A: Almora	Slight	Slight	Moderate: small stones.	Slight	Slight.
441B: Almora	Slight	Slight	Moderate: slope, small stones.	Slight	Slight.
441C: Almora	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
481: Kratka	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
494: Darnen	Slight	Slight	Slight	Slight	Slight.
497: Hantho	Slight	Slight	Moderate: slope.	Slight	Slight.
508: Wyndmere	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness, droughty.
540: Seelyeville	Severe: ponding, excess humus.	Severe: ponding, excess humus.	Severe: excess humus, ponding.	Severe: ponding, excess humus.	Severe: ponding, excess humus.
541: Rifle	Severe: ponding, excess humus.	Severe: ponding, excess humus.	Severe: excess humus, ponding.	Severe: ponding, excess humus.	Severe: ponding, excess humus.
544: Cathro	Severe: ponding, excess humus.	Severe: ponding, excess humus.	Severe: excess humus, ponding.	Severe: ponding, excess humus.	Severe: ponding, excess humus.
567A: Verndale	Slight	Slight	Moderate: small stones.	Slight	Moderate: droughty.
567B: Verndale	Slight	Slight	Moderate: slope, small stones.	Slight	Moderate: droughty.
609B: Dickey	Moderate: too sandy.	Moderate: too sandy.	Moderate: slope, too sandy.	Moderate: too sandy.	Moderate: droughty.

Recreational Development--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
624:					
Rosy	Slight	Slight	Slight	Slight	Slight.
646C:					
Peever	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
646D:					
Peever	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
670:					
Knute	Slight	Slight	Moderate: small stones.	Slight	Slight.
680:					
Parnell	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
698:					
Doran	Slight	Slight	Slight	Slight	Slight.
701:					
Runeberg	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
705B:					
Nitche	Slight	Slight	Moderate: slope, small stones.	Slight	Moderate: droughty.
Kandota	Slight	Slight	Moderate: slope, small stones.	Slight	Slight.
Lida	Slight	Slight	Moderate: slope.	Slight	Moderate: large stones, droughty.
705C:					
Nitche	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: droughty, slope.
Kandota	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
Lida	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: large stones, droughty, slope.
707B:					
Lizzie	Slight	Slight	Moderate: slope.	Slight	Slight.
707C2:					
Lizzie	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
707D2:					
Lizzie	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.

Recreational Development--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
710:					
Friberg	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Weetown	Slight	Slight	Moderate: slope, small stones.	Slight	Slight.
711B:					
Arvilla	Slight	Slight	Moderate: slope.	Slight	Moderate: droughty.
Sandberg	Moderate: droughty.	Moderate: droughty.	Severe: small stones.	Slight	Moderate: small stones, droughty.
711C:					
Arvilla	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: droughty, slope.
Sandberg	Moderate: slope.	Moderate: slope.	Severe: slope, small stones.	Slight	Moderate: small stones, droughty.
715:					
Bluffcreek	Slight	Slight	Moderate: small stones.	Slight	Moderate: droughty.
Clearriver	Moderate: too sandy.	Moderate: too sandy.	Moderate: small stones, too sandy.	Moderate: too sandy.	Severe: droughty.
716B:					
Leaflake	Moderate: too sandy.	Moderate: too sandy.	Moderate: slope, too sandy.	Moderate: too sandy.	Moderate: droughty.
Eagleview	Moderate: too sandy.	Moderate: too sandy.	Moderate: slope, small stones.	Moderate: too sandy.	Moderate: droughty.
716C:					
Leaflake	Moderate: slope, too sandy.	Moderate: slope, too sandy.	Severe: slope.	Moderate: too sandy.	Moderate: droughty, slope.
Eagleview	Moderate: slope, too sandy.	Moderate: slope, too sandy.	Severe: slope.	Moderate: too sandy.	Moderate: droughty, slope.
716D:					
Leaflake	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: too sandy, slope.	Severe: slope.
Eagleview	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: too sandy, slope.	Severe: slope.

Recreational Development--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
718E:					
Naytahwaush	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
721B:					
Corliss	Moderate: too sandy.	Moderate: too sandy.	Moderate: slope, small stones.	Moderate: too sandy.	Severe: droughty.
721C:					
Corliss	Moderate: slope, too sandy.	Moderate: slope, too sandy.	Severe: slope.	Moderate: too sandy.	Severe: droughty.
721D:					
Corliss	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: too sandy, slope.	Severe: droughty, slope.
721E:					
Corliss	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: droughty, slope.
726:					
Kratka	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
746:					
Haslie	Severe: ponding, excess humus.	Severe: ponding, excess humus.	Severe: excess humus, ponding.	Severe: ponding, excess humus.	Severe: ponding, excess humus.
760C2:					
Chapett	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
Sisseton	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
760D2:					
Chapett	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
Sisseton	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
769B:					
Mehurin	Slight	Slight	Moderate: slope.	Slight	Slight.
776B:					
Snellman	Slight	Slight	Moderate: slope, small stones.	Slight	Moderate: large stones.
Sugarbush	Slight	Slight	Moderate: slope.	Slight	Moderate: large stones, droughty.

Recreational Development--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
776C:					
Snellman	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: large stones, slope.
Sugarbush	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: large stones, droughty, slope.
776E:					
Snellman	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
Sugarbush	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
777C2:					
Sisseton	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
Heimdal	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
777D2:					
Sisseton	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
Heimdal	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
777E:					
Sisseton	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Heimdal	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
778B:					
Dorset	Slight	Slight	Moderate: slope, small stones.	Slight	Moderate: droughty.
Corliss	Moderate: too sandy.	Moderate: too sandy.	Moderate: slope, small stones.	Moderate: too sandy.	Severe: droughty.
778C:					
Dorset	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: droughty, slope.
Corliss	Moderate: slope, too sandy.	Moderate: slope, too sandy.	Severe: slope.	Moderate: too sandy.	Severe: droughty.
779B:					
Peever	Slight	Slight	Moderate: slope.	Slight	Slight.
Mehurin	Slight	Slight	Moderate: slope.	Slight	Slight.

Recreational Development--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
902B:					
Barnes	Slight	Slight	Moderate: slope, small stones.	Slight	Slight.
Buse	Slight	Slight	Moderate: slope, small stones.	Slight	Slight.
903C2:					
Barnes	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
Langhei	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
915C2:					
Forman	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
Buse	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
915D2:					
Forman	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
Buse	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
931C2:					
Formdale	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
Langhei	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Slight	Moderate: slope.
931D2:					
Formdale	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
Langhei	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
942D2:					
Langhei	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
Barnes	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
957B2:					
Rothsay	Slight	Slight	Moderate: slope.	Slight	Slight.
Zell	Slight	Slight	Moderate: slope.	Slight	Slight.

Recreational Development--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
969C2:					
Zell	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
Rothsay	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
969D2:					
Zell	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
Rothsay	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
1015:					
Udipsamments	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Moderate: droughty, too sandy.
1016:					
Udorthents	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
1027:					
Udorthents.					
1030:					
Pits.					
Udipsamments	Severe: slope, too sandy.	Severe: slope, too sandy.	Severe: slope, too sandy.	Severe: too sandy, slope.	Severe: slope.
1077:					
Forada	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
Leafriver	Severe: ponding, excess humus.	Severe: ponding, excess humus.	Severe: excess humus, ponding.	Severe: ponding, excess humus.	Severe: ponding, excess humus.
1102B:					
Chapett	Slight	Slight	Moderate: slope, small stones.	Slight	Slight.
Dorset	Slight	Slight	Moderate: slope, small stones.	Slight	Moderate: droughty.
1102C:					
Chapett	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
Dorset	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: droughty, slope.
1103:					
Clitherall	Slight	Slight	Moderate: small stones.	Slight	Moderate: droughty.

Recreational Development--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
1104B:					
Waukon	Slight	Slight	Moderate: slope.	Slight	Slight.
Dorset	Slight	Slight	Moderate: slope, small stones.	Slight	Moderate: droughty.
1104C:					
Waukon	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
Dorset	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: droughty, slope.
1104D:					
Waukon	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
Dorset	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
1105B:					
Dent	Slight	Slight	Moderate: slope.	Slight	Slight.
1110:					
Isan	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
1111:					
Nidaros	Severe: flooding, ponding, excess humus.	Severe: ponding, excess humus.	Severe: excess humus, ponding, flooding.	Severe: ponding, excess humus.	Severe: ponding, flooding, excess humus.
1112D:					
Chapett	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
Corliss	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: too sandy, slope.	Severe: droughty, slope.
1112E:					
Chapett	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Corliss	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: droughty, slope.
1113:					
Haslie	Severe: ponding, excess humus.	Severe: ponding, excess humus.	Severe: excess humus, ponding.	Severe: ponding, excess humus.	Severe: ponding, excess humus.
Seelyeville	Severe: ponding, excess humus.	Severe: ponding, excess humus.	Severe: excess humus, ponding.	Severe: ponding, excess humus.	Severe: ponding, excess humus.

Recreational Development--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
1113:					
Cathro	Severe: ponding, excess humus.	Severe: ponding, excess humus.	Severe: excess humus, ponding.	Severe: ponding, excess humus.	Severe: ponding, excess humus.
1114:					
Hangaard	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, droughty.
1120:					
Rushlake	Moderate: too sandy.	Moderate: too sandy.	Moderate: small stones, too sandy.	Moderate: too sandy.	Severe: droughty.
Hangaard	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, droughty.
1129:					
Lindaas	Severe: wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
1131B:					
Verndale	Slight	Slight	Moderate: slope, small stones.	Slight	Moderate: droughty.
Abbeylake	Moderate: too sandy.	Moderate: too sandy.	Moderate: slope, small stones, too sandy.	Moderate: too sandy.	Severe: droughty.
1136:					
Nidaros	Severe: ponding, excess humus.	Severe: ponding, excess humus.	Severe: excess humus, ponding.	Severe: ponding, excess humus.	Severe: ponding, excess humus.
1149:					
Hamerly	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: wetness.	Moderate: wetness.
1195A:					
Sybil	Slight	Slight	Slight	Slight	Moderate: droughty.
Eagleview	Moderate: too sandy.	Moderate: too sandy.	Moderate: small stones, too sandy.	Moderate: too sandy.	Moderate: droughty.
1195B:					
Sybil	Slight	Slight	Moderate: slope.	Slight	Moderate: droughty.
Eagleview	Moderate: too sandy.	Moderate: too sandy.	Moderate: slope, small stones.	Moderate: too sandy.	Moderate: droughty.

Recreational Development--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
1195C:					
Sybil	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: droughty, slope.
Eagleview	Moderate: slope, too sandy.	Moderate: slope, too sandy.	Severe: slope.	Moderate: too sandy.	Moderate: droughty, slope.
1195E:					
Sybil	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
Eagleview	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: too sandy, slope.	Severe: slope.
1196B:					
Lida	Slight	Slight	Moderate: slope.	Slight	Moderate: large stones, droughty.
Two Inlets	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Slight	Moderate: small stones, droughty, slope.
1196C:					
Lida	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: large stones, droughty, slope.
Two Inlets	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Slight	Moderate: small stones, droughty, slope.
1196E:					
Lida	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
Two Inlets	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.	Severe: slope.
1196F:					
Lida	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Two Inlets	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.
1200:					
Egglake	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.

Recreational Development--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
1208B:					
Naytahwaush	Slight	Slight	Severe: slope.	Slight	Slight.
Mahkonce	Slight	Slight	Moderate: slope.	Slight	Slight.
1209C:					
Naytahwaush	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
1212B:					
Mahkonce	Slight	Slight	Moderate: slope.	Slight	Slight.
1214:					
Mustinka	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
1215:					
Pinelake	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
1216B:					
Egglake	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Wykeham	Slight	Slight	Moderate: slope, small stones.	Slight	Slight.
1217E:					
Waukon	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Lida	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
1218B:					
Snellman	Slight	Slight	Moderate: slope, small stones.	Slight	Moderate: large stones.
Lida	Slight	Slight	Moderate: slope.	Slight	Moderate: large stones, droughty.
1218C:					
Snellman	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: large stones, slope.
Lida	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: large stones, droughty, slope.
1218E:					
Snellman	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
Lida	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.

Recreational Development--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
1218F:					
Snellman	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Lida	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
1219C:					
Sandberg	Moderate: slope.	Moderate: slope.	Severe: slope, small stones.	Slight	Moderate: small stones, droughty.
Sverdrup	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: droughty, slope.
1221B:					
Sverdrup	Slight	Slight	Moderate: slope.	Slight	Moderate: droughty.
Sandberg	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Slight	Moderate: small stones, droughty.
1223D:					
Sandberg	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.	Severe: slope.
Arvilla	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
1227:					
Quam	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
Cathro	Severe: ponding, excess humus.	Severe: ponding, excess humus.	Severe: excess humus, ponding.	Severe: ponding, excess humus.	Severe: ponding, excess humus.
Urness	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
1230:					
Haslie	Severe: ponding, excess humus.	Severe: ponding, excess humus.	Severe: excess humus, ponding.	Severe: ponding, excess humus.	Severe: ponding, excess humus.
Nidaros	Severe: ponding, excess humus.	Severe: ponding, excess humus.	Severe: excess humus, ponding.	Severe: ponding, excess humus.	Severe: ponding, excess humus.
1232B:					
Chapett	Slight	Slight	Moderate: slope, small stones.	Slight	Slight.
1232E:					
Chapett	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.

Recreational Development--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
1234B:					
Formdale	Slight	Slight	Moderate: slope.	Slight	Slight.
Buse	Slight	Slight	Moderate: slope, small stones.	Slight	Slight.
1237:					
Lakepark	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
1239:					
Quam	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
1240:					
Roliss	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
1247D:					
Corliss	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: too sandy, slope.	Severe: droughty, slope.
Dorset	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
1250C:					
Abbeylake	Moderate: slope, too sandy.	Moderate: slope, too sandy.	Severe: slope.	Moderate: too sandy.	Severe: droughty.
Verndale	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: droughty, slope.
1259:					
Hamerly	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: wetness.	Moderate: wetness.
Mustinka	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
1275B:					
Kandota	Slight	Slight	Moderate: slope, small stones.	Slight	Slight.
Egglake	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
1275C:					
Kandota	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
Egglake	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.

Recreational Development--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
1276:					
Knute	Slight	Slight	Moderate: small stones.	Slight	Slight.
Brandsvold	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
1277D:					
Corliss	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: too sandy, slope.	Severe: droughty, slope.
Sverdrup	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
1289:					
Knute	Slight	Slight	Moderate: small stones.	Slight	Slight.
1290:					
Brandsvold	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
1291:					
Sedgeville	Severe: flooding, ponding.	Severe: ponding.	Severe: ponding, flooding.	Severe: ponding.	Severe: ponding, flooding.
1293:					
Sedgeville	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
1304A:					
Glyndon	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.
1307:					
Rushlake	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: droughty.
1317:					
Vallers	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
1319B:					
Rockwood	Slight	Slight	Moderate: slope, small stones.	Slight	Moderate: large stones.
1319C:					
Rockwood	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: large stones, slope.
1319D:					
Rockwood	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
1320B:					
Blowers	Slight	Slight	Moderate: slope, small stones.	Slight	Moderate: large stones.

Recreational Development--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
1321:					
Paddock	Severe: wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.	Moderate: large stones, wetness.
Becida	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
1322:					
Wolverton	Slight	Slight	Slight	Slight	Slight.
1324B:					
Heimdal	Slight	Slight	Moderate: slope, small stones.	Slight	Slight.
Sisseton	Slight	Slight	Moderate: slope.	Slight	Slight.
1338:					
Oakcreek	Slight	Slight	Moderate: small stones.	Slight	Slight.
1339:					
Borup	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
1340:					
Bluffcreek	Slight	Slight	Moderate: small stones.	Slight	Moderate: droughty.
Epoufette	Severe: wetness.	Severe: wetness.	Severe: small stones, wetness.	Severe: wetness.	Severe: wetness.
1341:					
Clitherall	Slight	Slight	Moderate: slope, small stones.	Slight	Moderate: droughty.
Wykeham	Slight	Slight	Moderate: slope, small stones.	Slight	Slight.
1342:					
Pinelake	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Brandsvold	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
1343C:					
Lida	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: large stones, droughty, slope.
Almora	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
Lizzie	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.

Recreational Development--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
1344B:					
Lida	Slight	Slight	Moderate: slope.	Slight	Moderate: large stones, droughty.
Almora	Slight	Slight	Moderate: slope, small stones.	Slight	Slight.
Dent	Slight	Slight	Moderate: slope.	Slight	Slight.
1345:					
Bluffcreek	Slight	Slight	Moderate: small stones.	Slight	Moderate: droughty.
Rosy	Slight	Slight	Slight	Slight	Slight.
1346:					
Nidaros	Severe: ponding, excess humus.	Severe: ponding, excess humus.	Severe: excess humus, ponding.	Severe: ponding, excess humus.	Severe: ponding, excess humus.
1347B:					
Kandota	Slight	Slight	Moderate: slope, small stones.	Slight	Slight.
1348:					
Knute	Slight	Slight	Moderate: small stones.	Slight	Slight.
1349:					
Clotho	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
1350:					
Brandsvold	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
1351:					
Bluffton	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
1365:					
Hillview	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
1396:					
Sedgeville	Severe: flooding, ponding.	Severe: ponding.	Severe: ponding, flooding.	Severe: ponding.	Severe: ponding, flooding.
Nidaros	Severe: ponding, excess humus.	Severe: ponding, excess humus.	Severe: excess humus, ponding.	Severe: ponding, excess humus.	Severe: ponding, excess humus.
Aquolls	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.

Recreational Development--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
1397:					
Bemidji	Moderate: too sandy.	Moderate: too sandy.	Moderate: slope, small stones, too sandy.	Moderate: too sandy.	Moderate: droughty.
1825B:					
Seelyeville	Severe: wetness, excess humus.	Severe: wetness, excess humus.	Severe: excess humus, wetness.	Severe: wetness, excess humus.	Severe: wetness, excess humus.
1874:					
Radium	Moderate: too sandy.	Moderate: too sandy.	Moderate: too sandy.	Moderate: too sandy.	Severe: droughty.
1943:					
Roscommon	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
1975:					
Oylen	Slight	Slight	Moderate: small stones.	Slight	Moderate: droughty.

Wildlife Habitat

The diverse geological and soil features in Otter Tail County can provide diverse habitat for a variety of wildlife species when managed effectively. The kind and abundance of wildlife are dependent upon the amounts and distribution of food, cover, and water. Changes in land use patterns can have a direct influence on the population of wildlife species. Wildlife habitat can be created or improved by planting desirable vegetation, maintaining existing plant cover, or promoting the natural regeneration of vegetation. Knowledge of soil hazards and limitations is helpful in developing, managing, and protecting wildlife areas.

Throughout the county are wildlife management areas, waterfowl production areas, and game refuges that are managed and administered by the Minnesota Department of Natural Resources or the U.S. Fish and Wildlife Service.

Areas of soils that formed in glacial till and glaciolacustrine sediments under prairie vegetation are dominantly used as cropland but include small to large wetlands. These wetland areas provide waterfowl nesting areas and are used during the fall waterfowl migration. The wetlands and adjacent areas provide the habitat elements for upland game birds and other wildlife species. Wetland areas that support cattails and willows provide winter protection for upland game birds that may nest nearby. Because of the intense agricultural usage in this part of the county, additional food plots and habitat may be needed. Some of the common game species in the wildlife management areas, waterfowl production areas, and game refuges are ducks, geese, ring-necked pheasants, prairie chickens, Hungarian partridge, and white-tailed deer.

Areas of soils that formed in outwash under dominantly prairie vegetation are primarily used as cropland but include scattered small woodlots in conjunction with small marshes and wet depressions. These areas are well suited to waterfowl, upland game birds, and game animals, such as ducks, geese, ring-necked pheasants, Hungarian partridge, fox, rabbits, squirrels, and white-tailed deer. The wetlands provide nesting areas and protection for waterfowl, and the adjacent cropland and wooded areas provide food.

Soils that formed under dominantly forest vegetation on gently rolling to steep moraines, till plains, and outwash plains are currently about 35 percent forested. The forested areas provide habitat for such wildlife species as white-tailed deer, black bear, squirrels, ruffed grouse, and rabbits. Wild turkeys have recently been introduced into some of the larger forested areas in the south-central part of the county. Wetlands in these areas provide habitat for furbearers and various types of waterfowl, such as small flocks of mallards or wood ducks (fig. 5).

Generally, in the eastern two-thirds of the county, beaver have become a problem by blocking culverts, small streams, and drainage ditches. These blockages result in water backing over roads and farm fields.

In the eastern half of the county there have been sightings of bald eagles and some moose, coyotes, and timberwolves.

Soils affect the kind and amount of vegetation that is available to wildlife as food and cover. They also affect the construction of water impoundments. If food, cover, or water is missing, inadequate, or inaccessible, wildlife will be scarce or will not inhabit the area.

If the soils have potential for habitat development, wildlife habitat can be created or improved by planting appropriate vegetation, properly managing the existing plant cover, and fostering the natural establishment of desirable plants.

Elements of Wildlife Habitat

The elements of wildlife habitat are described in the following paragraphs.

Grain and seed crops are domestic grains and seed-producing herbaceous plants used by wildlife. Examples are corn, soybeans, wheat, oats, and barley.

Grasses and legumes are domestic perennial grasses and herbaceous legumes planted for wildlife food and cover. Examples are bromegrass, timothy, orchardgrass, clover, alfalfa, wheatgrass, and birdsfoot trefoil.

Wild herbaceous plants are native or naturally established grasses and forbs, including weeds, that provide food and cover for wildlife. Examples are

Figure 5.—An area of Haslie and Nidaros soils, ponded, provides good habitat for waterfowl, furbearers, and other wetland species.

bluestems, indiangrass, blueberry, goldenrod, lambsquarters, dandelions, blackberry, ragweed, wheatgrass, and nightshade.

The major soil properties affecting the growth of grain and forage crops and wild herbaceous plants are depth of the root zone, texture of the surface layer, the amount of water available to plants, wetness, salinity, and flooding. The length of the growing season also is important.

Hardwood trees and woody understory produce nuts or other fruit, buds, catkins, twigs, bark, and foliage that wildlife eat. Examples are oak, poplar, box elder, birch, maple, green ash, willow, and American elm.

Shrubs are bushy woody plants that produce fruit, buds, twigs, bark, and foliage. Examples of fruit-producing shrubs that are suitable for planting on soils that have good potential for these plants are hawthorn, honeysuckle, American plum, redosier dogwood, chokecherry, serviceberry, silver buffaloberry, and crabapple.

Coniferous plants are cone-bearing trees, shrubs,

and ground cover that provide habitat or supply food in the form of browse, seed, or fruit-like cones. Examples are pine, spruce, cedar, and tamarack.

The major soil properties affecting the growth of hardwood and coniferous trees and shrubs are depth of the root zone, the amount of water available to plants, and wetness.

Wetland plants are annual and perennial wild herbaceous plants that grow on moist or wet sites. Submerged or floating aquatic plants are excluded.

Wetland plants produce food or cover for wetland wildlife. Examples of these plants are smartweeds, wild millet, rushes, sedges, bulrushes, wild rice, arrowhead, waterplantain, cattail, prairie cordgrass, bluejoint grass, asters, and beggarticks.

The major soil properties affecting wetland plants are texture of the surface layer, wetness, acidity or alkalinity, and slope.

Shallow water areas have an average depth of less than 5 feet. They are useful as habitat for some wildlife species. They are naturally wet areas or are created by dams, levees, or water-control measures in marshes or streams. Examples are waterfowl feeding areas, wildlife watering developments, beaver ponds, and other wildlife ponds.

The major soil properties affecting shallow water areas are depth to bedrock, wetness, surface stoniness, slope, and permeability.

Kinds of Wildlife Habitat

Habitat for openland wildlife consists of cropland, pasture, meadows, and areas that are overgrown with grasses, herbs, and shrubs. These areas produce grain and seed crops, grasses and legumes, and wild herbaceous plants. The wildlife attracted to these areas include Hungarian partridge, ring-necked pheasant, sharp-tailed grouse, meadowlark, field sparrow, killdeer, cottontail rabbit, and red fox.

Habitat for woodland wildlife consists of areas of hardwoods or conifers or a mixture of these and associated grasses, legumes, and wild herbaceous plants. The wildlife attracted to this habitat include wild turkey, ruffed grouse, thrushes, woodpeckers, owls, tree squirrels, porcupine, raccoon, white-tailed deer, black bear, and moose.

Habitat for wetland wildlife consists of open, marshy or swampy shallow water areas, bogs, or flood plains that support water-tolerant plants. The wildlife attracted to this habitat include ducks, geese, herons, bitterns, rails, kingfishers, muskrat, otter, mink, and beaver.

Wildlife Habitat

(See text for definitions of terms used in this table. Absence of an entry indicates that no rating is applicable)

Map symbol and soil name	Potential for habitat elements								Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Shrubs	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
7A, 7B:											
Hubbard	Poor	Fair	Fair	Fair	Fair	---	Very poor.	Very poor.	Fair	Fair	Very poor.
7C:											
Hubbard	Very poor.	Fair	Fair	Fair	Fair	---	Very poor.	Very poor.	Fair	Fair	Very poor.
26:											
Aazdahl	Good	Good	Good	Good	Good	---	Poor	Fair	Good	Fair	Poor.
34:											
Parnell	Fair	Fair	Poor	Poor	Very poor.	Poor	Good	Good	Fair	Poor	Good.
38B, 38C2:											
Waukon	Good	Good	Good	Good	Good	---	Very poor.	Very poor.	Good	Good	Very poor.
38D2:											
Waukon	Fair	Good	Good	Good	Good	---	Very poor.	Very poor.	Good	Good	Very poor.
38E:											
Waukon	Poor	Fair	Good	Good	Good	---	Very poor.	Very poor.	Good	Good	Very poor.
46:											
Borup	Fair	Fair	Fair	Fair	Poor	Fair	Good	Good	Fair	Fair	Good.
53B:											
Kandota	Good	Good	Good	Good	Good	---	Very poor.	Very poor.	Good	Good	Very poor.
53C:											
Kandota	Fair	Good	Good	Good	Good	---	Very poor.	Very poor.	Good	Good	Very poor.
53D:											
Kandota	Poor	Good	Good	Good	Good	---	Very poor.	Very poor.	Good	Good	Very poor.
58:											
Kittson	Good	Good	Good	Fair	Fair	Good	Fair	Poor	Good	Fair	Fair.
59:											
Grimstad	Fair	Good	Fair	Fair	Fair	---	Fair	Fair	Fair	Fair	Fair.
61:											
Arveson	Good	Good	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
63:											
Rockwell	Fair	Fair	Good	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
65:											
Foxhome	Good	Good	Good	Fair	Fair	Fair	Poor	Poor	Good	Fair	Poor.

Wildlife Habitat--Continued

Map symbol and soil name	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
66:											
Flaming	Fair	Fair	Good	Fair	Fair	Fair	Fair	Poor	Fair	Fair	Fair.
68:											
Arveson	Fair	Fair	Poor	Fair	Fair	Poor	Good	Good	Fair	Fair	Good.
107:											
Winger	Good	Good	Fair	Fair	Fair	Good	Good	Good	Good	Fair	Good.
108:											
McIntosh	Good	Good	Good	Fair	Fair	Fair	Poor	Poor	Good	Fair	Poor.
121:											
Wykeham	Good	Good	Good	Good	Fair	Good	Poor	Poor	Good	Good	Poor.
127A, 127B:											
Sverdrup	Fair	Fair	Fair	Fair	Fair	---	Poor	Very poor.	Fair	Fair	Poor.
127C:											
Sverdrup	Fair	Fair	Fair	Fair	Fair	---	Very poor.	Very poor.	Fair	Fair	Very poor.
141B:											
Egeland	Fair	Fair	Good	Fair	Very poor.	Fair	Very poor.	Very poor.	Fair	---	Very poor.
141C, 141D:											
Egeland	Very poor.	Fair	Good	Fair	Very poor.	Fair	Very poor.	Very poor.	Very poor.	---	Very poor.
168B:											
Forman	Good	Good	Good	Good	Good	Fair	Poor	Very poor.	Good	Good	Very poor.
180:											
Gonvick	Good	Good	Good	Good	Fair	---	Poor	Poor	Good	Good	Poor.
184:											
Hamerly	Good	Good	Good	Good	Good	Fair	Fair	Poor	Good	Good	Poor.
187:											
Haug	Fair	Fair	Poor	Poor	Poor	---	Good	Good	Fair	Poor	Good.
191:											
Epoufette	Fair	Fair	Poor	Poor	Poor	---	Good	Good	Fair	Poor	Good.
202:											
Meehan	Poor	Fair	Good	Fair	Fair	---	Fair	Fair	Fair	Fair	Fair.
258A, 258B, 258C:											
Sandberg	Poor	Poor	Good	Poor	Poor	---	Very poor.	Very poor.	Good	Good	Very poor.
260:											
Duelm	Fair	Good	Good	Good	Good	---	Poor	Poor	Good	Good	Poor.
267B:											
Snellman	Good	Good	Good	Good	Good	---	Poor	Very poor.	Good	Good	Poor.

Wildlife Habitat--Continued

Map symbol and soil name	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
267C:											
Snellman	Fair	Good	Good	Good	Good	---	Very poor.	Very poor.	Good	Good	Very poor.
267E:											
Snellman	Poor	Fair	Good	Good	Good	---	Very poor.	Very poor.	Fair	Good	Very poor.
267F:											
Snellman	Very poor.	Fair	Good	Good	Good	---	Very poor.	Very poor.	Fair	Good	Very poor.
290:											
Rothsay	Good	Good	Fair	Fair	Fair	---	Poor	Very poor.	Good	Fair	Poor.
293B:											
Swenoda	Fair	Fair	Good	Good	Very poor.	---	Very poor.	Very poor.	Fair	Very poor.	Very poor.
335:											
Urness	Fair	Fair	Fair	Poor	Very poor.	Poor	Good	Good	Fair	Poor	Poor.
339:											
Fordville	Good	Good	Good	Poor	Very poor.	Fair	Very poor.	Very poor.	Good	Very poor.	Very poor.
341A, 341B:											
Arvilla	Fair	Good	Fair	Fair	Fair	Poor	Very poor.	Very poor.	Fair	Fair	Very poor.
371:											
Clontarf	Fair	Fair	Good	Good	Good	Fair	Poor	Poor	Fair	Good	Poor.
375:											
Forada	Good	Good	Fair	Fair	Fair	---	Good	Good	Good	Fair	Good.
402C, 402E:											
Sioux	Very poor.	Very poor.	Poor	Poor	Very poor.	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
406A, 406B:											
Dorset	Fair	Fair	Fair	Fair	Fair	---	Very poor.	Very poor.	Fair	Fair	Very poor.
418:											
Lamoure	Good	Good	Fair	Good	Good	Fair	Fair	Fair	Good	Good	Fair.
422B, 422C:											
Bygland	Good	Good	Good	Fair	---	Fair	Poor	Poor	Good	Poor	Poor.
426:											
Foldahl	Fair	Good	Good	Fair	Poor	---	Poor	Poor	Fair	Fair	Poor.
441A, 441B:											
Almora	Good	Good	Good	Good	Good	---	Very poor.	Very poor.	Good	Good	Very poor.

Wildlife Habitat--Continued

Map symbol and soil name	Potential for habitat elements								Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Shrubs	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
441C:											
Almora	Fair	Good	Good	Good	Good	---	Very poor.	Very poor.	Good	Good	Very poor.
481:											
Kratka	Fair	Good	Good	Fair	Poor	---	Good	Fair	Fair	Fair	Fair.
494:											
Darnen	Good	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
497:											
Hantho	Good	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
508:											
Wyndmere	Fair	Good	Good	Good	Good	Fair	Fair	Poor	Good	Good	Poor.
540:											
Seelyeville	Very poor.	Poor	Good	Poor	Poor	---	Good	Good	Fair	Poor	Good.
541:											
Rifle	Fair	Poor	Poor	Poor	Poor	---	Good	Good	Poor	Poor	Good.
544:											
Cathro	Poor	Fair	Fair	Poor	Poor	---	Good	Good	Poor	Poor	Good.
567A, 567B:											
Verndale	Good	Good	Good	Good	Good	---	Very poor.	Very poor.	Good	Good	Very poor.
609B:											
Dickey	Fair	Good	Good	Good	Good	Fair	Poor	Very poor.	Good	Good	Very poor.
624:											
Rosy	Good	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
646C:											
Peever	Fair	Good	Good	Good	Good	---	Very poor.	Very poor.	Fair	Good	Very poor.
646D:											
Peever	Poor	Fair	Good	Good	Good	---	Very poor.	Very poor.	Fair	Good	Very poor.
670:											
Knute	Good	Good	Good	Good	Good	---	Poor	Poor	Good	Good	Poor.
680:											
Parnell	Good	Good	Fair	Good	Fair	---	Good	Good	Good	Fair	Good.
698:											
Doran	Good	Good	Good	---	---	Poor	Fair	Fair	Good	---	Fair.
701:											
Runeberg	Very poor.	Poor	Poor	Poor	Poor	---	Good	Good	Poor	Poor	Good.

Wildlife Habitat--Continued

Map symbol and soil name	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
705B:											
Nitche	Good	Good	Good	Good	Good	---	Very poor.	Very poor.	Good	Good	Very poor.
Kandota	Good	Good	Good	Good	Good	---	Very poor.	Very poor.	Good	Good	Very poor.
Lida	Fair	Good	Good	Good	Good	---	Very poor.	Very poor.	Good	Good	Very poor.
705C:											
Nitche	Fair	Good	Good	Good	Good	---	Very poor.	Very poor.	Good	Good	Very poor.
Kandota	Fair	Good	Good	Good	Good	---	Very poor.	Very poor.	Good	Good	Very poor.
Lida	Fair	Good	Good	Good	Good	---	Very poor.	Very poor.	Good	Good	Very poor.
707B:											
Lizzie	Good	Good	Good	Good	Good	---	Very poor.	Very poor.	Good	Good	Very poor.
707C2, 707D2:											
Lizzie	Poor	Good	Good	Good	Good	---	Very poor.	Very poor.	Fair	Good	Very poor.
710:											
Friberg	Poor	Fair	Fair	Fair	Fair	---	Good	Good	Fair	Fair	Good.
Weetown	Good	Good	Good	Good	Good	---	Poor	Poor	Good	Good	Poor.
711B:											
Arvilla	Fair	Good	Fair	Fair	Fair	Poor	Very poor.	Very poor.	Fair	Fair	Very poor.
Sandberg	Poor	Poor	Good	Poor	Poor	---	Very poor.	Very poor.	Good	Good	Very poor.
711C:											
Arvilla	Poor	Fair	Fair	Fair	Fair	Poor	Very poor.	Very poor.	Fair	Fair	Very poor.
Sandberg	Poor	Poor	Good	Poor	Poor	---	Very poor.	Very poor.	Good	Good	Very poor.
715:											
Bluffcreek	Fair	Good	Good	Good	Good	---	Poor	Poor	Good	Good	Poor.
Clearriver	Poor	Good	Good	Good	Good	---	Fair	Very poor.	Good	Good	Fair.
716B, 716C:											
Leaflake	Poor	Good	Good	Good	Good	---	Very poor.	Very poor.	Fair	Good	Very poor.
Eagleview	Poor	Fair	Fair	Fair	Fair	---	Very poor.	Very poor.	Fair	Fair	Very poor.

Wildlife Habitat--Continued

Map symbol and soil name	Potential for habitat elements								Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Shrubs	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
716D:											
Leaflake	Poor	Fair	Good	Good	Good	---	Very poor.	Very poor.	Fair	Good	Very poor.
Eagleview	Poor	Poor	Fair	Fair	Fair	---	Very poor.	Very poor.	Poor	Fair	Very poor.
718E:											
Naytahwaush	Very poor.	Poor	Fair	Good	Good	---	Very poor.	Very poor.	Poor	Good	Very poor.
721B, 721C:											
Corliss	Fair	Fair	Fair	Fair	Fair	---	Very poor.	Very poor.	Fair	Fair	Very poor.
721D:											
Corliss	Poor	Poor	Fair	Fair	Fair	---	Very poor.	Very poor.	Poor	Fair	Very poor.
721E:											
Corliss	Very poor.	Very poor.	Fair	Fair	Fair	---	Very poor.	Very poor.	Poor	Fair	Very poor.
726:											
Kratka	Poor	Poor	Poor	Poor	Poor	---	Good	Good	Poor	Poor	Good.
746:											
Haslie	Poor	Poor	Poor	Poor	Poor	---	Good	Good	Poor	Poor	Good.
760C2:											
Chapett	Fair	Good	Good	Good	Good	---	Very poor.	Very poor.	Fair	Good	Very poor.
Sisseton	Very poor.	Very poor.	Fair	Poor	Very poor.	---	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
760D2:											
Chapett	Poor	Fair	Good	Good	Good	---	Very poor.	Very poor.	Fair	Good	Very poor.
Sisseton	Very poor.	Very poor.	Fair	Poor	Very poor.	---	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
769B:											
Mehurin	Good	Good	Good	Fair	Poor	Fair	Poor	Poor	Good	Fair	Poor.
776B:											
Snellman	Good	Good	Good	Good	Good	---	Poor	Very poor.	Good	Good	Poor.
Sugarbush	Fair	Fair	Good	Good	Good	---	Very poor.	Very poor.	Fair	Good	Very poor.
776C:											
Snellman	Fair	Good	Good	Good	Good	---	Very poor.	Very poor.	Good	Good	Very poor.
Sugarbush	Fair	Fair	Good	Good	Good	---	Very poor.	Very poor.	Fair	Good	Very poor.

Wildlife Habitat--Continued

Map symbol and soil name	Potential for habitat elements								Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Shrubs	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
776E:											
Snellman	Poor	Fair	Good	Good	Good	---	Very poor.	Very poor.	Fair	Good	Very poor.
Sugarbush	Poor	Fair	Good	Good	Good	---	Very poor.	Very poor.	Fair	Good	Very poor.
777C2, 777D2:											
Sisseton	Very poor.	Very poor.	Fair	Poor	Very poor.	---	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
Heimdal	Fair	Good	Good	Fair	---	Fair	Very poor.	Very poor.	Good	---	Very poor.
777E:											
Sisseton	Very poor.	Very poor.	Fair	Poor	Very poor.	---	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
Heimdal	Poor	Fair	Good	Fair	---	Fair	Very poor.	Very poor.	Good	---	Very poor.
778B, 778C:											
Dorset	Fair	Fair	Fair	Fair	Fair	---	Very poor.	Very poor.	Fair	Fair	Very poor.
Corliss	Fair	Fair	Fair	Fair	Fair	---	Very poor.	Very poor.	Fair	Fair	Very poor.
779B:											
Peever	Good	Good	Good	Good	Good	---	Very poor.	Very poor.	Good	Good	Very poor.
Mehurin	Good	Good	Good	Fair	Poor	Fair	Poor	Poor	Good	Fair	Poor.
902B:											
Barnes	Good	Good	Good	Good	Good	Fair	Poor	Very poor.	Good	Good	Very poor.
Buse	Good	Good	Fair	Fair	Fair	Fair	Poor	Very poor.	Good	Fair	Very poor.
903C2:											
Barnes	Fair	Good	Good	Good	Good	Fair	Very poor.	Very poor.	Good	Good	Very poor.
Langhei	Fair	Good	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
915C2:											
Forman	Fair	Good	Good	Good	Good	Fair	Very poor.	Very poor.	Good	Good	Very poor.
Buse	Fair	Good	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
915D2:											
Forman	Poor	Good	Good	Good	Good	Fair	Very poor.	Very poor.	Fair	Good	Very poor.
Buse	Fair	Fair	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.

Wildlife Habitat--Continued

Map symbol and soil name	Potential for habitat elements								Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Shrubs	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
931C2:											
Formdale	Good	Good	Good	Good	Fair	---	Poor	Fair	Good	Fair	Poor.
Langhei	Fair	Good	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
931D2:											
Formdale	Fair	Good	Good	Good	Fair	---	Poor	Poor	Good	Fair	Poor.
Langhei	Fair	Fair	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
942D2:											
Langhei	Fair	Fair	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
Barnes	Poor	Fair	Good	Good	Good	Fair	Very poor.	Very poor.	Fair	Good	Very poor.
957B2:											
Rothsay	Good	Good	Fair	Fair	Fair	---	Poor	Very poor.	Good	Fair	Poor.
Zell	Fair	Fair	Fair	Poor	Very poor.	---	Very poor.	Very poor.	Fair	Very poor.	Very poor.
969C2:											
Zell	Very poor.	Fair	Fair	Poor	Very poor.	Fair	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
Rothsay	Good	Good	Fair	Fair	Fair	---	Poor	Very poor.	Good	Fair	Poor.
969D2:											
Zell	Very poor.	Fair	Fair	Poor	Very poor.	Fair	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
Rothsay	Fair	Good	Fair	Fair	Fair	---	Poor	Very poor.	Good	Fair	Poor.
1016:											
Udorthents	Poor	Poor	Fair	Good	Good	Fair	Poor	Very poor.	Poor	Fair	Very poor.
1027:											
Udorthents.											
1030:											
Pits-Udipsamments.											
1077:											
Forada	Poor	Poor	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
Leafriver	Very poor.	Poor	Poor	Poor	Poor	---	Good	Good	Poor	Poor	Good.
1102B:											
Chapett	Good	Good	Good	Good	Good	---	Very poor.	Very poor.	Good	Good	Very poor.
Dorset	Fair	Fair	Fair	Fair	Fair	---	Very poor.	Very poor.	Fair	Fair	Very poor.

Wildlife Habitat--Continued

Map symbol and soil name	Potential for habitat elements								Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Shrubs	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
1102C:											
Chapett	Fair	Good	Good	Good	Good	---	Very poor.	Very poor.	Fair	Good	Very poor.
Dorset	Fair	Fair	Fair	Fair	Fair	---	Very poor.	Very poor.	Fair	Fair	Very poor.
1103:											
Clitherall	Fair	Good	Good	Fair	Fair	---	Poor	Poor	Good	Fair	Poor.
1104B, 1104C:											
Waukon	Good	Good	Good	Good	Good	---	Very poor.	Very poor.	Good	Good	Very poor.
Dorset	Fair	Fair	Fair	Fair	Fair	---	Very poor.	Very poor.	Fair	Fair	Very poor.
1104D:											
Waukon	Fair	Good	Good	Good	Good	---	Very poor.	Very poor.	Good	Good	Very poor.
Dorset	Poor	Poor	Fair	Fair	Fair	---	Very poor.	Very poor.	Poor	Fair	Very poor.
1105B:											
Dent	Good	Good	Good	Good	Good	---	Very poor.	Very poor.	Good	Good	Very poor.
1110:											
Isan	Poor	Fair	Good	Poor	Poor	---	Good	Good	Fair	Poor	Good.
1111:											
Nidaros	Very poor.	Very poor.	Poor	Poor	Poor	---	Good	Good	Very poor.	Poor	Good.
1112D:											
Chapett	Poor	Fair	Good	Good	Good	---	Very poor.	Very poor.	Fair	Good	Very poor.
Corliss	Poor	Poor	Fair	Fair	Fair	---	Very poor.	Very poor.	Poor	Fair	Very poor.
1112E:											
Chapett	Poor	Fair	Good	Good	Good	---	Very poor.	Very poor.	Fair	Good	Very poor.
Corliss	Very poor.	Very poor.	Fair	Fair	Fair	---	Very poor.	Very poor.	Poor	Fair	Very poor.
1113:											
Haslie	Very poor.	Very poor.	Poor	Very poor.	Very poor.	---	Good	Good	Poor	Very poor.	Good.
Seelyeville	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	---	Good	Good	Very poor.	Very poor.	Good.
Cathro	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	---	Good	Good	Very poor.	Very poor.	Good.
1114:											
Hangaard	Poor	Fair	Fair	Fair	Poor	---	Good	Good	Fair	Fair	Good.

Wildlife Habitat--Continued

Map symbol and soil name	Potential for habitat elements								Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Shrubs	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
1120:											
Rushlake	Poor	Good	Good	Good	Good	---	Fair	Poor	Good	Good	Fair.
Hangaard	Poor	Fair	Fair	Fair	Poor	---	Good	Good	Fair	Fair	Good.
1129:											
Lindaas	Good	Good	Good	Good	Good	Good	Good	Good	Fair	Fair	Good.
1131B:											
Verndale	Good	Good	Good	Good	Good	---	Very poor.	Very poor.	Good	Good	Very poor.
Abbeylake	Poor	Fair	Fair	Poor	Fair	---	Very poor.	Very poor.	Fair	Fair	Very poor.
1136:											
Nidaros	Very poor.	Very poor.	Poor	Poor	Poor	---	Good	Good	Poor	Poor	Good.
1149:											
Hamerly	Good	Good	Good	Good	Good	Fair	Fair	Fair	Good	Good	Fair.
1195A, 1195B:											
Sybil	Fair	Good	Good	Good	Good	---	Very poor.	Very poor.	Good	Good	Very poor.
Eagleview	Poor	Fair	Fair	Fair	Fair	---	Very poor.	Very poor.	Fair	Fair	Very poor.
1195C:											
Sybil	Poor	Fair	Good	Good	Good	---	Very poor.	Very poor.	Fair	Good	Very poor.
Eagleview	Poor	Fair	Fair	Fair	Fair	---	Very poor.	Very poor.	Fair	Fair	Very poor.
1195E:											
Sybil	Very poor.	Poor	Good	Good	Good	---	Very poor.	Very poor.	Fair	Good	Very poor.
Eagleview	Poor	Poor	Fair	Fair	Fair	---	Very poor.	Very poor.	Poor	Fair	Very poor.
1196B:											
Lida	Fair	Good	Good	Good	Good	---	Very poor.	Very poor.	Good	Good	Very poor.
Two Inlets	Fair	Fair	Fair	Fair	Fair	---	Very poor.	Very poor.	Fair	Fair	Very poor.
1196C:											
Lida	Fair	Good	Good	Good	Good	---	Very poor.	Very poor.	Good	Good	Very poor.
Two Inlets	Very poor.	Poor	Fair	Poor	Fair	---	Very poor.	Very poor.	Poor	Fair	Very poor.
1196E:											
Lida	Poor	Fair	Good	Good	Good	---	Very poor.	Very poor.	Fair	Good	Very poor.

Wildlife Habitat--Continued

Map symbol and soil name	Potential for habitat elements								Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Shrubs	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
1196E:											
Two Inlets	Very poor.	Poor	Fair	Poor	Fair	---	Very poor.	Very poor.	Poor	Fair	Very poor.
1196F:											
Lida	Very poor.	Poor	Good	Good	Good	---	Very poor.	Very poor.	Poor	Good	Very poor.
Two Inlets	Very poor.	Poor	Fair	Poor	Fair	---	Very poor.	Very poor.	Poor	Fair	Very poor.
1200:											
Egglake	Good	Good	Good	Good	Good	Good	Good	Good	Fair	Fair	Good.
1208B:											
Naytahwaush	Fair	Good	Good	Good	Good	---	Very poor.	Very poor.	Fair	Good	Very poor.
Mahkonce	Good	Good	Good	Good	Good	---	Poor	Poor	Good	Good	Poor.
1209C:											
Naytahwaush	Fair	Good	Good	Good	Good	---	Very poor.	Very poor.	Fair	Good	Very poor.
1212B:											
Mahkonce	Good	Good	Good	Good	Good	---	Poor	Poor	Good	Good	Poor.
1214:											
Mustinka	Poor	Fair	Fair	---	---	Poor	Good	Good	Fair	---	Good.
1215:											
Pinelake	Poor	Fair	Good	Fair	Fair	---	Good	Good	Fair	Fair	Good.
1216B:											
Egglake	Good	Good	Good	Good	Good	Good	Good	Good	Fair	Fair	Good.
Wykeham	Good	Good	Good	Good	Fair	Good	Poor	Poor	Good	Good	Poor.
1217E:											
Waukon	Poor	Fair	Good	Good	Good	---	Very poor.	Very poor.	Good	Good	Very poor.
Lida	Poor	Fair	Good	Good	Good	---	Very poor.	Very poor.	Fair	Good	Very poor.
1218B:											
Snellman	Good	Good	Good	Good	Good	---	Poor	Very poor.	Good	Good	Poor.
Lida	Fair	Good	Good	Good	Good	---	Very poor.	Very poor.	Good	Good	Very poor.
1218C:											
Snellman	Fair	Good	Good	Good	Good	---	Very poor.	Very poor.	Good	Good	Very poor.
Lida	Fair	Good	Good	Good	Good	---	Very poor.	Very poor.	Good	Good	Very poor.

Wildlife Habitat--Continued

Map symbol and soil name	Potential for habitat elements								Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Shrubs	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
1218E:											
Snellman	Poor	Fair	Good	Good	Good	---	Very poor.	Very poor.	Fair	Good	Very poor.
Lida	Poor	Fair	Good	Good	Good	---	Very poor.	Very poor.	Fair	Good	Very poor.
1218F:											
Snellman	Very poor.	Fair	Good	Good	Good	---	Very poor.	Very poor.	Fair	Good	Very poor.
Lida	Very poor.	Poor	Good	Good	Good	---	Very poor.	Very poor.	Poor	Good	Very poor.
1219C:											
Sandberg	Poor	Poor	Good	Poor	Poor	---	Very poor.	Very poor.	Good	Good	Very poor.
Sverdrup	Fair	Fair	Fair	Fair	Fair	---	Very poor.	Very poor.	Fair	Fair	Very poor.
1221B:											
Sverdrup	Fair	Fair	Fair	Fair	Fair	---	Poor	Very poor.	Fair	Fair	Poor.
Sandberg	Poor	Poor	Good	Poor	Poor	---	Very poor.	Very poor.	Good	Good	Very poor.
1223D:											
Sandberg	Very poor.	Fair	Good	Poor	Poor	---	Very poor.	Very poor.	Fair	Poor	Very poor.
Arvilla	Poor	Fair	Fair	Fair	Fair	Poor	Very poor.	Very poor.	Fair	Fair	Very poor.
1227:											
Quam	Very poor.	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Good	Good	Very poor.	Very poor.	Good.
Cathro	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	---	Good	Good	Very poor.	Very poor.	Good.
Urness	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	---	Good	Good	Very poor.	Very poor.	Good.
1230:											
Haslie	Very poor.	Very poor.	Poor	Very poor.	Very poor.	---	Good	Good	Poor	Very poor.	Good.
Nidaros	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	---	Good	Good	Very poor.	Very poor.	Good.
1232B:											
Chapett	Good	Good	Good	Good	Good	---	Very poor.	Very poor.	Good	Good	Very poor.
1232E:											
Chapett	Poor	Fair	Good	Good	Good	---	Very poor.	Very poor.	Fair	Good	Very poor.

Wildlife Habitat--Continued

Map symbol and soil name	Potential for habitat elements								Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Shrubs	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
1234B:											
Formdale	Good	Good	Good	Good	Fair	---	Poor	Fair	Good	Fair	Poor.
Buse	Good	Good	Fair	Fair	Fair	Fair	Poor	Very poor.	Good	Fair	Very poor.
1237:											
Lakepark	Good	Good	Good	Fair	Fair	Fair	Good	Good	Good	Fair	Good.
1239:											
Quam	Fair	Fair	Poor	Poor	Poor	Poor	Good	Good	Fair	Poor	Good.
1240:											
Roliss	Good	Good	Good	Fair	---	---	Good	Fair	Good	Fair	Fair.
1247D:											
Corliss	Poor	Poor	Fair	Fair	Fair	---	Very poor.	Very poor.	Poor	Fair	Very poor.
Dorset	Poor	Poor	Fair	Fair	Fair	---	Very poor.	Very poor.	Poor	Fair	Very poor.
1250C:											
Abbeylake	Poor	Fair	Fair	Poor	Fair	---	Very poor.	Very poor.	Fair	Fair	Very poor.
Verndale	Good	Good	Good	Good	Good	---	Very poor.	Very poor.	Good	Good	Very poor.
1259:											
Hamerly	Good	Good	Good	Good	Good	Fair	Fair	Fair	Good	Good	Fair.
Mustinka	Poor	Fair	Fair	---	---	Poor	Good	Good	Fair	---	Good.
1275B:											
Kandota	Good	Good	Good	Good	Good	---	Very poor.	Very poor.	Good	Good	Very poor.
Egglake	Very poor.	Poor	Poor	Poor	Poor	---	Good	Good	Poor	Poor	Good.
1275C:											
Kandota	Fair	Good	Good	Good	Good	---	Very poor.	Very poor.	Good	Good	Very poor.
Egglake	Very poor.	Poor	Poor	Poor	Poor	---	Good	Good	Poor	Poor	Good.
1276:											
Knute	Good	Good	Good	Good	Good	---	Poor	Poor	Good	Good	Poor.
Brandsvold	Fair	Fair	Good	Fair	Fair	---	Good	Good	Fair	Fair	Good.
1277D:											
Corliss	Poor	Poor	Fair	Fair	Fair	---	Very poor.	Very poor.	Poor	Fair	Very poor.
Sverdrup	Poor	Fair	Fair	Fair	Fair	---	Very poor.	Very poor.	Fair	Fair	Very poor.

Wildlife Habitat--Continued

Map symbol and soil name	Potential for habitat elements								Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Shrubs	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
1289:											
Knute	Good	Good	Good	Good	Good	---	Poor	Poor	Good	Good	Poor.
1290:											
Brandsvold	Fair	Fair	Good	Fair	Fair	---	Good	Good	Fair	Fair	Good.
1291:											
Sedgeville	Very poor.	Poor	Poor	Fair	Fair	---	Good	Good	Poor	Fair	Good.
1293:											
Sedgeville	Poor	Fair	Fair	Fair	Fair	---	Good	Good	Poor	Fair	Good.
1304A:											
Glyndon	Good	Good	Good	Fair	Poor	Fair	Poor	Poor	Good	Fair	Poor.
1307:											
Rushlake	Poor	Good	Good	Good	Good	---	Fair	Poor	Good	Good	Fair.
1317:											
Vallers	Fair	Fair	Fair	Fair	Poor	Fair	Good	Good	Fair	Fair	Good.
1319B:											
Rockwood	Good	Good	Good	Good	Good	---	Poor	Very poor.	Good	Good	Very poor.
1319C:											
Rockwood	Fair	Good	Good	Good	Good	---	Very poor.	Very poor.	Fair	Good	Very poor.
1319D:											
Rockwood	Poor	Fair	Good	Good	Good	---	Very poor.	Very poor.	Fair	Good	Very poor.
1320B:											
Blowers	Good	Good	Good	Good	Good	---	Poor	Very poor.	Good	Good	Very poor.
1321:											
Paddock	Fair	Good	Good	Good	Good	---	Fair	Fair	Fair	Good	Fair.
Becida	Fair	Fair	Good	Good	Good	---	Good	Good	Fair	Good	Good.
1322:											
Wolverton	Good	Good	Good	Fair	Poor	Poor	Poor	Poor	Good	Fair	Poor.
1324B:											
Heimdal	Good	Good	Good	Good	---	Good	Very poor.	Very poor.	Good	---	Very poor.
Sisseton	Fair	Fair	Fair	Poor	Very poor.	---	Very poor.	Very poor.	Fair	Very poor.	Very poor.
1338:											
Oakcreek	Fair	Good	Good	Good	Good	---	Poor	Very poor.	Good	Good	Poor.
1339:											
Borup	Poor	Poor	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.

Wildlife Habitat--Continued

Map symbol and soil name	Potential for habitat elements								Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Shrubs	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
1340:											
Bluffcreek	Fair	Good	Good	Good	Good	---	Poor	Poor	Good	Good	Poor.
Epoufette	Fair	Fair	Poor	Poor	Poor	---	Good	Good	Fair	Poor	Good.
1341:											
Clitherall	Fair	Good	Good	Fair	Fair	---	Poor	Poor	Good	Fair	Poor.
Wykeham	Good	Good	Good	Good	Fair	Good	Poor	Poor	Good	Good	Poor.
1342:											
Pinelake	Poor	Fair	Good	Fair	Fair	---	Good	Good	Fair	Fair	Good.
Brandsvold	Fair	Fair	Good	Fair	Fair	---	Good	Good	Fair	Fair	Good.
1343C:											
Lida	Fair	Good	Good	Good	Good	---	Very poor.	Very poor.	Good	Good	Very poor.
Almora	Fair	Good	Good	Good	Good	---	Very poor.	Very poor.	Good	Good	Very poor.
Lizzie	Poor	Good	Good	Good	Good	---	Very poor.	Very poor.	Fair	Good	Very poor.
1344B:											
Lida	Fair	Good	Good	Good	Good	---	Very poor.	Very poor.	Good	Good	Very poor.
Almora	Good	Good	Good	Good	Good	---	Very poor.	Very poor.	Good	Good	Very poor.
Dent	Good	Good	Good	Good	Good	---	Very poor.	Very poor.	Good	Good	Very poor.
1345:											
Bluffcreek	Fair	Good	Good	Good	Good	---	Poor	Poor	Good	Good	Poor.
Rosy	Good	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
1346:											
Nidaros	Very poor.	Very poor.	Poor	Poor	Poor	---	Good	Good	Poor	Poor	Good.
1347B:											
Kandota	Good	Good	Good	Good	Good	---	Very poor.	Very poor.	Good	Good	Very poor.
1348:											
Knute	Good	Good	Good	Good	Good	---	Poor	Poor	Good	Good	Poor.
1349:											
Clotho	Fair	Fair	Good	Fair	Fair	---	Good	Good	Fair	Fair	Good.
1350:											
Brandsvold	Fair	Fair	Good	Fair	Fair	---	Good	Good	Fair	Fair	Good.
1351:											
Bluffton	Very poor.	Poor	Poor	Poor	Poor	---	Good	Good	Poor	Poor	Good.

Wildlife Habitat--Continued

Map symbol and soil name	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
1365:											
Hillview	Fair	Good	Good	Good	Good	---	Fair	Fair	Fair	Good	Fair.
1396:											
Sedgeville	Very poor.	Poor	Poor	Fair	Fair	---	Good	Good	Poor	Fair	Good.
Nidaros	Very poor.	Very poor.	Poor	Poor	Poor	---	Good	Good	Poor	Poor	Good.
Aquolls	Poor	Poor	Fair	Fair	Fair	---	Fair	Fair	Poor	Fair	Fair.
1397:											
Bemidji	Fair	Fair	Fair	Good	Good	---	Poor	Very poor.	Fair	Good	Poor.
1825B:											
Seelyeville	Poor	Poor	Good	Poor	Poor	---	Good	Good	Good	Poor	Good.
1874:											
Radium	Poor	Poor	Fair	Poor	---	Fair	Poor	Very poor.	Poor	Poor	Very poor.
1943:											
Roscommon	Poor	Poor	Good	Good	Poor	---	Good	Good	Poor	Good	Good.
1975:											
Oylen	Good	Good	Good	Good	Good	---	Fair	Fair	Good	Good	Fair.

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Engineering

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

Information in this section is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil within a depth of 5 or 6 feet. Because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

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

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

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about grain-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock within 5 or 6 feet of the surface, soil wetness, depth to a seasonal high water table, slope, likelihood of flooding, natural soil structure aggregation, and soil density. Data were collected about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kinds of adsorbed cations. Estimates were made for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, and other behavioral characteristics affecting engineering uses.

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

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

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

Building Site Development

The table "Building Site Development" shows the degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, small commercial buildings, local roads and streets, and lawns and landscaping. The limitations are considered *slight* if soil properties and site features generally are favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required. Special feasibility studies may be required where the soil limitations are severe.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for basements, graves, utility lines, open ditches, and other purposes. The ratings are based on soil properties, site features, and

observed performance of the soils. The ease of digging, filling, and compacting is affected by the depth to bedrock, a cemented pan, or a very firm dense layer; stone content; soil texture; and slope. The time of the year that excavations can be made is affected by the depth to a seasonal high water table and the susceptibility of the soil to flooding. The resistance of the excavation walls or banks to sloughing or caving is affected by soil texture and depth to the water table.

Dwellings and *small commercial buildings* are structures built on shallow foundations on undisturbed soil. The load limit is the same as that for single-family dwellings no higher than three stories. Ratings are made for small commercial buildings without basements, for dwellings with basements, and for dwellings without basements. The ratings are based on soil properties, site features, and observed performance of the soils. A high water table, flooding, shrinking and swelling, and organic layers can cause the movement of footings. A high water table, depth to bedrock, large stones, and flooding affect the ease of excavation and construction. Landscaping and grading that require cuts and fills of more than 5 or 6 feet are not considered.

Local roads and streets have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material; a base of gravel, crushed rock, or stabilized soil material; and a flexible or rigid surface. Cuts and fills generally are limited to less than 6 feet. The ratings are based on soil properties, site features, and observed performance of the soils. Depth to bedrock or to a cemented pan, a high water table, flooding, large stones, and slope affect the ease of excavating and grading. Soil strength (as inferred from the engineering classification of the soil), shrink-swell potential, potential for frost action, and depth to a high water table affect the traffic-supporting capacity.

Lawns and landscaping require soils on which turf and ornamental trees and shrubs can be established and maintained. The ratings are based on soil properties, site features, and observed performance of the soils. Soil reaction, a high water table, depth to bedrock, the available water capacity in the upper 40 inches, and the content of salts affect plant growth. Flooding, wetness, slope, stoniness, and the amount of sand, clay, or organic matter in the surface layer affect trafficability after vegetation is established.

Sanitary Facilities

The table "Sanitary Facilities" shows the degree and the kind of soil limitations that affect septic tank absorption fields, sewage lagoons, and sanitary landfills. It also shows the suitability of the soils for use as daily cover for landfill.

Soil properties are important in selecting sites for sanitary facilities and in identifying limiting soil properties and site features to be considered in planning, design, and installation. Soil limitation ratings of *slight, moderate,* or *severe* are given for septic tank absorption fields, sewage lagoons, and trench and area sanitary landfills. Soil suitability ratings of *good, fair,* and *poor* are given for daily cover for landfill.

A rating of *slight* or *good* indicates that the soils have no limitations or that the limitations can be easily overcome. Good performance and low maintenance can be expected. A rating of *moderate* or *fair* indicates that the limitations should be recognized but generally can be overcome by good management or special design. A rating of *severe* or *poor* indicates that overcoming the limitations is difficult or impractical. Increased maintenance may be required.

Septic tank absorption fields are areas in which subsurface systems of tile or perforated pipe distribute effluent from a septic tank into the natural soil. The centerline of the tile is assumed to be at a depth of 24 inches. Only the part of the soil between depths of 24 and 60 inches is considered in making the ratings. The soil properties and site features considered are those that affect the absorption of the effluent, those that affect the construction and maintenance of the system, and those that may affect public health.

The ratings are based on soil properties, site features, and observed performance of the soils. Permeability, a high water table, depth to bedrock, and flooding affect absorption of the effluent. Large stones and bedrock or a cemented pan interfere with installation.

Unsatisfactory performance of septic tank absorption fields, including excessively slow absorption of effluent, surfacing of effluent, and hillside seepage, can affect public health. Ground water can be polluted if highly permeable sand and gravel or fractured bedrock is less than 4 feet below the base of the absorption field, if slope is excessive, or if the water table is near the surface. There must be unsaturated soil material beneath the absorption field to filter the effluent effectively. Many local ordinances require that this material be of a certain thickness.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons should have a nearly level floor surrounded by cut slopes or embankments of compacted, relatively impervious soil material. Aerobic lagoons generally are designed to hold the sewage within a depth of 2 to 5 feet. Relatively impervious soil material for the lagoon floor and sides

is desirable to minimize seepage and contamination of local ground water.

The table "Sanitary Facilities" gives ratings for the natural soil that makes up the lagoon floor. The surface layer and, generally, 1 or 2 feet of soil material below the surface layer are excavated to provide material for the embankments. The ratings are based on soil properties, site features, and observed performance of the soils. Considered in the ratings are slope, permeability, a high water table, depth to bedrock, flooding, large stones, and content of organic matter.

Excessive seepage resulting from rapid permeability in the soil or a water table that is high enough to raise the level of sewage in the lagoon causes a lagoon to function unsatisfactorily. Pollution results if seepage is excessive or if floodwater overtops the lagoon. A high content of organic matter is detrimental to proper functioning of the lagoon because it inhibits aerobic activity. Slope and bedrock can cause construction problems, and large stones can hinder compaction of the lagoon floor.

Trench sanitary landfill is an area where solid waste is disposed of by placing refuse in successive layers in an excavated trench. The waste is spread, compacted, and covered daily with a thin layer of soil that is excavated from the trench. When the trench is full, a final cover of soil material at least 2 feet thick is placed over the landfill. Soil properties that influence the risk of pollution, the ease of excavation, trafficability, and revegetation are the major considerations in rating the soils.

Area sanitary landfill is an area where solid waste is disposed of by placing refuse in successive layers on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil that is imported from a source away from the site. A final cover of soil at least 2 feet thick is placed over the completed landfill. Soil properties that influence trafficability, revegetation, and the risk of pollution are the main considerations in rating the soils for area sanitary landfills.

Both types of landfill must be able to bear heavy vehicular traffic. Both types involve a risk of ground-water pollution. The ratings in the table "Sanitary Facilities" are based on soil properties, site features, and observed performance of the soils. Permeability, depth to bedrock, a high water table, slope, and flooding affect both types of landfill. Texture, stones and boulders, highly organic layers, soil reaction, and content of salts affect trench landfills. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet. For deeper trenches, a limitation rated slight or moderate may not be valid. Onsite investigation is needed.

Daily cover for landfill is the soil material that is used to cover compacted solid waste in an area sanitary landfill. The soil material is obtained offsite, transported to the landfill, and spread over the waste. The suitability of a soil for use as cover is based on properties that affect workability and the ease of digging, moving, and spreading the material over the refuse daily during both wet and dry periods.

Soil texture, wetness, rock fragments, and slope affect the ease of removing and spreading the material during wet and dry periods. Loamy or silty soils that are free of large stones or excess gravel are the best cover for a landfill. Clayey soils are sticky or cloddy and are difficult to spread; sandy soils are subject to soil blowing.

After soil material has been removed, the soil material remaining in the borrow area must be thick enough over bedrock or the water table to permit revegetation. The soil material used as the final cover for a landfill should be suitable for plants. The surface layer generally has the best workability, more organic matter, and the best potential for plants. Material from the surface layer should be stockpiled for use as the final cover.

Waste Management

Soil properties are important when organic waste is applied as fertilizer and wastewater is applied in irrigated areas. They also are important when the soil is used as a medium for the treatment and disposal of the organic waste and wastewater. Unfavorable soil properties can result in environmental damage.

The use of organic waste and wastewater as production resources results in energy and resource conservation and minimizes the problems associated with waste disposal. If disposal is the goal, applying a maximum amount of the organic waste or the wastewater to a minimal area holds costs to a minimum and environmental damage is the main hazard. If reuse is the goal, a minimum amount should be applied to a maximum area and environmental damage is unlikely.

Interpretations developed for waste management may include ratings for manure- and food-processing waste, municipal sewage sludge, use of wastewater for irrigation, and treatment of wastewater by slow rate, overland flow, and rapid infiltration processes.

Specific information regarding waste management is available at the local office of the Natural Resources

Conservation Service or the Cooperative Extension Service.

Construction Materials

The table "Construction Materials" gives information about the soils as a source of roadfill, sand, gravel, and topsoil. The soils are rated *good, fair,* or *poor* as a source of roadfill and topsoil. They are rated as a *probable* or *improbable* source of sand and gravel.

Roadfill is soil material that is excavated in one place and used in road embankments in another place. In the table "Construction Materials," the soils are rated as a source of roadfill for low embankments, generally less than 6 feet high and less exacting in design than higher embankments.

The ratings are for the soil material below the surface layer to a depth of 5 or 6 feet. It is assumed that soil layers will be mixed during excavating and spreading. Many soils have layers of contrasting suitability within their profile. The table showing engineering index properties provides detailed information about each soil layer. This information can help to determine the suitability of each layer for use as roadfill. The performance of soil after it is stabilized with lime or cement is not considered in the ratings.

The ratings are based on soil properties, site features, and observed performance of the soils. The thickness of suitable material is a major consideration. The ease of excavation is affected by large stones, a high water table, and slope. How well the soil performs in place after it has been compacted and drained is determined by its strength (as inferred from the engineering classification of the soil) and shrink-swell potential.

Soils rated *good* contain significant amounts of sand or gravel, or both. They have at least 5 feet of suitable material, a low shrink-swell potential, few cobbles and stones, and slopes of 15 percent or less. Depth to the water table is more than 3 feet. Soils rated *fair* are more than 35 percent silt- and clay-sized particles and have a plasticity index of less than 10. They have a moderate shrink-swell potential, slopes of 15 to 25 percent, or many stones. Depth to the water table is 1 to 3 feet. Soils rated *poor* have one or more of the following characteristics: a plasticity index of more than 10, a high shrink-swell potential, many stones, or slopes of more than 25 percent. They are wet and have a water table at a depth of less than 1 foot. They may have layers of suitable material, but the material is less than 3 feet thick.

Sand and *gravel* are natural aggregates suitable for commercial use with a minimum of processing. They are used in many kinds of construction. Specifications for each use vary widely. In the table "Construction Materials," only the probability of finding material in suitable quantity in or below the soil is evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material.

The properties used to evaluate the soil as a source of sand or gravel are gradation of grain sizes (as indicated by the engineering classification of the soil), the thickness of suitable material, and the content of rock fragments. Kinds of rock, acidity, and stratification are given in the soil series descriptions. Gradation of grain sizes is given in the table on engineering index properties.

A soil rated as a probable source has a layer of clean sand or gravel or a layer of sand or gravel that is as much as 12 percent silty fines. This material must be at least 3 feet thick and less than 50 percent, by weight, large stones. All other soils are rated as an improbable source. Fragments of soft bedrock, such as shale and siltstone, are not considered to be sand and gravel.

Topsoil is used to cover an area so that vegetation can be established and maintained. The upper 40 inches of a soil is evaluated for use as topsoil. Also evaluated is the reclamation potential of the borrow area.

Plant growth is affected by toxic material and by such properties as soil reaction, available water capacity, and fertility. The ease of excavating, loading, and spreading is affected by rock fragments, slope, a water table, soil texture, and thickness of suitable material. Reclamation of the borrow area is affected by slope, a water table, rock fragments, bedrock, and toxic material.

Soils rated *good* have friable, loamy material to a depth of at least 40 inches. They are free of stones and cobbles, have little or no gravel, and have slopes of less than 8 percent. They are low in content of soluble salts, are naturally fertile or respond well to fertilizer, and are not so wet that excavation is difficult.

Soils rated *fair* are sandy soils, loamy soils that have a relatively high content of clay, soils that have only 20 to 40 inches of suitable material, soils that have an appreciable amount of gravel, stones, or soluble salts, or soils that have slopes of 8 to 15 percent. The soils are not so wet that excavation is difficult.

Soils rated *poor* are very sandy or clayey, have less than 20 inches of suitable material, have a large

amount of gravel, stones, or soluble salts, have slopes of more than 15 percent, or have a seasonal high water table at or near the surface.

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

Water Management

The table "Water Management" gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for pond reservoir areas; embankments, dikes, and levees; and aquifer-fed excavated ponds. The limitations are considered *slight* if soil properties and site features generally are favorable for the indicated use and limitations are minor and are easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increase in construction costs, and possibly increased maintenance are required.

This table also gives for each soil the restrictive features that affect drainage, irrigation, terraces and diversions, and grassed waterways.

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

Embankments, dikes, and levees are raised structures of soil material, generally less than 20 feet high, constructed to impound water or to protect land against overflow. In the table "Water Management," the soils are rated as a source of material for embankment fill. The ratings apply to the soil material below the surface layer to a depth of about 5 feet. It is assumed that soil layers will be uniformly mixed and compacted during construction.

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

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

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

Drainage is the removal of excess surface and subsurface water from the soil. How easily and effectively the soil is drained depends on the depth to bedrock or to other layers that affect the rate of water movement; permeability; depth to a high water table or depth of standing water if the soil is subject to ponding; slope; susceptibility to flooding; subsidence of organic layers; and the potential for frost action. Excavating and grading and the stability of ditchbanks are affected by depth to bedrock, large stones, slope, and the hazard of cutbanks caving. The productivity of the soil after drainage is adversely affected by extreme acidity or by toxic substances in the root zone, such as salts. Availability of drainage outlets is not considered in the ratings.

Irrigation is the controlled application of water to supplement rainfall and support plant growth. The design and management of an irrigation system are affected by depth to the water table, the need for drainage, flooding, available water capacity, intake rate, permeability, erosion hazard, and slope. The construction of a system is affected by large stones and depth to bedrock. The performance of a system is affected by the depth of the root zone, the amount of salts, and soil reaction.

Terraces and diversions are embankments or a combination of channels and ridges constructed across a slope to control erosion and conserve moisture by intercepting runoff.

Slope, wetness, large stones, and depth to bedrock affect the construction of terraces and diversions. A restricted rooting depth, a severe hazard of soil blowing or water erosion, an excessively coarse texture, and restricted permeability adversely affect maintenance.

Grassed waterways are natural or constructed channels, generally broad and shallow, that conduct

surface water to outlets at a nonerosive velocity. Large stones, wetness, slope, and depth to bedrock affect the construction of grassed waterways. A hazard of soil blowing, low available water capacity, restricted rooting depth, toxic substances such as salts, and restricted permeability adversely affect the growth and maintenance of the grass after construction.

Building Site Development

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. See text for definitions of terms used in this table. Absence of an entry indicates that no rating is applicable)

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
7A:						
Hubbard	Severe: cutbanks cave.	Slight	Slight	Slight	Slight	Moderate: droughty.
7B:						
Hubbard	Severe: cutbanks cave.	Slight	Slight	Moderate: slope.	Slight	Moderate: droughty.
7C:						
Hubbard	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: droughty, slope.
26:						
Aazdahl	Moderate: wetness.	Moderate: shrink-swell.	Moderate: wetness, shrink-swell.	Moderate: shrink-swell.	Severe: low strength, frost action.	Slight.
34:						
Parnell	Severe: ponding.	Severe: ponding, shrink-swell.	Severe: ponding, shrink-swell.	Severe: ponding, shrink-swell.	Severe: shrink-swell, low strength, ponding.	Severe: ponding.
38B:						
Waukon	Slight	Slight	Slight	Moderate: slope.	Moderate: low strength, frost action.	Slight.
38C2:						
Waukon	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: low strength, slope, frost action.	Moderate: slope.
38D2, 38E:						
Waukon	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
46:						
Borup	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, frost action.	Severe: wetness.
53B:						
Kandota	Slight	Slight	Slight	Moderate: slope.	Moderate: frost action.	Slight.
53C:						
Kandota	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope, frost action.	Moderate: slope.
53D:						
Kandota	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.

Building Site Development--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
58:						
Kittson	Moderate: wetness.	Moderate: shrink-swell.	Moderate: wetness, shrink-swell.	Moderate: shrink-swell.	Severe: frost action.	Slight.
59:						
Grimstad	Severe: cutbanks cave.	Slight	Moderate: wetness.	Slight	Moderate: frost action.	Slight.
61:						
Arveson	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, frost action.	Severe: wetness.
63:						
Rockwell	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, frost action.	Severe: wetness.
65:						
Foxhome	Severe: cutbanks cave.	Slight	Moderate: wetness.	Slight	Severe: frost action.	Slight.
66:						
Flaming	Severe: cutbanks cave.	Slight	Moderate: wetness.	Slight	Moderate: frost action.	Moderate: droughty.
68:						
Arveson	Severe: cutbanks cave, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding, frost action.	Severe: ponding.
107:						
Winger	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, frost action.	Severe: wetness.
108:						
McIntosh	Moderate: wetness.	Moderate: shrink-swell.	Moderate: wetness, shrink-swell.	Moderate: shrink-swell.	Severe: low strength, frost action.	Slight.
121:						
Wykeham	Moderate: wetness.	Moderate: shrink-swell.	Moderate: wetness.	Moderate: shrink-swell.	Moderate: shrink-swell, frost action.	Slight.
127A:						
Sverdrup	Severe: cutbanks cave.	Slight	Slight	Slight	Slight	Moderate: droughty.
127B:						
Sverdrup	Severe: cutbanks cave.	Slight	Slight	Moderate: slope.	Slight	Moderate: droughty.
127C:						
Sverdrup	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: droughty, slope.
141B:						
Egeland	Severe: cutbanks cave.	Slight	Slight	Slight	Slight	Moderate: droughty.

Building Site Development--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
141C:						
Egeland	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: droughty, slope.
141D:						
Egeland	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
168B:						
Forman	Slight	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Moderate: shrink-swell, low strength.	Slight.
180:						
Gonvick	Moderate: wetness.	Moderate: shrink-swell.	Moderate: wetness.	Moderate: shrink-swell.	Severe: low strength, frost action.	Slight.
184:						
Hamerly	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Severe: frost action.	Slight.
187:						
Haug	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding, frost action.	Severe: ponding, excess humus.
191:						
Epoufette	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, frost action.	Severe: wetness.
202:						
Meehan	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Moderate: wetness, frost action.	Severe: too acid.
258A, 258B:						
Sandberg	Severe: cutbanks cave.	Slight	Slight	Slight	Slight	Severe: droughty.
258C:						
Sandberg	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Severe: droughty.
260:						
Duelm	Severe: cutbanks cave.	Slight	Moderate: wetness.	Slight	Moderate: frost action.	Moderate: droughty.
267B:						
Snellman	Slight	Moderate: shrink-swell.	Slight	Moderate: shrink-swell, slope.	Moderate: shrink-swell, frost action.	Moderate: large stones.

Building Site Development--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
267C: Snellman	Moderate: slope.	Moderate: shrink-swell, slope.	Moderate: slope.	Severe: slope.	Moderate: shrink-swell, slope, frost action.	Moderate: large stones, slope.
267E, 267F: Snellman	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
290: Rothsay	Slight	Slight	Slight	Slight	Severe: frost action.	Slight.
293B: Swenoda	Moderate: wetness.	Slight	Moderate: wetness, shrink-swell.	Slight	Moderate: frost action.	Slight.
335: Urness	Severe: excess humus, ponding.	Severe: ponding, low strength.	Severe: ponding.	Severe: ponding, low strength.	Severe: low strength, ponding, frost action.	Severe: ponding.
339: Fordville	Severe: cutbanks cave.	Slight	Slight	Slight	Slight	Slight.
341A: Arvilla	Severe: cutbanks cave.	Slight	Slight	Slight	Slight	Moderate: droughty.
341B: Arvilla	Severe: cutbanks cave.	Slight	Slight	Moderate: slope.	Slight	Moderate: droughty.
371: Clontarf	Severe: cutbanks cave.	Slight	Moderate: wetness.	Slight	Moderate: frost action.	Moderate: droughty.
375: Forada	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, frost action.	Severe: wetness.
402C: Sioux	Severe: cutbanks cave.	Slight	Slight	Moderate: slope.	Slight	Severe: droughty.
402E: Sioux	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: droughty, slope.
406A: Dorset	Severe: cutbanks cave.	Slight	Slight	Slight	Slight	Moderate: droughty.
406B: Dorset	Severe: cutbanks cave.	Slight	Slight	Moderate: slope.	Slight	Moderate: droughty.

Building Site Development--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
418:						
Lamoure	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, wetness, flooding.	Severe: wetness.
422B:						
Bygland	Moderate: too clayey, wetness.	Severe: shrink-swell.	Moderate: wetness, shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell, low strength.	Slight.
422C:						
Bygland	Moderate: too clayey, wetness, slope.	Severe: shrink-swell.	Moderate: wetness, slope, shrink-swell.	Severe: shrink-swell, slope.	Severe: shrink-swell, low strength.	Moderate: slope.
426:						
Foldahl	Severe: cutbanks cave.	Slight	Moderate: wetness, shrink-swell.	Slight	Severe: frost action.	Moderate: droughty.
441A:						
Almora	Severe: cutbanks cave.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, low strength.	Slight.
441B:						
Almora	Severe: cutbanks cave.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Moderate: shrink-swell, low strength.	Slight.
441C:						
Almora	Severe: cutbanks cave.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Moderate: shrink-swell, low strength, slope.	Moderate: slope.
481:						
Kratka	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
494:						
Darnen	Severe: excess humus.	Severe: low strength.	Moderate: wetness, shrink-swell.	Severe: low strength.	Moderate: frost action.	Slight.
497:						
Hantho	Moderate: wetness.	Slight	Moderate: wetness.	Slight	Severe: frost action.	Slight.
508:						
Wyndmere	Severe: cutbanks cave, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Severe: frost action.	Moderate: wetness, droughty.
540:						
Seelyeville	Severe: excess humus, ponding.	Severe: subsides, ponding, low strength.	Severe: subsides, ponding, low strength.	Severe: subsides, ponding, low strength.	Severe: subsides, ponding, frost action.	Severe: ponding, excess humus.

Building Site Development--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
541:						
Rifle	Severe: excess humus, ponding.	Severe: ponding, low strength.	Severe: ponding, low strength.	Severe: ponding, low strength.	Severe: ponding, low strength.	Severe: ponding, excess humus.
544:						
Cathro	Severe: excess humus, ponding.	Severe: subsides, ponding.	Severe: subsides, ponding.	Severe: subsides, ponding.	Severe: subsides, ponding, frost action.	Severe: ponding, excess humus.
567A:						
Verndale	Severe: cutbanks cave.	Slight	Slight	Slight	Slight	Moderate: droughty.
567B:						
Verndale	Severe: cutbanks cave.	Slight	Slight	Moderate: slope.	Slight	Moderate: droughty.
609B:						
Dickey	Severe: cutbanks cave.	Slight	Moderate: shrink-swell.	Slight	Slight	Moderate: droughty.
624:						
Rosy	Severe: cutbanks cave.	Slight	Moderate: wetness.	Slight	Moderate: frost action.	Slight.
646C:						
Peever	Moderate: too clayey, slope.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell, slope.	Severe: shrink-swell, low strength.	Moderate: slope.
646D:						
Peever	Severe: slope.	Severe: shrink-swell, slope.	Severe: slope, shrink-swell.	Severe: shrink-swell, slope.	Severe: shrink-swell, low strength, slope.	Severe: slope.
670:						
Knute	Moderate: wetness.	Slight	Moderate: wetness.	Slight	Moderate: frost action.	Slight.
680:						
Parnell	Severe: excess humus, wetness.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: shrink-swell, low strength, wetness.	Severe: wetness.
698:						
Doran	Moderate: wetness.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell, low strength, frost action.	Slight.
701:						
Runeberg	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding, frost action.	Severe: ponding.

Building Site Development--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
705B:						
Nitche	Severe: cutbanks cave.	Slight	Slight	Slight	Slight	Moderate: droughty.
Kandota	Slight	Slight	Slight	Slight	Moderate: frost action.	Slight.
Lida	Severe: cutbanks cave.	Slight	Slight	Slight	Slight	Moderate: large stones, droughty.
705C:						
Nitche	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: droughty, slope.
Kandota	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope, frost action.	Moderate: slope.
Lida	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: large stones, droughty, slope.
707B:						
Lizzie	Severe: cutbanks cave.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength, frost action.	Slight.
707C2:						
Lizzie	Severe: cutbanks cave.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: low strength, frost action.	Moderate: slope.
707D2:						
Lizzie	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope, frost action.	Severe: slope.
710:						
Friberg	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, frost action.	Severe: wetness.
Weetown	Moderate: wetness.	Slight	Moderate: wetness.	Slight	Moderate: frost action.	Slight.
711B:						
Arvilla	Severe: cutbanks cave.	Slight	Slight	Moderate: slope.	Slight	Moderate: droughty.
Sandberg	Severe: cutbanks cave.	Slight	Slight	Moderate: slope.	Slight	Moderate: small stones, droughty.
711C:						
Arvilla	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: droughty, slope.

Building Site Development--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
711C:						
Sandberg	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: small stones, droughty.
715:						
Bluffcreek	Severe: cutbanks cave.	Slight	Moderate: wetness.	Slight	Moderate: frost action.	Moderate: droughty.
Clearriver	Severe: cutbanks cave.	Slight	Moderate: wetness.	Slight	Slight	Severe: droughty.
716B:						
Leaflake	Severe: cutbanks cave.	Slight	Slight	Slight	Slight	Moderate: droughty.
Eagleview	Severe: cutbanks cave.	Slight	Slight	Slight	Slight	Moderate: droughty.
716C:						
Leaflake	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: droughty, slope.
Eagleview	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: droughty, slope.
716D:						
Leaflake	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Eagleview	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
718E:						
Naytahwaush	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
721B:						
Corliss	Severe: cutbanks cave.	Slight	Slight	Moderate: slope.	Slight	Severe: droughty.
721C:						
Corliss	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Severe: droughty.
721D, 721E:						
Corliss	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: droughty, slope.
726:						
Kratka	Severe: cutbanks cave, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.

Building Site Development--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
746:						
Haslie	Severe: excess humus, ponding.	Severe: ponding, low strength.	Severe: ponding, low strength.	Severe: ponding, low strength.	Severe: ponding, frost action.	Severe: ponding, excess humus.
760C2:						
Chapett	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope, frost action.	Moderate: slope.
Sisseton	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope, frost action.	Moderate: slope.
760D2:						
Chapett	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Sisseton	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
769B:						
Mehurin	Moderate: too clayey, wetness.	Severe: shrink-swell.	Moderate: wetness, shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell, low strength.	Slight.
776B:						
Snellman	Slight	Moderate: shrink-swell.	Slight	Moderate: shrink-swell, slope.	Moderate: shrink-swell, frost action.	Moderate: large stones.
Sugarbush	Severe: cutbanks cave.	Slight	Slight	Moderate: slope.	Slight	Moderate: large stones, droughty.
776C:						
Snellman	Moderate: slope.	Moderate: shrink-swell, slope.	Moderate: slope.	Severe: slope.	Moderate: shrink-swell, slope, frost action.	Moderate: large stones, slope.
Sugarbush	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: large stones, droughty, slope.
776E:						
Snellman	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Sugarbush	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
777C2:						
Sisseton	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope, frost action.	Moderate: slope.
Heimdal	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope, frost action.	Moderate: slope.

Building Site Development--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
777D2, 777E:						
Sisseton	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Heimdal	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
778B:						
Dorset	Severe: cutbanks cave.	Slight	Slight	Slight	Slight	Moderate: droughty.
Corliss	Severe: cutbanks cave.	Slight	Slight	Slight	Slight	Severe: droughty.
778C:						
Dorset	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: droughty, slope.
Corliss	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Severe: droughty.
779B:						
Peever	Moderate: too clayey.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell, low strength.	Slight.
Mehurin	Moderate: too clayey, wetness.	Severe: shrink-swell.	Moderate: wetness, shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell, low strength.	Slight.
902B:						
Barnes	Slight	Slight	Slight	Moderate: slope.	Moderate: low strength, frost action.	Slight.
Buse	Slight	Slight	Slight	Moderate: slope.	Moderate: low strength, frost action.	Slight.
903C2:						
Barnes	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: low strength, slope, frost action.	Moderate: slope.
Langhei	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: low strength, slope, frost action.	Moderate: slope.
915C2:						
Forman	Moderate: slope.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Moderate: shrink-swell, low strength, slope.	Moderate: slope.
Buse	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: low strength, slope, frost action.	Moderate: slope.

Building Site Development--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
915D2:						
Forman	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Buse	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
931C2:						
Formdale	Moderate: slope.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: slope.
Langhei	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: low strength.	Moderate: slope.
931D2:						
Formdale	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
Langhei	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
942D2:						
Langhei	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Barnes	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
957B2:						
Rothsay	Slight	Slight	Slight	Moderate: slope.	Severe: frost action.	Slight.
Zell	Slight	Slight	Slight	Moderate: slope.	Severe: frost action.	Slight.
969C2:						
Zell	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: frost action.	Moderate: slope.
Rothsay	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: frost action.	Moderate: slope.
969D2:						
Zell	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, frost action.	Severe: slope.
Rothsay	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, frost action.	Severe: slope.
1015:						
Udipsamments	Severe: cutbanks cave.	Slight	Slight	Moderate: slope.	Slight	Moderate: droughty, too sandy.
1016:						
Udorthents	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.

Building Site Development--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
1027: Udorthents.						
1030: Pits.						
Udipsamments	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
1077:						
Forada	Severe: cutbanks cave, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding, frost action.	Severe: ponding.
Leafriver	Severe: cutbanks cave, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding, frost action.	Severe: ponding, excess humus.
1102B:						
Chapett	Slight	Slight	Slight	Slight	Moderate: frost action.	Slight.
Dorset	Severe: cutbanks cave.	Slight	Slight	Slight	Slight	Moderate: droughty.
1102C:						
Chapett	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope, frost action.	Moderate: slope.
Dorset	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: droughty, slope.
1103:						
Clitherall	Severe: cutbanks cave.	Slight	Moderate: wetness.	Slight	Moderate: frost action.	Moderate: droughty.
1104B:						
Waukon	Slight	Slight	Slight	Slight	Moderate: low strength, frost action.	Slight.
Dorset	Severe: cutbanks cave.	Slight	Slight	Slight	Slight	Moderate: droughty.
1104C:						
Waukon	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: low strength, slope, frost action.	Moderate: slope.
Dorset	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: droughty, slope.
1104D:						
Waukon	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.

Building Site Development--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
1104D:						
Dorset	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
1105B:						
Dent	Severe: cutbanks cave.	Moderate: shrink-swell.	Moderate: wetness.	Moderate: shrink-swell.	Severe: low strength, frost action.	Slight.
1110:						
Isan	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
1111:						
Nidaros	Severe: cutbanks cave, excess humus, ponding.	Severe: subsides, flooding, ponding.	Severe: subsides, flooding, ponding.	Severe: subsides, flooding, ponding.	Severe: subsides, ponding, flooding.	Severe: ponding, flooding, excess humus.
1112D, 1112E:						
Chapett	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Corliss	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: droughty, slope.
1113:						
Haslie	Severe: excess humus, ponding.	Severe: subsides, ponding, low strength.	Severe: subsides, ponding, low strength.	Severe: subsides, ponding, low strength.	Severe: subsides, ponding, frost action.	Severe: ponding, excess humus.
Seelyeville	Severe: excess humus, ponding.	Severe: ponding, low strength.	Severe: ponding, low strength.	Severe: ponding, low strength.	Severe: ponding, frost action.	Severe: ponding, excess humus.
Cathro	Severe: excess humus, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding, frost action.	Severe: ponding, excess humus.
1114:						
Hangaard	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, droughty.
1120:						
Rushlake	Severe: cutbanks cave.	Slight	Moderate: wetness.	Slight	Moderate: frost action.	Severe: droughty.
Hangaard	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, droughty.
1129:						
Lindaas	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: shrink-swell, low strength, frost action.	Moderate: wetness.

Building Site Development--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
1131B:						
Verndale	Severe: cutbanks cave.	Slight	Slight	Slight	Slight	Moderate: droughty.
Abbeylake	Severe: cutbanks cave.	Slight	Slight	Slight	Slight	Severe: droughty.
1136:						
Nidaros	Severe: cutbanks cave, excess humus, ponding.	Severe: subsides, ponding, low strength.	Severe: subsides, ponding.	Severe: subsides, ponding, low strength.	Severe: subsides, ponding, frost action.	Severe: ponding, excess humus.
1149:						
Hamerly	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: low strength, frost action.	Moderate: wetness.
1195A:						
Sybil	Severe: cutbanks cave.	Slight	Slight	Slight	Slight	Moderate: droughty.
Eagleview	Severe: cutbanks cave.	Slight	Slight	Slight	Slight	Moderate: droughty.
1195B:						
Sybil	Severe: cutbanks cave.	Slight	Slight	Moderate: slope.	Slight	Moderate: droughty.
Eagleview	Severe: cutbanks cave.	Slight	Slight	Moderate: slope.	Slight	Moderate: droughty.
1195C:						
Sybil	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: droughty, slope.
Eagleview	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: droughty, slope.
1195E:						
Sybil	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Eagleview	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
1196B:						
Lida	Severe: cutbanks cave.	Slight	Slight	Moderate: slope.	Slight	Moderate: large stones, droughty.
Two Inlets	Severe: cutbanks cave.	Slight	Slight	Moderate: slope.	Slight	Moderate: small stones, droughty.

Building Site Development--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
1196C:						
Lida	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: large stones, droughty, slope.
Two Inlets	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: small stones, droughty, slope.
1196E, 1196F:						
Lida	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Two Inlets	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
1200:						
Egglake	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, frost action.	Severe: wetness.
1208B:						
Naytahwaush	Moderate: too clayey.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength.	Slight.
Mahkonce	Moderate: too clayey, wetness.	Severe: shrink-swell.	Moderate: wetness, shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell, low strength, frost action.	Slight.
1209C:						
Naytahwaush	Moderate: too clayey, slope.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: slope.
1212B:						
Mahkonce	Moderate: too clayey, wetness.	Severe: shrink-swell.	Moderate: wetness, shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell, low strength, frost action.	Slight.
1214:						
Mustinka	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, wetness, frost action.	Severe: wetness.
1215:						
Pinelake	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, frost action.	Severe: wetness.
1216B:						
Egglake	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, frost action.	Severe: wetness.

Building Site Development--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
1216B:						
Wykeham	Moderate: wetness.	Moderate: shrink-swell.	Moderate: wetness.	Moderate: shrink-swell.	Moderate: shrink-swell, frost action.	Slight.
1217E:						
Waukon	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Lida	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
1218B:						
Snellman	Slight	Moderate: shrink-swell.	Slight	Moderate: shrink-swell, slope.	Moderate: shrink-swell, frost action.	Moderate: large stones.
Lida	Severe: cutbanks cave.	Slight	Slight	Moderate: slope.	Slight	Moderate: large stones, droughty.
1218C:						
Snellman	Moderate: slope.	Moderate: shrink-swell, slope.	Moderate: slope.	Severe: slope.	Moderate: shrink-swell, slope, frost action.	Moderate: large stones, slope.
Lida	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: large stones, droughty, slope.
1218E, 1218F:						
Snellman	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Lida	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
1219C:						
Sandberg	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: small stones, droughty.
Sverdrup	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: droughty, slope.
1221B:						
Sverdrup	Severe: cutbanks cave.	Slight	Slight	Moderate: slope.	Slight	Moderate: droughty.
Sandberg	Severe: cutbanks cave.	Slight	Slight	Moderate: slope.	Slight	Moderate: small stones, droughty.
1223D:						
Sandberg	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.

Building Site Development--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
1223D:						
Arvilla	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
1227:						
Quam	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: low strength, ponding, frost action.	Severe: ponding.
Cathro	Severe: excess humus, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding, frost action.	Severe: ponding, excess humus.
Urness	Severe: excess humus, ponding.	Severe: ponding, low strength.	Severe: ponding.	Severe: ponding, low strength.	Severe: low strength, ponding, frost action.	Severe: ponding.
1230:						
Haslie	Severe: excess humus, ponding.	Severe: subsides, ponding, low strength.	Severe: subsides, ponding, low strength.	Severe: subsides, ponding, low strength.	Severe: subsides, ponding, frost action.	Severe: ponding, excess humus.
Nidaros	Severe: cutbanks cave, excess humus, ponding.	Severe: subsides, ponding, low strength.	Severe: subsides, ponding.	Severe: subsides, ponding, low strength.	Severe: subsides, ponding, frost action.	Severe: ponding, excess humus.
1232B:						
Chapett	Slight	Slight	Slight	Moderate: slope.	Moderate: frost action.	Slight.
1232E:						
Chapett	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
1234B:						
Formdale	Slight	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength.	Slight.
Buse	Slight	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Moderate: shrink-swell, low strength.	Slight.
1237:						
Lakepark	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, frost action.	Severe: wetness.
1239:						
Quam	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: low strength, ponding, frost action.	Severe: ponding.

Building Site Development--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
1240:						
Roliss	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, wetness, frost action.	Severe: wetness.
1247D:						
Corliss	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: droughty, slope.
Dorset	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
1250C:						
Abbeylake	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Severe: droughty.
Verndale	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: droughty, slope.
1259:						
Hamerly	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: low strength, frost action.	Moderate: wetness.
Mustinka	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, wetness, frost action.	Severe: wetness.
1275B:						
Kandota	Slight	Slight	Slight	Moderate: slope.	Moderate: frost action.	Slight.
Egglake	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding, frost action.	Severe: ponding.
1275C:						
Kandota	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope, frost action.	Moderate: slope.
Egglake	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding, frost action.	Severe: ponding.
1276:						
Knute	Moderate: wetness.	Slight	Moderate: wetness.	Slight	Moderate: frost action.	Slight.
Brandsvold	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, frost action.	Severe: wetness.
1277D:						
Corliss	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: droughty, slope.

Building Site Development--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
1277D:						
Sverdrup	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
1289:						
Knute	Moderate: wetness.	Slight	Moderate: wetness.	Slight	Moderate: frost action.	Slight.
1290:						
Brandsvold	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, frost action.	Severe: wetness.
1291:						
Sedgeville	Severe: cutbanks cave, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: ponding, flooding, frost action.	Severe: ponding, flooding.
1293:						
Sedgeville	Severe: cutbanks cave, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness, frost action.	Severe: wetness.
1304A:						
Glyndon	Severe: cutbanks cave, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Severe: frost action.	Moderate: wetness.
1307:						
Rushlake	Severe: cutbanks cave.	Slight	Moderate: wetness.	Slight	Moderate: frost action.	Severe: droughty.
1317:						
Vallers	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, frost action.	Severe: wetness.
1319B:						
Rockwood	Severe: cutbanks cave.	Slight	Slight	Moderate: slope.	Moderate: frost action.	Moderate: large stones.
1319C:						
Rockwood	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope, frost action.	Moderate: large stones, slope.
1319D:						
Rockwood	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
1320B:						
Blowers	Severe: cutbanks cave.	Slight	Moderate: wetness.	Slight	Severe: frost action.	Moderate: large stones.
1321:						
Paddock	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: frost action.	Moderate: large stones, wetness.

Building Site Development--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
1321:						
Becida	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, frost action.	Severe: wetness.
1322:						
Wolverton	Severe: cutbanks cave.	Slight	Moderate: wetness, shrink-swell.	Slight	Moderate: frost action.	Slight.
1324B:						
Heimdal	Slight	Slight	Slight	Moderate: slope.	Moderate: frost action.	Slight.
Sisseton	Slight	Slight	Slight	Moderate: slope.	Moderate: frost action.	Slight.
1338:						
Oakcreek	Severe: cutbanks cave.	Slight	Moderate: wetness.	Slight	Moderate: frost action.	Slight.
1339:						
Borup	Severe: cutbanks cave, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding, frost action.	Severe: ponding.
1340:						
Bluffcreek	Severe: cutbanks cave.	Slight	Moderate: wetness.	Slight	Moderate: frost action.	Moderate: droughty.
Epoufette	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, frost action.	Severe: wetness.
1341:						
Clitherall	Severe: cutbanks cave.	Slight	Moderate: wetness.	Slight	Moderate: frost action.	Moderate: droughty.
Wykeham	Moderate: wetness.	Moderate: shrink-swell.	Moderate: wetness.	Moderate: shrink-swell.	Moderate: shrink-swell, frost action.	Slight.
1342:						
Pinelake	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, frost action.	Severe: wetness.
Brandsvold	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, frost action.	Severe: wetness.
1343C:						
Lida	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: large stones, droughty, slope.
Almora	Severe: cutbanks cave.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Moderate: shrink-swell, low strength, slope.	Moderate: slope.

Building Site Development--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
1343C:						
Lizzie	Severe: cutbanks cave.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: low strength, frost action.	Moderate: slope.
1344B:						
Lida	Severe: cutbanks cave.	Slight	Slight	Moderate: slope.	Slight	Moderate: large stones, droughty.
Almora	Severe: cutbanks cave.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Moderate: shrink-swell, low strength.	Slight.
Dent	Severe: cutbanks cave.	Moderate: shrink-swell.	Moderate: wetness.	Moderate: shrink-swell.	Severe: low strength, frost action.	Slight.
1345:						
Bluffcreek	Severe: cutbanks cave.	Slight	Moderate: wetness.	Slight	Moderate: frost action.	Moderate: droughty.
Rosy	Severe: cutbanks cave.	Slight	Moderate: wetness.	Slight	Moderate: frost action.	Slight.
1346:						
Nidaros	Severe: cutbanks cave, excess humus, ponding.	Severe: subsides, ponding, low strength.	Severe: subsides, ponding.	Severe: subsides, ponding, low strength.	Severe: subsides, ponding, frost action.	Severe: ponding, excess humus.
1347B:						
Kandota	Slight	Slight	Slight	Slight	Moderate: frost action.	Slight.
1348:						
Knute	Moderate: wetness.	Slight	Moderate: wetness.	Slight	Moderate: frost action.	Slight.
1349:						
Clotho	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, frost action.	Severe: wetness.
1350:						
Brandsvold	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, frost action.	Severe: wetness.
1351:						
Bluffton	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding, frost action.	Severe: ponding.
1365:						
Hillview	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, frost action.	Severe: wetness.

Building Site Development--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
1396:						
Sedgeville	Severe: cutbanks cave, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: ponding, flooding, frost action.	Severe: ponding, flooding.
Nidaros	Severe: cutbanks cave, excess humus, ponding.	Severe: subsides, ponding, low strength.	Severe: subsides, ponding.	Severe: subsides, ponding, low strength.	Severe: subsides, ponding, frost action.	Severe: ponding, excess humus.
Aquolls	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding, frost action.	Severe: ponding.
1397:						
Bemidji	Severe: cutbanks cave.	Slight	Moderate: wetness.	Slight	Moderate: frost action.	Moderate: droughty.
1825B:						
Seelyeville	Severe: excess humus, wetness.	Severe: subsides, wetness, low strength.	Severe: subsides, wetness, low strength.	Severe: subsides, wetness.	Severe: subsides, wetness, frost action.	Severe: wetness, excess humus.
1874:						
Radium	Severe: cutbanks cave.	Slight	Moderate: wetness.	Slight	Slight	Severe: droughty.
1943:						
Roscommon	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
1975:						
Oylen	Severe: cutbanks cave.	Slight	Moderate: wetness.	Slight	Moderate: frost action.	Moderate: droughty.

Sanitary Facilities

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. See text for definitions of terms used in this table. Absence of an entry indicates that no rating is applicable)

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
7A, 7B:					
Hubbard	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
7C:					
Hubbard	Severe: poor filter.	Severe: seepage, slope.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
26:					
Aazdahl	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Fair: too clayey, wetness.
34:					
Parnell	Severe: ponding, percs slowly.	Severe: ponding.	Severe: ponding, too clayey.	Severe: ponding.	Poor: too clayey, hard to pack, ponding.
38B:					
Waukon	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight	Fair: too clayey.
38C2:					
Waukon	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, slope.
38D2, 38E:					
Waukon	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
46:					
Borup	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: wetness.
53B:					
Kandota	Moderate: percs slowly.	Moderate: seepage, slope.	Slight	Slight	Fair: small stones.
53C:					
Kandota	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope.	Moderate: slope.	Fair: small stones, slope.
53D:					
Kandota	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.

Sanitary Facilities--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
58:					
Kittson	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Fair: too clayey, wetness.
59:					
Grimstad	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: wetness.	Severe: seepage, wetness.	Fair: wetness.
61:					
Arveson	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
63:					
Rockwell	Severe: wetness, percs slowly, poor filter.	Severe: seepage, wetness.	Severe: wetness.	Severe: seepage, wetness.	Poor: wetness.
65:					
Foxhome	Severe: wetness.	Severe: seepage, wetness.	Severe: wetness.	Severe: seepage, wetness.	Fair: too clayey, wetness.
66:					
Flaming	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy.
68:					
Arveson	Severe: ponding, poor filter.	Severe: seepage, ponding.	Severe: seepage, ponding, too sandy.	Severe: seepage, ponding.	Poor: seepage, too sandy, ponding.
107:					
Winger	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
108:					
McIntosh	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Fair: too clayey, wetness.
121:					
Wykeham	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Fair: wetness.
127A, 127B:					
Sverdrup	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
127C:					
Sverdrup	Severe: poor filter.	Severe: seepage, slope.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.

Sanitary Facilities--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
141B: Egeland	Slight	Severe: seepage.	Slight	Severe: seepage.	Poor: thin layer.
141C: Egeland	Moderate: slope.	Severe: seepage, slope.	Moderate: slope.	Severe: seepage.	Poor: thin layer.
141D: Egeland	Severe: slope.	Severe: seepage, slope.	Severe: slope.	Severe: seepage, slope.	Poor: slope, thin layer.
168B: Forman	Severe: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight	Fair: too clayey.
180: Gonvick	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Fair: too clayey, wetness.
184: Hamerly	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Fair: too clayey, wetness.
187: Haug	Severe: ponding.	Severe: seepage, excess humus, ponding.	Severe: ponding.	Severe: ponding.	Poor: ponding.
191: Epoufette	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, small stones.
202: Meehan	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
258A, 258B: Sandberg	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy, small stones.
258C: Sandberg	Severe: poor filter.	Severe: seepage, slope.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy, small stones.

Sanitary Facilities--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
260:					
Duelm	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy.
267B:					
Snellman	Moderate: percs slowly.	Moderate: seepage, slope.	Slight	Slight	Fair: small stones.
267C:					
Snellman	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope.	Moderate: slope.	Fair: small stones, slope.
267E, 267F:					
Snellman	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
290:					
Rothsay	Moderate: percs slowly.	Severe: seepage.	Severe: seepage.	Severe: seepage.	Good.
293B:					
Swenoda	Severe: wetness, percs slowly.	Severe: seepage, wetness.	Moderate: wetness, too clayey.	Severe: seepage.	Fair: too clayey, wetness.
335:					
Urness	Severe: ponding, percs slowly.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Poor: ponding.
339:					
Fordville	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy, small stones.
341A, 341B:					
Arvilla	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy, small stones.
371:					
Clontarf	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy.
375:					
Forada	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
402C:					
Sioux	Severe: poor filter.	Severe: seepage, slope.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy, small stones.

Sanitary Facilities--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
402E:					
Sioux	Severe: poor filter, slope.	Severe: seepage, slope.	Severe: seepage, slope, too sandy.	Severe: seepage, slope.	Poor: seepage, too sandy, small stones.
406A, 406B:					
Dorset	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy, small stones.
418:					
Lamoure	Severe: flooding, wetness, percs slowly.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: hard to pack, wetness.
422B:					
Bygland	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: hard to pack.
422C:					
Bygland	Severe: wetness, percs slowly.	Severe: slope, wetness.	Severe: wetness.	Severe: wetness.	Poor: hard to pack.
426:					
Foldahl	Severe: wetness, percs slowly, poor filter.	Severe: seepage, wetness.	Severe: wetness.	Severe: seepage, wetness.	Fair: too clayey, small stones, wetness.
441A, 441B:					
Almora	Severe: poor filter.	Severe: seepage.	Severe: seepage.	Severe: seepage.	Poor: thin layer.
441C:					
Almora	Severe: poor filter.	Severe: seepage, slope.	Severe: seepage.	Severe: seepage.	Poor: thin layer.
481:					
Kratka	Severe: wetness, percs slowly, poor filter.	Severe: seepage, wetness.	Severe: wetness.	Severe: seepage, wetness.	Poor: wetness.
494:					
Darnen	Severe: wetness.	Moderate: seepage, excess humus.	Severe: wetness.	Moderate: wetness.	Fair: too clayey.
497:					
Hantho	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Fair: wetness.
508:					
Wyndmere	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: too sandy.

Sanitary Facilities--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
540:					
Seelyeville	Severe: subsides, ponding, percs slowly.	Severe: seepage, excess humus, ponding.	Severe: seepage, ponding, excess humus.	Severe: seepage, ponding.	Poor: ponding, excess humus.
541:					
Rifle	Severe: ponding.	Severe: seepage, excess humus, ponding.	Severe: seepage, ponding, excess humus.	Severe: seepage, ponding.	Poor: ponding, excess humus.
544:					
Cathro	Severe: ponding, percs slowly.	Severe: seepage, excess humus, ponding.	Severe: ponding.	Severe: seepage, ponding.	Poor: ponding.
567A, 567B:					
Verndale	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
609B:					
Dickey	Severe: percs slowly, poor filter.	Severe: seepage.	Moderate: too clayey.	Severe: seepage.	Fair: too clayey.
624:					
Rosy	Severe: wetness.	Severe: wetness.	Severe: wetness, too sandy.	Severe: wetness.	Poor: too sandy.
646C:					
Peever	Severe: percs slowly.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Poor: too clayey, hard to pack.
646D:					
Peever	Severe: percs slowly, slope.	Severe: slope.	Severe: slope, too clayey.	Severe: slope.	Poor: too clayey, hard to pack, slope.
670:					
Knute	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Fair: wetness.
680:					
Parnell	Severe: wetness, percs slowly.	Moderate: seepage.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
698:					
Doran	Severe: wetness, percs slowly.	Moderate: seepage.	Severe: wetness.	Severe: wetness.	Fair: too clayey, wetness.
701:					
Runeberg	Severe: ponding, percs slowly.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Poor: ponding.

Sanitary Facilities--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
705B:					
Nitche	Severe: poor filter.	Severe: seepage.	Severe: too sandy.	Severe: seepage.	Poor: seepage, too sandy, small stones.
Kandota	Moderate: percs slowly.	Moderate: seepage, slope.	Slight	Slight	Fair: small stones.
Lida	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy, small stones.
705C:					
Nitche	Severe: poor filter.	Severe: seepage, slope.	Severe: too sandy.	Severe: seepage.	Poor: seepage, too sandy, small stones.
Kandota	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope.	Moderate: slope.	Fair: small stones, slope.
Lida	Severe: poor filter.	Severe: seepage, slope.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy, small stones.
707B:					
Lizzie	Moderate: percs slowly.	Severe: seepage.	Severe: seepage.	Slight	Fair: too clayey.
707C2:					
Lizzie	Moderate: percs slowly, slope.	Severe: seepage, slope.	Severe: seepage.	Moderate: slope.	Fair: too clayey, slope.
707D2:					
Lizzie	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: slope.	Poor: slope.
710:					
Friberg	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
Weetown	Severe: wetness.	Moderate: seepage, slope, wetness.	Severe: wetness.	Moderate: wetness.	Good.
711B:					
Arvilla	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy, small stones.
Sandberg	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy, small stones.

Sanitary Facilities--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
711C:					
Arvilla	Severe: poor filter.	Severe: seepage, slope.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy, small stones.
Sandberg	Severe: poor filter.	Severe: seepage, slope.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy, small stones.
715:					
Bluffcreek	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy.
Clearriver	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy.
716B:					
Leaflake	Severe: poor filter.	Severe: seepage.	Slight	Severe: seepage.	Fair: small stones.
Eagleview	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
716C:					
Leaflake	Severe: poor filter.	Severe: seepage, slope.	Moderate: slope.	Severe: seepage.	Fair: small stones, slope.
Eagleview	Severe: poor filter.	Severe: seepage, slope.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
716D:					
Leaflake	Severe: poor filter, slope.	Severe: seepage, slope.	Severe: slope.	Severe: seepage, slope.	Poor: slope.
Eagleview	Severe: poor filter, slope.	Severe: seepage, slope.	Severe: seepage, slope, too sandy.	Severe: seepage, slope.	Poor: seepage, too sandy, slope.
718E:					
Naytahwaush	Severe: percs slowly, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
721B:					
Corliss	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy, small stones.

Sanitary Facilities--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
721C:					
Corliss	Severe: poor filter.	Severe: seepage, slope.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy, small stones.
721D, 721E:					
Corliss	Severe: poor filter, slope.	Severe: seepage, slope.	Severe: seepage, slope, too sandy.	Severe: seepage, slope.	Poor: seepage, too sandy, small stones.
726:					
Kratka	Severe: ponding, percs slowly, poor filter.	Severe: seepage, ponding.	Severe: ponding.	Severe: seepage, ponding.	Poor: ponding.
746:					
Haslie	Severe: ponding, percs slowly.	Severe: seepage, excess humus, ponding.	Severe: ponding, excess humus.	Severe: seepage, ponding.	Poor: hard to pack, ponding.
760C2:					
Chapett	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope.	Moderate: slope.	Fair: slope.
Sisseton	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope.	Moderate: slope.	Fair: slope.
760D2:					
Chapett	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
Sisseton	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
769B:					
Mehurin	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Fair: too clayey, wetness.
776B:					
Snellman	Moderate: percs slowly.	Moderate: seepage, slope.	Slight	Slight	Fair: small stones.
Sugarbush	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy, small stones.
776C:					
Snellman	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope.	Moderate: slope.	Fair: small stones, slope.

Sanitary Facilities--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
776C:					
Sugarbush	Severe: poor filter.	Severe: seepage, slope.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy, small stones.
776E:					
Snellman	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
Sugarbush	Severe: poor filter, slope.	Severe: seepage, slope.	Severe: seepage, slope, too sandy.	Severe: seepage, slope.	Poor: seepage, too sandy, small stones.
777C2:					
Sisseton	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope.	Moderate: slope.	Fair: slope.
Heimdal	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope.	Moderate: slope.	Fair: slope.
777D2, 777E:					
Sisseton	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
Heimdal	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
778B:					
Dorset	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy, small stones.
Corliss	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy, small stones.
778C:					
Dorset	Severe: poor filter.	Severe: seepage, slope.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy, small stones.
Corliss	Severe: poor filter.	Severe: seepage, slope.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy, small stones.
779B:					
Peever	Severe: percs slowly.	Moderate: slope.	Severe: too clayey.	Slight	Poor: too clayey, hard to pack.
Mehurin	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Fair: too clayey, wetness.

Sanitary Facilities--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
902B:					
Barnes	Moderate: percs slowly.	Moderate: seepage, slope.	Slight	Slight	Good.
Buse	Moderate: percs slowly.	Moderate: seepage, slope.	Slight	Slight	Good.
903C2:					
Barnes	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope.	Moderate: slope.	Fair: slope.
Langhei	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, slope.
915C2:					
Forman	Severe: percs slowly.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, slope.
Buse	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope.	Moderate: slope.	Fair: slope.
915D2:					
Forman	Severe: percs slowly, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
Buse	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
931C2:					
Formdale	Severe: percs slowly.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, slope.
Langhei	Severe: percs slowly.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, slope.
931D2:					
Formdale	Severe: percs slowly, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
Langhei	Severe: percs slowly, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
942D2:					
Langhei	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
Barnes	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.

Sanitary Facilities--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
957B2:					
Rothsay	Moderate: percs slowly.	Severe: seepage.	Severe: seepage.	Severe: seepage.	Good.
Zell	Moderate: percs slowly.	Moderate: seepage, slope.	Slight	Slight	Good.
969C2:					
Zell	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope.	Moderate: slope.	Fair: slope.
Rothsay	Moderate: percs slowly, slope.	Severe: seepage, slope.	Severe: seepage.	Severe: seepage.	Fair: slope.
969D2:					
Zell	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
Rothsay	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: slope.
1015:					
Udipsamments	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
1016:					
Udorthents	Slight	Slight	Severe: slope.	Severe: slope.	Poor: slope, thin layer.
1027:					
Udorthents.					
1030:					
Pits.					
Udipsamments	Severe: poor filter, slope.	Severe: seepage, slope.	Severe: seepage, slope, too sandy.	Severe: seepage, slope.	Poor: seepage, too sandy, slope.
1077:					
Forada	Severe: ponding, poor filter.	Severe: seepage, ponding.	Severe: seepage, ponding, too sandy.	Severe: seepage, ponding.	Poor: seepage, too sandy, ponding.
Leafriver	Severe: ponding, poor filter.	Severe: seepage, excess humus, ponding.	Severe: seepage, ponding, too sandy.	Severe: seepage, ponding.	Poor: seepage, too sandy, ponding.
1102B:					
Chapett	Moderate: percs slowly.	Moderate: seepage, slope.	Slight	Slight	Good.

Sanitary Facilities--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
1102B:					
Dorset	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy, small stones.
1102C:					
Chapett	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope.	Moderate: slope.	Fair: slope.
Dorset	Severe: poor filter.	Severe: seepage, slope.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy, small stones.
1103:					
Clitherall	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, small stones.
1104B:					
Waukon	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight	Fair: too clayey.
Dorset	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy, small stones.
1104C:					
Waukon	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, slope.
Dorset	Severe: poor filter.	Severe: seepage, slope.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy, small stones.
1104D:					
Waukon	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
Dorset	Severe: poor filter, slope.	Severe: seepage, slope.	Severe: seepage, slope, too sandy.	Severe: seepage, slope.	Poor: seepage, too sandy, small stones.
1105B:					
Dent	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Fair: wetness.
1110:					
Isan	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.

Sanitary Facilities--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
1111:					
Nidaros	Severe: subsides, flooding, ponding.	Severe: seepage, flooding, excess humus.	Severe: flooding, seepage, ponding.	Severe: flooding, seepage, ponding.	Poor: ponding, excess humus.
1112D:					
Chapett	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
Corliss	Severe: poor filter, slope.	Severe: seepage, slope.	Severe: seepage, slope, too sandy.	Severe: seepage, slope.	Poor: seepage, too sandy, small stones.
1112E:					
Chapett	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
Corliss	Severe: poor filter, slope.	Severe: seepage, slope.	Severe: seepage, slope, too sandy.	Severe: seepage, slope.	Poor: seepage, too sandy, small stones.
1113:					
Haslie	Severe: subsides, ponding, percs slowly.	Severe: seepage, excess humus, ponding.	Severe: ponding, too clayey, excess humus.	Severe: seepage, ponding.	Poor: too clayey, hard to pack, ponding.
Seelyeville	Severe: ponding, percs slowly.	Severe: seepage, excess humus, ponding.	Severe: seepage, ponding, excess humus.	Severe: seepage, ponding.	Poor: ponding, excess humus.
Cathro	Severe: ponding, percs slowly.	Severe: seepage, excess humus, ponding.	Severe: ponding.	Severe: seepage, ponding.	Poor: ponding.
1114:					
Hangaard	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
1120:					
Rushlake	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, small stones.
Hangaard	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
1129:					
Lindaas	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.

Sanitary Facilities--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
1131B:					
Verndale	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
Abbeylake	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
1136:					
Nidaros	Severe: subsides, ponding, percs slowly.	Severe: seepage, excess humus, ponding.	Severe: seepage, ponding, too sandy.	Severe: seepage, ponding.	Poor: seepage, too sandy, ponding.
1149:					
Hamerly	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Fair: too clayey, wetness.
1195A, 1195B:					
Sybil	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
Eagleview	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
1195C:					
Sybil	Severe: poor filter.	Severe: seepage, slope.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
Eagleview	Severe: poor filter.	Severe: seepage, slope.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
1195E:					
Sybil	Severe: poor filter, slope.	Severe: seepage, slope.	Severe: seepage, slope, too sandy.	Severe: seepage, slope.	Poor: seepage, too sandy, slope.
Eagleview	Severe: poor filter, slope.	Severe: seepage, slope.	Severe: seepage, slope, too sandy.	Severe: seepage, slope.	Poor: seepage, too sandy, slope.
1196B:					
Lida	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy, small stones.
Two Inlets	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy, small stones.

Sanitary Facilities--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
1196C:					
Lida	Severe: poor filter.	Severe: seepage, slope.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy, small stones.
Two Inlets	Severe: poor filter.	Severe: seepage, slope.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy, small stones.
1196E, 1196F:					
Lida	Severe: poor filter, slope.	Severe: seepage, slope.	Severe: seepage, slope, too sandy.	Severe: seepage, slope.	Poor: seepage, too sandy, small stones.
Two Inlets	Severe: poor filter, slope.	Severe: seepage, slope.	Severe: seepage, slope, too sandy.	Severe: seepage, slope.	Poor: seepage, too sandy, small stones.
1200:					
Egglake	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
1208B:					
Naytahwaush	Severe: percs slowly.	Moderate: slope.	Moderate: too clayey.	Slight	Fair: too clayey.
Mahkonce	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Fair: too clayey, wetness.
1209C:					
Naytahwaush	Severe: percs slowly.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, slope.
1212B:					
Mahkonce	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Fair: too clayey, wetness.
1214:					
Mustinka	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: hard to pack, wetness.
1215:					
Pinelake	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, small stones.
1216B:					
Egglake	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
Wykeham	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Fair: wetness.

Sanitary Facilities--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
1217E:					
Waukon	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
Lida	Severe: poor filter, slope.	Severe: seepage, slope.	Severe: seepage, slope, too sandy.	Severe: seepage, slope.	Poor: seepage, too sandy, small stones.
1218B:					
Snellman	Moderate: percs slowly.	Moderate: seepage, slope.	Slight	Slight	Fair: small stones.
Lida	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy, small stones.
1218C:					
Snellman	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope.	Moderate: slope.	Fair: small stones, slope.
Lida	Severe: poor filter.	Severe: seepage, slope.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy, small stones.
1218E, 1218F:					
Snellman	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
Lida	Severe: poor filter, slope.	Severe: seepage, slope.	Severe: seepage, slope, too sandy.	Severe: seepage, slope.	Poor: seepage, too sandy, small stones.
1219C:					
Sandberg	Severe: poor filter.	Severe: seepage, slope.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy, small stones.
Sverdrup	Severe: poor filter.	Severe: seepage, slope.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
1221B:					
Sverdrup	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
Sandberg	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy, small stones.

Sanitary Facilities--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
1223D:					
Sandberg	Severe: poor filter, slope.	Severe: seepage, slope.	Severe: seepage, slope, too sandy.	Severe: seepage, slope.	Poor: seepage, too sandy, small stones.
Arvilla	Severe: poor filter, slope.	Severe: seepage, slope.	Severe: seepage, slope, too sandy.	Severe: seepage, slope.	Poor: seepage, too sandy, small stones.
1227:					
Quam	Severe: ponding, percs slowly.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Poor: ponding.
Cathro	Severe: ponding, percs slowly.	Severe: seepage, excess humus, ponding.	Severe: ponding.	Severe: seepage, ponding.	Poor: ponding.
Urness	Severe: ponding, percs slowly.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Poor: ponding.
1230:					
Haslie	Severe: subsides, ponding, percs slowly.	Severe: seepage, excess humus, ponding.	Severe: ponding, too clayey, excess humus.	Severe: seepage, ponding.	Poor: too clayey, hard to pack, ponding.
Nidaros	Severe: subsides, ponding, percs slowly.	Severe: seepage, excess humus, ponding.	Severe: seepage, ponding, excess humus.	Severe: seepage, ponding.	Poor: ponding, excess humus.
1232B:					
Chapett	Moderate: percs slowly.	Moderate: seepage, slope.	Slight	Slight	Good.
1232E:					
Chapett	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
1234B:					
Formdale	Severe: percs slowly.	Moderate: slope.	Moderate: too clayey.	Slight	Fair: too clayey.
Buse	Severe: percs slowly.	Moderate: slope.	Moderate: too clayey.	Slight	Fair: too clayey.
1237:					
Lakepark	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
1239:					
Quam	Severe: ponding, percs slowly.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Poor: ponding.

Sanitary Facilities--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
1240:					
Roliss	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
1247D:					
Corliss	Severe: poor filter, slope.	Severe: seepage, slope.	Severe: seepage, slope, too sandy.	Severe: seepage, slope.	Poor: seepage, too sandy, small stones.
Dorset	Severe: poor filter, slope.	Severe: seepage, slope.	Severe: seepage, slope, too sandy.	Severe: seepage, slope.	Poor: seepage, too sandy, small stones.
1250C:					
Abbeylake	Severe: poor filter.	Severe: seepage, slope.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
Verndale	Severe: poor filter.	Severe: seepage, slope.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
1259:					
Hamerly	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Fair: too clayey, wetness.
Mustinka	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: hard to pack, wetness.
1275B:					
Kandota	Moderate: percs slowly.	Moderate: seepage, slope.	Slight	Slight	Fair: small stones.
Egglake	Severe: ponding.	Severe: seepage, ponding.	Severe: ponding.	Severe: ponding.	Poor: ponding.
1275C:					
Kandota	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope.	Moderate: slope.	Fair: small stones, slope.
Egglake	Severe: ponding.	Severe: seepage, ponding.	Severe: ponding.	Severe: ponding.	Poor: ponding.
1276:					
Knute	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Fair: wetness.
Brandsvold	Severe: wetness, percs slowly.	Severe: seepage, wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.

Sanitary Facilities--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
1277D:					
Corliss	Severe: poor filter, slope.	Severe: seepage, slope.	Severe: seepage, slope, too sandy.	Severe: seepage, slope.	Poor: seepage, too sandy, small stones.
Sverdrup	Severe: poor filter, slope.	Severe: seepage, slope.	Severe: seepage, slope, too sandy.	Severe: seepage, slope.	Poor: seepage, too sandy, slope.
1289:					
Knute	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Fair: wetness.
1290:					
Brandsvold	Severe: wetness, percs slowly.	Severe: seepage, wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
1291:					
Sedgeville	Severe: flooding, ponding, poor filter.	Severe: seepage, flooding.	Severe: flooding, seepage, ponding.	Severe: flooding, seepage, ponding.	Poor: seepage, too sandy, small stones.
1293:					
Sedgeville	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, small stones.
1304A:					
Glyndon	Severe: wetness.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Fair: too sandy, wetness.
1307:					
Rushlake	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, small stones.
1317:					
Vallers	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
1319B:					
Rockwood	Severe: percs slowly.	Moderate: seepage, slope.	Slight	Slight	Good.
1319C:					
Rockwood	Severe: percs slowly.	Severe: slope.	Moderate: slope.	Moderate: slope.	Fair: slope.
1319D:					
Rockwood	Severe: percs slowly, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.

Sanitary Facilities--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
1320B:					
Blowers	Severe: wetness, percs slowly.	Moderate: seepage, slope.	Moderate: wetness, too sandy.	Moderate: wetness.	Fair: too sandy, small stones, wetness.
1321:					
Paddock	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
Becida	Severe: wetness, percs slowly.	Moderate: seepage.	Severe: wetness.	Severe: wetness.	Poor: wetness.
1322:					
Wolverton	Severe: wetness, percs slowly, poor filter.	Severe: seepage, wetness.	Severe: wetness.	Severe: seepage, wetness.	Fair: too clayey, wetness.
1324B:					
Heimdal	Moderate: percs slowly.	Moderate: seepage, slope.	Slight	Slight	Good.
Sisseton	Moderate: percs slowly.	Moderate: seepage, slope.	Slight	Slight	Good.
1338:					
Oakcreek	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Poor: thin layer.
1339:					
Borup	Severe: ponding, poor filter.	Severe: seepage, ponding.	Severe: seepage, ponding, too sandy.	Severe: seepage, ponding.	Poor: ponding.
1340:					
Bluffcreek	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy.
Epoufette	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, small stones.
1341:					
Clitherall	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, small stones.
Wykeham	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Fair: wetness.

Sanitary Facilities--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
1342:					
Pinelake	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: wetness.	Severe: seepage, wetness.	Poor: seepage, small stones, wetness.
Brandsvold	Severe: wetness, percs slowly.	Severe: seepage, wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
1343C:					
Lida	Severe: poor filter.	Severe: seepage, slope.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy, small stones.
Almora	Severe: poor filter.	Severe: seepage, slope.	Severe: seepage.	Severe: seepage.	Poor: thin layer.
Lizzie	Moderate: percs slowly, slope.	Severe: seepage, slope.	Severe: seepage.	Moderate: slope.	Fair: too clayey, slope.
1344B:					
Lida	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy, small stones.
Almora	Severe: poor filter.	Severe: seepage.	Severe: seepage.	Severe: seepage.	Poor: thin layer.
Dent	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Fair: wetness.
1345:					
Bluffcreek	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy.
Rosy	Severe: wetness.	Severe: wetness.	Severe: wetness, too sandy.	Severe: wetness.	Poor: too sandy.
1346:					
Nidaros	Severe: subsides, ponding, percs slowly.	Severe: seepage, excess humus, ponding.	Severe: seepage, ponding, too sandy.	Severe: seepage, ponding.	Poor: seepage, too sandy, ponding.
1347B:					
Kandota	Moderate: percs slowly.	Moderate: seepage, slope.	Slight	Slight	Fair: small stones.
1348:					
Knute	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Fair: wetness.

Sanitary Facilities--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
1349:					
Clotho	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
1350:					
Brandsvold	Severe: wetness, percs slowly.	Severe: seepage, wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
1351:					
Bluffton	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Poor: ponding.
1365:					
Hillview	Severe: wetness.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: too sandy, wetness.
1396:					
Sedgeville	Severe: flooding, ponding, poor filter.	Severe: seepage, flooding.	Severe: flooding, seepage, ponding.	Severe: flooding, seepage, ponding.	Poor: seepage, too sandy, small stones.
Nidaros	Severe: subsides, ponding, percs slowly.	Severe: seepage, excess humus, ponding.	Severe: seepage, ponding, too sandy.	Severe: seepage, ponding.	Poor: seepage, too sandy, ponding.
Aquolls	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Poor: seepage, small stones, ponding.
1397:					
Bemidji	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: wetness.	Severe: seepage, wetness.	Fair: wetness.
1825B:					
Seelyeville	Severe: subsides, wetness, percs slowly.	Severe: seepage, excess humus.	Severe: seepage, wetness, excess humus.	Severe: seepage, wetness.	Poor: wetness, excess humus.
1874:					
Radium	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy.
1943:					
Roscommon	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.

Sanitary Facilities--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
1975: Oylen	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy.

Construction Materials

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. See text for definitions of terms used in this table. Absence of an entry indicates that no rating is applicable)

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
7A, 7B:				
Hubbard	Good	Probable	Improbable: too sandy.	Fair: too sandy.
7C:				
Hubbard	Good	Probable	Improbable: too sandy.	Fair: too sandy, slope.
26:				
Aazdahl	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
34:				
Parnell	Poor: shrink-swell, low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
38B:				
Waukon	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, small stones.
38C2:				
Waukon	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, small stones, slope.
38D2:				
Waukon	Fair: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
38E:				
Waukon	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
46:				
Borup	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
53B, 53C:				
Kandota	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
53D:				
Kandota	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
58:				
Kittson	Fair: shrink-swell, low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.

Construction Materials--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
59:				
Grimstad	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too sandy.
61:				
Arveson	Poor: wetness.	Probable	Improbable: too sandy.	Poor: wetness.
63:				
Rockwell	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer, wetness.
65:				
Foxhome	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
66:				
Flaming	Fair: wetness.	Probable	Improbable: too sandy.	Poor: too sandy.
68:				
Arveson	Poor: wetness.	Probable	Improbable: too sandy.	Poor: wetness.
107:				
Winger	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
108:				
McIntosh	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
121:				
Wykeham	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, small stones.
127A, 127B, 127C:				
Sverdrup	Good	Probable	Improbable: too sandy.	Poor: too sandy.
141B:				
Egeland	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
141C:				
Egeland	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, slope.
141D:				
Egeland	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
168B:				
Forman	Fair: shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.

Construction Materials--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
180: Gonvick	Fair: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, small stones.
184: Hamerly	Fair: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
187: Haug	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
191: Epoufette	Poor: wetness.	Probable	Probable	Poor: too sandy, small stones, area reclaim.
202: Meehan	Fair: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, too acid.
258A, 258B, 258C: Sandberg	Good	Probable	Probable	Poor: small stones, area reclaim.
260: Duelm	Fair: wetness.	Probable	Improbable: too sandy.	Poor: too sandy.
267B, 267C: Snellman	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
267E: Snellman	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
267F: Snellman	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
290: Rothsay	Good	Improbable: excess fines.	Improbable: excess fines.	Good.
293B: Swenoda	Fair: shrink-swell, low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
335: Urness	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.

Construction Materials--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
339:				
Fordville	Good	Probable	Probable	Poor: too sandy, small stones, area reclaim.
341A, 341B:				
Arvilla	Good	Probable	Probable	Poor: too sandy, small stones, area reclaim.
371:				
Clontarf	Fair: wetness.	Probable	Improbable: too sandy.	Fair: thin layer.
375:				
Forada	Poor: wetness.	Probable	Probable	Poor: small stones, wetness.
402C:				
Sioux	Good	Probable	Probable	Poor: too sandy, small stones, area reclaim.
402E:				
Sioux	Poor: slope.	Probable	Probable	Poor: too sandy, small stones, area reclaim.
406A, 406B:				
Dorset	Good	Probable	Probable	Poor: too sandy, small stones, area reclaim.
418:				
Lamoure	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
422B, 422C:				
Bygland	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
426:				
Foldahl	Fair: shrink-swell, low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too sandy.
441A, 441B, 441C:				
Almora	Good	Probable	Improbable: too sandy.	Poor: small stones, area reclaim.
481:				
Kratka	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer, wetness.

Construction Materials--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
494:				
Darnen	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
497:				
Hantho	Fair: low strength, thin layer, wetness.	Improbable: excess fines.	Improbable: excess fines.	Good.
508:				
Wyndmere	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: thin layer.
540:				
Seelyeville	Poor: wetness.	Improbable: excess humus.	Improbable: excess humus.	Poor: excess humus, wetness.
541:				
Rifle	Poor: wetness.	Improbable: excess humus.	Improbable: excess humus.	Poor: excess humus, wetness.
544:				
Cathro	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer, wetness.
567A, 567B:				
Verndale	Good	Probable	Improbable: too sandy.	Poor: too sandy.
609B:				
Dickey	Fair: shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too sandy.
624:				
Rosy	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too sandy.
646C:				
Peever	Poor: shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
646D:				
Peever	Poor: shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
670:				
Knute	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
680:				
Parnell	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.

Construction Materials--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
698:				
Doran	Poor: shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
701:				
Runeberg	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, wetness.
705B, 705C:				
Nitche	Good	Improbable: thin layer.	Improbable: thin layer.	Poor: small stones.
Kandota	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
Lida	Good	Probable	Probable	Poor: small stones, area reclaim.
707B:				
Lizzie	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
707C2:				
Lizzie	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, slope.
707D2:				
Lizzie	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
710:				
Friberg	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
Weetown	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
711B, 711C:				
Arvilla	Good	Probable	Probable	Poor: too sandy, small stones, area reclaim.
Sandberg	Good	Probable	Probable	Poor: small stones, area reclaim.
715:				
Bluffcreek	Fair: wetness.	Probable	Probable	Poor: too sandy, small stones.
Clearriver	Fair: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, small stones.

Construction Materials--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
716B, 716C:				
Leaflake	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: too sandy.
Eagleview	Good	Probable	Improbable: too sandy.	Poor: too sandy.
716D:				
Leaflake	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too sandy, slope.
Eagleview	Fair: slope.	Probable	Improbable: too sandy.	Poor: too sandy, slope.
718E:				
Naytahwaush	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer, slope.
721B, 721C:				
Corliss	Good	Probable	Probable	Poor: too sandy, small stones, area reclaim.
721D:				
Corliss	Fair: slope.	Probable	Probable	Poor: too sandy, small stones, area reclaim.
721E:				
Corliss	Poor: slope.	Probable	Probable	Poor: too sandy, small stones, area reclaim.
726:				
Kratka	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer, wetness.
746:				
Haslie	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: excess humus, wetness.
760C2:				
Chapett	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, small stones, slope.
Sisseton	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, slope.

Construction Materials--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
760D2:				
Chapett	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
Sisseton	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
769B:				
Mehurin	Fair: shrink-swell, low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
776B, 776C:				
Snellman	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
Sugarbush	Good	Probable	Probable	Poor: too sandy, small stones, area reclaim.
776E:				
Snellman	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Sugarbush	Fair: slope.	Probable	Probable	Poor: too sandy, small stones, area reclaim.
777C2:				
Sisseton	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, slope.
Heimdal	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, slope.
777D2:				
Sisseton	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
Heimdal	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
777E:				
Sisseton	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
Heimdal	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.

Construction Materials--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
778B, 778C:				
Dorset	Good	Probable	Probable	Poor: too sandy, small stones, area reclaim.
Corliss	Good	Probable	Probable	Poor: too sandy, small stones, area reclaim.
779B:				
Peever	Poor: shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
Mehurin	Fair: shrink-swell, low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
902B:				
Barnes	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
Buse	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
903C2:				
Barnes	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, slope.
Langhei	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, small stones, slope.
915C2:				
Forman	Fair: shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, slope.
Buse	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, slope.
915D2:				
Forman	Fair: shrink-swell, low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
Buse	Fair: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
931C2:				
Formdale	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, small stones, slope.

Construction Materials--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
931C2:				
Langhei	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, small stones, slope.
931D2:				
Formdale	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
Langhei	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
942D2:				
Langhei	Fair: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
Barnes	Fair: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
957B2:				
Rothsay	Good	Improbable: excess fines.	Improbable: excess fines.	Good.
Zell	Good	Improbable: excess fines.	Improbable: excess fines.	Good.
969C2:				
Zell	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: slope.
Rothsay	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: slope.
969D2:				
Zell	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
Rothsay	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
1015:				
Udipsamments	Good	Probable	Probable	Poor: too sandy.
1016:				
Udorthents	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer, slope.
1027:				
Udorthents.				
1030:				
Pits.				
Udipsamments	Poor: slope.	Probable	Probable	Poor: too sandy, slope.

Construction Materials--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
1077:				
Forada	Poor: wetness.	Probable	Probable	Poor: small stones, wetness.
Leafriver	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, wetness.
1102B:				
Chapett	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, small stones.
Dorset	Good	Probable	Probable	Poor: too sandy, small stones, area reclaim.
1102C:				
Chapett	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, small stones, slope.
Dorset	Good	Probable	Probable	Poor: too sandy, small stones, area reclaim.
1103:				
Clitherall	Fair: wetness.	Improbable: thin layer.	Improbable: thin layer.	Poor: small stones.
1104B:				
Waukon	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, small stones.
Dorset	Good	Probable	Probable	Poor: too sandy, small stones, area reclaim.
1104C:				
Waukon	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, small stones, slope.
Dorset	Good	Probable	Probable	Poor: too sandy, small stones, area reclaim.
1104D:				
Waukon	Fair: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.

Construction Materials--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
1104D:				
Dorset	Fair: slope.	Probable	Probable	Poor: too sandy, small stones, area reclaim.
1105B:				
Dent	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
1110:				
Isan	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, wetness.
1111:				
Nidaros	Poor: wetness.	Probable	Probable	Poor: excess humus, wetness.
1112D:				
Chapett	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
Corliss	Fair: slope.	Probable	Probable	Poor: too sandy, small stones, area reclaim.
1112E:				
Chapett	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
Corliss	Poor: slope.	Probable	Probable	Poor: too sandy, small stones, area reclaim.
1113:				
Haslie	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: excess humus, wetness.
Seelyeville	Poor: wetness.	Improbable: excess humus.	Improbable: excess humus.	Poor: excess humus, wetness.
Cathro	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer, wetness.
1114:				
Hangaard	Poor: wetness.	Probable	Probable	Poor: too sandy, small stones, wetness.
1120:				
Rushlake	Fair: wetness.	Probable	Probable	Poor: too sandy, small stones, area reclaim.

Construction Materials--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
1120:				
Hangaard	Poor: wetness.	Probable	Probable	Poor: too sandy, small stones, wetness.
1129:				
Lindaas	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
1131B:				
Verndale	Good	Probable	Improbable: too sandy.	Poor: too sandy.
Abbeylake	Good	Probable	Improbable: too sandy.	Poor: too sandy.
1136:				
Nidaros	Poor: wetness.	Probable	Probable	Poor: excess humus, wetness.
1149:				
Hamerly	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
1195A, 1195B, 1195C:				
Sybil	Good	Probable	Improbable: too sandy.	Poor: too sandy.
Eagleview	Good	Probable	Improbable: too sandy.	Poor: too sandy.
1195E:				
Sybil	Fair: slope.	Probable	Improbable: too sandy.	Poor: too sandy, slope.
Eagleview	Fair: slope.	Probable	Improbable: too sandy.	Poor: too sandy, slope.
1196B, 1196C:				
Lida	Good	Probable	Probable	Poor: small stones, area reclaim.
Two Inlets	Good	Probable	Probable	Poor: small stones, area reclaim.
1196E:				
Lida	Fair: slope.	Probable	Probable	Poor: small stones, area reclaim, slope.
Two Inlets	Fair: slope.	Probable	Probable	Poor: small stones, area reclaim, slope.

Construction Materials--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
1196F:				
Lida	Poor: slope.	Probable	Probable	Poor: small stones, area reclaim, slope.
Two Inlets	Poor: slope.	Probable	Probable	Poor: small stones, area reclaim, slope.
1200:				
Egglake	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
1208B:				
Naytahwaush	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
Mahkonce	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
1209C:				
Naytahwaush	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
1212B:				
Mahkonce	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
1214:				
Mustinka	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer, wetness.
1215:				
Pinelake	Poor: wetness.	Probable	Probable	Poor: small stones, area reclaim, wetness.
1216B:				
Egglake	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
Wykeham	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, small stones.
1217E:				
Waukon	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
Lida	Poor: slope.	Probable	Probable	Poor: small stones, area reclaim, slope.

Construction Materials--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
1218B, 1218C:				
Snellman	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
Lida	Good	Probable	Probable	Poor: small stones, area reclaim.
1218E:				
Snellman	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Lida	Fair: slope.	Probable	Probable	Poor: small stones, area reclaim, slope.
1218F:				
Snellman	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Lida	Poor: slope.	Probable	Probable	Poor: small stones, area reclaim, slope.
1219C:				
Sandberg	Good	Probable	Probable	Poor: small stones, area reclaim.
Sverdrup	Good	Probable	Improbable: too sandy.	Poor: too sandy.
1221B:				
Sverdrup	Good	Probable	Improbable: too sandy.	Poor: too sandy.
Sandberg	Good	Probable	Probable	Poor: small stones, area reclaim.
1223D:				
Sandberg	Fair: slope.	Probable	Probable	Poor: small stones, area reclaim, slope.
Arvilla	Fair: slope.	Probable	Probable	Poor: too sandy, small stones, area reclaim.
1227:				
Quam	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
Cathro	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer, wetness.

Construction Materials--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
1227:				
Urness	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
1230:				
Haslie	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: excess humus, wetness.
Nidaros	Poor: wetness.	Probable	Probable	Poor: excess humus, wetness.
1232B:				
Chapett	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, small stones.
1232E:				
Chapett	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
1234B:				
Formdale	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, small stones.
Buse	Fair: shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, small stones.
1237:				
Lakepark	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
1239:				
Quam	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
1240:				
Roliss	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
1247D:				
Corliss	Fair: slope.	Probable	Probable	Poor: too sandy, small stones, area reclaim.
Dorset	Fair: slope.	Probable	Probable	Poor: too sandy, small stones, area reclaim.
1250C:				
Abbeylake	Good	Probable	Improbable: too sandy.	Poor: too sandy.
Verndale	Good	Probable	Improbable: too sandy.	Poor: too sandy.

Construction Materials--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
1259:				
Hamerly	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
Mustinka	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer, wetness.
1275B, 1275C:				
Kandota	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
Egglake	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
1276:				
Knute	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
Brandsvold	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
1277D:				
Corliss	Fair: slope.	Probable	Probable	Poor: too sandy, small stones, area reclaim.
Sverdrup	Fair: slope.	Probable	Improbable: too sandy.	Poor: too sandy, slope.
1289:				
Knute	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
1290:				
Brandsvold	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
1291, 1293:				
Sedgeville	Poor: wetness.	Probable	Probable	Poor: small stones, area reclaim, wetness.
1304A:				
Glyndon	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: thin layer.
1307:				
Rushlake	Fair: wetness.	Probable	Probable	Poor: too sandy, small stones, area reclaim.
1317:				
Vallers	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.

Construction Materials--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
1319B:				
Rockwood	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, area reclaim.
1319C:				
Rockwood	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, area reclaim, slope.
1319D:				
Rockwood	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
1320B:				
Blowers	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
1321:				
Paddock	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
Becida	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, wetness.
1322:				
Wolverton	Fair: shrink-swell, low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, small stones.
1324B:				
Heimdal	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
Sisseton	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
1338:				
Oakcreek	Fair: wetness.	Probable	Probable	Poor: area reclaim.
1339:				
Borup	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
1340:				
Bluffcreek	Fair: wetness.	Probable	Probable	Poor: too sandy, small stones.
Epoufette	Poor: wetness.	Probable	Probable	Poor: too sandy, small stones, area reclaim.

Construction Materials--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
1341:				
Clitherall	Fair: wetness.	Improbable: thin layer.	Improbable: thin layer.	Poor: small stones.
Wykeham	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, small stones.
1342:				
Pinelake	Poor: wetness.	Probable	Improbable: too sandy.	Poor: small stones, area reclaim, wetness.
Brandsvold	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
1343C:				
Lida	Good	Probable	Probable	Poor: small stones, area reclaim.
Almora	Good	Probable	Improbable: too sandy.	Poor: small stones, area reclaim.
Lizzie	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, slope.
1344B:				
Lida	Good	Probable	Probable	Poor: small stones, area reclaim.
Almora	Good	Probable	Improbable: too sandy.	Poor: small stones, area reclaim.
Dent	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
1345:				
Bluffcreek	Fair: wetness.	Probable	Probable	Poor: too sandy, small stones.
Rosy	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too sandy.
1346:				
Nidaros	Poor: wetness.	Probable	Probable	Poor: excess humus, wetness.
1347B:				
Kandota	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
1348:				
Knute	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.

Construction Materials--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
1349:				
Clotho	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
1350:				
Brandsvold	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
1351:				
Bluffton	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
1365:				
Hillview	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
1396:				
Sedgeville	Poor: wetness.	Probable	Probable	Poor: small stones, area reclaim, wetness.
Nidaros	Poor: wetness.	Probable	Probable	Poor: excess humus, wetness.
Aquolls	Poor: wetness.	Probable	Probable	Poor: small stones, area reclaim, wetness.
1397:				
Bemidji	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too sandy.
1825B:				
Seelyeville	Poor: wetness.	Improbable: excess humus.	Improbable: excess humus.	Poor: excess humus, wetness.
1874:				
Radium	Fair: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, small stones.
1943:				
Roscommon	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, wetness.
1975:				
Oylen	Fair: wetness.	Probable	Improbable: too sandy.	Poor: too sandy.

Water Management

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. See text for definitions of terms used in this table. Absence of an entry indicates that no rating is applicable)

Map symbol and soil name	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
7A:							
Hubbard	Severe: seepage.	Severe: seepage.	Severe: no water.	Deep to water	Droughty, fast intake.	Too sandy, soil blowing.	Droughty.
7B:							
Hubbard	Severe: seepage.	Severe: seepage.	Severe: no water.	Deep to water	Slope, droughty, fast intake.	Too sandy, soil blowing.	Droughty.
7C:							
Hubbard	Severe: seepage, slope.	Severe: seepage.	Severe: no water.	Deep to water	Slope, droughty, fast intake.	Slope, too sandy, soil blowing.	Slope, droughty.
26:							
Aazdahl	Slight	Moderate: wetness.	Severe: slow refill.	Frost action	Wetness	Erodes easily, wetness.	Erodes easily.
34:							
Parnell	Slight	Severe: hard to pack, ponding.	Severe: slow refill.	Ponding, percs slowly, frost action.	Ponding, percs slowly.	Erodes easily, ponding, percs slowly.	Wetness, erodes easily, percs slowly.
38B:							
Waukon	Moderate: seepage, slope.	Moderate: piping.	Severe: no water.	Deep to water	Slope	Favorable	Favorable.
38C2:							
Waukon	Severe: slope.	Moderate: piping.	Severe: no water.	Deep to water	Slope	Slope	Slope.
38D2:							
Waukon	Severe: slope.	Moderate: piping.	Severe: no water.	Deep to water	Slope	Slope	Slope.
38E:							
Waukon	Severe: slope.	Moderate: piping.	Severe: no water.	Deep to water	Slope	Slope	Slope.

Water Management--Continued

Map symbol and soil name	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
46:							
Borup	Severe: seepage.	Severe: piping, wetness.	Severe: cutbanks cave.	Frost action, cutbanks cave.	Wetness	Wetness	Wetness.
53B:							
Kandota	Moderate: seepage, slope.	Severe: piping.	Severe: no water.	Deep to water	Slope, soil blowing, rooting depth.	Soil blowing	Rooting depth.
53C:							
Kandota	Severe: slope.	Severe: piping.	Severe: no water.	Deep to water	Slope, soil blowing, rooting depth.	Slope, soil blowing.	Slope, rooting depth.
53D:							
Kandota	Severe: slope.	Severe: piping.	Severe: no water.	Deep to water	Slope, soil blowing, rooting depth.	Slope, soil blowing.	Slope, rooting depth.
58:							
Kittson	Moderate: seepage.	Moderate: piping, wetness.	Severe: slow refill.	Frost action	Wetness	Wetness	Favorable.
59:							
Grimstad	Severe: seepage.	Severe: piping.	Severe: cutbanks cave.	Favorable	Wetness	Erodes easily, wetness, soil blowing.	Erodes easily.
61:							
Arveson	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Frost action, cutbanks cave.	Wetness	Wetness, too sandy.	Wetness.
63:							
Rockwell	Severe: seepage.	Severe: piping, wetness.	Severe: slow refill, cutbanks cave.	Frost action	Wetness	Wetness	Wetness.
65:							
Foxhome	Severe: seepage.	Severe: piping.	Severe: cutbanks cave.	Frost action	Wetness, soil blowing.	Wetness, soil blowing.	Favorable.

Water Management--Continued

Map symbol and soil name	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
66: Flaming	Severe: seepage.	Severe: seepage, piping.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Wetness, too sandy, soil blowing.	Droughty.
68: Arveson	Severe: seepage.	Severe: seepage, piping, ponding.	Severe: cutbanks cave.	Ponding, frost action, cutbanks cave.	Ponding	Ponding, too sandy.	Wetness.
107: Winger	Moderate: seepage.	Severe: piping, wetness.	Severe: slow refill.	Frost action	Wetness	Wetness	Wetness.
108: McIntosh	Moderate: seepage.	Severe: piping.	Severe: slow refill.	Frost action	Wetness	Erodes easily, wetness.	Erodes easily.
121: Wykeham	Moderate: seepage.	Moderate: wetness.	Severe: cutbanks cave.	Favorable	Wetness, soil blowing.	Wetness, soil blowing.	Rooting depth.
127A: Sverdrup	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Deep to water	Droughty, soil blowing.	Too sandy, soil blowing.	Droughty.
127B: Sverdrup	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Deep to water	Slope, droughty, soil blowing.	Too sandy, soil blowing.	Droughty.
127C: Sverdrup	Severe: seepage, slope.	Severe: seepage, piping.	Severe: no water.	Deep to water	Slope, droughty, soil blowing.	Slope, too sandy, soil blowing.	Slope, droughty.
141B: Egeland	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Deep to water	Slope, droughty.	Soil blowing	Droughty.

Water Management--Continued

Map symbol and soil name	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
141C:							
Egeland	Severe: seepage, slope.	Severe: seepage, piping.	Severe: no water.	Deep to water	Slope, droughty.	Slope, soil blowing.	Slope, droughty.
141D:							
Egeland	Severe: seepage, slope.	Severe: seepage, piping.	Severe: no water.	Deep to water	Slope, droughty.	Slope, soil blowing.	Slope, droughty.
168B:							
Forman	Moderate: slope.	Severe: piping.	Severe: no water.	Deep to water	Slope	Erodes easily	Erodes easily.
180:							
Gonvick	Moderate: seepage.	Severe: piping.	Severe: slow refill.	Frost action	Wetness	Wetness	Favorable.
184:							
Hamerly	Moderate: seepage.	Severe: piping.	Moderate: deep to water, slow refill.	Frost action	Wetness	Erodes easily, wetness.	Erodes easily.
187:							
Haug	Moderate: seepage.	Severe: piping, ponding.	Moderate: slow refill.	Ponding, frost action.	Ponding, soil blowing.	Ponding, soil blowing.	Wetness.
191:							
Epoufette	Severe: seepage.	Severe: seepage, wetness.	Severe: cutbanks cave.	Frost action, cutbanks cave.	Wetness, droughty.	Wetness, too sandy, soil blowing.	Wetness, droughty.
202:							
Meehan	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Cutbanks cave, too acid.	Wetness, droughty, fast intake.	Wetness, too sandy, soil blowing.	Wetness, droughty.
258A:							
Sandberg	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Deep to water	Droughty, fast intake.	Too sandy, soil blowing.	Droughty.

Water Management--Continued

Map symbol and soil name	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
258B: Sandberg	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Deep to water	Slope, droughty.	Too sandy, soil blowing.	Droughty.
258C: Sandberg	Severe: seepage, slope.	Severe: seepage, piping.	Severe: no water.	Deep to water	Slope, droughty.	Slope, too sandy, soil blowing.	Slope, droughty.
260: Duelm	Severe: seepage.	Severe: seepage, piping.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Wetness, too sandy, soil blowing.	Droughty.
267B: Snellman	Moderate: seepage, slope.	Slight	Severe: no water.	Deep to water	Slope, soil blowing, rooting depth.	Soil blowing	Rooting depth.
267C: Snellman	Severe: slope.	Slight	Severe: no water.	Deep to water	Slope, soil blowing, rooting depth.	Slope, soil blowing.	Slope, rooting depth.
267E: Snellman	Severe: slope.	Slight	Severe: no water.	Deep to water	Slope, soil blowing, rooting depth.	Slope, soil blowing.	Slope, rooting depth.
267F: Snellman	Severe: slope.	Slight	Severe: no water.	Deep to water	Slope, soil blowing, rooting depth.	Slope, soil blowing.	Slope, rooting depth.
290: Rothsay	Severe: seepage.	Severe: piping.	Severe: no water.	Deep to water	Favorable	Erodes easily	Erodes easily.
293B: Swenoda	Severe: seepage.	Severe: piping.	Severe: no water.	Favorable	Wetness, soil blowing.	Erodes easily, wetness.	Erodes easily.
335: Urness	Moderate: seepage.	Severe: ponding.	Severe: slow refill.	Ponding, frost action.	Ponding	Ponding	Wetness.

Water Management--Continued

Map symbol and soil name	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
339:							
Fordville	Severe: seepage.	Severe: seepage.	Severe: no water.	Deep to water	Rooting depth	Too sandy	Rooting depth.
341A:							
Arvilla	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Deep to water	Droughty, soil blowing.	Too sandy, soil blowing.	Droughty.
341B:							
Arvilla	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Deep to water	Slope, droughty, soil blowing.	Too sandy, soil blowing.	Droughty.
371:							
Clontarf	Severe: seepage.	Severe: seepage, piping.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty, soil blowing.	Wetness, too sandy, soil blowing.	Droughty.
375:							
Forada	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Frost action, cutbanks cave.	Wetness	Wetness, too sandy.	Wetness.
402C:							
Sioux	Severe: seepage.	Severe: seepage.	Severe: no water.	Deep to water	Slope, droughty, fast intake.	Too sandy, soil blowing.	Droughty.
402E:							
Sioux	Severe: seepage, slope.	Severe: seepage.	Severe: no water.	Deep to water	Slope, droughty, fast intake.	Slope, too sandy, soil blowing.	Slope, droughty.
406A:							
Dorset	Severe: seepage.	Severe: seepage.	Severe: no water.	Deep to water	Droughty, soil blowing.	Too sandy, soil blowing.	Droughty.
406B:							
Dorset	Severe: seepage.	Severe: seepage.	Severe: no water.	Deep to water	Slope, droughty, soil blowing.	Too sandy, soil blowing.	Droughty.

Water Management--Continued

Map symbol and soil name	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
418: Lamoure	Moderate: seepage.	Severe: hard to pack, wetness.	Severe: slow refill.	Flooding, frost action.	Wetness, flooding.	Erodes easily, wetness.	Wetness, erodes easily.
422B: Bygland	Moderate: slope.	Moderate: piping, hard to pack, wetness.	Severe: slow refill.	Percs slowly, frost action, slope.	Slope, wetness.	Erodes easily, wetness.	Erodes easily, percs slowly.
422C: Bygland	Severe: slope.	Moderate: piping, hard to pack, wetness.	Severe: slow refill.	Percs slowly, frost action, slope.	Slope, wetness.	Slope, erodes easily, wetness.	Slope, erodes easily, percs slowly.
426: Foldahl	Severe: seepage.	Severe: piping.	Severe: slow refill, cutbanks cave.	Frost action---	Wetness, droughty.	Erodes easily, wetness, soil blowing.	Erodes easily, droughty.
441A: Almora	Severe: seepage.	Severe: piping.	Severe: no water.	Deep to water	Favorable------	Favorable------	Favorable.
441B: Almora	Severe: seepage.	Severe: piping.	Severe: no water.	Deep to water	Slope----------	Favorable------	Favorable.
441C: Almora	Severe: seepage, slope.	Severe: piping.	Severe: no water.	Deep to water	Slope----------	Slope----------	Slope.
481: Kratka	Severe: seepage.	Severe: piping, wetness.	Severe: slow refill, cutbanks cave.	Favorable------	Wetness, droughty.	Erodes easily, wetness, soil blowing.	Wetness, erodes easily, droughty.
494: Darnen	Moderate: seepage.	Severe: piping.	Moderate: deep to water, slow refill.	Deep to water	Favorable------	Erodes easily	Erodes easily.

Water Management--Continued

Map symbol and soil name	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
497:							
Hantho	Moderate: seepage.	Severe: piping.	Moderate: deep to water, slow refill.	Frost action	Wetness	Erodes easily, wetness.	Erodes easily.
508:							
Wyndmere	Severe: seepage.	Severe: piping, wetness.	Severe: cutbanks cave.	Frost action, cutbanks cave.	Wetness, droughty.	Wetness, too sandy, soil blowing.	Droughty.
540:							
Seelyeville	Severe: seepage.	Severe: excess humus, ponding.	Severe: slow refill.	Ponding, subsides, frost action.	Ponding, soil blowing.	Ponding, soil blowing.	Wetness.
541:							
Rifle	Severe: seepage.	Severe: excess humus, ponding.	Moderate: slow refill.	Ponding, frost action.	Ponding	Ponding	Wetness.
544:							
Cathro	Severe: seepage.	Severe: piping, ponding.	Severe: slow refill.	Ponding, subsides, frost action.	Ponding, soil blowing.	Ponding, soil blowing.	Wetness.
567A:							
Verndale	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Deep to water	Droughty, soil blowing.	Too sandy, soil blowing.	Droughty.
567B:							
Verndale	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Deep to water	Slope, droughty, soil blowing.	Too sandy, soil blowing.	Droughty.
609B:							
Dickey	Severe: seepage.	Severe: piping.	Severe: no water.	Deep to water	Slope, droughty, fast intake.	Erodes easily, soil blowing.	Erodes easily, droughty.
624:							
Rosy	Moderate: seepage.	Severe: piping.	Severe: cutbanks cave.	Cutbanks cave	Wetness, soil blowing.	Wetness, too sandy, soil blowing.	Favorable.

Water Management--Continued

Map symbol and soil name	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
646C:							
Peever	Severe: slope.	Severe: hard to pack.	Severe: no water.	Deep to water	Slope, percs slowly.	Slope, erodes easily, percs slowly.	Slope, erodes easily, percs slowly.
646D:							
Peever	Severe: slope.	Severe: hard to pack.	Severe: no water.	Deep to water	Slope, percs slowly.	Slope, erodes easily, percs slowly.	Slope, erodes easily, percs slowly.
670:							
Knute	Moderate: seepage.	Severe: piping.	Severe: slow refill.	Favorable	Wetness, soil blowing.	Wetness, soil blowing.	Favorable.
680:							
Parnell	Moderate: seepage.	Severe: hard to pack, wetness.	Severe: slow refill.	Percs slowly, frost action.	Wetness, percs slowly.	Wetness, percs slowly.	Wetness, percs slowly.
698:							
Doran	Moderate: seepage.	Moderate: piping, wetness.	Severe: slow refill.	Deep to water	Percs slowly	Erodes easily, percs slowly.	Erodes easily, percs slowly.
701:							
Runeberg	Slight	Severe: piping, ponding.	Severe: slow refill.	Ponding, percs slowly, frost action.	Ponding, percs slowly.	Ponding, percs slowly.	Wetness, rooting depth, percs slowly.
705B:							
Nitche	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Deep to water	Slope, droughty.	Too sandy, soil blowing.	Droughty.
Kandota	Moderate: seepage, slope.	Severe: piping.	Severe: no water.	Deep to water	Slope, soil blowing, rooting depth.	Soil blowing	Rooting depth.
Lida	Severe: seepage.	Severe: seepage.	Severe: no water.	Deep to water	Slope, droughty.	Too sandy, soil blowing.	Droughty.

Water Management--Continued

Map symbol and soil name	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
705C:							
Nitche	Severe: seepage, slope.	Severe: seepage, piping.	Severe: no water.	Deep to water	Slope, droughty.	Slope, too sandy, soil blowing.	Slope, droughty.
Kandota	Severe: slope.	Severe: piping.	Severe: no water.	Deep to water	Slope, soil blowing, rooting depth.	Slope, soil blowing.	Slope, rooting depth.
Lida	Severe: seepage, slope.	Severe: seepage.	Severe: no water.	Deep to water	Slope, droughty.	Slope, too sandy, soil blowing.	Slope, droughty.
707B:							
Lizzie	Severe: seepage.	Severe: piping.	Severe: no water.	Deep to water	Slope	Erodes easily	Erodes easily.
707C2:							
Lizzie	Severe: seepage, slope.	Severe: piping.	Severe: no water.	Deep to water	Slope	Slope, erodes easily.	Slope, erodes easily.
707D2:							
Lizzie	Severe: seepage, slope.	Severe: piping.	Severe: no water.	Deep to water	Slope	Slope, erodes easily.	Slope, erodes easily.
710:							
Friberg	Moderate: seepage.	Severe: thin layer, wetness.	Moderate: slow refill.	Frost action	Wetness	Wetness	Wetness.
Weetown	Moderate: seepage.	Severe: piping.	Moderate: deep to water, slow refill.	Deep to water	Soil blowing	Soil blowing	Favorable.
711B:							
Arvilla	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Deep to water	Slope, droughty, soil blowing.	Too sandy, soil blowing.	Droughty.
Sandberg	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Deep to water	Slope, droughty.	Too sandy, soil blowing.	Droughty.

Water Management--Continued

Map symbol and soil name	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
711C:							
Arvilla---------	Severe: seepage, slope.	Severe: seepage, piping.	Severe: no water.	Deep to water	Slope, droughty, soil blowing.	Slope, too sandy, soil blowing.	Slope, droughty.
Sandberg--------	Severe: seepage, slope.	Severe: seepage, piping.	Severe: no water.	Deep to water	Slope, droughty.	Slope, too sandy, soil blowing.	Slope, droughty.
715:							
Bluffcreek------	Severe: seepage.	Severe: seepage, piping.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty.	Wetness, too sandy, soil blowing.	Droughty.
Clearriver------	Severe: seepage.	Severe: seepage.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Wetness, too sandy, soil blowing.	Droughty.
716B:							
Leaflake--------	Severe: seepage.	Severe: thin layer.	Severe: no water.	Deep to water	Slope, droughty, fast intake.	Soil blowing---	Droughty.
Eagleview-------	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Deep to water	Slope, droughty, fast intake.	Too sandy, soil blowing.	Droughty.
716C:							
Leaflake--------	Severe: seepage, slope.	Severe: thin layer.	Severe: no water.	Deep to water	Slope, droughty, fast intake.	Slope, soil blowing.	Slope, droughty.
Eagleview-------	Severe: seepage, slope.	Severe: seepage, piping.	Severe: no water.	Deep to water	Slope, droughty, fast intake.	Slope, too sandy, soil blowing.	Slope, droughty.
716D:							
Leaflake--------	Severe: seepage, slope.	Severe: thin layer.	Severe: no water.	Deep to water	Slope, droughty, fast intake.	Slope, soil blowing.	Slope, droughty.
Eagleview-------	Severe: seepage, slope.	Severe: seepage, piping.	Severe: no water.	Deep to water	Slope, droughty, fast intake.	Slope, too sandy, soil blowing.	Slope, droughty.

Water Management--Continued

Map symbol and soil name	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
718E:							
Naytahwaush	Severe: slope.	Slight	Severe: no water.	Deep to water	Slope, percs slowly.	Slope, erodes easily.	Slope, erodes easily, percs slowly.
721B:							
Corliss	Severe: seepage.	Severe: seepage.	Severe: no water.	Deep to water	Slope, droughty, fast intake.	Too sandy, soil blowing.	Droughty.
721C:							
Corliss	Severe: seepage, slope.	Severe: seepage.	Severe: no water.	Deep to water	Slope, droughty, fast intake.	Slope, too sandy, soil blowing.	Slope, droughty.
721D:							
Corliss	Severe: seepage, slope.	Severe: seepage.	Severe: no water.	Deep to water	Slope, droughty, fast intake.	Slope, too sandy, soil blowing.	Slope, droughty.
721E:							
Corliss	Severe: seepage, slope.	Severe: seepage.	Severe: no water.	Deep to water	Slope, droughty, fast intake.	Slope, too sandy, soil blowing.	Slope, droughty.
726:							
Kratka	Severe: seepage.	Severe: piping, ponding.	Severe: slow refill, cutbanks cave.	Ponding	Ponding, droughty.	Ponding, soil blowing.	Wetness, droughty, rooting depth.
746:							
Haslie	Severe: seepage.	Severe: excess humus, ponding.	Severe: slow refill.	Ponding, percs slowly, subsides.	Ponding, soil blowing, percs slowly.	Ponding, soil blowing, percs slowly.	Wetness, percs slowly.
760C2:							
Chapett	Severe: slope.	Severe: piping.	Severe: no water.	Deep to water	Slope, rooting depth.	Slope	Slope, rooting depth.
Sisseton	Severe: slope.	Severe: piping.	Severe: no water.	Deep to water	Slope	Slope, erodes easily.	Slope, erodes easily.

Water Management--Continued

Map symbol and soil name	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
760D2:							
Chapett	Severe: slope.	Severe: piping.	Severe: no water.	Deep to water	Slope, rooting depth.	Slope	Slope, rooting depth.
Sisseton	Severe: slope.	Severe: piping.	Severe: no water.	Deep to water	Slope	Slope, erodes easily.	Slope, erodes easily.
769B:							
Mehurin	Moderate: seepage.	Moderate: piping, wetness.	Severe: slow refill.	Percs slowly	Wetness, percs slowly.	Erodes easily, wetness.	Erodes easily, percs slowly.
776B:							
Snellman	Moderate: seepage, slope.	Slight	Severe: no water.	Deep to water	Slope, soil blowing, rooting depth.	Soil blowing	Rooting depth.
Sugarbush	Severe: seepage.	Severe: seepage.	Severe: no water.	Deep to water	Slope, droughty.	Too sandy, soil blowing.	Droughty, rooting depth.
776C:							
Snellman	Severe: slope.	Slight	Severe: no water.	Deep to water	Slope, soil blowing, rooting depth.	Slope, soil blowing.	Slope, rooting depth.
Sugarbush	Severe: seepage, slope.	Severe: seepage.	Severe: no water.	Deep to water	Slope, droughty.	Slope, too sandy, soil blowing.	Slope, droughty, rooting depth.
776E:							
Snellman	Severe: slope.	Slight	Severe: no water.	Deep to water	Slope, soil blowing, rooting depth.	Slope, soil blowing.	Slope, rooting depth.
Sugarbush	Severe: seepage, slope.	Severe: seepage.	Severe: no water.	Deep to water	Slope, droughty.	Slope, too sandy, soil blowing.	Slope, droughty, rooting depth.
777C2:							
Sisseton	Severe: slope.	Severe: piping.	Severe: no water.	Deep to water	Slope	Slope, erodes easily.	Slope, erodes easily.
Heimdal	Severe: slope.	Severe: piping.	Severe: no water.	Deep to water	Slope, rooting depth.	Slope	Slope, rooting depth.

Water Management--Continued

Map symbol and soil name	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
777D2:							
Sisseton	Severe: slope.	Severe: piping.	Severe: no water.	Deep to water	Slope	Slope, erodes easily.	Slope, erodes easily.
Heimdal	Severe: slope.	Severe: piping.	Severe: no water.	Deep to water	Slope, rooting depth.	Slope	Slope, rooting depth.
777E:							
Sisseton	Severe: slope.	Severe: piping.	Severe: no water.	Deep to water	Slope	Slope, erodes easily.	Slope, erodes easily.
Heimdal	Severe: slope.	Severe: piping.	Severe: no water.	Deep to water	Slope, rooting depth.	Slope	Slope, rooting depth.
778B:							
Dorset	Severe: seepage.	Severe: seepage.	Severe: no water.	Deep to water	Slope, droughty, soil blowing.	Too sandy, soil blowing.	Droughty.
Corliss	Severe: seepage.	Severe: seepage.	Severe: no water.	Deep to water	Slope, droughty, fast intake.	Too sandy, soil blowing.	Droughty.
778C:							
Dorset	Severe: seepage, slope.	Severe: seepage.	Severe: no water.	Deep to water	Slope, droughty, soil blowing.	Slope, too sandy, soil blowing.	Slope, droughty.
Corliss	Severe: seepage, slope.	Severe: seepage.	Severe: no water.	Deep to water	Slope, droughty, fast intake.	Slope, too sandy, soil blowing.	Slope, droughty.
779B:							
Peever	Moderate: slope.	Severe: hard to pack.	Severe: no water.	Deep to water	Slope, percs slowly.	Erodes easily, percs slowly.	Erodes easily, percs slowly.
Mehurin	Moderate: seepage, slope.	Moderate: piping, wetness.	Severe: slow refill.	Percs slowly, slope.	Slope, wetness, percs slowly.	Erodes easily, wetness.	Erodes easily, percs slowly.

Water Management--Continued

Map symbol and soil name	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
902B:							
Barnes	Moderate: seepage, slope.	Severe: piping.	Severe: no water.	Deep to water	Slope	Erodes easily	Erodes easily.
Buse	Moderate: seepage, slope.	Severe: piping.	Severe: no water.	Deep to water	Slope	Erodes easily	Erodes easily.
903C2:							
Barnes	Severe: slope.	Severe: piping.	Severe: no water.	Deep to water	Slope	Slope, erodes easily.	Slope, erodes easily.
Langhei	Severe: slope.	Severe: piping.	Severe: no water.	Deep to water	Slope	Slope	Slope.
915C2:							
Forman	Severe: slope.	Severe: piping.	Severe: no water.	Deep to water	Slope	Slope, erodes easily.	Slope, erodes easily.
Buse	Severe: slope.	Severe: piping.	Severe: no water.	Deep to water	Slope	Slope, erodes easily.	Slope, erodes easily.
915D2:							
Forman	Severe: slope.	Severe: piping.	Severe: no water.	Deep to water	Slope	Slope, erodes easily.	Slope, erodes easily.
Buse	Severe: slope.	Severe: piping.	Severe: no water.	Deep to water	Slope	Slope, erodes easily.	Slope, erodes easily.
931C2:							
Formdale	Severe: slope.	Slight	Severe: no water.	Deep to water	Slope	Slope, erodes easily.	Slope, erodes easily.
Langhei	Severe: slope.	Moderate: piping.	Severe: no water.	Deep to water	Slope	Slope	Slope.
931D2:							
Formdale	Severe: slope.	Slight	Severe: no water.	Deep to water	Slope	Slope, erodes easily.	Slope, erodes easily.
Langhei	Severe: slope.	Moderate: piping.	Severe: no water.	Deep to water	Slope	Slope	Slope.

Water Management--Continued

Map symbol and soil name	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
942D2:							
Langhei	Severe: slope.	Severe: piping.	Severe: no water.	Deep to water	Slope	Slope	Slope.
Barnes	Severe: slope.	Severe: piping.	Severe: no water.	Deep to water	Slope	Slope, erodes easily.	Slope, erodes easily.
957B2:							
Rothsay	Severe: seepage.	Severe: piping.	Severe: no water.	Deep to water	Slope	Erodes easily	Erodes easily.
Zell	Moderate: seepage, slope.	Severe: piping.	Severe: no water.	Deep to water	Slope	Erodes easily	Erodes easily.
969C2:							
Zell	Severe: slope.	Severe: piping.	Severe: no water.	Deep to water	Slope	Slope, erodes easily.	Slope, erodes easily.
Rothsay	Severe: seepage, slope.	Severe: piping.	Severe: no water.	Deep to water	Slope	Slope, erodes easily.	Slope, erodes easily.
969D2:							
Zell	Severe: slope.	Severe: piping.	Severe: no water.	Deep to water	Slope	Slope, erodes easily.	Slope, erodes easily.
Rothsay	Severe: seepage, slope.	Severe: piping.	Severe: no water.	Deep to water	Slope	Slope, erodes easily.	Slope, erodes easily.
1015:							
Udipsamments	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Deep to water	Slope, droughty, fast intake.	Too sandy, soil blowing.	Droughty.
1016:							
Udorthents	Slight	Slight	Severe: no water.	Deep to water	Slope	Slope	Slope.
1027:							
Udorthents.							

Water Management--Continued

Map symbol and soil name	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
1030: Pits.							
Udipsamments	Severe: seepage, slope.	Severe: seepage, piping.	Severe: no water.	Deep to water	Slope, droughty, fast intake.	Slope, too sandy, soil blowing.	Slope, droughty.
1077:							
Forada	Severe: seepage.	Severe: seepage, ponding.	Severe: cutbanks cave.	Ponding, frost action, cutbanks cave.	Ponding	Ponding, too sandy.	Wetness.
Leafriver	Severe: seepage.	Severe: seepage, piping, ponding.	Severe: cutbanks cave.	Ponding, subsides, frost action.	Ponding, soil blowing.	Ponding, too sandy, soil blowing.	Wetness.
1102B:							
Chapett	Moderate: seepage, slope.	Severe: piping.	Severe: no water.	Deep to water	Slope, rooting depth.	Favorable	Rooting depth.
Dorset	Severe: seepage.	Severe: seepage.	Severe: no water.	Deep to water	Slope, droughty, soil blowing.	Too sandy, soil blowing.	Droughty.
1102C:							
Chapett	Severe: slope.	Severe: piping.	Severe: no water.	Deep to water	Slope, rooting depth.	Slope	Slope, rooting depth.
Dorset	Severe: seepage, slope.	Severe: seepage.	Severe: no water.	Deep to water	Slope, droughty, soil blowing.	Slope, too sandy, soil blowing.	Slope, droughty.
1103:							
Clitherall	Severe: seepage.	Severe: seepage.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty.	Wetness, too sandy, soil blowing.	Droughty.

Water Management--Continued

Map symbol and soil name	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
1104B:							
Waukon	Moderate: seepage, slope.	Moderate: piping.	Severe: no water.	Deep to water	Slope	Favorable	Favorable.
Dorset	Severe: seepage.	Severe: seepage.	Severe: no water.	Deep to water	Slope, droughty, soil blowing.	Too sandy, soil blowing.	Droughty.
1104C:							
Waukon	Severe: slope.	Moderate: piping.	Severe: no water.	Deep to water	Slope	Slope	Slope.
Dorset	Severe: seepage, slope.	Severe: seepage.	Severe: no water.	Deep to water	Slope, droughty, soil blowing.	Slope, too sandy, soil blowing.	Slope, droughty.
1104D:							
Waukon	Severe: slope.	Moderate: piping.	Severe: no water.	Deep to water	Slope	Slope	Slope.
Dorset	Severe: seepage, slope.	Severe: seepage.	Severe: no water.	Deep to water	Slope, droughty, soil blowing.	Slope, too sandy, soil blowing.	Slope, droughty.
1105B:							
Dent	Moderate: seepage, slope.	Severe: piping.	Severe: cutbanks cave.	Frost action, slope.	Slope, wetness.	Erodes easily, wetness.	Erodes easily.
1110:							
Isan	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty.	Wetness, too sandy, soil blowing.	Wetness, droughty.
1111:							
Nidaros	Severe: seepage.	Severe: excess humus, ponding.	Severe: slow refill, cutbanks cave.	Ponding, flooding, subsides.	Ponding, soil blowing, rooting depth.	Ponding, soil blowing.	Wetness, rooting depth.

Water Management--Continued

Map symbol and soil name	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
1112D:							
Chapett	Severe: slope.	Severe: piping.	Severe: no water.	Deep to water	Slope, rooting depth.	Slope	Slope, rooting depth.
Corliss	Severe: seepage, slope.	Severe: seepage.	Severe: no water.	Deep to water	Slope, droughty, fast intake.	Slope, too sandy, soil blowing.	Slope, droughty.
1112E:							
Chapett	Severe: slope.	Severe: piping.	Severe: no water.	Deep to water	Slope, rooting depth.	Slope	Slope, rooting depth.
Corliss	Severe: seepage, slope.	Severe: seepage.	Severe: no water.	Deep to water	Slope, droughty, fast intake.	Slope, too sandy, soil blowing.	Slope, droughty.
1113:							
Haslie	Severe: seepage.	Severe: excess humus, ponding.	Severe: slow refill.	Ponding, percs slowly, subsides.	Ponding, percs slowly.	Ponding, percs slowly.	Wetness, percs slowly.
Seelyeville	Severe: seepage.	Severe: excess humus, ponding.	Severe: slow refill.	Ponding, frost action.	Ponding	Ponding	Wetness.
Cathro	Severe: seepage.	Severe: piping, ponding.	Severe: slow refill.	Ponding, frost action.	Ponding	Ponding	Wetness.
1114:							
Hangaard	Severe: seepage.	Severe: seepage, wetness.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Wetness, too sandy, soil blowing.	Wetness, droughty.
1120:							
Rushlake	Severe: seepage.	Severe: seepage.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty.	Wetness, too sandy, soil blowing.	Droughty.
Hangaard	Severe: seepage.	Severe: seepage, wetness.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Wetness, too sandy, soil blowing.	Wetness, droughty.

Water Management--Continued

Map symbol and soil name	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
1129:							
Lindaas	Slight	Severe: piping, wetness.	Severe: slow refill.	Percs slowly, frost action.	Wetness, percs slowly.	Wetness	Wetness, percs slowly.
1131B:							
Verndale	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Deep to water	Slope, droughty, soil blowing.	Too sandy, soil blowing.	Droughty.
Abbeylake	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Deep to water	Slope, droughty, fast intake.	Too sandy, soil blowing.	Droughty.
1136:							
Nidaros	Severe: seepage.	Severe: seepage, piping, ponding.	Severe: slow refill, cutbanks cave.	Ponding, subsides, frost action.	Ponding, soil blowing, rooting depth.	Ponding, too sandy, soil blowing.	Wetness, rooting depth.
1149:							
Hamerly	Moderate: seepage.	Severe: piping, wetness.	Severe: slow refill.	Frost action	Wetness	Erodes easily, wetness.	Erodes easily.
1195A:							
Sybil	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Deep to water	Droughty, fast intake.	Too sandy, soil blowing.	Droughty.
Eagleview	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Deep to water	Droughty, fast intake.	Too sandy, soil blowing.	Droughty.
1195B:							
Sybil	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Deep to water	Slope, droughty, fast intake.	Too sandy, soil blowing.	Droughty.
Eagleview	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Deep to water	Slope, droughty, fast intake.	Too sandy, soil blowing.	Droughty.

Water Management--Continued

Map symbol and soil name	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
1195C:							
Sybil	Severe: seepage, slope.	Severe: seepage, piping.	Severe: no water.	Deep to water	Slope, droughty, fast intake.	Slope, too sandy, soil blowing.	Slope, droughty.
Eagleview	Severe: seepage, slope.	Severe: seepage, piping.	Severe: no water.	Deep to water	Slope, droughty, fast intake.	Slope, too sandy, soil blowing.	Slope, droughty.
1195E:							
Sybil	Severe: seepage, slope.	Severe: seepage, piping.	Severe: no water.	Deep to water	Slope, droughty.	Slope, too sandy, soil blowing.	Slope, droughty.
Eagleview	Severe: seepage, slope.	Severe: seepage, piping.	Severe: no water.	Deep to water	Slope, droughty, fast intake.	Slope, too sandy, soil blowing.	Slope, droughty.
1196B:							
Lida	Severe: seepage.	Severe: seepage.	Severe: no water.	Deep to water	Slope, droughty.	Too sandy, soil blowing.	Droughty.
Two Inlets	Severe: seepage.	Severe: seepage.	Severe: no water.	Deep to water	Slope, droughty.	Too sandy, soil blowing.	Droughty, rooting depth.
1196C:							
Lida	Severe: seepage, slope.	Severe: seepage.	Severe: no water.	Deep to water	Slope, droughty.	Slope, too sandy, soil blowing.	Slope, droughty.
Two Inlets	Severe: seepage, slope.	Severe: seepage.	Severe: no water.	Deep to water	Slope, droughty.	Slope, too sandy, soil blowing.	Slope, droughty, rooting depth.
1196E:							
Lida	Severe: seepage, slope.	Severe: seepage.	Severe: no water.	Deep to water	Slope, droughty.	Slope, too sandy, soil blowing.	Slope, droughty.
Two Inlets	Severe: seepage, slope.	Severe: seepage.	Severe: no water.	Deep to water	Slope, droughty.	Slope, too sandy, soil blowing.	Slope, droughty, rooting depth.

Water Management--Continued

Map symbol and soil name	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
1196F:							
Lida	Severe: seepage, slope.	Severe: seepage.	Severe: no water.	Deep to water	Slope, droughty.	Slope, too sandy, soil blowing.	Slope, droughty.
Two Inlets	Severe: seepage, slope.	Severe: seepage.	Severe: no water.	Deep to water	Slope, droughty.	Slope, too sandy, soil blowing.	Slope, droughty, rooting depth.
1200:							
Egglake	Moderate: seepage.	Severe: piping, wetness.	Moderate: slow refill.	Frost action	Wetness, rooting depth.	Wetness	Wetness, rooting depth.
1208B:							
Naytahwaush	Moderate: slope.	Slight	Severe: no water.	Deep to water	Slope, percs slowly.	Erodes easily	Erodes easily, percs slowly.
Mahkonce	Slight	Moderate: wetness.	Severe: slow refill.	Percs slowly, frost action.	Wetness	Wetness	Percs slowly.
1209C:							
Naytahwaush	Severe: slope.	Slight	Severe: no water.	Deep to water	Slope, percs slowly.	Slope, erodes easily.	Slope, erodes easily, percs slowly.
1212B:							
Mahkonce	Slight	Moderate: wetness.	Severe: slow refill.	Percs slowly, frost action.	Wetness	Wetness	Percs slowly.
1214:							
Mustinka	Slight	Severe: wetness.	Severe: slow refill.	Percs slowly, frost action.	Wetness, percs slowly.	Erodes easily, wetness.	Wetness, erodes easily, percs slowly.
1215:							
Pinelake	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Frost action, cutbanks cave.	Wetness, soil blowing.	Wetness, too sandy, soil blowing.	Wetness.

Water Management--Continued

Map symbol and soil name	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
1216B:							
Egglake	Moderate: seepage.	Severe: piping, wetness.	Moderate: slow refill.	Frost action	Wetness, soil blowing, rooting depth.	Wetness, soil blowing.	Wetness, rooting depth.
Wykeham	Moderate: seepage, slope.	Moderate: wetness.	Severe: cutbanks cave.	Slope	Slope, wetness, soil blowing.	Wetness, soil blowing.	Rooting depth.
1217E:							
Waukon	Severe: slope.	Moderate: piping.	Severe: no water.	Deep to water	Slope	Slope	Slope.
Lida	Severe: seepage, slope.	Severe: seepage.	Severe: no water.	Deep to water	Slope, droughty.	Slope, too sandy, soil blowing.	Slope, droughty.
1218B:							
Snellman	Moderate: seepage, slope.	Slight	Severe: no water.	Deep to water	Slope, soil blowing, rooting depth.	Soil blowing	Rooting depth.
Lida	Severe: seepage.	Severe: seepage.	Severe: no water.	Deep to water	Slope, droughty.	Too sandy, soil blowing.	Droughty.
1218C:							
Snellman	Severe: slope.	Slight	Severe: no water.	Deep to water	Slope, soil blowing, rooting depth.	Slope, soil blowing.	Slope, rooting depth.
Lida	Severe: seepage, slope.	Severe: seepage.	Severe: no water.	Deep to water	Slope, droughty.	Slope, too sandy, soil blowing.	Slope, droughty.
1218E:							
Snellman	Severe: slope.	Slight	Severe: no water.	Deep to water	Slope, soil blowing, rooting depth.	Slope, soil blowing.	Slope, rooting depth.
Lida	Severe: seepage, slope.	Severe: seepage.	Severe: no water.	Deep to water	Slope, droughty.	Slope, too sandy, soil blowing.	Slope, droughty.

Water Management--Continued

Map symbol and soil name	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
1218F:							
Snellman	Severe: slope.	Slight	Severe: no water.	Deep to water	Slope, soil blowing, rooting depth.	Slope, soil blowing.	Slope, rooting depth.
Lida	Severe: seepage, slope.	Severe: seepage.	Severe: no water.	Deep to water	Slope, droughty.	Slope, too sandy, soil blowing.	Slope, droughty.
1219C:							
Sandberg	Severe: seepage, slope.	Severe: seepage, piping.	Severe: no water.	Deep to water	Slope, droughty.	Slope, too sandy, soil blowing.	Slope, droughty.
Sverdrup	Severe: seepage, slope.	Severe: seepage, piping.	Severe: no water.	Deep to water	Slope, droughty, soil blowing.	Slope, too sandy, soil blowing.	Slope, droughty.
1221B:							
Sverdrup	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Deep to water	Slope, droughty, soil blowing.	Too sandy, soil blowing.	Droughty.
Sandberg	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Deep to water	Slope, droughty.	Too sandy, soil blowing.	Droughty.
1223D:							
Sandberg	Severe: seepage, slope.	Severe: seepage, piping.	Severe: no water.	Deep to water	Slope, droughty.	Slope, too sandy, soil blowing.	Slope, droughty.
Arvilla	Severe: seepage, slope.	Severe: seepage, piping.	Severe: no water.	Deep to water	Slope, droughty, soil blowing.	Slope, too sandy, soil blowing.	Slope, droughty.
1227:							
Quam	Slight	Severe: piping, ponding.	Severe: slow refill.	Ponding, frost action.	Ponding	Erodes easily, ponding.	Wetness, erodes easily.

Water Management--Continued

Map symbol and soil name	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
1227:							
Cathro	Severe: seepage.	Severe: piping, ponding.	Severe: slow refill.	Ponding, frost action.	Ponding	Ponding	Wetness.
Urness	Moderate: seepage.	Severe: ponding.	Severe: slow refill.	Ponding, frost action.	Ponding	Ponding	Wetness.
1230:							
Haslie	Severe: seepage.	Severe: excess humus, ponding.	Severe: slow refill.	Ponding, percs slowly, subsides.	Ponding, percs slowly.	Ponding, percs slowly.	Wetness, percs slowly.
Nidaros	Severe: seepage.	Severe: excess humus, ponding.	Severe: slow refill, cutbanks cave.	Ponding, subsides, frost action.	Ponding, rooting depth.	Ponding	Wetness, rooting depth.
1232B:							
Chapett	Moderate: seepage, slope.	Severe: piping.	Severe: no water.	Deep to water	Slope, rooting depth.	Favorable	Rooting depth.
1232E:							
Chapett	Severe: slope.	Severe: piping.	Severe: no water.	Deep to water	Slope, rooting depth.	Slope	Slope, rooting depth.
1234B:							
Formdale	Moderate: slope.	Slight	Severe: no water.	Deep to water	Slope	Erodes easily	Erodes easily.
Buse	Moderate: slope.	Severe: piping.	Severe: no water.	Deep to water	Slope	Erodes easily	Erodes easily.
1237:							
Lakepark	Slight	Severe: wetness.	Severe: slow refill.	Frost action	Wetness	Wetness	Wetness.
1239:							
Quam	Slight	Severe: piping, ponding.	Severe: slow refill.	Ponding, frost action.	Ponding	Erodes easily, ponding.	Wetness, erodes easily.
1240:							
Roliss	Moderate: seepage.	Severe: piping, wetness.	Severe: slow refill.	Frost action	Wetness	Wetness	Wetness.

Water Management--Continued

Map symbol and soil name	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
1247D:							
Corliss	Severe: seepage, slope.	Severe: seepage.	Severe: no water.	Deep to water	Slope, droughty, fast intake.	Slope, too sandy, soil blowing.	Slope, droughty.
Dorset	Severe: seepage, slope.	Severe: seepage.	Severe: no water.	Deep to water	Slope, droughty, soil blowing.	Slope, too sandy, soil blowing.	Slope, droughty.
1250C:							
Abbeylake	Severe: seepage, slope.	Severe: seepage, piping.	Severe: no water.	Deep to water	Slope, droughty, fast intake.	Slope, too sandy, soil blowing.	Slope, droughty.
Verndale	Severe: seepage, slope.	Severe: seepage, piping.	Severe: no water.	Deep to water	Slope, droughty, soil blowing.	Slope, too sandy, soil blowing.	Slope, droughty.
1259:							
Hamerly	Moderate: seepage.	Severe: piping, wetness.	Severe: slow refill.	Frost action	Wetness	Erodes easily, wetness.	Erodes easily.
Mustinka	Slight	Severe: wetness.	Severe: slow refill.	Percs slowly, frost action.	Wetness, percs slowly.	Erodes easily, wetness.	Wetness, erodes easily, percs slowly.
1275B:							
Kandota	Moderate: seepage, slope.	Severe: piping.	Severe: no water.	Deep to water	Slope, soil blowing, rooting depth.	Soil blowing	Rooting depth.
Egglake	Moderate: seepage.	Severe: thin layer, ponding.	Moderate: slow refill.	Ponding, frost action.	Ponding	Ponding	Wetness.
1275C:							
Kandota	Severe: slope.	Severe: piping.	Severe: no water.	Deep to water	Slope, soil blowing, rooting depth.	Slope, soil blowing.	Slope, rooting depth.
Egglake	Moderate: seepage.	Severe: thin layer, ponding.	Moderate: slow refill.	Ponding, frost action.	Ponding	Ponding	Wetness.

Water Management--Continued

Map symbol and soil name	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
1276:							
Knute	Moderate: seepage.	Severe: piping.	Severe: slow refill.	Favorable	Wetness, soil blowing.	Wetness, soil blowing.	Favorable.
Brandsvold	Moderate: seepage.	Severe: thin layer, wetness.	Severe: slow refill.	Frost action	Wetness, soil blowing.	Wetness, soil blowing.	Wetness.
1277D:							
Corliss	Severe: seepage, slope.	Severe: seepage.	Severe: no water.	Deep to water	Slope, droughty, fast intake.	Slope, too sandy, soil blowing.	Slope, droughty.
Sverdrup	Severe: seepage, slope.	Severe: seepage, piping.	Severe: no water.	Deep to water	Slope, droughty, soil blowing.	Slope, too sandy, soil blowing.	Slope, droughty.
1289:							
Knute	Moderate: seepage.	Severe: piping.	Severe: slow refill.	Favorable	Wetness, soil blowing.	Wetness, soil blowing.	Favorable.
1290:							
Brandsvold	Moderate: seepage.	Severe: thin layer, wetness.	Severe: slow refill.	Frost action	Wetness, soil blowing.	Wetness, soil blowing.	Wetness.
1291:							
Sedgeville	Severe: seepage.	Severe: seepage, piping, ponding.	Severe: cutbanks cave.	Ponding, flooding, frost action.	Ponding, flooding.	Ponding, too sandy.	Wetness.
1293:							
Sedgeville	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Frost action, cutbanks cave.	Wetness, droughty.	Wetness, too sandy.	Wetness, droughty.
1304A:							
Glyndon	Severe: seepage.	Severe: piping, wetness.	Severe: cutbanks cave.	Frost action, cutbanks cave.	Wetness, soil blowing.	Erodes easily, wetness, soil blowing.	Erodes easily.

Water Management--Continued

Map symbol and soil name	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
1307:							
Rushlake	Severe: seepage.	Severe: seepage.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty.	Wetness, too sandy, soil blowing.	Droughty.
1317:							
Vallers	Slight	Severe: piping, wetness.	Severe: slow refill.	Frost action	Wetness	Erodes easily, wetness.	Wetness, erodes easily.
1319B:							
Rockwood	Moderate: seepage, slope.	Severe: piping.	Severe: no water.	Deep to water	Slope, soil blowing, percs slowly.	Soil blowing	Rooting depth.
1319C:							
Rockwood	Severe: slope.	Severe: piping.	Severe: no water.	Deep to water	Slope, soil blowing, percs slowly.	Slope, soil blowing.	Slope, rooting depth.
1319D:							
Rockwood	Severe: slope.	Severe: piping.	Severe: no water.	Deep to water	Slope, soil blowing, percs slowly.	Slope, soil blowing.	Slope, rooting depth.
1320B:							
Blowers	Moderate: seepage, slope.	Severe: piping.	Severe: no water.	Frost action, slope, cutbanks cave.	Slope, wetness, soil blowing.	Wetness, too sandy, soil blowing.	Rooting depth.
1321:							
Paddock	Moderate: seepage.	Severe: piping.	Severe: no water.	Frost action	Wetness, soil blowing, percs slowly.	Wetness, soil blowing.	Wetness, rooting depth.
Becida	Moderate: seepage.	Severe: piping, wetness.	Severe: no water.	Percs slowly, frost action, cutbanks cave.	Wetness	Wetness, too sandy.	Wetness, rooting depth.
1322:							
Wolverton	Severe: seepage.	Moderate: piping, wetness.	Severe: slow refill, cutbanks cave.	Favorable	Wetness	Wetness, soil blowing.	Favorable.

Water Management--Continued

Map symbol and soil name	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
1324B:							
Heimdal	Moderate: seepage, slope.	Severe: piping.	Severe: no water.	Deep to water	Slope, rooting depth.	Favorable	Rooting depth.
Sisseton	Moderate: seepage, slope.	Severe: piping.	Severe: no water.	Deep to water	Slope	Erodes easily	Erodes easily.
1338:							
Oakcreek	Severe: seepage.	Severe: seepage, piping.	Severe: cutbanks cave.	Favorable	Wetness	Erodes easily, wetness.	Erodes easily.
1339:							
Borup	Severe: seepage.	Severe: piping, ponding.	Severe: cutbanks cave.	Ponding, frost action, cutbanks cave.	Ponding, excess salt.	Ponding	Wetness.
1340:							
Bluffcreek	Severe: seepage.	Severe: seepage, piping.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty.	Wetness, too sandy, soil blowing.	Droughty.
Epoufette	Severe: seepage.	Severe: seepage, wetness.	Severe: cutbanks cave.	Frost action, cutbanks cave.	Wetness, droughty.	Wetness, too sandy, soil blowing.	Wetness, droughty.
1341:							
Clitherall	Severe: seepage.	Severe: seepage.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty.	Wetness, too sandy, soil blowing.	Droughty.
Wykeham	Moderate: seepage.	Moderate: wetness.	Severe: cutbanks cave.	Favorable	Wetness, soil blowing.	Wetness, soil blowing.	Rooting depth.
1342:							
Pinelake	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Frost action, cutbanks cave.	Wetness, soil blowing.	Wetness, too sandy, soil blowing.	Wetness.
Brandsvold	Moderate: seepage.	Severe: thin layer, wetness.	Severe: slow refill.	Frost action	Wetness, soil blowing.	Wetness, soil blowing.	Wetness.

Water Management--Continued

Map symbol and soil name	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
1343C:							
Lida	Severe: seepage, slope.	Severe: seepage.	Severe: no water.	Deep to water	Slope, droughty.	Slope, too sandy, soil blowing.	Slope, droughty.
Almora	Severe: seepage, slope.	Severe: piping.	Severe: no water.	Deep to water	Slope, soil blowing.	Slope, soil blowing.	Slope.
Lizzie	Severe: seepage, slope.	Severe: piping.	Severe: no water.	Deep to water	Slope, soil blowing.	Slope, erodes easily, soil blowing.	Slope, erodes easily.
1344B:							
Lida	Severe: seepage.	Severe: seepage.	Severe: no water.	Deep to water	Slope, droughty.	Too sandy, soil blowing.	Droughty.
Almora	Severe: seepage.	Severe: piping.	Severe: no water.	Deep to water	Slope, soil blowing.	Soil blowing---	Favorable.
Dent	Moderate: seepage, slope.	Severe: piping.	Severe: cutbanks cave.	Frost action, slope.	Slope, wetness, soil blowing.	Erodes easily, wetness, soil blowing.	Erodes easily.
1345:							
Bluffcreek	Severe: seepage.	Severe: seepage, piping.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty.	Wetness, too sandy, soil blowing.	Droughty.
Rosy	Moderate: seepage.	Severe: piping.	Severe: cutbanks cave.	Cutbanks cave	Wetness, soil blowing.	Wetness, too sandy, soil blowing.	Favorable.
1346:							
Nidaros	Severe: seepage.	Severe: seepage, piping, ponding.	Severe: slow refill, cutbanks cave.	Ponding, subsides, frost action.	Ponding, soil blowing, rooting depth.	Ponding, too sandy, soil blowing.	Wetness, rooting depth.
1347B:							
Kandota	Moderate: seepage, slope.	Severe: piping.	Severe: no water.	Deep to water	Slope, rooting depth.	Favorable------	Rooting depth.

Water Management--Continued

Map symbol and soil name	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
1348:							
Knute	Moderate: seepage.	Severe: piping.	Severe: slow refill.	Favorable	Wetness	Wetness	Favorable.
1349:							
Clotho	Moderate: seepage.	Severe: piping, wetness.	Severe: slow refill.	Frost action	Wetness, rooting depth.	Wetness	Wetness, rooting depth.
1350:							
Brandsvold	Moderate: seepage.	Severe: thin layer, wetness.	Severe: slow refill.	Frost action	Wetness	Wetness	Wetness.
1351:							
Bluffton	Moderate: seepage.	Severe: piping, ponding.	Moderate: slow refill.	Ponding, frost action.	Ponding	Ponding	Wetness.
1365:							
Hillview	Severe: seepage.	Severe: piping, wetness.	Severe: cutbanks cave.	Frost action, cutbanks cave.	Wetness, soil blowing.	Wetness, too sandy, soil blowing.	Wetness.
1396:							
Sedgeville	Severe: seepage.	Severe: seepage, piping, ponding.	Severe: cutbanks cave.	Ponding, flooding, frost action.	Ponding, flooding.	Ponding, too sandy.	Wetness.
Nidaros	Severe: seepage.	Severe: seepage, piping, ponding.	Severe: slow refill, cutbanks cave.	Ponding, subsides, frost action.	Ponding, soil blowing, rooting depth.	Ponding, too sandy, soil blowing.	Wetness, rooting depth.
Aquolls	Moderate: seepage.	Severe: seepage, piping, ponding.	Moderate: slow refill.	Ponding, frost action.	Ponding, soil blowing.	Ponding, soil blowing.	Wetness.
1397:							
Bemidji	Severe: seepage.	Severe: piping.	Severe: cutbanks cave.	Favorable	Wetness, droughty, fast intake.	Wetness, soil blowing.	Droughty, rooting depth.

Water Management--Continued

Map symbol and soil name	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
1825B: Seelyeville	Severe: seepage.	Severe: excess humus, wetness.	Severe: slow refill.	Subsides, frost action, slope.	Slope, wetness.	Wetness	Wetness.
1874: Radium	Severe: seepage.	Severe: seepage, piping.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Wetness, too sandy, soil blowing.	Droughty, rooting depth.
1943: Roscommon	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Wetness, too sandy, soil blowing.	Wetness, droughty, rooting depth.
1975: Oylen	Severe: seepage.	Severe: seepage, piping.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty, soil blowing.	Wetness, too sandy, soil blowing.	Droughty.

Soil Properties

Data relating to soil properties are collected during the course of the soil survey. The data and the estimates of soil and water features, listed in tables, are explained on the following pages.

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

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

The estimates of soil properties shown in the tables include the range of grain-size distribution and Atterberg limits, the engineering classification, and the physical and chemical properties of the major layers of each soil. Pertinent soil and water features also are given.

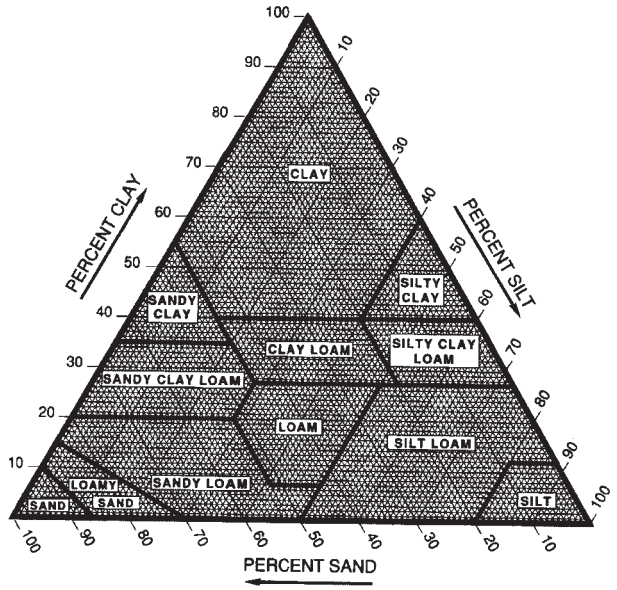

Figure 6.—Percentages of clay, silt, and sand in the basic USDA soil textural classes.

Engineering Index Properties

The table "Engineering Index Properties" gives estimates of the engineering classification and of the range of index properties for the major layers of each soil in the survey area. Most soils have layers of contrasting properties within the upper 5 or 6 feet.

Depth to the upper and lower boundaries of each layer is indicated. The range in depth and information on other properties of each layer are given in the series descriptions in Part I of this survey.

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter (fig. 6). "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is as much as 15 percent, an appropriate modifier is added, for example, "gravelly." Textural terms are defined in the Glossary.

Classification of the soils is determined according to the Unified soil classification system (ASTM, 1993) and the system adopted by the American Association of State Highway and Transportation Officials (AASHTO, 1986).

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

The AASHTO system classifies soils according to those properties that affect roadway construction and

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

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20 or higher for the poorest.

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

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

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

The estimates of grain-size distribution, liquid limit, and plasticity index are generally rounded to the nearest 5 percent. Thus, if the ranges of gradation and Atterberg limits extend a marginal amount (1 or 2 percentage points) across classification boundaries, the classification in the marginal zone is omitted in the table.

Physical and Chemical Properties

The tables "Physical Properties of the Soils" and "Chemical Properties of the Soils" show estimates of some characteristics and features that affect soil behavior. These estimates are given for the major layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Depth to the upper and lower boundaries of each layer is indicated. The range in depth and information on other properties of each layer are given in the series descriptions in Part I of this survey.

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

The amount and kind of clay greatly affect the fertility and physical condition of the soil. They determine the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, permeability, plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earth-moving operations.

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at 1/3-bar moisture tension. Weight is determined after drying the soil at 105 degrees C. In the table "Physical Properties of the Soils," the estimated moist bulk density of each major soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. A bulk density of more than 1.6 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Permeability refers to the ability of a soil to transmit water or air. The estimates indicate the rate of downward movement of water when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Permeability is considered in the design of soil drainage systems and septic tank absorption fields.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each major soil layer. The capacity varies, depending on soil properties that affect the retention of water and the depth of the root zone. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of

irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

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

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

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

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

The content of organic matter in a soil can be maintained or increased by returning crop residue to the soil. Organic matter affects the available water capacity, infiltration rate, and tilth. It is a source of nitrogen and other nutrients for crops.

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) to predict the average rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, very fine sand, sand, and organic matter (as much as 4 percent) and on soil structure and permeability. The estimates are modified by the presence of rock fragments. Values of K range from 0.02 to 0.69. The higher the value, the more susceptible the soil is to sheet and rill erosion.

Erosion factor Kf indicates the erodibility of the fine-earth fraction, or the material less than 2 millimeters in size.

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

Wind erodibility groups are made up of soils that have similar properties affecting their resistance to soil blowing in cultivated areas. The groups indicate the susceptibility to soil blowing. Soils are grouped according to the following distinctions:

1. Coarse sands, sands, fine sands, and very fine sands. These soils generally are not suitable for crops. They are extremely erodible, and vegetation is difficult to establish.
2. Loamy coarse sands, loamy sands, loamy fine sands, loamy very fine sands, and sapric soil material. These soils are very highly erodible. Crops can be grown if intensive measures to control soil blowing are used.
3. Coarse sandy loams, sandy loams, fine sandy loams, and very fine sandy loams. These soils are highly erodible. Crops can be grown if intensive measures to control soil blowing are used.

4L. Calcareous loams, silt loams, clay loams, and silty clay loams that have more than 5 percent finely divided calcium carbonate. These soils are highly erodible. Crops can be grown if intensive measures to control soil blowing are used.

4. Clays, silty clays, noncalcareous clay loams, and silty clay loams that are more than 35 percent clay. These soils are moderately erodible. Crops can be grown if measures to control soil blowing are used.
5. Noncalcareous loams and silt loams that are less than 20 percent clay and sandy clay loams, sandy clays, and hemic soil material. These soils have less than 5 percent finely divided calcium carbonate. They are moderately erodible. Crops can be grown if measures to control soil blowing are used.
6. Noncalcareous loams and silt loams that are more than 20 percent clay and noncalcareous clay loams that are less than 35 percent clay. These soils have less than 5 percent finely divided calcium carbonate. They are moderately erodible. Crops can be grown if ordinary measures to control soil blowing are used.
7. Silts, noncalcareous silty clay loams that are less than 35 percent clay, and fibric soil material. These soils have less than 5 percent finely divided calcium carbonate. They are very slightly erodible. Crops can be grown if ordinary measures to control soil blowing are used.
8. Soils that are not subject to soil blowing because of rock fragments on the surface or because of surface wetness.

The *wind erodibility index* is a number that is determined based on the percentage of dry,

nonerodible surface soil aggregates larger than 0.84 millimeter in diameter. It is an expression of the stability of the soil aggregates, or the extent to which they are broken down by tillage and the abrasion caused by windblown soil particles.

In the table "Chemical Properties of the Soils," *cation-exchange capacity* is the total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. It is a measurement of the nutrient-holding capacity of the soil.

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

Calcium carbonate is expressed as a weighted percentage of the fraction of the soil less than 2 millimeters in size. The availability of plant nutrients, such as phosphorus, is affected by the amount of carbonates in the soil.

Gypsum is expressed as the percent, by weight, of hydrated calcium sulfates in the fraction of the soil less than 20 millimeters in size. Soils high in gypsum, such as those that are more than 10 percent gypsum, may collapse if the gypsum is removed by percolating water. Gypsum is corrosive to concrete. Corrosion of concrete is most likely to occur in soils that are more than about 1 percent gypsum when wetting and drying occur.

Salinity is a measure of soluble salts in the soil at saturation. It is expressed as the electrical conductivity of the saturation extract, in millimhos per centimeter at 25 degrees C. Estimates are based on field and laboratory measurements at representative sites of nonirrigated soils. The salinity of irrigated soils is affected by the quality of the irrigation water and by the frequency of water application. Hence, the salinity of soils in individual fields can differ greatly from the value given in the table. Salinity affects the suitability of a soil for crop production, the stability of the soil if used as construction material, and the potential of the soil to corrode metal and concrete.

Sodium adsorption ratio (SAR) is a measure of the amount of sodium (Na) relative to calcium (Ca) and magnesium (Mg) in the water extract from saturated soil paste. It is the ratio of the Na concentration divided by the square root of one-half of the Ca + Mg concentration. Soils that have SAR values of 13 or more may be characterized by an increased dispersion of organic matter and clay particles, reduced permeability and aeration, and a general degradation of soil structure.

Water Features

The table "Water Features" gives estimates of several important water features used in land use planning that involves engineering considerations. These features are described in the following paragraphs.

Hydrologic soil groups are groups of soils that, when saturated, have the same runoff potential under similar storm and ground cover conditions. The soil properties that affect the runoff potential are those that influence the minimum rate of infiltration in a bare soil after prolonged wetting and when the soil is not frozen. These properties include the depth to a seasonal high water table, the infiltration rate, permeability after prolonged wetting, and the depth to a very slowly permeable layer. The influences of ground cover and slope are treated independently and are not taken into account in hydrologic soil groups.

In the definitions of the hydrologic soil groups, the infiltration rate is the rate at which water enters the soil at the surface and is controlled by surface conditions. The transmission rate is the rate at which water moves through the soil and is controlled by properties of the soil layers.

The four hydrologic soil groups are:

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

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

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

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

If a soil is assigned to two hydrologic groups in the table, the first letter is for drained areas and the second is for undrained areas.

Flooding, the temporary covering of the soil surface by flowing water, is caused by overflow from streams or by runoff from adjacent slopes. Shallow water standing or flowing for short periods after rainfall or snowmelt is not considered flooding. Standing water in marshes and swamps or in closed depressions is considered to be ponding.

The table "Water Features" gives the frequency and duration of flooding and the time of year when flooding is most likely to occur. Frequency, duration, and probable dates of occurrence are estimated. Frequency generally is expressed as none, rare, occasional, or frequent. *None* means that flooding is not probable; *rare* that it is unlikely but is possible under unusual weather conditions (the chance of flooding is nearly 0 percent to 5 percent in any year); *occasional* that it occurs infrequently under normal weather conditions (the chance of flooding is 5 to 50 percent in any year); and *frequent* that it occurs often under normal weather conditions (the chance of flooding is 50 percent or more in any year).

Duration is expressed as *very brief* (less than 2 days), *brief* (2 to 7 days), *long* (7 to 30 days), and *very long* (more than 30 days). The time of year that flooding is most likely to occur is expressed in months. About two-thirds to three-fourths of all flooding occurs during the stated period.

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

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

High water table (seasonal) is a zone of saturation at the highest average depth during the wettest season. It is at least 6 inches thick, persists in the soil for more than a few weeks, and is within 6 feet of the surface. Indicated in the table "Water Features" are the depth to the seasonal high water table, the kind of water table, and the months of the year when the water table usually is highest.

An *apparent* water table is indicated by the level at which water stands in a freshly dug, unlined borehole after adequate time for adjustments in the surrounding soil.

A *perched* water table is one that is above an unsaturated zone in the soil. The basis for determining that a water table is perched may be general knowledge of the area. The water table is proven to be perched if the water level in a borehole is observed to fall when the borehole is extended.

Two numbers in the column showing depth to the water table indicate the normal range in depth to a saturated zone. Depth is given to the nearest half foot. The first numeral in the range indicates the highest water level. "More than 6.0" indicates that the water table is below a depth of 6 feet or that it is within a depth of 6 feet for less than a month.

Ponding is standing water in a closed depression. Unless a drainage system is installed, the water is removed only by percolation, transpiration, or evaporation. *Ponding duration* classes are the same as those for flooding. *Maximum ponding depth* refers to the depth of the water above the surface of the soil.

Soil Features

The table "Soil Features" gives estimates of several important soil features used in land use planning that involves engineering considerations. These features are described in the following paragraphs.

Depth to bedrock is given if bedrock is within a depth of 60 inches. The depth is based on many soil borings and on observations during soil mapping. The rock is specified as either soft or hard. If the rock is soft or fractured, excavations can be made with trenching machines, backhoes, or small rippers. If the rock is hard or massive, blasting or special equipment generally is needed for excavation.

Subsidence is the settlement of organic soils or of saturated mineral soils of very low density. Subsidence generally results from either desiccation and shrinkage or oxidation of organic material, or both, following drainage. Subsidence takes place gradually, usually over a period of several years. The table "Soil Features" shows the expected initial subsidence, which usually is a result of drainage, and total subsidence, which results from a combination of factors.

Potential frost action is the likelihood of upward or lateral expansion of the soil caused by the formation of segregated ice lenses (frost heave) and the subsequent collapse of the soil and loss of strength on thawing. Frost action occurs when moisture moves into the freezing zone of the soil. Temperature, texture, density, permeability, content of organic matter, and depth to the water table are the most important factors considered in evaluating the potential for frost action. It is assumed that the soil is not insulated by vegetation

or snow and is not artificially drained. Silty and highly structured, clayey soils that have a high water table in winter are the most susceptible to frost action. Well drained, very gravelly, or very sandy soils are the least susceptible. Frost heave and low soil strength during thawing cause damage mainly to pavements and other rigid structures.

A *low* potential for frost action indicates that the soil is rarely susceptible to the formation of ice lenses; a *moderate* potential indicates that the soil is susceptible to formation of ice lenses, resulting in frost heave and the subsequent loss of soil strength; and a *high* potential indicates that the soil is highly susceptible to formation of ice lenses, resulting in frost heave and the subsequent loss of soil strength.

Risk of corrosion pertains to potential soil-induced electrochemical or chemical action that dissolves or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate content, texture, moisture content, and acidity of the soil.

Special site examination and design may be needed if the combination of factors results in a severe hazard of corrosion. The steel in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than steel in installations that are entirely within one kind of soil or within one soil layer.

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

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

Engineering Index Properties

(Absence of an entry indicates that the data were not estimated)

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
7A:												
Hubbard	0-20	Loamy sand	SM, SP-SM	A-2	0	0	98-100	95-100	50-80	10-25	15-20	NP
	20-45	Sand, coarse sand, loamy sand.	SP-SM, SW-SM	A-1, A-3, A-2-4	0	0	98-100	95-100	25-75	5-12	15-20	NP
	45-60	Sand, coarse sand.	SP, SW	A-1, A-3, A-2	0	0	95-100	85-100	20-70	2-5	15-20	NP
7B:												
Hubbard	0-12	Loamy sand	SM, SP-SM	A-2	0	0	98-100	95-100	50-80	10-25	15-20	NP
	12-42	Sand, coarse sand, loamy sand.	SP-SM, SW-SM	A-1, A-3, A-2-4	0	0	98-100	95-100	25-75	5-12	15-20	NP
	42-60	Sand, coarse sand.	SP, SW	A-1, A-3, A-2	0	0	95-100	85-100	20-70	2-5	15-20	NP
7C:												
Hubbard	0-9	Loamy sand	SM, SP-SM	A-2	0	0	98-100	95-100	50-80	10-25	15-20	NP
	9-34	Sand, coarse sand, loamy sand.	SP-SM, SW-SM	A-1, A-3, A-2-4	0	0	98-100	95-100	25-75	5-12	15-20	NP
	34-60	Sand, coarse sand.	SP, SW	A-1, A-3, A-2	0	0	95-100	85-100	20-70	2-5	15-20	NP
26:												
Aazdahl	0-13	Clay loam	CL	A-7, A-6	0	0-3	95-100	90-100	85-100	75-90	35-50	15-30
	13-23	Clay loam, silty clay loam.	CL	A-7, A-6	0	0-3	95-100	90-100	85-95	70-80	35-50	15-30
	23-36	Clay loam, silty clay loam, loam.	CL	A-7, A-6	0	0-3	95-100	90-100	85-95	70-80	35-50	15-30
	36-60	Clay loam, silty clay loam, loam.	CL	A-7, A-6	0	0-3	95-100	90-100	85-95	70-80	35-50	15-30

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
34:												
Parnell	0-18	Silty clay loam	CL, CH	A-7	0	0	100	100	95-100	85-100	40-60	15-30
	18-50	Clay loam, silty clay loam, silty clay.	CL, CH	A-7	0	0	100	95-100	90-100	70-100	40-80	20-50
	50-60	Clay loam, silty clay loam, silty clay.	CL, CH	A-6, A-7	0	0	95-100	90-100	80-95	70-95	30-80	15-50
38B:												
Waukon	0-8	Loam	ML, CL, CL-ML	A-6, A-4	0-1	0-3	95-100	90-100	80-95	60-90	20-40	5-20
	8-32	Clay loam, loam	CL, ML	A-6, A-7	0-1	0-3	95-100	90-100	75-95	50-85	30-45	10-20
	32-60	Loam, clay loam	ML, CL	A-6	0-1	0-3	95-100	90-100	70-95	50-80	30-40	10-20
38C2:												
Waukon	0-8	Loam	ML, CL, CL-ML	A-6, A-4	0-1	0-3	95-100	90-100	80-95	60-90	20-40	5-20
	8-27	Clay loam, loam	CL, ML	A-6, A-7	0-1	0-3	95-100	90-100	75-95	50-85	30-45	10-20
	27-60	Loam, clay loam	ML, CL	A-6	0-1	0-3	95-100	90-100	70-95	50-80	30-40	10-20
38D2:												
Waukon	0-7	Loam	ML, CL, CL-ML	A-6, A-4	0-1	0-3	95-100	90-100	80-95	60-90	20-40	5-20
	7-22	Clay loam, loam	CL, ML	A-6, A-7	0-1	0-3	95-100	90-100	75-95	50-85	30-45	10-20
	22-60	Loam, clay loam	ML, CL	A-6	0-1	0-3	95-100	90-100	70-95	50-80	30-40	10-20
38E:												
Waukon	0-9	Loam	ML, CL, CL-ML	A-6, A-4	0-1	0-3	95-100	90-100	80-95	60-90	20-40	5-20
	9-26	Clay loam, loam	CL, ML	A-6, A-7	0-1	0-3	95-100	90-100	75-95	50-85	30-45	10-20
	26-60	Loam, clay loam	ML, CL	A-6	0-1	0-3	95-100	90-100	70-95	50-80	30-40	10-20
46:												
Borup	0-13	Loam	ML	A-4	0	0	100	100	95-100	70-95	20-34	NP-7
	13-32	Very fine sandy loam, silt loam, sandy clay loam.	ML	A-4	0	0	100	100	90-100	60-95	0-30	NP-5
	32-60	Loamy very fine sand, very fine sand, very fine sandy loam.	ML	A-4	0	0	100	100	85-100	50-90	0-30	NP-5

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
53B:												
Kandota	0-8	Sandy loam	SC-SM, SC	A-4, A-6	0	0-5	95-100	75-98	65-85	35-50	21-35	4-11
	8-11	Fine sandy loam, sandy loam, loamy sand.	SM, SC-SM, SC	A-4, A-2-4	0	0-5	95-100	75-98	45-85	20-65	15-28	NP-10
	11-32	Sandy clay loam, loam, fine sandy loam.	SC, CL	A-4, A-6	0	0-10	90-100	75-98	70-85	35-55	28-39	9-18
	32-68	Sandy loam, fine sandy loam, loam.	SC, SC-SM, CL-ML	A-4	0	0-10	85-100	75-98	65-85	35-55	23-28	4-9
	68-80	Sandy loam, fine sandy loam, loam.	SC, SC-SM, CL-ML	A-4	0	0-10	85-100	80-95	65-85	35-55	23-28	5-10
53C:												
Kandota	0-8	Sandy loam	SC-SM, SC	A-4, A-6	0	0-5	95-100	75-98	65-85	35-50	21-35	4-11
	8-24	Sandy clay loam, loam, fine sandy loam.	SC, CL	A-4, A-6	0	0-10	90-100	75-98	70-85	35-55	28-39	9-18
	24-60	Sandy loam, fine sandy loam, loam.	SC, SC-SM, CL-ML	A-4	0	0-10	85-100	80-95	65-85	35-55	23-28	5-10
53D:												
Kandota	0-7	Sandy loam	SC-SM, SC	A-4, A-6	0	0-5	95-100	75-98	65-85	35-50	21-35	4-11
	7-9	Fine sandy loam, sandy loam, loamy sand.	SM, SC-SM, SC	A-4, A-2-4	0	0-5	95-100	75-98	45-85	20-65	15-28	NP-10
	9-28	Sandy clay loam, loam, fine sandy loam.	SC, CL	A-4, A-6	0	0-10	90-100	75-98	70-85	35-55	28-39	9-18
	28-60	Sandy loam, fine sandy loam, loam.	SC, SC-SM, CL-ML	A-4	0	0-10	85-100	80-95	65-85	35-55	23-28	5-10

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
58:												
Kittson---------	0-7	Loam----------	CL, CL-ML	A-6, A-4	0	0	100	95-100	85-95	50-75	20-40	5-20
	7-18	Loam, fine sandy loam, sandy loam.	CL, SC	A-6	0	0-5	90-100	65-100	60-90	40-75	20-40	10-20
	18-32	Loam, clay loam	CL	A-6	0	0-2	95-100	85-98	80-90	50-75	20-40	10-20
	32-60	Loam, clay loam	CL	A-6	0	0-2	95-100	85-98	80-90	50-75	20-40	10-20
59:												
Grimstad--------	0-10	Fine sandy loam	SM, SC-SM	A-4, A-2	0	0	100	100	80-100	15-50	15-30	NP-7
	10-27	Loamy sand, loamy fine sand, fine sand.	SM, SP-SM	A-2, A-3	0	0	100	95-100	80-90	5-35	15-25	NP-4
	27-60	Sandy loam, fine sandy loam, loam.	SC, CL, SC-SM, CL-ML	A-4, A-6	0	0-3	95-100	85-100	70-90	40-85	15-40	5-20
61:												
Arveson---------	0-10	Loam----------	ML	A-4	0	0-1	100	95-100	85-90	50-80	20-40	NP-10
	10-30	Fine sandy loam, sandy loam, loam.	SM, SC-SM	A-4	0	0	100	95-100	60-85	35-50	0-20	NP-5
	30-60	Fine sand, loamy sand, sandy loam.	SP-SM, SM, SC-SM	A-3, A-2, A-4	0	0	100	95-100	50-80	5-45	0-20	NP-5
63:												
Rockwell--------	0-10	Loam----------	OL, ML	A-4	0	0	100	95-100	85-95	50-75	20-40	NP-10
	10-27	Fine sandy loam, sandy loam, loam.	SM, ML, SC-SM, CL-ML	A-4	0	0	100	95-100	60-85	35-55	15-25	1-7
	27-36	Fine sand, sand, loamy fine sand.	SM	A-2	0	0	100	95-100	65-80	20-35	0-14	NP
	36-60	Silt loam, loam, clay loam.	CL, CL-ML, SC, SC-SM	A-6, A-4	0	0-1	95-100	90-100	70-90	40-85	15-40	5-20

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
65:												
Foxhome	0-13	Sandy loam	SM	A-4	0	0-2	95-100	90-100	75-90	35-50	15-30	NP-5
	13-16	Loamy sand, sandy loam, gravelly loam.	SM, SP-SM	A-2, A-4	0	0-2	95-100	70-100	45-80	10-50	20-30	NP-5
	16-35	Very gravelly sand, very gravelly coarse sand, very gravelly loamy sand.	SP, SP-SM, GP, GP-GM	A-1	0	2-5	50-75	40-60	20-50	0-10	---	NP
	35-60	Loam, clay loam, silt loam.	ML, CL, CL-ML	A-4, A-6	0	1-5	90-100	85-100	75-90	50-80	20-40	1-15
66:												
Flaming	0-16	Loamy fine sand	SM, SP-SM	A-2, A-3	0	0	100	100	75-90	5-30	---	NP
	16-60	Fine sand, loamy sand, sand.	SM, SP-SM	A-2, A-3	0	0	100	100	75-90	5-30	---	NP
68:												
Arveson	0-16	Loam	ML	A-4	0	0	100	95-100	85-90	50-80	20-40	NP-10
	16-23	Fine sandy loam, sandy loam, loam.	SM, SC-SM	A-4	0	0	100	95-100	60-85	35-50	0-20	NP-5
	23-60	Fine sand, sand, sandy loam.	SP-SM, SM, SC-SM	A-3, A-2, A-4	0	0	100	95-100	50-80	5-45	0-20	NP-5
107:												
Winger	0-16	Silt loam	ML, CL, CL-ML	A-4, A-6	0	0	100	100	90-100	70-90	20-40	2-15
	16-29	Silt loam, silty clay loam.	ML, CL, CL-ML	A-4, A-6	0	0	100	100	90-100	80-90	20-40	2-15
	29-60	Loam, clay loam	ML, CL, CL-ML	A-4, A-6, A-7	0	0-10	90-100	85-97	75-95	50-75	20-45	3-25
108:												
McIntosh	0-12	Silt loam	CL, ML	A-4, A-6	0	0	100	100	85-100	70-95	28-36	9-15
	12-25	Silt loam, silty clay loam, loam.	ML, CL	A-4, A-6	0	0	100	100	90-100	70-90	28-43	9-21
	25-60	Loam, clay loam	CL, ML	A-6, A-4	0	0-5	95-100	90-100	80-95	60-80	28-43	9-21

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
121:												
Wykeham	0-8	Fine sandy loam	SM, SC-SM	A-4	0	0-5	90-100	85-100	65-80	40-50	25-30	2-5
	8-14	Fine sandy loam, loamy sand, sandy loam.	SM, SC-SM	A-4, A-2	0	0-5	85-100	70-95	65-80	25-50	15-20	1-5
	14-28	Loam, sandy clay loam, sandy loam.	SC, CL	A-6	0	0-5	90-100	85-95	70-80	35-60	30-35	10-15
	28-60	Fine sandy loam, sandy loam.	SC-SM, SC	A-4	0	0-5	85-95	85-95	65-80	35-50	20-25	5-10
127A:												
Sverdrup	0-7	Sandy loam	SM	A-4	0	0	100	95-100	60-70	35-50	---	NP
	7-17	Loam, sandy loam, loamy sand.	ML, SM	A-2, A-4	0	0	100	95-100	50-75	30-70	15-30	NP-5
	17-60	Sand, fine sand	SP, SP-SM	A-3, A-2	0	0	100	95-100	50-90	2-10	---	NP
127B:												
Sverdrup	0-12	Sandy loam	SM	A-4	0	0	100	95-100	60-70	35-50	---	NP
	12-24	Loam, sandy loam, loamy sand.	ML, SM	A-2, A-4	0	0	100	95-100	50-75	30-70	15-30	NP-5
	24-60	Sand, fine sand	SP, SP-SM	A-3, A-2	0	0	100	95-100	50-90	2-10	---	NP
127C:												
Sverdrup	0-8	Sandy loam	SM	A-4	0	0	100	95-100	60-70	35-50	---	NP
	8-15	Loam, sandy loam, loamy sand.	ML, SM	A-2, A-4	0	0	100	95-100	50-75	30-70	15-30	NP-5
	15-60	Sand, fine sand	SP, SP-SM	A-3, A-2	0	0	100	95-100	50-90	2-10	---	NP
141B:												
Egeland	0-15	Fine sandy loam	SM, SC-SM	A-2, A-4	0	0	100	95-100	75-100	30-50	15-25	NP-7
	15-42	Sandy loam, fine sandy loam.	SM, SC-SM	A-2, A-4	0	0	95-100	85-100	70-100	15-50	15-25	NP-7
	42-60	Loamy sand, loamy fine sand, loamy very fine sand.	SM, SP-SM, SC-SM	A-2, A-4	0	0	95-100	85-100	70-100	10-45	15-25	NP-5

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
141C:												
Egeland---------	0-11	Fine sandy loam	SM, SC-SM	A-2, A-4	0	0	100	95-100	75-100	30-50	15-25	NP-7
	11-35	Sandy loam, fine sandy loam.	SM, SC-SM	A-2, A-4	0	0	95-100	85-100	70-100	15-50	15-25	NP-7
	35-60	Loamy sand, loamy fine sand, loamy very fine sand.	SM, SP-SM, SC-SM	A-2, A-4	0	0	95-100	85-100	70-100	10-45	15-25	NP-5
141D:												
Egeland---------	0-9	Fine sandy loam	SM, SC-SM	A-2, A-4	0	0	100	95-100	75-100	30-50	15-25	NP-7
	9-30	Sandy loam, fine sandy loam.	SM, SC-SM	A-2, A-4	0	0	95-100	85-100	70-100	15-50	15-25	NP-7
	30-60	Loamy sand, loamy fine sand, loamy very fine sand.	SM, SP-SM, SC-SM	A-2, A-4	0	0	95-100	85-100	70-100	10-45	15-25	NP-5
168B:												
Forman----------	0-9	Clay loam------	CL	A-6, A-7	0	0-5	95-100	90-100	85-100	70-80	30-45	10-25
	9-24	Clay loam------	CL, CL-ML	A-4, A-6, A-7	0	0-5	95-100	90-100	80-95	60-80	25-45	5-20
	24-60	Loam, clay loam	CL, CL-ML	A-4, A-6, A-7	0	0-5	95-100	90-100	80-95	60-80	25-45	5-20
180:												
Gonvick---------	0-15	Loam-----------	ML, CL, CL-ML	A-4, A-6	0	0-3	95-100	90-100	85-95	50-75	20-40	3-20
	15-35	Loam, clay loam	CL	A-6, A-7	0	0-3	95-100	90-100	75-95	50-85	20-50	10-30
	35-60	Loam, clay loam	CL-ML, CL	A-4, A-6	0	0-3	95-100	90-100	70-95	50-80	15-40	5-20
184:												
Hamerly---------	0-10	Loam-----------	CL, CL-ML	A-4, A-6	0	0-5	95-100	90-100	80-95	60-90	20-40	5-20
	10-38	Loam, clay loam	CL, CL-ML	A-4, A-6	0	0-5	95-100	85-95	80-95	60-75	20-40	5-20
	38-60	Loam, clay loam	CL, CL-ML	A-4, A-6	0	0-5	95-100	85-95	80-95	60-75	20-40	5-20

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
187:												
Haug	0-14	Muck	PT	A-8	0	0	0	0	0	0	---	NP
	14-20	Mucky sandy loam, fine sandy loam, loam.	OL, ML, CL, SM	A-4, A-6	0	0-3	95-100	90-100	70-85	35-65	15-40	1-15
	20-60	Loam, sandy loam, fine sandy loam.	ML, CL, SM, SC	A-4, A-6	0	0-3	95-100	70-100	60-95	35-65	15-40	1-15
191:												
Epoufette	0-7	Sandy loam	SM, SC-SM	A-2, A-4	0	0-5	95-100	65-95	60-75	25-40	15-25	NP-7
	7-33	Gravelly sandy loam, sandy loam, gravelly loamy sand.	SM, SC-SM, SC	A-2, A-4	0	0-5	95-100	70-95	60-80	25-40	15-25	2-10
	33-60	Gravelly sand, coarse sand, sand.	SP, SP-SM, GP, GP-GM	A-1, A-3, A-2-4	0	0-10	50-90	45-85	30-60	0-10	---	NP
202:												
Meehan	0-8	Loamy sand	SM	A-2, A-1	0	0	90-100	75-100	40-90	15-30	0-14	NP
	8-24	Sand, loamy sand, loamy coarse sand.	SM, SP-SM, SP	A-1, A-2, A-3	0	0	90-100	75-100	40-90	3-30	0-14	NP
	24-60	Sand, coarse sand.	SP, SP-SM	A-1, A-3, A-2	0	0	90-100	75-100	40-90	0-5	0-14	NP
258A:												
Sandberg	0-11	Loamy sand	SM, SP-SM	A-1, A-2	0-3	0-5	85-100	50-95	40-75	10-25	---	NP-4
	11-33	Gravelly loamy coarse sand, gravelly coarse sand, loamy sand.	SP-SM, SM	A-1, A-2, A-3	0-3	0-5	75-95	50-95	35-70	5-25	---	NP-4
	33-60	Gravelly coarse sand, coarse sand, sand.	SP, SP-SM	A-1, A-3, A-2	0-3	0-5	60-95	50-95	30-65	2-10	---	NP

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
258B:												
Sandberg--------	0-12	Loamy sand-----	SM, SP-SM	A-1, A-2	0-3	0-5	85-100	50-95	40-75	10-25	---	NP-4
	12-19	Gravelly loamy coarse sand, gravelly coarse sand, loamy sand.	SP-SM, SM	A-1, A-2, A-3	0-3	0-5	75-95	50-95	35-70	5-25	---	NP-4
	19-29	Gravelly coarse sand, coarse sand, sand.	SP, SP-SM	A-1, A-3, A-2	0-3	0-5	60-95	50-95	30-65	2-10	---	NP
	29-80	Gravelly coarse sand, coarse sand, sand.	SP, SP-SM	A-1, A-3, A-2	0-3	0-5	60-95	50-95	30-65	2-10	---	NP
258C:												
Sandberg--------	0-10	Loamy sand-----	SM, SP-SM	A-1, A-2	0-3	0-5	85-100	50-95	40-75	10-25	---	NP-4
	10-17	Gravelly loamy coarse sand, gravelly coarse sand, loamy sand.	SP-SM, SM	A-1, A-2, A-3	0-3	0-5	75-95	50-95	35-70	5-25	---	NP-4
	17-44	Gravelly coarse sand, coarse sand, sand.	SP, SP-SM	A-1, A-3, A-2	0-3	0-5	60-95	50-95	30-65	2-10	---	NP
	44-60	Gravelly coarse sand, coarse sand, sand.	SP, SP-SM	A-1, A-3, A-2	0-3	0-5	60-95	50-95	30-65	2-10	---	NP
260:												
Duelm-----------	0-16	Loamy sand-----	SM, SP-SM	A-2, A-1	0	0	90-100	85-100	35-75	10-25	15-20	NP
	16-56	Loamy sand, sand, coarse sand.	SM, SP-SM	A-2, A-3, A-1	0	0	90-100	85-100	35-75	5-25	15-20	NP
	56-60	Coarse sand, sand.	SP, SM, SP-SM	A-2, A-3, A-1	0	0	85-100	75-100	35-75	3-15	15-20	NP

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
267B:												
Snellman	0-9	Sandy loam	SM, SC-SM	A-4	0	0-10	90-100	80-95	65-80	40-50	25-30	2-5
	9-15	Loamy sand, sandy loam, fine sandy loam.	SM, SC-SM	A-4, A-2	0	0-10	88-100	80-95	65-80	30-50	15-20	NP-5
	15-31	Sandy clay loam, sandy loam, clay loam.	SC, CL	A-6	0	0-10	90-100	80-95	70-80	35-50	25-40	10-20
	31-60	Sandy loam, fine sandy loam.	SC-SM, SC	A-4	0	0-10	85-95	80-95	65-80	35-50	15-25	5-10
267C:												
Snellman	0-7	Sandy loam	SM, SC-SM	A-4	0	0-10	90-100	80-95	65-80	40-50	25-30	2-5
	7-15	Loamy sand, sandy loam, fine sandy loam.	SM, SC-SM	A-4, A-2	0	0-10	88-100	80-95	65-80	30-50	15-20	NP-5
	15-31	Sandy clay loam, sandy loam, clay loam.	SC, CL	A-6	0	0-10	90-100	80-95	70-80	35-50	25-40	10-20
	31-45	Sandy loam, fine sandy loam.	SC-SM, SC	A-4	0	0-10	85-95	80-95	65-80	35-50	15-25	5-10
	45-60	Sandy loam, fine sandy loam.	SC-SM, SC	A-4	0	0-10	85-95	80-95	65-80	35-50	15-25	5-10

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
267E:												
Snellman--------	0-3	Sandy loam-----	SM, SC-SM	A-4	0	0-10	90-100	80-95	65-80	40-50	25-30	2-5
	3-14	Loamy sand, sandy loam, fine sandy loam.	SM, SC-SM	A-4, A-2	0	0-10	88-100	80-95	65-80	30-50	15-20	NP-5
	14-26	Sandy clay loam, sandy loam, clay loam.	SC, CL	A-6	0	0-10	90-100	80-95	70-80	35-50	25-40	10-20
	26-39	Sandy loam, fine sandy loam.	SC-SM, SC	A-4	0	0-10	85-95	80-95	65-80	35-50	15-25	5-10
	39-60	Sandy loam, fine sandy loam.	SC-SM, SC	A-4	0	0-10	85-95	80-95	65-80	35-50	15-25	5-10
267F:												
Snellman--------	0-3	Sandy loam-----	SM, SC-SM	A-4	0	0-10	90-100	80-95	65-80	40-50	25-30	2-5
	3-16	Loamy sand, sandy loam, fine sandy loam.	SM, SC-SM	A-4, A-2	0	0-10	88-100	80-95	65-80	30-50	15-20	NP-5
	16-32	Sandy clay loam, sandy loam, clay loam.	SC, CL	A-6	0	0-10	90-100	80-95	70-80	35-50	25-40	10-20
	32-40	Sandy loam, fine sandy loam.	SC-SM, SC	A-4	0	0-10	85-95	80-95	65-80	35-50	15-25	5-10
	40-60	Sandy loam, fine sandy loam.	SC-SM, SC	A-4	0	0-10	85-95	80-95	65-80	35-50	15-25	5-10

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
290:												
Rothsay	0-14	Silt loam	ML	A-4	0	0	95-100	95-100	90-100	85-100	20-40	NP-10
	14-22	Silt loam, very fine sandy loam, loam.	ML	A-4	0	0	95-100	95-100	90-100	80-100	20-40	NP-10
	22-31	Silt loam, loam, very fine sandy loam.	ML	A-4	0	0	95-100	95-100	90-100	80-90	10-28	NP-10
	31-60	Silt loam, loam, very fine sandy loam.	ML	A-4	0	0	95-100	95-100	90-100	80-90	10-28	NP-10
293B:												
Swenoda	0-15	Fine sandy loam	SM	A-2, A-4	0	0	100	95-100	70-100	30-50	20-30	NP-7
	15-29	Fine sandy loam, sandy loam.	SC-SM, SM, ML, CL-ML	A-2, A-4	0	0	100	95-100	60-100	30-55	15-30	NP-10
	29-60	Silt loam, silty clay loam, loam.	CL, CL-ML	A-4, A-6, A-7	0	0-5	90-100	90-100	75-100	50-95	25-50	5-30
335:												
Urness	0-9	Mucky silt loam	OL, CL, CL-ML	A-4, A-6, A-7	0	0	100	100	90-100	70-95	20-50	3-20
	9-60	Mucky silt loam, mucky silty clay loam, silty clay loam.	ML, CL, CL-ML, OL	A-4, A-6, A-7	0	0	95-100	90-100	85-100	70-95	20-50	3-30
339:												
Fordville	0-10	Loam	ML, CL	A-4, A-6, A-7	0	0	100	100	70-85	55-75	30-45	5-20
	10-29	Loam, silt loam, clay loam.	CL, ML	A-4, A-6, A-7	0	0	100	95-100	70-95	55-80	30-45	5-20
	29-37	Loam, clay loam, fine sandy loam.	CL, ML, SM, SC	A-4, A-6	0	0	95-100	90-100	65-90	40-55	25-40	3-15
	37-60	Gravelly loamy sand, gravelly sand, very gravelly sand.	SW, SW-SM, SM	A-1	0	0	65-85	45-70	15-45	0-15	15-25	NP-5

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
341A:												
Arvilla	0-13	Sandy loam	SM, SC, SC-SM	A-2, A-4, A-6	0	0	95-100	90-100	50-80	20-45	15-30	NP-15
	13-20	Sandy loam, loam, coarse sandy loam.	SM, SC, SC-SM	A-2, A-4, A-6	0	0	90-100	85-100	50-80	20-45	15-40	NP-15
	20-60	Gravelly coarse sand, coarse sand, very gravelly coarse sand.	SP-SM, GM, SP, GP-GM	A-1, A-2, A-3	0	0	35-100	25-100	10-60	0-15	---	NP
341B:												
Arvilla	0-9	Sandy loam	SM, SC, SC-SM	A-2, A-4, A-6	0	0	95-100	90-100	50-80	20-45	15-30	NP-15
	9-19	Sandy loam, loam, coarse sandy loam.	SM, SC, SC-SM	A-2, A-4, A-6	0	0	90-100	85-100	50-80	20-45	15-40	NP-15
	19-60	Gravelly coarse sand, coarse sand, very gravelly coarse sand.	SP-SM, GM, SP, GP-GM	A-1, A-2, A-3	0	0	35-100	25-100	10-60	0-15	---	NP
371:												
Clontarf	0-13	Sandy loam	SM	A-2, A-4	0	0	100	95-100	60-85	25-50	15-30	NP-10
	13-24	Sandy loam, loam, fine sandy loam.	SM, ML	A-2, A-4	0	0	100	95-100	60-95	20-60	15-30	NP-10
	24-60	Sand, fine sand, loamy sand.	SP-SM, SM	A-2, A-3	0	0	100	95-100	50-80	5-35	15-20	NP-5
375:												
Forada	0-18	Loam	ML	A-4	0	0	95-100	85-100	70-90	50-70	25-35	5-20
	18-36	Sandy loam, loam, fine sandy loam.	ML, SM	A-4, A-2	0	0	95-100	85-100	55-85	30-60	15-30	NP-10
	36-60	Sand, gravelly coarse sand, loamy sand.	SP, SM, SP-SM, GP-GM	A-1, A-2, A-3	0	0	50-100	50-100	40-70	5-30	---	NP

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
402C:												
Sioux	0-10	Loamy sand	SM, SC-SM	A-1	0	0-5	95-100	90-100	25-50	15-30	0-25	NP-5
	10-60	Extremely gravelly sand, very gravelly loamy sand, very gravelly sand.	GM, GP, SM, SP	A-1	0	0	25-75	20-60	5-35	0-25	0-25	NP-5
402E:												
Sioux	0-10	Loamy sand	SM, SC-SM	A-1	0	0-5	95-100	90-100	25-50	15-30	0-25	NP-5
	10-60	Extremely gravelly sand, very gravelly loamy sand, very gravelly sand.	GM, GP, SM, SP	A-1	0	0	25-75	20-60	5-35	0-25	0-25	NP-5
406A:												
Dorset	0-11	Sandy loam	SM, SC-SM	A-4, A-2	0	0	90-100	85-100	50-70	25-50	0-25	NP-5
	11-20	Loam, sandy loam, coarse sandy loam.	SC-SM, SC, CL-ML, CL	A-4, A-6	0	0	90-100	85-100	50-90	35-75	15-30	4-14
	20-60	Gravelly coarse sand, gravelly sand.	SP, SP-SM, GP, GP-GM	A-1	0	0-5	50-90	35-75	15-40	0-10	0-20	NP
406B:												
Dorset	0-11	Sandy loam	SM, SC-SM	A-4, A-2	0	0	90-100	85-100	50-70	25-50	0-25	NP-5
	11-20	Loam, sandy loam, coarse sandy loam.	SC-SM, SC, CL-ML, CL	A-4, A-6	0	0	90-100	85-100	50-90	35-75	15-30	4-14
	20-38	Gravelly loamy sand, gravelly loamy coarse sand, gravelly coarse sand.	SP-SM, SM, SC-SM, GM	A-1, A-2	0	0-5	50-90	35-75	20-50	10-25	0-20	NP-7
	38-60	Gravelly coarse sand, gravelly sand.	SP, SP-SM, GP, GP-GM	A-1	0	0-5	50-90	35-75	15-40	0-10	0-20	NP

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
418:												
Lamoure	0-32	Silty clay loam	CL, CH, MH, ML	A-7	0	0	100	100	95-100	85-100	40-70	15-35
	32-40	Silty clay loam, silt loam.	CL, CH, MH, ML	A-7	0	0	100	100	90-100	60-100	40-70	15-35
	40-48	Silty clay loam, silt loam, loam.	CL, ML	A-6, A-7	0	0	95-100	95-100	90-100	60-100	30-70	10-35
	48-60	Stratified sandy loam to silty clay loam.	CL, SC	A-6, A-7	0	0	95-100	95-100	70-95	35-90	30-70	10-35
422B:												
Bygland	0-10	Silty clay loam	CL, ML	A-7, A-6	0	0	100	100	95-100	95-100	35-50	15-25
	10-41	Silty clay, clay, silty clay loam.	CH, CL, MH	A-7	0	0	100	100	95-100	85-100	45-70	20-45
	41-46	Silty clay loam, silt loam, silty clay.	CL, CH	A-6, A-7	0	0	100	100	90-100	80-95	25-50	10-30
	46-60	Stratified silty clay loam to silt loam.	CL, CH	A-6, A-7	0	0	100	100	90-100	80-95	25-50	10-30
422C:												
Bygland	0-8	Silty clay loam	CL, ML	A-7, A-6	0	0	100	100	95-100	95-100	35-50	15-25
	8-16	Silty clay, clay, silty clay loam.	CH, CL, MH	A-7	0	0	100	100	95-100	85-100	45-70	20-45
	16-22	Silty clay loam, silt loam, silty clay.	CL, CH	A-6, A-7	0	0	100	100	90-100	80-95	25-50	10-30
	22-60	Stratified silty clay loam to silt loam.	CL, CH	A-6, A-7	0	0	100	100	90-100	80-95	25-50	10-30

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
426:												
Foldahl	0-14	Loamy fine sand	SM, SP-SM	A-2	0	0	100	95-100	70-85	12-35	---	NP
	14-26	Fine sand, loamy fine sand, sand.	SP-SM, SM	A-2, A-3	0-1	0-3	95-100	90-100	70-85	5-35	---	NP
	26-40	Loam, clay loam	CL-ML, CL	A-4, A-6	0-1	1-5	95-100	75-95	70-90	50-85	15-40	5-20
	40-60	Loam, clay loam	CL-ML, CL	A-4, A-6	0-1	1-5	95-100	75-95	70-90	50-85	15-40	5-20
441A:												
Almora	0-11	Loam	SC, SC-SM, CL-ML	A-4	0	0	95-100	85-100	45-85	45-75	23-30	6-11
	11-15	Sandy loam, fine sandy loam, loam.	SC, SC-SM, CL-ML	A-4	0	0	95-100	85-100	45-85	35-65	23-30	6-11
	15-38	Sandy clay loam, gravelly sandy clay loam, loam.	SC, ML, CL	A-4, A-6	0	0-5	95-100	60-98	40-80	40-75	34-39	9-18
	38-46	Gravelly loamy coarse sand, sand, loamy sand.	SM, SP-SM, SC-SM	A-1-a, A-1-b, A-3	0	0-5	90-100	30-98	20-70	5-20	15-20	NP-6
	46-60	Gravelly coarse sand, sand, coarse sand.	SW, SP-SM, SP	A-1-a, A-1-b	0	0-5	90-100	30-98	5-30	0-10	---	NP
441B:												
Almora	0-9	Loam	SC, SC-SM, CL-ML	A-4	0	0	95-100	85-100	45-85	45-75	23-30	6-11
	9-13	Sandy loam, fine sandy loam, loam.	SC, SC-SM, CL-ML	A-4	0	0	95-100	85-100	45-85	35-65	23-30	6-11
	13-27	Sandy clay loam, gravelly sandy clay loam, loam.	SC, ML, CL	A-4, A-6	0	0-5	95-100	60-98	40-80	40-75	34-39	9-18
	27-60	Gravelly coarse sand, sand, coarse sand.	SW, SP-SM, SP	A-1-a, A-1-b	0	0-5	90-100	30-98	5-30	0-10	---	NP

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
441C:												
Almora----------	0-10	Loam----------	SC, SC-SM, CL-ML	A-4	0	0	95-100	85-100	45-85	45-75	23-30	6-11
	10-13	Sandy loam, fine sandy loam, loam.	SC, SC-SM, CL-ML	A-4	0	0	95-100	85-100	45-85	35-65	23-30	6-11
	13-33	Sandy clay loam, gravelly sandy clay loam, loam.	SC, ML, CL	A-4, A-6	0	0-5	95-100	60-98	40-80	40-75	34-39	9-18
	33-60	Gravelly coarse sand, sand, coarse sand.	SW, SP-SM, SP	A-1-a, A-1-b	0	0-5	90-100	30-98	5-30	0-10	---	NP
481:												
Kratka----------	0-9	Fine sandy loam	SM, SC-SM	A-4	0	0	95-100	90-100	50-80	36-50	15-25	2-6
	9-25	Loamy sand, sand, loamy fine sand.	SP-SM	A-3, A-2	0	0	95-100	90-100	50-80	5-10	---	NP
	25-60	Loam, clay loam	CL-ML, CL	A-4, A-6	0	0	95-100	90-100	75-100	55-80	21-43	5-21
494:												
Darnen----------	0-36	Loam----------	OL, ML, CL, CL-ML	A-4	0	0	100	100	85-100	60-90	20-35	2-10
	36-43	Loam, clay loam	CL, CL-ML	A-4, A-6, A-7	0	0	100	100	85-100	60-90	20-45	5-25
	43-60	Loam, clay loam	CL, CL-ML	A-4, A-6, A-7	0	0	90-100	90-100	80-95	60-85	20-45	5-25
497:												
Hantho----------	0-9	Silt loam------	ML	A-4, A-6	0	0	100	98-100	90-100	85-100	21-36	4-15
	9-22	Silt loam, very fine sandy loam.	ML, CL-ML	A-4	0	0	100	98-100	90-100	80-100	21-36	4-9
	22-31	Silt loam, very fine sandy loam.	ML, CL-ML	A-4	0	0	100	98-100	90-100	80-100	21-36	4-9
	31-60	Silt loam, very fine sandy loam, silty clay loam.	ML, CL, CL-ML	A-4, A-6, A-7	0	0	100	98-100	90-100	80-100	21-36	4-21

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
508:												
Wyndmere	0-12	Fine sandy loam	SM, ML, SC-SM, CL-ML	A-2, A-4	0	0	100	100	60-80	30-55	15-25	NP-10
	12-38	Sandy loam, fine sandy loam.	SM, ML, SC, SC-SM	A-2, A-4	0	0	100	100	60-90	30-55	15-25	NP-10
	38-60	Fine sand, loamy fine sand, fine sandy loam.	SM, ML, SC-SM	A-2, A-4	0	0	100	100	60-100	20-55	15-25	NP-10
540:												
Seelyeville	0-8	Muck	PT	A-8	0	0	0	0	0	0	---	NP
	8-80	Muck, mucky peat.	PT	A-8	0	0	0	0	0	0	---	NP
541:												
Rifle	0-21	Mucky peat	PT	A-8	0	0	0	0	0	0	---	NP
	21-80	Mucky peat	PT	A-8	0	0	0	0	0	0	---	NP
544:												
Cathro	0-16	Muck	PT	A-8	0	0	0	0	0	0	---	NP
	16-38	Sapric material	PT	A-8	0	0	0	0	0	0	---	NP
	38-60	Sandy loam, loam, clay loam.	CL-ML, SC-SM, SC, CL	A-4, A-6	0	0-5	85-100	75-100	60-100	35-90	20-40	5-20
567A:												
Verndale	0-9	Sandy loam	SM, SC-SM	A-4, A-2-4	0	0	100	85-100	60-85	25-45	15-20	3-6
	9-21	Sandy loam, fine sandy loam, loam.	SC, SC-SM	A-4, A-2-4	0	0	98-100	85-100	60-85	25-45	20-26	5-10
	21-38	Sand, coarse sand, loamy coarse sand.	SM, SP-SM	A-3, A-2-4	0	0	98-100	85-100	50-65	5-20	---	NP-2
	38-60	Sand, coarse sand.	SP, SP-SM	A-3, A-1-b, A-2-4	0	0	96-100	75-100	45-60	3-10	---	NP

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
567B:												
Verndale--------	0-10	Sandy loam-----	SM, SC-SM	A-4, A-2-4	0	0	100	85-100	60-85	25-45	15-20	3-6
	10-18	Sandy loam, fine sandy loam, loam.	SC, SC-SM	A-4, A-2-4	0	0	98-100	85-100	60-85	25-45	20-26	5-10
	18-29	Sand, coarse sand, loamy coarse sand.	SM, SP-SM	A-3, A-2-4	0	0	98-100	85-100	50-65	5-20	---	NP-2
	29-60	Sand, coarse sand.	SP, SP-SM	A-3, A-1-b, A-2-4	0	0	96-100	75-100	45-60	3-10	---	NP
609B:												
Dickey----------	0-13	Loamy fine sand	SM	A-2-4	0	0	100	100	50-75	15-30	0-14	NP
	13-28	Loamy fine sand, loamy sand, fine sand.	SM	A-2-4	0	0	100	100	50-80	15-35	0-14	NP
	28-60	Loam, clay loam, silty clay loam.	CL, CL-ML	A-4, A-6	0	0-5	95-100	90-100	85-100	60-90	24-40	4-20
624:												
Rosy----------	0-9	Sandy loam-----	ML, SM, CL-ML, SC-SM	A-4	0	0	100	95-100	70-95	40-65	15-25	NP-6
	9-26	Loam, very fine sandy loam, fine sandy loam.	ML, CL-ML, SM, SC	A-4, A-6	0	0	100	95-100	70-95	40-75	20-35	3-12
	26-60	Stratified sand to silty clay loam.	SM, SC, SC-SM, ML	A-4, A-2-4	0	0	95-100	95-100	60-95	30-75	15-35	2-12
646C:												
Peever----------	0-9	Clay loam------	CL	A-6, A-7	0	0	100	95-100	90-100	65-90	35-50	12-25
	9-18	Clay, silty clay, clay loam.	CL, CH, MH, ML	A-7	0	0	100	95-100	85-100	70-85	40-65	15-30
	18-37	Clay loam, clay	CL, CH, MH, ML	A-7	0	0-5	95-100	90-100	85-100	70-85	40-65	15-30
	37-60	Clay loam, clay	CL, CH, MH, ML	A-7	0	0-5	95-100	90-100	85-100	70-85	40-65	15-30

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
646D:												
Peever	0-8	Clay loam	CL	A-6, A-7	0	0	100	95-100	90-100	65-90	35-50	12-25
	8-21	Clay, silty clay, clay loam.	CL, CH, MH, ML	A-7	0	0	100	95-100	85-100	70-85	40-65	15-30
	21-60	Clay loam, clay	CL, CH, MH, ML	A-7	0	0-5	95-100	90-100	85-100	70-85	40-65	15-30
670:												
Knute	0-9	Fine sandy loam	SM, SC, SC-SM	A-2-4, A-4	0	0-5	95-100	85-95	50-80	30-50	20-30	2-10
	9-22	Sandy clay loam, loam, fine sandy loam.	CL	A-4, A-6	0	0-5	95-100	85-95	55-85	55-70	30-40	8-20
	22-29	Fine sandy loam, sandy loam, loam.	SM, SC, ML, CL	A-4, A-6	0	0-5	95-100	85-95	50-85	35-65	20-30	3-12
	29-60	Fine sandy loam, sandy loam, loam.	SM, SC, ML, CL	A-4, A-6	0	0-5	95-100	85-95	50-85	35-65	15-25	3-12
680:												
Parnell	0-27	Silt loam	OL, ML, CL	A-4, A-6	0	0	100	100	85-100	60-85	25-40	2-15
	27-49	Clay loam, silty clay loam, silty clay.	CL, CH	A-7	0	0-2	97-100	95-100	90-100	70-100	40-80	20-50
	49-60	Clay loam, silty clay loam, loam.	CL, CH	A-6, A-7	0	0-2	95-100	92-100	80-95	70-95	35-60	15-40
698:												
Doran	0-9	Clay loam	CH, CL	A-6, A-7	0	0	100	100	95-100	65-95	30-60	11-35
	9-19	Clay, clay loam, silty clay.	CH, CL	A-7, A-6	0	0	100	95-100	90-95	70-90	35-75	15-50
	19-32	Clay loam, loam	CL	A-6, A-7	0	0-3	100	90-95	85-90	70-80	30-50	11-30
	32-60	Clay loam, loam	CL	A-6, A-7	0	0-3	95-100	85-95	70-90	50-80	25-50	11-30
701:												
Runeberg	0-10	Mucky loam	ML, CL	A-4, A-6	0-1	2-5	95-100	90-95	80-90	50-80	30-40	5-15
	10-36	Sandy loam	SM, SC, SC-SM	A-2, A-4	0-1	5-10	85-95	80-95	60-75	30-45	15-25	3-10
	36-60	Sandy loam	SM, SC-SM, SC	A-2, A-4	0-1	5-10	85-95	80-95	60-75	30-45	15-25	3-8

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
705B:												
Nitche----------	0-16	Sandy loam-----	SM, SC-SM, CL-ML, ML	A-4, A-2-4	0	0	95-100	85-100	50-90	15-90	15-25	3-9
	16-24	Gravelly sandy loam, sandy loam, loam.	SM, SC-SM, CL-ML, CL	A-1-b, A-4, A-6	0	0-1	55-100	50-100	30-85	10-75	15-30	3-9
	24-33	Loamy sand, loamy coarse sand, gravelly loamy sand.	SP-SM, SM, GP-GM, GM	A-1-b, A-3, A-2-4	0	0-1	50-100	50-100	10-75	5-50	0-20	NP-5
	33-55	Gravelly sand, coarse sand, gravelly loamy sand.	SP-SM, GP-GM, SM, GM	A-1-a, A-1-b, A-3	0	0-1	50-100	50-100	50-55	5-35	0-15	NP
	55-80	Loam, sandy loam, fine sandy loam.	SC-SM, SM, CL-ML, ML	A-4	0-1	0-5	85-100	75-98	65-85	35-55	21-28	4-9
Kandota----------	0-7	Sandy loam-----	SC-SM, SC	A-4, A-6	0	0-5	95-100	75-98	65-85	35-50	21-35	4-11
	7-11	Fine sandy loam, sandy loam, loamy sand.	SM, SC-SM, SC	A-4, A-2-4	0	0-5	95-100	75-98	45-85	20-65	15-28	NP-10
	11-28	Sandy clay loam, loam, fine sandy loam.	SC, CL	A-4, A-6	0	0-10	90-100	75-98	70-85	35-55	28-39	9-18
	28-48	Sandy loam, fine sandy loam, loam.	SC, SC-SM, CL-ML	A-4	0	0-10	85-100	75-98	65-85	35-55	23-28	4-9
	48-80	Sandy loam, fine sandy loam, loam.	SC, SC-SM, CL-ML	A-4	0	0-10	85-100	80-95	65-85	35-55	23-28	5-10

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
705B:												
Lida	0-9	Sandy loam	SC-SM, SM, SC, ML	A-4, A-2-4	0	0-10	85-100	85-100	30-85	15-55	0-28	NP-9
	9-19	Loamy sand, loamy coarse sand, sandy loam.	SM, SP-SM	A-4, A-3, A-2-4	0	0-10	85-100	85-100	30-85	10-55	0-25	NP-7
	19-28	Sandy loam, gravelly sandy loam, gravelly coarse sandy loam.	SM, SC, SC-SM, ML	A-4, A-2-4	0	0-5	85-100	50-85	30-75	15-55	20-28	NP-9
	28-60	Gravelly coarse sand, sand, gravelly sand.	GP, GW, GP-GM, SP	A-3, A-1-b, A-2-4	0	0-5	50-85	50-85	20-60	2-10	---	NP
705C:												
Nitche	0-15	Sandy loam	SM, SC-SM, CL-ML, ML	A-4, A-2-4	0	0	95-100	85-100	50-90	15-90	15-25	3-9
	15-23	Gravelly sandy loam, sandy loam, loam.	SM, SC-SM, CL-ML, CL	A-1-b, A-4, A-6	0	0-1	55-100	50-100	30-85	10-75	15-30	3-9
	23-41	Loamy sand, loamy coarse sand, gravelly loamy sand.	SP-SM, SM, GP-GM, GM	A-1-b, A-3, A-2-4	0	0-1	50-100	50-100	10-75	5-50	0-20	NP-5
	41-60	Loam, sandy loam, fine sandy loam.	SC-SM, SM, CL-ML, ML	A-4	0-1	0-5	85-100	75-98	65-85	35-55	21-28	4-9
Kandota	0-7	Sandy loam	SC-SM, SC	A-4, A-6	0	0-5	95-100	75-98	65-85	35-50	21-35	4-11
	7-13	Fine sandy loam, sandy loam, loamy sand.	SM, SC-SM, SC	A-4, A-2-4	0	0-5	95-100	75-98	45-85	20-65	15-28	NP-10
	13-33	Sandy clay loam, loam, fine sandy loam.	SC, CL	A-4, A-6	0	0-10	90-100	75-98	70-85	35-55	28-39	9-18
	33-47	Sandy loam, fine sandy loam, loam.	SC, SC-SM, CL-ML	A-4	0	0-10	85-100	75-98	65-85	35-55	23-28	4-9
	47-60	Sandy loam, fine sandy loam, loam.	SC, SC-SM, CL-ML	A-4	0	0-10	85-100	80-95	65-85	35-55	23-28	5-10

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
705C:												
Lida----------	0-6	Sandy loam-----	SC-SM, SM, SC, ML	A-4, A-2-4	0	0-10	85-100	85-100	30-85	15-55	0-28	NP-9
	6-17	Loamy sand, loamy coarse sand, sandy loam.	SM, SP-SM	A-4, A-3, A-2-4	0	0-10	85-100	85-100	30-85	10-55	0-25	NP-7
	17-28	Sandy loam, gravelly sandy loam, gravelly coarse sandy loam.	SM, SC, SC-SM, ML	A-4, A-2-4	0	0-5	85-100	50-85	30-75	15-55	20-28	NP-9
	28-60	Gravelly coarse sand, sand, gravelly sand.	GP, GW, GP-GM, SP	A-3, A-1-b, A-2-4	0	0-5	50-85	50-85	20-60	2-10	---	NP
707B:												
Lizzie----------	0-9	Silt loam------	CL-ML, CL	A-4, A-6	0	0	100	97-100	85-100	60-90	28-32	9-13
	9-26	Silt loam, silty clay loam, loam.	CL, ML	A-4, A-6	0	0	100	97-100	80-100	75-95	28-43	9-21
	26-32	Silt loam, loam, fine sandy loam.	CL, CL-ML	A-4, A-6	0	0	100	97-100	85-100	60-90	15-30	NP-11
	32-60	Very fine sandy loam, silt loam, loamy very fine sand.	CL-ML, SM, SC-SM	A-2-4, A-4	0	0	100	97-100	65-95	15-90	15-26	NP-8
707C2:												
Lizzie----------	0-10	Silt loam------	CL-ML, CL	A-4, A-6	0	0	100	97-100	85-100	60-90	28-32	9-13
	10-35	Silt loam, silty clay loam, loam.	CL, ML	A-4, A-6	0	0	100	97-100	80-100	75-95	28-43	9-21
	35-40	Silt loam, loam, fine sandy loam.	CL, CL-ML	A-4, A-6	0	0	100	97-100	85-100	60-90	15-30	NP-11
	40-80	Very fine sandy loam, silt loam, loamy very fine sand.	CL-ML, SM, SC-SM	A-2-4, A-4	0	0	100	97-100	65-95	15-90	15-26	NP-8

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
707D2:												
Lizzie----------	0-8	Silt loam------	CL-ML, CL	A-4, A-6	0	0	100	97-100	85-100	60-90	28-32	9-13
	8-21	Silt loam, silty clay loam, loam.	CL, ML	A-4, A-6	0	0	100	97-100	80-100	75-95	28-43	9-21
	21-35	Silt loam, loam, fine sandy loam.	CL, CL-ML	A-4, A-6	0	0	100	97-100	85-100	60-90	15-30	NP-11
	35-60	Very fine sandy loam, silt loam, loamy very fine sand.	CL-ML, SM, SC-SM	A-2-4, A-4	0	0	100	97-100	65-95	15-90	15-26	NP-8
710:												
Friberg---------	0-19	Loam-----------	CL-ML, CL	A-6, A-4	0-1	0-2	98-100	95-98	85-98	60-85	21-34	4-14
	19-47	Clay loam, sandy clay loam, loam.	CL	A-6, A-4	0-1	0-5	95-100	90-98	70-95	50-80	28-43	9-21
	47-60	Loam, fine sandy loam, sandy loam.	SC, SC-SM, CL-ML	A-4, A-6	0-1	1-5	95-100	80-95	50-80	35-65	21-32	4-13
Weetown---------	0-9	Fine sandy loam	SC-SM, SC	A-4, A-2	0-1	0-5	95-100	85-95	50-80	30-50	21-30	4-11
	9-31	Fine sandy loam, sandy loam, loam.	SC-SM, SC, CL-ML	A-4, A-6	0-1	0-5	95-100	85-95	50-85	35-65	21-32	4-13
	31-51	Sandy clay loam, fine sandy loam, loam.	CL	A-4, A-6	0-1	0-5	95-100	85-95	55-85	55-70	28-37	9-16
	51-60	Sandy loam, fine sandy loam, loam.	SC-SM, SC, CL-ML	A-4	0-1	0-5	95-100	85-95	50-85	35-65	21-28	4-9
711B:												
Arvilla---------	0-13	Sandy loam-----	SM, SC, SC-SM	A-2, A-4, A-6	0	0	95-100	90-100	50-80	20-45	15-30	NP-15
	13-19	Sandy loam, loam, coarse sandy loam.	SM, SC, SC-SM	A-2, A-4, A-6	0	0	90-100	85-100	50-80	20-45	15-40	NP-15
	19-60	Gravelly coarse sand, coarse sand, very gravelly coarse sand.	SP-SM, GM, SP, GP-GM	A-1, A-2, A-3	0	0	35-100	25-100	10-60	0-15	---	NP

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
711B:												
Sandberg--------	0-12	Coarse sandy loam.	SM	A-2	0-3	0-5	85-100	50-95	50-65	25-35	15-20	NP-7
	12-20	Gravelly loamy coarse sand, gravelly coarse sand, loamy sand.	SP-SM, SM	A-1, A-2, A-3	0-3	0-5	75-95	50-95	35-70	5-25	---	NP-4
	20-32	Gravelly coarse sand, coarse sand, sand.	SP, SP-SM	A-1, A-3, A-2	0-3	0-5	60-95	50-95	30-65	2-10	---	NP
	32-60	Gravelly coarse sand, coarse sand, sand.	SP, SP-SM	A-1, A-3, A-2	0-3	0-5	60-95	50-95	30-65	2-10	---	NP
711C:												
Arvilla---------	0-8	Sandy loam-----	SM, SC, SC-SM	A-2, A-4, A-6	0	0	95-100	90-100	50-80	20-45	15-30	NP-15
	8-15	Sandy loam, loam, coarse sandy loam.	SM, SC, SC-SM	A-2, A-4, A-6	0	0	90-100	85-100	50-80	20-45	15-40	NP-15
	15-60	Gravelly coarse sand, coarse sand, very gravelly coarse sand.	SP-SM, GM, SP, GP-GM	A-1, A-2, A-3	0	0	35-100	25-100	10-60	0-15	---	NP
Sandberg--------	0-7	Coarse sandy loam.	SM	A-2	0-3	0-5	85-100	50-95	50-65	25-35	15-20	NP-7
	7-14	Gravelly loamy coarse sand, gravelly coarse sand, loamy sand.	SP-SM, SM	A-1, A-2, A-3	0-3	0-5	75-95	50-95	35-70	5-25	---	NP-4
	14-60	Gravelly coarse sand, coarse sand, sand.	SP, SP-SM	A-1, A-3, A-2	0-3	0-5	60-95	50-95	30-65	2-10	---	NP

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
715:												
Bluffcreek------	0-8	Sandy loam-----	SM, SC-SM	A-4, A-2-4, A-1-b	0	0-1	95-100	75-100	40-85	25-45	15-25	2-10
	8-26	Loamy sand, sand, loamy coarse sand.	SM, SP-SM	A-3, A-1-b, A-2-4	0	0-1	90-100	75-100	35-75	10-35	0-20	NP-5
	26-42	Sandy loam, coarse sandy loam, gravelly sandy loam.	SM, SC-SM, SC, CL	A-2-4, A-4, A-1-b	0	0	60-95	50-95	30-80	25-70	20-30	3-12
	42-80	Gravelly coarse sand, coarse sand, sand.	SP, SP-SM, SW, GP	A-2, A-3, A-1-b	0	0	50-95	50-95	20-55	2-15	---	NP
Clearriver------	0-9	Loamy coarse sand.	SM, SP-SM	A-2	0	0	95-100	85-100	40-90	10-35	15-25	NP-10
	9-48	Sand, loamy sand.	SP-SM, SM	A-2, A-3	0	0	95-100	85-100	55-80	5-20	---	NP
	48-60	Stratified fine sand to gravelly coarse sand.	SP-SM, SP	A-2, A-3, A-1	0	0-2	75-100	65-85	40-65	0-10	---	NP
716B:												
Leaflake--------	0-8	Loamy sand-----	SM	A-2-4, A-1-b	0	0	100	93-100	45-70	20-35	---	NP
	8-26	Sand, fine sand, loamy sand.	SP-SM, SM	A-2-4	0	0	100	93-100	65-90	10-20	---	NP
	26-51	Sandy loam, loam, sandy clay loam.	SC, CL	A-4, A-6	0	0-10	90-100	75-98	70-85	35-55	25-37	7-16
	51-60	Sandy loam, loam.	SC-SM, SC, CL-ML	A-4	0	0-10	85-100	75-98	65-85	35-55	21-28	4-9
Eagleview-------	0-9	Loamy sand-----	SP-SM, SM	A-2, A-1	0	0	100	85-100	60-80	10-25	---	NP
	9-36	Loamy sand, loamy coarse sand, sand.	SP-SM, SM, SP	A-3, A-2, A-1	0	0	100	85-100	50-75	2-15	---	NP
	36-54	Sand, coarse sand, loamy sand.	SP, SP-SM, SM	A-3, A-2, A-1	0	0	100	85-100	50-75	2-15	---	NP
	54-60	Sand, coarse sand.	SP, SP-SM	A-3, A-2, A-1	0	0	100	85-100	40-75	2-10	---	NP

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
716C:												
Leaflake--------	0-3	Loamy sand-----	SM	A-2-4, A-1-b	0	0	100	93-100	45-70	20-35	---	NP
	3-34	Sand, fine sand, loamy sand.	SP-SM, SM	A-2-4	0	0	100	93-100	65-90	10-20	---	NP
	34-71	Sandy loam, loam, sandy clay loam.	SC, CL	A-4, A-6	0	0-10	90-100	75-98	70-85	35-55	25-37	7-16
	71-80	Sandy loam, loam.	SC-SM, SC, CL-ML	A-4	0	0-10	85-100	75-98	65-85	35-55	21-28	4-9
Eagleview-------	0-3	Loamy sand-----	SP-SM, SM	A-2, A-1	0	0	100	85-100	60-80	10-25	---	NP
	3-46	Loamy sand, loamy coarse sand, sand.	SP-SM, SM, SP	A-3, A-2, A-1	0	0	100	85-100	50-75	2-15	---	NP
	46-78	Sand, coarse sand, loamy sand.	SP, SP-SM, SM	A-3, A-2, A-1	0	0	100	85-100	50-75	2-15	---	NP
	78-80	Sand, coarse sand.	SP, SP-SM	A-3, A-2, A-1	0	0	100	85-100	40-75	2-10	---	NP
716D:												
Leaflake--------	0-6	Loamy sand-----	SM	A-2-4, A-1-b	0	0	100	93-100	45-70	20-35	---	NP
	6-23	Sand, fine sand, loamy sand.	SP-SM, SM	A-2-4	0	0	100	93-100	65-90	10-20	---	NP
	23-39	Sandy loam, loam, sandy clay loam.	SC, CL	A-4, A-6	0	0-10	90-100	75-98	70-85	35-55	25-37	7-16
	39-60	Sandy loam, loam.	SC-SM, SC, CL-ML	A-4	0	0-10	85-100	75-98	65-85	35-55	21-28	4-9
Eagleview-------	0-3	Loamy sand-----	SP-SM, SM	A-2, A-1	0	0	100	85-100	60-80	10-25	---	NP
	3-42	Loamy sand, loamy coarse sand, sand.	SP-SM, SM, SP	A-3, A-2, A-1	0	0	100	85-100	50-75	2-15	---	NP
	42-60	Sand, coarse sand, loamy sand.	SP, SP-SM, SM	A-3, A-2, A-1	0	0	100	85-100	50-75	2-15	---	NP

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
718E:												
Naytahwaush-----	0-5	Loam----------	CL, ML	A-6	0	0-5	95-100	90-100	75-90	60-90	30-40	10-15
	5-10	Loam, silt loam, fine sandy loam.	CL, ML	A-4, A-6	0	0-5	95-100	90-100	65-90	50-80	25-40	5-20
	10-31	Clay, silty clay, clay loam.	CL, CH	A-7	0	0-5	95-100	90-100	75-95	70-90	45-65	25-40
	31-60	Clay loam, silty clay loam, loam.	CL	A-6, A-7	0	0-5	95-100	90-100	75-95	60-90	35-50	15-25
721B:												
Corliss---------	0-8	Loamy sand-----	SM, SP-SM	A-1-b, A-2-4	0	0-5	85-100	80-100	40-70	10-25	15-21	NP-4
	8-19	Loamy sand, gravelly sand, coarse sand.	SP-SM, SM, SP	A-1-b, A-2-4, A-3	0	0-5	75-95	50-85	35-70	2-25	15-21	NP-4
	19-60	Coarse sand, sand, gravelly coarse sand.	SP, SP-SM	A-1-b, A-3	0	0-5	60-95	50-85	30-65	2-10	---	NP
721C:												
Corliss---------	0-7	Loamy sand-----	SM, SP-SM	A-1-b, A-2-4	0	0-5	85-100	80-100	40-70	10-25	15-21	NP-4
	7-28	Loamy sand, gravelly sand, coarse sand.	SP-SM, SM, SP	A-1-b, A-2-4, A-3	0	0-5	75-95	50-85	35-70	2-25	15-21	NP-4
	28-80	Coarse sand, sand, gravelly coarse sand.	SP, SP-SM	A-1-b, A-3	0	0-5	60-95	50-85	30-65	2-10	---	NP
721D:												
Corliss---------	0-6	Loamy sand-----	SM, SP-SM	A-1-b, A-2-4	0	0-5	85-100	80-100	40-70	10-25	15-21	NP-4
	6-20	Loamy sand, gravelly sand, coarse sand.	SP-SM, SM, SP	A-1-b, A-2-4, A-3	0	0-5	75-95	50-85	35-70	2-25	15-21	NP-4
	20-60	Coarse sand, sand, gravelly coarse sand.	SP, SP-SM	A-1-b, A-3	0	0-5	60-95	50-85	30-65	2-10	---	NP

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
721E:												
Corliss	0-2	Loamy sand	SM, SP-SM	A-1-b, A-2-4	0	0-5	85-100	80-100	40-70	10-25	15-21	NP-4
	2-22	Loamy sand, gravelly sand, coarse sand.	SP-SM, SM, SP	A-1-b, A-2-4, A-3	0	0-5	75-95	50-85	35-70	2-25	15-21	NP-4
	22-60	Coarse sand, sand, gravelly coarse sand.	SP, SP-SM	A-1-b, A-3	0	0-5	60-95	50-85	30-65	2-10	---	NP
726:												
Kratka	0-8	Fine sandy loam	SM, SC-SM	A-4	0	0	95-100	90-100	50-80	36-50	0-25	NP-7
	8-33	Loamy sand, loamy fine sand, sand.	SP-SM	A-3, A-2	0	0	95-100	90-100	50-80	5-10	0-20	NP-4
	33-60	Loam, clay loam, sandy loam.	SC-SM, SC, CL-ML, CL	A-4, A-6	0	0-3	95-100	85-96	70-90	40-60	21-43	4-21
746:												
Haslie	0-21	Muck	PT	A-8	0	0	0	0	0	0	---	NP
	21-24	Sapric material, muck.	PT	A-8	0	0	0	0	0	0	---	NP
	24-60	Coprogenous earth, mucky silt loam.	OL	A-5	0	0	100	95-100	85-100	75-96	41-50	2-10
760C2:												
Chapett	0-7	Loam	ML, CL, CL-ML	A-4, A-6	0-1	0-5	95-100	85-95	55-85	50-70	15-30	3-15
	7-19	Sandy clay loam, sandy loam, loam.	ML, CL	A-4, A-6	0-1	0-5	95-100	85-95	55-85	55-70	20-40	8-20
	19-27	Fine sandy loam, loam, sandy loam.	SC, ML, CL, SM	A-4, A-6	0-1	0-5	95-100	85-95	50-85	35-65	15-30	3-12
	27-60	Fine sandy loam, loam, sandy loam.	SC, ML, CL, SM	A-4, A-6	0-1	0-5	95-100	85-95	50-85	35-65	15-30	3-12
Sisseton	0-7	Loam	ML, CL	A-4, A-6	0	0-5	95-100	90-100	90-100	60-75	30-40	5-15
	7-22	Loam, silt loam	ML, CL, CL-ML	A-4, A-6	0	0-5	90-100	85-100	75-100	60-90	20-40	3-15
	22-60	Stratified silt loam to sandy loam.	ML, CL, CL-ML	A-4, A-6	0	0-5	90-100	85-100	70-95	50-75	20-35	NP-15

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
760D2:												
Chapett	0-7	Loam	ML, CL, CL-ML	A-4, A-6	0-1	0-5	95-100	85-95	55-85	50-70	15-30	3-15
	7-15	Sandy clay loam, sandy loam, loam.	ML, CL	A-4, A-6	0-1	0-5	95-100	85-95	55-85	55-70	20-40	8-20
	15-23	Fine sandy loam, loam, sandy loam.	SC, ML, CL, SM	A-4, A-6	0-1	0-5	95-100	85-95	50-85	35-65	15-30	3-12
	23-60	Fine sandy loam, loam, sandy loam.	SC, ML, CL, SM	A-4, A-6	0-1	0-5	95-100	85-95	50-85	35-65	15-30	3-12
Sisseton	0-8	Loam	ML, CL	A-4, A-6	0	0-5	95-100	90-100	90-100	60-75	30-40	5-15
	8-16	Loam, silt loam	ML, CL, CL-ML	A-4, A-6	0	0-5	90-100	85-100	75-100	60-90	20-40	3-15
	16-60	Stratified silt loam to sandy loam.	ML, CL, CL-ML	A-4, A-6	0	0-5	90-100	85-100	70-95	50-75	20-35	NP-15
769B:												
Mehurin	0-13	Clay loam	CL	A-6, A-7	0	0-4	95-100	90-98	50-90	50-80	35-40	15-20
	13-26	Clay loam, silty clay, clay.	CL, CH, MH	A-7	0	0-4	95-100	90-98	50-90	50-90	45-65	20-40
	26-34	Clay loam, loam	CL	A-6, A-7	0	0-4	95-100	90-98	45-90	45-80	30-45	10-20
	34-60	Clay loam, loam	CL	A-6, A-7	0	0-4	95-100	90-98	45-90	45-80	30-45	10-20
776B:												
Snellman	0-3	Sandy loam	SM, SC-SM	A-4	0	0-10	90-100	80-95	65-80	40-50	25-30	2-5
	3-12	Loamy sand, sandy loam, fine sandy loam.	SM, SC-SM	A-4, A-2	0	0-10	88-100	80-95	65-80	30-50	15-20	NP-5
	12-32	Sandy clay loam, sandy loam, clay loam.	SC, CL	A-6	0	0-10	90-100	80-95	70-80	35-50	25-40	10-20
	32-60	Sandy loam, fine sandy loam.	SC-SM, SC	A-4	0	0-10	85-95	80-95	65-80	35-50	15-25	5-10

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
776B:												
Sugarbush-------	0-3	Sandy loam-----	SM	A-2-4	0-1	0-10	95-100	90-100	55-70	25-35	15-20	NP-4
	3-17	Loamy sand, loamy coarse sand.	SM, SP-SM	A-1-b, A-2-4	0-1	0-10	95-100	90-100	40-70	10-25	---	NP
	17-28	Sandy loam, coarse sandy loam.	SM	A-2-4	0-1	0-10	95-100	90-100	50-70	25-35	15-20	NP-4
	28-60	Gravelly coarse sand, gravelly sand.	SP, SP-SM	A-1-b, A-2-4, A-3	0-1	0-10	55-85	50-75	30-55	2-10	---	NP
776C:												
Snellman--------	0-2	Sandy loam-----	SM, SC-SM	A-4	0	0-10	90-100	80-95	65-80	40-50	25-30	2-5
	2-16	Loamy sand, sandy loam, fine sandy loam.	SM, SC-SM	A-4, A-2	0	0-10	88-100	80-95	65-80	30-50	15-20	NP-5
	16-32	Sandy clay loam, sandy loam, clay loam.	SC, CL	A-6	0	0-10	90-100	80-95	70-80	35-50	25-40	10-20
	32-60	Sandy loam, fine sandy loam.	SC-SM, SC	A-4	0	0-10	85-95	80-95	65-80	35-50	15-25	5-10
Sugarbush-------	0-2	Sandy loam-----	SM	A-2-4	0-1	0-10	95-100	90-100	55-70	25-35	15-20	NP-4
	2-14	Loamy sand, loamy coarse sand.	SM, SP-SM	A-1-b, A-2-4	0-1	0-10	95-100	90-100	40-70	10-25	---	NP
	14-21	Sandy loam, coarse sandy loam.	SM	A-2-4	0-1	0-10	95-100	90-100	50-70	25-35	15-20	NP-4
	21-60	Gravelly coarse sand, gravelly sand.	SP, SP-SM	A-1-b, A-2-4, A-3	0-1	0-10	55-85	50-75	30-55	2-10	---	NP

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
776E:												
Snellman--------	0-3	Sandy loam-----	SM, SC-SM	A-4	0	0-10	90-100	80-95	65-80	40-50	25-30	2-5
	3-14	Loamy sand, sandy loam, fine sandy loam.	SM, SC-SM	A-4, A-2	0	0-10	88-100	80-95	65-80	30-50	15-20	NP-5
	14-26	Sandy clay loam, sandy loam, clay loam.	SC, CL	A-6	0	0-10	90-100	80-95	70-80	35-50	25-40	10-20
	26-60	Sandy loam, fine sandy loam.	SC-SM, SC	A-4	0	0-10	85-95	80-95	65-80	35-50	15-25	5-10
Sugarbush-------	0-2	Sandy loam-----	SM	A-2-4	0-1	0-10	95-100	90-100	55-70	25-35	15-20	NP-4
	2-10	Loamy sand, loamy coarse sand.	SM, SP-SM	A-1-b, A-2-4	0-1	0-10	95-100	90-100	40-70	10-25	---	NP
	10-19	Sandy loam, coarse sandy loam.	SM	A-2-4	0-1	0-10	95-100	90-100	50-70	25-35	15-20	NP-4
	19-60	Gravelly coarse sand, gravelly sand.	SP, SP-SM	A-1-b, A-2-4, A-3	0-1	0-10	55-85	50-75	30-55	2-10	---	NP
777C2:												
Sisseton--------	0-9	Loam-----------	ML, CL	A-4, A-6	0	0-5	95-100	90-100	90-100	60-75	30-40	5-15
	9-19	Loam, silt loam	ML, CL, CL-ML	A-4, A-6	0	0-5	90-100	85-100	75-100	60-90	20-40	3-15
	19-60	Stratified silt loam to sandy loam.	ML, CL, CL-ML	A-4, A-6	0	0-5	90-100	85-100	70-95	50-75	20-35	NP-15
Heimdal---------	0-7	Loam-----------	ML, CL, CL-ML	A-4, A-6	0-1	0-1	95-100	85-95	55-85	50-70	20-35	3-15
	7-17	Loam, fine sandy loam, sandy loam.	SM, SC, ML, CL	A-4, A-6	0-1	0-1	95-100	85-95	50-80	35-65	15-30	3-15
	17-34	Fine sandy loam, loam, sandy loam.	SM, SC, ML, CL	A-4, A-6	0-1	0-1	95-100	85-95	50-80	35-65	15-30	2-12
	34-60	Fine sandy loam, loam, sandy loam.	SM, SC, ML, CL	A-4, A-6	0-1	0-3	95-100	85-95	50-80	35-65	15-30	2-12

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
777D2:												
Sisseton--------	0-8	Loam----------	ML, CL	A-4, A-6	0	0-5	95-100	90-100	90-100	60-75	30-40	5-15
	8-16	Loam, silt loam	ML, CL, CL-ML	A-4, A-6	0	0-5	90-100	85-100	75-100	60-90	20-40	3-15
	16-60	Stratified silt loam to sandy loam.	ML, CL, CL-ML	A-4, A-6	0	0-5	90-100	85-100	70-95	50-75	20-35	NP-15
Heimdal---------	0-8	Loam----------	ML, CL, CL-ML	A-4, A-6	0-1	0-1	95-100	85-95	55-85	50-70	20-35	3-15
	8-12	Loam, fine sandy loam, sandy loam.	SM, SC, ML, CL	A-4, A-6	0-1	0-1	95-100	85-95	50-80	35-65	15-30	3-15
	12-25	Fine sandy loam, loam, sandy loam.	SM, SC, ML, CL	A-4, A-6	0-1	0-1	95-100	85-95	50-80	35-65	15-30	2-12
	25-60	Fine sandy loam, loam, sandy loam.	SM, SC, ML, CL	A-4, A-6	0-1	0-3	95-100	85-95	50-80	35-65	15-30	2-12
777E:												
Sisseton--------	0-3	Loam----------	ML, CL	A-4, A-6	0	0-5	95-100	90-100	90-100	60-75	30-40	5-15
	3-12	Loam, silt loam	ML, CL, CL-ML	A-4, A-6	0	0-5	90-100	85-100	75-100	60-90	20-40	3-15
	12-60	Stratified silt loam to sandy loam.	ML, CL, CL-ML	A-4, A-6	0	0-5	90-100	85-100	70-95	50-75	20-35	NP-15
Heimdal---------	0-8	Loam----------	ML, CL, CL-ML	A-4, A-6	0-1	0-1	95-100	85-95	55-85	50-70	20-35	3-15
	8-12	Loam, fine sandy loam, sandy loam.	SM, SC, ML, CL	A-4, A-6	0-1	0-1	95-100	85-95	50-80	35-65	15-30	3-15
	12-19	Fine sandy loam, loam, sandy loam.	SM, SC, ML, CL	A-4, A-6	0-1	0-1	95-100	85-95	50-80	35-65	15-30	2-12
	19-60	Fine sandy loam, loam, sandy loam.	SM, SC, ML, CL	A-4, A-6	0-1	0-3	95-100	85-95	50-80	35-65	15-30	2-12

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
778B:												
Dorset----------	0-10	Sandy loam-----	SM, SC-SM	A-4, A-2	0	0	90-100	85-100	50-70	25-50	0-25	NP-5
	10-20	Loam, sandy loam, coarse sandy loam.	SC-SM, SC, CL-ML, CL	A-4, A-6	0	0	90-100	85-100	50-90	35-75	15-30	4-14
	20-38	Gravelly loamy sand, gravelly loamy coarse sand, gravelly coarse sand.	SP-SM, SM, SC-SM, GM	A-1, A-2	0	0-5	50-90	35-75	20-50	10-25	0-20	NP-7
	38-60	Gravelly coarse sand, gravelly sand.	SP, SP-SM, GP, GP-GM	A-1	0	0-5	50-90	35-75	15-40	0-10	0-20	NP
Corliss---------	0-7	Loamy coarse sand.	SM, SP-SM	A-1-b, A-2-4	0	0-5	85-100	80-100	40-70	10-25	15-21	NP-4
	7-16	Loamy sand, gravelly sand, coarse sand.	SP-SM, SM, SP	A-1-b, A-2-4, A-3	0	0-5	75-95	50-85	35-70	2-25	15-21	NP-4
	16-60	Coarse sand, sand, gravelly coarse sand.	SP, SP-SM	A-1-b, A-3	0	0-5	60-95	50-85	30-65	2-10	---	NP
778C:												
Dorset----------	0-9	Sandy loam-----	SM, SC-SM	A-4, A-2	0	0	90-100	85-100	50-70	25-50	0-25	NP-5
	9-16	Loam, sandy loam, coarse sandy loam.	SC-SM, SC, CL-ML, CL	A-4, A-6	0	0	90-100	85-100	50-90	35-75	15-30	4-14
	16-43	Gravelly loamy sand, gravelly loamy coarse sand, gravelly coarse sand.	SP-SM, SM, SC-SM, GM	A-1, A-2	0	0-5	50-90	35-75	20-50	10-25	0-20	NP-7
	43-60	Gravelly coarse sand, gravelly sand.	SP, SP-SM, GP, GP-GM	A-1	0	0-5	50-90	35-75	15-40	0-10	0-20	NP
Corliss---------	0-7	Loamy coarse sand.	SM, SP-SM	A-1-b, A-2-4	0	0-5	85-100	80-100	40-70	10-25	15-21	NP-4
	7-11	Loamy sand, gravelly sand, coarse sand.	SP-SM, SM, SP	A-1-b, A-2-4, A-3	0	0-5	75-95	50-85	35-70	2-25	15-21	NP-4
	11-60	Coarse sand, sand, gravelly coarse sand.	SP, SP-SM	A-1-b, A-3	0	0-5	60-95	50-85	30-65	2-10	---	NP

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
779B:												
Peever	0-11	Clay loam	CL	A-6, A-7	0	0	100	95-100	90-100	65-90	35-50	12-25
	11-29	Clay, silty clay, clay loam.	CL, CH, MH, ML	A-7	0	0	100	95-100	85-100	70-85	40-65	15-30
	29-60	Clay loam, clay	CL, CH, MH, ML	A-7	0	0-5	95-100	90-100	85-100	70-85	40-65	15-30
Mehurin	0-13	Clay loam	CL	A-6, A-7	0	0-4	95-100	90-98	50-90	50-80	35-40	15-20
	13-35	Clay loam, silty clay, clay.	CL, CH, MH	A-7	0	0-4	95-100	90-98	50-90	50-90	45-65	20-40
	35-48	Clay loam, loam	CL	A-6, A-7	0	0-4	95-100	90-98	45-90	45-80	30-45	10-20
	48-60	Clay loam, loam	CL	A-6, A-7	0	0-4	95-100	90-98	45-90	45-80	30-45	10-20
902B:												
Barnes	0-9	Loam	CL, CL-ML	A-4, A-6	0	0-5	90-100	85-100	80-100	50-90	20-40	5-20
	9-17	Loam, sandy clay loam.	CL, CL-ML, SC, SC-SM	A-4, A-6	0	0-5	90-100	85-100	75-95	35-80	25-40	5-20
	17-60	Loam	CL, CL-ML	A-4, A-6	0	0-5	90-100	85-100	75-95	55-80	25-40	5-20
Buse	0-8	Loam	ML, CL, CL-ML	A-4, A-6	0	0	90-100	85-95	70-90	55-80	20-40	3-15
	8-40	Loam	CL, CL-ML	A-4, A-6	0	0	90-100	85-95	70-90	60-80	25-40	5-15
	40-60	Loam	CL, CL-ML	A-4, A-6	0	0	90-100	85-95	70-90	60-80	25-40	5-15
903C2:												
Barnes	0-10	Loam	CL, CL-ML	A-4, A-6	0	0-5	90-100	85-100	80-100	50-90	20-40	5-20
	10-16	Loam, sandy clay loam.	CL, CL-ML, SC, SC-SM	A-4, A-6	0	0-5	90-100	85-100	75-95	35-80	25-40	5-20
	16-60	Loam	CL, CL-ML	A-4, A-6	0	0-5	90-100	85-100	75-95	55-80	25-40	5-20
Langhei	0-7	Loam	CL-ML, CL	A-4, A-6	0	0-3	95-100	90-100	75-90	55-80	20-40	5-20
	7-30	Loam, clay loam	CL, CL-ML	A-4, A-6	0	0-3	95-100	90-100	75-90	60-80	20-40	5-25
	30-60	Loam, clay loam	CL, CL-ML	A-4, A-6	0	0-3	95-100	90-100	75-90	60-80	20-40	5-25
915C2:												
Forman	0-8	Clay loam	CL	A-6, A-7	0	0-5	95-100	90-100	85-100	70-80	30-45	10-25
	8-23	Clay loam	CL, CL-ML	A-4, A-6, A-7	0	0-5	95-100	90-100	80-95	60-80	25-45	5-20
	23-60	Loam, clay loam	CL, CL-ML	A-4, A-6, A-7	0	0-5	95-100	90-100	80-95	60-80	25-45	5-20
Buse	0-7	Loam	ML, CL, CL-ML	A-4, A-6	0	0	90-100	85-95	70-90	55-80	20-40	3-15
	7-30	Loam	CL, CL-ML	A-4, A-6	0	0	90-100	85-95	70-90	60-80	25-40	5-15
	30-60	Loam	CL, CL-ML	A-4, A-6	0	0	90-100	85-95	70-90	60-80	25-40	5-15

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
915D2:												
Forman	0-9	Clay loam	CL	A-6, A-7	0	0-5	95-100	90-100	85-100	70-80	30-45	10-25
	9-23	Clay loam	CL, CL-ML	A-4, A-6, A-7	0	0-5	95-100	90-100	80-95	60-80	25-45	5-20
	23-60	Loam, clay loam	CL, CL-ML	A-4, A-6, A-7	0	0-5	95-100	90-100	80-95	60-80	25-45	5-20
Buse	0-9	Loam	ML, CL, CL-ML	A-4, A-6	0	0	90-100	85-95	70-90	55-80	20-40	3-15
	9-16	Loam	CL, CL-ML	A-4, A-6	0	0	90-100	85-95	70-90	60-80	25-40	5-15
	16-60	Loam	CL, CL-ML	A-4, A-6	0	0	90-100	85-95	70-90	60-80	25-40	5-15
931C2:												
Formdale	0-8	Clay loam	CL	A-7, A-6	0	0-3	95-100	90-100	85-100	75-90	35-50	15-30
	8-18	Clay loam, loam	CL	A-7, A-6	0	0-3	95-100	90-100	85-95	70-80	35-50	15-30
	18-39	Clay loam, silty clay loam, loam.	CL	A-7, A-6	0	0-3	95-100	90-100	85-95	70-80	35-50	15-30
	39-60	Clay loam, silty clay loam, loam.	CL	A-7, A-6	0	0-3	95-100	90-100	85-95	70-80	35-50	15-30
Langhei	0-7	Clay loam	CL, ML	A-7, A-6	0	0	95-100	90-100	75-95	70-80	35-45	10-20
	7-16	Clay loam, silty clay loam.	CL, ML	A-7, A-6	0	0	95-100	90-100	75-95	70-80	35-45	10-20
	16-60	Clay loam, silty clay loam.	CL, ML	A-7, A-6	0	0	95-100	90-100	75-95	70-80	35-45	10-20
931D2:												
Formdale	0-8	Clay loam	CL	A-7, A-6	0	0-3	95-100	90-100	85-100	75-90	35-50	15-30
	8-12	Clay loam, loam	CL	A-7, A-6	0	0-3	95-100	90-100	85-95	70-80	35-50	15-30
	12-26	Clay loam, silty clay loam, loam.	CL	A-7, A-6	0	0-3	95-100	90-100	85-95	70-80	35-50	15-30
	26-60	Clay loam, silty clay loam, loam.	CL	A-7, A-6	0	0-3	95-100	90-100	85-95	70-80	35-50	15-30
Langhei	0-5	Clay loam	CL, ML	A-7, A-6	0	0	95-100	90-100	75-95	70-80	35-45	10-20
	5-21	Clay loam, silty clay loam.	CL, ML	A-7, A-6	0	0	95-100	90-100	75-95	70-80	35-45	10-20
	21-60	Clay loam, silty clay loam.	CL, ML	A-7, A-6	0	0	95-100	90-100	75-95	70-80	35-45	10-20

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
942D2:												
Langhei---	0-7	Loam---	CL-ML, CL	A-4, A-6	0	0-3	95-100	90-100	75-90	55-80	20-40	5-20
	7-13	Loam, clay loam	CL, CL-ML	A-4, A-6	0	0-3	95-100	90-100	75-90	60-80	20-40	5-25
	13-60	Loam, clay loam	CL, CL-ML	A-4, A-6	0	0-3	95-100	90-100	75-90	60-80	20-40	5-25
Barnes---	0-7	Loam---	CL, CL-ML	A-4, A-6	0	0-5	90-100	85-100	80-100	50-90	20-40	5-20
	7-14	Loam, sandy clay loam.	CL, CL-ML, SC, SC-SM	A-4, A-6	0	0-5	90-100	85-100	75-95	35-80	25-40	5-20
	14-60	Loam---	CL, CL-ML	A-4, A-6	0	0-5	90-100	85-100	75-95	55-80	25-40	5-20
957B2:												
Rothsay---	0-15	Silt loam---	ML	A-4	0	0	95-100	95-100	90-100	85-100	20-40	NP-10
	15-27	Silt loam, very fine sandy loam, loam.	ML	A-4	0	0	95-100	95-100	90-100	80-100	20-40	NP-10
	27-33	Silt loam, loam, very fine sandy loam.	ML	A-4	0	0	95-100	95-100	90-100	80-90	10-28	NP-10
	33-60	Silt loam, loam, very fine sandy loam.	ML	A-4	0	0	95-100	95-100	90-100	80-90	10-28	NP-10
Zell---	0-9	Silt loam---	CL, ML	A-4, A-6	0	0	100	95-100	90-100	80-100	30-40	5-15
	9-18	Silt loam, very fine sandy loam, loam.	CL, CL-ML	A-4, A-6	0	0	100	95-100	85-100	70-100	25-40	5-15
	18-60	Silt loam, very fine sandy loam, loam.	ML, CL-ML	A-4	0	0	100	95-100	85-100	60-100	15-25	NP-7
969C2:												
Zell---	0-8	Silt loam---	CL, ML	A-4, A-6	0	0	100	95-100	90-100	80-100	30-40	5-15
	8-31	Silt loam, very fine sandy loam, loam.	CL, CL-ML	A-4, A-6	0	0	100	95-100	85-100	70-100	25-40	5-15
	31-60	Silt loam, very fine sandy loam, loam.	ML, CL-ML	A-4	0	0	100	95-100	85-100	60-100	15-25	NP-7

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
969C2:												
Rothsay	0-9	Silt loam	ML	A-4	0	0	95-100	95-100	90-100	85-100	20-40	NP-10
	9-17	Silt loam, very fine sandy loam, loam.	ML	A-4	0	0	95-100	95-100	90-100	80-100	20-40	NP-10
	17-28	Silt loam, loam, very fine sandy loam.	ML	A-4	0	0	95-100	95-100	90-100	80-90	10-28	NP-10
	28-60	Silt loam, loam, very fine sandy loam.	ML	A-4	0	0	95-100	95-100	90-100	80-90	10-28	NP-10
969D2:												
Zell	0-8	Silt loam	CL, ML	A-4, A-6	0	0	100	95-100	90-100	80-100	30-40	5-15
	8-13	Silt loam, very fine sandy loam, loam.	CL, CL-ML	A-4, A-6	0	0	100	95-100	85-100	70-100	25-40	5-15
	13-60	Silt loam, very fine sandy loam, loam.	ML, CL-ML	A-4	0	0	100	95-100	85-100	60-100	15-25	NP-7
Rothsay	0-6	Silt loam	ML	A-4	0	0	95-100	95-100	90-100	85-100	20-40	NP-10
	6-12	Silt loam, very fine sandy loam, loam.	ML	A-4	0	0	95-100	95-100	90-100	80-100	20-40	NP-10
	12-32	Silt loam, loam, very fine sandy loam.	ML	A-4	0	0	95-100	95-100	90-100	80-90	10-28	NP-10
	32-60	Silt loam, loam, very fine sandy loam.	ML	A-4	0	0	95-100	95-100	90-100	80-90	10-28	NP-10
1015:												
Udipsamments	0-14	Sand	SM, SP-SM	A-2	0	0	95-100	85-100	75-90	10-35	---	NP
	14-60	Sand, fine sand	SP-SM, SP	A-2, A-3	0	0	95-100	85-100	50-75	5-25	---	NP
	60-80	Coarse sand, gravelly coarse sand.	SP, SP-SM, GP-GM	A-1, A-2	0	0	75-100	65-85	40-65	1-10	---	NP

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
969C2:												
Rothsay---------	0-9	Silt loam------	ML	A-4	0	0	95-100	95-100	90-100	85-100	20-40	NP-10
	9-17	Silt loam, very fine sandy loam, loam.	ML	A-4	0	0	95-100	95-100	90-100	80-100	20-40	NP-10
	17-28	Silt loam, loam, very fine sandy loam.	ML	A-4	0	0	95-100	95-100	90-100	80-90	10-28	NP-10
	28-60	Silt loam, loam, very fine sandy loam.	ML	A-4	0	0	95-100	95-100	90-100	80-90	10-28	NP-10
969D2:												
Zell------------	0-8	Silt loam------	CL, ML	A-4, A-6	0	0	100	95-100	90-100	80-100	30-40	5-15
	8-13	Silt loam, very fine sandy loam, loam.	CL, CL-ML	A-4, A-6	0	0	100	95-100	85-100	70-100	25-40	5-15
	13-60	Silt loam, very fine sandy loam, loam.	ML, CL-ML	A-4	0	0	100	95-100	85-100	60-100	15-25	NP-7
Rothsay---------	0-6	Silt loam------	ML	A-4	0	0	95-100	95-100	90-100	85-100	20-40	NP-10
	6-12	Silt loam, very fine sandy loam, loam.	ML	A-4	0	0	95-100	95-100	90-100	80-100	20-40	NP-10
	12-32	Silt loam, loam, very fine sandy loam.	ML	A-4	0	0	95-100	95-100	90-100	80-90	10-28	NP-10
	32-60	Silt loam, loam, very fine sandy loam.	ML	A-4	0	0	95-100	95-100	90-100	80-90	10-28	NP-10
1015:												
Udipsamments----	0-14	Sand-----------	SM, SP-SM	A-2	0	0	95-100	85-100	75-90	10-35	---	NP
	14-60	Sand, fine sand	SP-SM, SP	A-2, A-3	0	0	95-100	85-100	50-75	5-25	---	NP
	60-80	Coarse sand, gravelly coarse sand.	SP, SP-SM, GP-GM	A-1, A-2	0	0	75-100	65-85	40-65	1-10	---	NP

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
1102B:												
Dorset----------	0-12	Sandy loam-----	SM, SC-SM	A-4, A-2	0	0	90-100	85-100	50-70	25-50	0-25	NP-5
	12-15	Loam, sandy loam, coarse sandy loam.	SC-SM, SC, CL-ML, CL	A-4, A-6	0	0	90-100	85-100	50-90	35-75	15-30	4-14
	15-32	Gravelly loamy sand, gravelly loamy coarse sand, gravelly coarse sand.	SP-SM, SM, SC-SM, GM	A-1, A-2	0	0-5	50-90	35-75	20-50	10-25	0-20	NP-7
	32-60	Gravelly coarse sand, gravelly sand.	SP, SP-SM, GP, GP-GM	A-1	0	0-5	50-90	35-75	15-40	0-10	0-20	NP
1102C:												
Chapett----------	0-9	Loam-----------	ML, CL, CL-ML	A-4, A-6	0-1	0-5	95-100	85-95	55-85	50-70	15-30	3-15
	9-20	Sandy clay loam, sandy loam, loam.	ML, CL	A-4, A-6	0-1	0-5	95-100	85-95	55-85	55-70	20-40	8-20
	20-34	Fine sandy loam, loam, sandy loam.	SC, ML, CL, SM	A-4, A-6	0-1	0-5	95-100	85-95	50-85	35-65	15-30	3-12
	34-60	Fine sandy loam, loam, sandy loam.	SC, ML, CL, SM	A-4, A-6	0-1	0-5	95-100	85-95	50-85	35-65	15-30	3-12
Dorset----------	0-10	Sandy loam-----	SM, SC-SM	A-4, A-2	0	0	90-100	85-100	50-70	25-50	0-25	NP-5
	10-18	Loam, sandy loam, coarse sandy loam.	SC-SM, SC, CL-ML, CL	A-4, A-6	0	0	90-100	85-100	50-90	35-75	15-30	4-14
	18-29	Gravelly loamy sand, gravelly loamy coarse sand, gravelly coarse sand.	SP-SM, SM, SC-SM, GM	A-1, A-2	0	0-5	50-90	35-75	20-50	10-25	0-20	NP-7
	29-60	Gravelly coarse sand, gravelly sand.	SP, SP-SM, GP, GP-GM	A-1	0	0-5	50-90	35-75	15-40	0-10	0-20	NP

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
1103:												
Clitherall------	0-10	Sandy loam-----	SM, SC-SM	A-2-4, A-4	0	0	95-100	85-98	50-85	15-70	15-20	3-9
	10-16	Coarse sandy loam, sandy loam, loam.	SC, SC-SM, CL-ML	A-4, A-2-4, A-1-b	0	0	95-100	85-100	50-85	15-70	15-30	4-14
	16-38	Gravelly loamy sand, gravelly sand, gravelly coarse sand.	SP-SM, SM, GP-GM	A-1-a, A-1-b, A-3	0	0-1	50-95	50-90	5-65	2-30	0-20	NP
	38-80	Fine sandy loam, sandy loam, loam.	SC, SC-SM, CL-ML	A-4, A-2-4	0	0-5	85-98	85-98	65-80	35-50	23-28	4-9
1104B:												
Waukon----------	0-9	Loam-----------	ML, CL, CL-ML	A-6, A-4	0-1	0-3	95-100	90-100	80-95	60-90	20-40	5-20
	9-34	Clay loam, loam	CL, ML	A-6, A-7	0-1	0-3	95-100	90-100	75-95	50-85	30-45	10-20
	34-60	Loam, clay loam	ML, CL	A-6	0-1	0-3	95-100	90-100	70-95	50-80	30-40	10-20
Dorset----------	0-9	Sandy loam-----	SM, SC-SM	A-4, A-2	0	0	90-100	85-100	50-70	25-50	0-25	NP-5
	9-23	Loam, sandy loam, coarse sandy loam.	SC-SM, SC, CL-ML, CL	A-4, A-6	0	0	90-100	85-100	50-90	35-75	15-30	4-14
	23-33	Gravelly loamy sand, gravelly loamy coarse sand, gravelly coarse sand.	SP-SM, SM, SC-SM, GM	A-1, A-2	0	0-5	50-90	35-75	20-50	10-25	0-20	NP-7
	33-60	Gravelly coarse sand, gravelly sand.	SP, SP-SM, GP, GP-GM	A-1	0	0-5	50-90	35-75	15-40	0-10	0-20	NP
1104C:												
Waukon----------	0-9	Loam-----------	ML, CL, CL-ML	A-6, A-4	0-1	0-3	95-100	90-100	80-95	60-90	20-40	5-20
	9-28	Clay loam, loam	CL, ML	A-6, A-7	0-1	0-3	95-100	90-100	75-95	50-85	30-45	10-20
	28-60	Loam, clay loam	ML, CL	A-6	0-1	0-3	95-100	90-100	70-95	50-80	30-40	10-20

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
1104C:												
Dorset----------	0-10	Sandy loam-----	SM, SC-SM	A-4, A-2	0	0	90-100	85-100	50-70	25-50	0-25	NP-5
	10-14	Loam, sandy loam, coarse sandy loam.	SC-SM, SC, CL-ML, CL	A-4, A-6	0	0	90-100	85-100	50-90	35-75	15-30	4-14
	14-20	Gravelly loamy sand, gravelly loamy coarse sand, gravelly coarse sand.	SP-SM, SM, SC-SM, GM	A-1, A-2	0	0-5	50-90	35-75	20-50	10-25	0-20	NP-7
	20-60	Gravelly coarse sand, gravelly sand.	SP, SP-SM, GP, GP-GM	A-1	0	0-5	50-90	35-75	15-40	0-10	0-20	NP
1104D:												
Waukon----------	0-9	Loam-----------	ML, CL, CL-ML	A-6, A-4	0-1	0-3	95-100	90-100	80-95	60-90	20-40	5-20
	9-21	Clay loam, loam	CL, ML	A-6, A-7	0-1	0-3	95-100	90-100	75-95	50-85	30-45	10-20
	21-60	Loam, clay loam	ML, CL	A-6	0-1	0-3	95-100	90-100	70-95	50-80	30-40	10-20
Dorset----------	0-8	Sandy loam-----	SM, SC-SM	A-4, A-2	0	0	90-100	85-100	50-70	25-50	0-25	NP-5
	8-18	Loam, sandy loam, coarse sandy loam.	SC-SM, SC, CL-ML, CL	A-4, A-6	0	0	90-100	85-100	50-90	35-75	15-30	4-14
	18-60	Gravelly coarse sand, gravelly sand.	SP, SP-SM, GP, GP-GM	A-1	0	0-5	50-90	35-75	15-40	0-10	0-20	NP
1105B:												
Dent----------	0-12	Silt loam------	CL-ML, CL, ML	A-4, A-6	0	0	100	95-100	85-100	60-90	15-34	3-13
	12-26	Silt loam, silty clay loam, loam.	CL, CL-ML, ML	A-4, A-6, A-7, A-5	0	0	100	95-100	80-100	75-95	30-50	10-25
	26-54	Silt loam, loam, very fine sandy loam.	CL, CL-ML, ML	A-4, A-6	0	0	100	95-100	85-100	60-95	20-40	3-17
	54-80	Very fine sandy loam, silt loam, loamy very fine sand.	CL-ML, ML, SM, SC-SM	A-2-4, A-4	0	0	100	95-100	65-100	15-90	15-32	NP-12

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
1110:												
Isan----------	0-16	Sandy loam-----	SC-SM, SM	A-2	0	0	95-100	92-100	50-75	15-35	15-20	2-5
	16-26	Sand, loamy sand.	SM, SP-SM	A-2	0	0	95-100	92-100	50-75	10-30	15-20	NP
	26-60	Sand, coarse sand.	SM, SP	A-1, A-2, A-3	0	0	85-100	85-100	35-70	2-15	15-20	NP
1111:												
Nidaros---------	0-32	Muck----------	PT	A-8	0	0	0	0	0	0	---	NP
	32-38	Sandy clay loam, sandy loam, loam.	SC, CL, CL-ML, SC-SM	A-6, A-2-6, A-4	0	0	95-100	85-100	50-95	30-75	21-40	NP-20
	38-60	Coarse sand, loamy sand, gravelly sand.	SP, SM, SP-SM, SW	A-1-b, A-3, A-2-4	0	0	60-100	50-100	30-70	3-30	---	NP
1112D:												
Chapett---------	0-8	Loam----------	ML, CL, CL-ML	A-4, A-6	0-1	0-5	95-100	85-95	55-85	50-70	15-30	3-15
	8-18	Sandy clay loam, sandy loam, loam.	ML, CL	A-4, A-6	0-1	0-5	95-100	85-95	55-85	55-70	20-40	8-20
	18-30	Fine sandy loam, loam, sandy loam.	SC, ML, CL, SM	A-4, A-6	0-1	0-5	95-100	85-95	50-85	35-65	15-30	3-12
	30-60	Fine sandy loam, loam, sandy loam.	SC, ML, CL, SM	A-4, A-6	0-1	0-5	95-100	85-95	50-85	35-65	15-30	3-12
Corliss---------	0-6	Loamy sand-----	SM, SP-SM	A-1-b, A-2-4	0	0-5	85-100	80-100	40-70	10-25	15-21	NP-4
	6-18	Loamy sand, gravelly sand, coarse sand.	SP-SM, SM, SP	A-1-b, A-2-4, A-3	0	0-5	75-95	50-85	35-70	2-25	15-21	NP-4
	18-60	Coarse sand, sand, gravelly coarse sand.	SP, SP-SM	A-1-b, A-3	0	0-5	60-95	50-85	30-65	2-10	---	NP

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
1112E:												
Chapett	0-7	Loam	ML, CL, CL-ML	A-4, A-6	0-1	0-5	95-100	85-95	55-85	50-70	15-30	3-15
	7-20	Sandy clay loam, sandy loam, loam.	ML, CL	A-4, A-6	0-1	0-5	95-100	85-95	55-85	55-70	20-40	8-20
	20-37	Fine sandy loam, loam, sandy loam.	SC, ML, CL, SM	A-4, A-6	0-1	0-5	95-100	85-95	50-85	35-65	15-30	3-12
	37-60	Fine sandy loam, loam, sandy loam.	SC, ML, CL, SM	A-4, A-6	0-1	0-5	95-100	85-95	50-85	35-65	15-30	3-12
Corliss	0-7	Loamy sand	SM, SP-SM	A-1-b, A-2-4	0	0-5	85-100	80-100	40-70	10-25	15-21	NP-4
	7-10	Loamy sand, gravelly sand, coarse sand.	SP-SM, SM, SP	A-1-b, A-2-4, A-3	0	0-5	75-95	50-85	35-70	2-25	15-21	NP-4
	10-60	Coarse sand, sand, gravelly coarse sand.	SP, SP-SM	A-1-b, A-3	0	0-5	60-95	50-85	30-65	2-10	---	NP
1113:												
Haslie	0-44	Muck	PT	A-8	0	0	0	0	0	0	---	NP
	44-60	Coprogenous earth, mucky silty clay.	OL	A-5	0	0	100	95-100	85-100	75-96	41-50	2-10
Seelyeville	0-30	Muck	PT	A-8	0	0	0	0	0	0	---	NP
	30-60	Mucky peat, muck.	PT	A-8	0	0	0	0	0	0	---	NP
Cathro	0-30	Muck	PT	A-8	0	0	0	0	0	0	---	NP
	30-60	Sandy loam, silt loam, clay loam.	SC-SM, CL-ML, SC, CL	A-4, A-6	0	0-5	80-100	65-100	60-100	35-90	20-40	4-20
1114:												
Hangaard	0-8	Loamy sand	SP-SM, SM	A-3, A-1, A-2	0	0-3	95-100	80-100	50-75	10-20	---	NP
	8-60	Gravelly coarse sand, gravelly sand, coarse sand.	SP-SM, SP	A-3, A-1, A-2	0	2-5	70-95	55-90	30-60	0-10	---	NP

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
1120:												
Rushlake	0-5	Loamy sand	SM, SP-SM	A-1-b, A-2-4	0	0	95-100	75-100	15-60	10-35	---	NP
	5-60	Gravelly sand, gravelly loamy sand, sand.	SP, SP-SM	A-1-b, A-3	0	0-3	55-95	50-90	15-60	2-10	---	NP
Hangaard	0-4	Loamy sand	SP-SM, SM	A-3, A-1, A-2	0	0-3	95-100	80-100	50-75	10-20	---	NP
	4-60	Gravelly coarse sand, gravelly sand, coarse sand.	SP-SM, SP	A-3, A-1, A-2	0	2-5	70-95	55-90	30-60	0-10	---	NP
1129:												
Lindaas	0-15	Silty clay loam	CL	A-7	0	0	100	100	95-100	85-95	41-48	21-25
	15-25	Clay, silty clay.	CL, CH	A-7	0	0	100	100	95-100	85-95	51-76	29-49
	25-60	Silt loam, silty clay loam.	CL-ML	A-6	0	0	100	100	95-100	85-95	41-48	21-25
1131B:												
Verndale	0-9	Sandy loam	SM, SC-SM	A-4, A-2-4	0	0	100	85-100	60-85	25-45	15-20	3-6
	9-19	Sandy loam, fine sandy loam, loam.	SC, SC-SM	A-4, A-2-4	0	0	98-100	85-100	60-85	25-45	20-26	5-10
	19-49	Sand, coarse sand, loamy coarse sand.	SM, SP-SM	A-3, A-2-4	0	0	98-100	85-100	50-65	5-20	---	NP-2
	49-60	Sand, coarse sand.	SP, SP-SM	A-3, A-1-b, A-2-4	0	0	96-100	75-100	45-60	3-10	---	NP
Abbeylake	0-8	Loamy sand	SM, SP-SM	A-2-4	0	0	100	85-100	55-70	10-25	---	NP-4
	8-19	Sand, coarse sand, loamy sand.	SP, SP-SM, SM	A-3, A-2-4	0	0	100	85-100	55-75	2-15	---	NP-4
	19-60	Sand, coarse sand.	SP, SP-SM	A-3, A-1	0	0	100	85-100	40-75	2-10	---	NP
1136:												
Nidaros	0-27	Muck	PT	A-8	0	0	0	0	0	0	---	NP
	27-38	Sandy clay loam, sandy loam, loam.	SC, CL, CL-ML, SC-SM	A-6, A-2-6, A-4	0	0	95-100	85-100	50-95	30-75	21-40	NP-20
	38-60	Coarse sand, loamy sand, gravelly sand.	SP, SM, SP-SM, SW	A-1-b, A-3, A-2-4	0	0	60-100	50-100	30-70	3-30	---	NP

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
1149:												
Hamerly---------	0-16	Clay loam------	CL	A-6, A-7	0	0-5	95-100	90-100	80-95	75-95	35-45	15-25
	16-25	Loam, clay loam	CL, CL-ML	A-4, A-6, A-7	0	0-5	95-100	90-100	80-95	60-75	25-45	10-25
	25-60	Loam, clay loam	CL, CL-ML	A-4, A-6, A-7	0	0-5	95-100	90-100	75-95	55-75	25-45	10-25
1195A:												
Sybil-----------	0-6	Loamy sand-----	SM, SP-SM	A-1-b, A-2-4, A-4	0	0	95-100	90-100	35-100	5-45	15-20	NP-4
	6-14	Loamy sand, loamy fine sand, sandy loam.	SM, SP-SM, SC-SM	A-1-b, A-2-4, A-3	0	0	95-100	90-100	35-90	10-55	15-25	NP-7
	14-19	Sandy loam, fine sandy loam.	SM, SC-SM, SC	A-4, A-2-4	0	0	95-100	90-100	50-90	15-70	20-30	3-9
	19-34	Sand, loamy coarse sand, loamy sand.	SP-SM, SM	A-1-b, A-2-4, A-3	0	0	90-100	85-100	35-100	5-45	15-20	NP-4
	34-80	Sand, coarse sand.	SP, SP-SM	A-1-b, A-3	0	0	90-100	85-100	35-80	2-10	---	NP
Eagleview-------	0-8	Loamy sand-----	SP-SM, SM	A-2, A-1	0	0	100	85-100	60-80	10-25	---	NP
	8-32	Loamy sand, loamy coarse sand, sand.	SP-SM, SM, SP	A-3, A-2, A-1	0	0	100	85-100	50-75	2-15	---	NP
	32-60	Sand, coarse sand, loamy sand.	SP, SP-SM, SM	A-3, A-2, A-1	0	0	100	85-100	50-75	2-15	---	NP
	60-80	Sand, coarse sand.	SP, SP-SM	A-3, A-2, A-1	0	0	100	85-100	40-75	2-10	---	NP

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
1195B:												
Sybil----------	0-5	Loamy sand-----	SM, SP-SM	A-1-b, A-2-4, A-4	0	0	95-100	90-100	35-100	5-45	15-20	NP-4
	5-10	Loamy sand, loamy fine sand, sandy loam.	SM, SP-SM, SC-SM	A-1-b, A-2-4, A-3	0	0	95-100	90-100	35-90	10-55	15-25	NP-7
	10-15	Sandy loam, fine sandy loam.	SM, SC-SM, SC	A-4, A-2-4	0	0	95-100	90-100	50-90	15-70	20-30	3-9
	15-32	Sand, loamy coarse sand, loamy sand.	SP-SM, SM	A-1-b, A-2-4, A-3	0	0	90-100	85-100	35-100	5-45	15-20	NP-4
	32-80	Sand, coarse sand.	SP, SP-SM	A-1-b, A-3	0	0	90-100	85-100	35-80	2-10	---	NP
Eagleview-------	0-4	Loamy sand-----	SP-SM, SM	A-2, A-1	0	0	100	85-100	60-80	10-25	---	NP
	4-36	Loamy sand, loamy coarse sand, sand.	SP-SM, SM, SP	A-3, A-2, A-1	0	0	100	85-100	50-75	2-15	---	NP
	36-60	Sand, coarse sand, loamy sand.	SP, SP-SM, SM	A-3, A-2, A-1	0	0	100	85-100	50-75	2-15	---	NP
1195C:												
Sybil----------	0-8	Loamy sand-----	SM, SP-SM	A-1-b, A-2-4, A-4	0	0	95-100	90-100	35-100	5-45	15-20	NP-4
	8-17	Loamy sand, loamy fine sand, sandy loam.	SM, SP-SM, SC-SM	A-1-b, A-2-4, A-3	0	0	95-100	90-100	35-90	10-55	15-25	NP-7
	17-26	Sandy loam, fine sandy loam.	SM, SC-SM, SC	A-4, A-2-4	0	0	95-100	90-100	50-90	15-70	20-30	3-9
	26-37	Sand, loamy coarse sand, loamy sand.	SP-SM, SM	A-1-b, A-2-4, A-3	0	0	90-100	85-100	35-100	5-45	15-20	NP-4
	37-80	Sand, coarse sand.	SP, SP-SM	A-1-b, A-3	0	0	90-100	85-100	35-80	2-10	---	NP

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
1195C:												
Eagleview-------	0-3	Loamy sand-----	SP-SM, SM	A-2, A-1	0	0	100	85-100	60-80	10-25	---	NP
	3-37	Loamy sand, loamy coarse sand, sand.	SP-SM, SM, SP	A-3, A-2, A-1	0	0	100	85-100	50-75	2-15	---	NP
	37-60	Sand, coarse sand, loamy sand.	SP, SP-SM, SM	A-3, A-2, A-1	0	0	100	85-100	50-75	2-15	---	NP
	60-80	Sand, coarse sand.	SP, SP-SM	A-3, A-2, A-1	0	0	100	85-100	40-75	2-10	---	NP
1195E:												
Sybil-----------	0-4	Sandy loam-----	SM, SC-SM, SC	A-2-4, A-4	0	0	95-100	90-100	50-90	15-55	15-30	NP-9
	4-15	Loamy sand, loamy fine sand, sandy loam.	SM, SP-SM, SC-SM	A-1-b, A-2-4, A-3	0	0	95-100	90-100	35-90	10-55	15-25	NP-7
	15-25	Sandy loam, fine sandy loam.	SM, SC-SM, SC	A-4, A-2-4	0	0	95-100	90-100	50-90	15-70	20-30	3-9
	25-78	Sand, loamy coarse sand, loamy sand.	SP-SM, SM	A-1-b, A-2-4, A-3	0	0	90-100	85-100	35-100	5-45	15-20	NP-4
	78-80	Sand, coarse sand.	SP, SP-SM	A-1-b, A-3	0	0	90-100	85-100	35-80	2-10	---	NP
Eagleview-------	0-7	Loamy sand-----	SP-SM, SM	A-2, A-1	0	0	100	85-100	60-80	10-25	---	NP
	7-17	Loamy sand, loamy coarse sand, sand.	SP-SM, SM, SP	A-3, A-2, A-1	0	0	100	85-100	50-75	2-15	---	NP
	17-55	Sand, coarse sand, loamy sand.	SP, SP-SM, SM	A-3, A-2, A-1	0	0	100	85-100	50-75	2-15	---	NP
	55-80	Sand, coarse sand.	SP, SP-SM	A-3, A-2, A-1	0	0	100	85-100	40-75	2-10	---	NP

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
1196B:												
Lida----------	0-9	Sandy loam-----	SC-SM, SM, SC, ML	A-4, A-2-4	0	0-10	85-100	85-100	30-85	15-55	0-28	NP-9
	9-13	Loamy sand, loamy coarse sand, sandy loam.	SM, SP-SM	A-4, A-3, A-2-4	0	0-10	85-100	85-100	30-85	10-55	0-25	NP-7
	13-25	Sandy loam, gravelly sandy loam, gravelly coarse sandy loam.	SM, SC, SC-SM, ML	A-4, A-2-4	0	0-5	85-100	50-85	30-75	15-55	20-28	NP-9
	25-45	Loamy sand, gravelly loamy coarse sand, gravelly loamy sand.	GM, GP-GM, SP-SM, SM	A-1-b, A-2-4, A-4	0	0-5	50-85	50-85	20-65	5-25	---	NP
	45-60	Gravelly coarse sand, sand, gravelly sand.	GP, GW, GP-GM, SP	A-3, A-1-b, A-2-4	0	0-5	50-85	50-85	20-60	2-10	---	NP
Two Inlets------	0-7	Sandy loam-----	SM	A-2, A-2-4	0	0-2	80-100	50-90	40-65	20-35	15-21	NP-4
	7-14	Loamy coarse sand, gravelly loamy coarse sand, coarse sandy loam.	SM	A-2-4	0	0-2	80-100	50-90	30-65	15-30	15-21	NP-4
	14-29	Loamy coarse sand, gravelly loamy coarse sand, loamy sand.	SM	A-2-4, A-2, A-3	0	0-5	80-100	50-90	30-65	5-30	15-25	NP-7
	29-60	Gravelly coarse sand, gravelly sand.	SP, SP-SM	A-1, A-3	0	0-5	60-95	50-75	30-55	2-10	---	NP

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
1196C:												
Lida----------	0-8	Sandy loam-----	SC-SM, SM, SC, ML	A-4, A-2-4	0	0-10	85-100	85-100	30-85	15-55	0-28	NP-9
	8-17	Loamy sand, loamy coarse sand, sandy loam.	SM, SP-SM	A-4, A-3, A-2-4	0	0-10	85-100	85-100	30-85	10-55	0-25	NP-7
	17-25	Sandy loam, gravelly sandy loam, gravelly coarse sandy loam.	SM, SC, SC-SM, ML	A-4, A-2-4	0	0-5	85-100	50-85	30-75	15-55	20-28	NP-9
	25-41	Loamy sand, gravelly loamy coarse sand, gravelly loamy sand.	GM, GP-GM, SP-SM, SM	A-1-b, A-2-4, A-4	0	0-5	50-85	50-85	20-65	5-25	---	NP
	41-80	Gravelly coarse sand, sand, gravelly sand	GP, GW, GP-GM, SP	A-3, A-1-b, A-2-4	0	0-5	50-85	50-85	20-60	2-10	---	NP
Two Inlets------	0-4	Sandy loam-----	SM	A-2, A-2-4	0	0-2	80-100	50-90	40-65	20-35	15-21	NP-4
	4-9	Loamy coarse sand, gravelly loamy coarse sand, coarse sandy loam.	SM	A-2-4	0	0-2	80-100	50-90	30-65	15-30	15-21	NP-4
	9-38	Loamy coarse sand, gravelly loamy coarse sand, loamy sand.	SM	A-2-4, A-2, A-3	0	0-5	80-100	50-90	30-65	5-30	15-25	NP-7
	38-60	Gravelly coarse sand, gravelly sand.	SP, SP-SM	A-1, A-3	0	0-5	60-95	50-75	30-55	2-10	---	NP

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
1196E:												
Lida----------	0-3	Sandy loam-----	SC-SM, SM, SC, ML	A-4, A-2-4	0	0-10	85-100	85-100	30-85	15-55	0-28	NP-9
	3-14	Loamy sand, loamy coarse sand, sandy loam.	SM, SP-SM	A-4, A-3, A-2-4	0	0-10	85-100	85-100	30-85	10-55	0-25	NP-7
	14-20	Sandy loam, gravelly sandy loam, gravelly coarse sandy loam.	SM, SC, SC-SM, ML	A-4, A-2-4	0	0-5	85-100	50-85	30-75	15-55	20-28	NP-9
	20-27	Loamy sand, gravelly loamy coarse sand, gravelly loamy sand.	GM, GP-GM, SP-SM, SM	A-1-b, A-2-4, A-4	0	0-5	50-85	50-85	20-65	5-25	---	NP
	27-60	Gravelly coarse sand, sand, gravelly sand.	GP, GW, GP-GM, SP	A-3, A-1-b, A-2-4	0	0-5	50-85	50-85	20-60	2-10	---	NP
Two Inlets------	0-3	Sandy loam-----	SM	A-2, A-2-4	0	0-2	80-100	50-90	40-65	20-35	15-21	NP-4
	3-7	Loamy coarse sand, gravelly loamy coarse sand, coarse sandy loam.	SM	A-2-4	0	0-2	80-100	50-90	30-65	15-30	15-21	NP-4
	7-21	Loamy coarse sand, gravelly loamy coarse sand, loamy sand.	SM	A-2-4, A-2, A-3	0	0-5	80-100	50-90	30-65	5-30	15-25	NP-7
	21-60	Gravelly coarse sand, gravelly sand.	SP, SP-SM	A-1, A-3	0	0-5	60-95	50-75	30-55	2-10	---	NP

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
1196F:												
Lida----------	0-4	Sandy loam-----	SC-SM, SM, SC, ML	A-4, A-2-4	0	0-10	85-100	85-100	30-85	15-55	0-28	NP-9
	4-17	Loamy sand, loamy coarse sand, sandy loam.	SM, SP-SM	A-4, A-3, A-2-4	0	0-10	85-100	85-100	30-85	10-55	0-25	NP-7
	17-25	Sandy loam, gravelly sandy loam, gravelly coarse sandy loam.	SM, SC, SC-SM, ML	A-4, A-2-4	0	0-5	85-100	50-85	30-75	15-55	20-28	NP-9
	25-28	Loamy sand, gravelly loamy coarse sand, gravelly loamy sand.	GM, GP-GM, SP-SM, SM	A-1-b, A-2-4, A-4	0	0-5	50-85	50-85	20-65	5-25	---	NP
	28-60	Gravelly coarse sand, sand, gravelly sand.	GP, GW, GP-GM, SP	A-3, A-1-b, A-2-4	0	0-5	50-85	50-85	20-60	2-10	---	NP
Two Inlets------	0-3	Sandy loam-----	SM	A-2, A-2-4	0	0-2	80-100	50-90	40-65	20-35	15-21	NP-4
	3-7	Loamy coarse sand, gravelly loamy coarse sand, coarse sandy loam.	SM	A-2-4	0	0-2	80-100	50-90	30-65	15-30	15-21	NP-4
	7-14	Loamy coarse sand, gravelly loamy coarse sand, loamy sand.	SM	A-2-4, A-2, A-3	0	0-5	80-100	50-90	30-65	5-30	15-25	NP-7
	14-60	Gravelly coarse sand, gravelly sand.	SP, SP-SM	A-1, A-3	0	0-5	60-95	50-75	30-55	2-10	---	NP

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
1200:												
Egglake---------	0-4	Loam----------	ML, CL-ML	A-4	0-1	0-5	95-100	85-98	50-97	50-90	15-25	3-7
	4-9	Fine sandy loam, sandy loam, loam.	SM	A-2-4	0-1	0-5	95-100	85-98	40-50	25-35	15-21	2-4
	9-25	Sandy clay loam, sandy loam, loam.	SC, CL	A-6, A-4	0-1	0-5	95-100	85-98	55-75	40-60	28-36	9-15
	25-60	Sandy loam, coarse sandy loam, fine sandy loam.	SC-SM, SC, CL-ML, CL	A-4	0-1	0-5	95-100	85-98	50-70	35-55	21-28	4-9
1208B:												
Naytahwaush-----	0-7	Clay loam------	CL	A-6, A-7	0	0-5	95-100	90-100	75-90	60-90	35-50	15-25
	7-25	Clay, silty clay, clay loam.	CL, CH	A-7	0	0-5	95-100	90-100	75-95	70-90	45-65	25-40
	25-60	Clay loam, silty clay loam, loam.	CL	A-6, A-7	0	0-5	95-100	90-100	75-95	60-90	35-50	15-25
Mahkonce--------	0-7	Clay loam------	CL, ML	A-6, A-7	0	0-5	95-100	90-98	75-95	60-90	35-50	15-25
	7-37	Silty clay, clay.	CH	A-7	0	0-5	95-100	90-98	75-95	70-90	50-65	25-40
	37-55	Clay loam, silty clay loam, clay.	CL, CH	A-6, A-7	0	0-5	95-100	95-98	75-95	60-90	35-50	15-25
	55-60	Loam, clay loam, silty clay loam.	CL	A-6, A-7	0-1	0-5	95-100	90-98	75-95	60-90	35-50	15-25
1209C:												
Naytahwaush-----	0-7	Clay loam------	CL	A-6, A-7	0	0-5	95-100	90-100	75-90	60-90	35-50	15-25
	7-24	Clay, silty clay, clay loam.	CL, CH	A-7	0	0-5	95-100	90-100	75-95	70-90	45-65	25-40
	24-60	Clay loam, silty clay loam, loam.	CL	A-6, A-7	0	0-5	95-100	90-100	75-95	60-90	35-50	15-25

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
1212B:												
Mahkonce	0-7	Clay loam	CL, ML	A-6, A-7	0	0-5	95-100	90-98	75-95	60-90	35-50	15-25
	7-23	Silty clay, clay.	CH	A-7	0	0-5	95-100	90-98	75-95	70-90	50-65	25-40
	23-46	Clay loam, silty clay loam, clay.	CL, CH	A-6, A-7	0	0-5	95-100	95-98	75-95	60-90	35-50	15-25
	46-60	Loam, clay loam, silty clay loam.	CL	A-6, A-7	0-1	0-5	95-100	90-98	75-95	60-90	35-50	15-25
1214:												
Mustinka	0-14	Silty clay loam	CL, CH	A-7	0	0	100	100	90-100	70-95	40-52	20-30
	14-24	Silty clay, silty clay loam, clay.	CH, CL	A-7	0	0	100	100	90-100	75-95	47-72	25-44
	24-36	Silty clay loam, clay loam, silt loam.	CL	A-6, A-7	0	0	100	95-100	85-100	70-95	31-47	12-25
	36-80	Clay loam, silty clay loam, loam.	CL, CH	A-4, A-5, A-6, A-7	0	0	95-100	85-98	75-95	50-90	31-47	12-25
1215:												
Pinelake	0-12	Sandy loam	SM, SC-SM, ML, CL-ML	A-4, A-2-4, A-1-b	0	0	95-100	75-100	50-85	15-70	15-25	3-7
	12-30	Coarse sandy loam, sandy loam, loam.	CL, SC-SM, SC, CL-ML	A-4, A-2-4, A-1-b	0	0	95-100	75-100	20-75	15-70	23-30	5-9
	30-35	Loamy sand, loamy coarse sand, gravelly sand.	SM, SP-SM, GP-GM	A-2-4, A-4, A-1-b	0	0	50-98	50-98	10-65	10-45	0-20	NP-2
	35-80	Sand, coarse sand, gravelly coarse sand.	SP, SM, SP-SM, GP-GM	A-1-b, A-2-4, A-3	0	0-2	50-98	50-98	40-70	2-20	---	NP

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
1216B:												
Egglake----------	0-4	Fine sandy loam	SM, SC-SM	A-4, A-2-4	0-1	0-5	95-100	85-98	45-55	30-40	15-25	3-7
	4-8	Fine sandy loam, sandy loam, loam.	SM	A-2-4	0-1	0-5	95-100	85-98	40-50	25-35	15-21	2-4
	8-22	Sandy clay loam, sandy loam, loam.	SC, CL	A-6, A-4	0-1	0-5	95-100	85-98	55-75	40-60	28-36	9-15
	22-60	Sandy loam, coarse sandy loam, fine sandy loam.	SC-SM, SC, CL-ML, CL	A-4	0-1	0-5	95-100	85-98	50-70	35-55	21-28	4-9
Wykeham----------	0-9	Fine sandy loam	SM, SC-SM	A-4	0	0-5	90-100	85-100	65-80	40-50	25-30	2-5
	9-13	Fine sandy loam, loamy sand, sandy loam.	SM, SC-SM	A-4, A-2	0	0-5	85-100	70-95	65-80	25-50	15-20	1-5
	13-40	Loam, sandy clay loam, sandy loam.	SC, CL	A-6	0	0-5	90-100	85-95	70-80	35-60	30-35	10-15
	40-60	Fine sandy loam, sandy loam.	SC-SM, SC	A-4	0	0-5	85-95	85-95	65-80	35-50	20-25	5-10
1217E:												
Waukon----------	0-8	Loam----------	ML, CL, CL-ML	A-6, A-4	0-1	0-3	95-100	90-100	80-95	60-90	20-40	5-20
	8-36	Clay loam, loam	CL, ML	A-6, A-7	0-1	0-3	95-100	90-100	75-95	50-85	30-45	10-20
	36-60	Loam, clay loam	ML, CL	A-6	0-1	0-3	95-100	90-100	70-95	50-80	30-40	10-20
Lida----------	0-6	Sandy loam-----	SC-SM, SM, SC, ML	A-4, A-2-4	0	0-10	85-100	85-100	30-85	15-55	0-28	NP-9
	6-16	Loamy sand, loamy coarse sand, sandy loam.	SM, SP-SM	A-4, A-3, A-2-4	0	0-10	85-100	85-100	30-85	10-55	0-25	NP-7
	16-36	Sandy loam, gravelly sandy loam, gravelly coarse sandy loam.	SM, SC, SC-SM, ML	A-4, A-2-4	0	0-5	85-100	50-85	30-75	15-55	20-28	NP-9
	36-60	Gravelly coarse sand, sand, gravelly sand.	GP, GW, GP-GM, SP	A-3, A-1-b, A-2-4	0	0-5	50-85	50-85	20-60	2-10	---	NP

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
1218B:												
Snellman--------	0-3	Fine sandy loam	SM, SC-SM	A-4	0	0-10	90-100	80-95	65-80	40-50	25-30	2-5
	3-10	Loamy sand, sandy loam, fine sandy loam.	SM, SC-SM	A-4, A-2	0	0-10	88-100	80-95	65-80	30-50	15-20	NP-5
	10-42	Sandy clay loam, sandy loam, clay loam.	SC, CL	A-6	0	0-10	90-100	80-95	70-80	35-50	25-40	10-20
	42-55	Sandy loam, fine sandy loam.	SC-SM, SC	A-4	0	0-10	85-95	80-95	65-80	35-50	15-25	5-10
	55-80	Sandy loam, fine sandy loam.	SC-SM, SC	A-4	0	0-10	85-95	80-95	65-80	35-50	15-25	5-10
Lida----------	0-5	Sandy loam-----	SC-SM, SM, SC, ML	A-4, A-2-4	0	0-10	85-100	85-100	30-85	15-55	0-28	NP-9
	5-19	Loamy sand, loamy coarse sand, sandy loam.	SM, SP-SM	A-4, A-3, A-2-4	0	0-10	85-100	85-100	30-85	10-55	0-25	NP-7
	19-31	Sandy loam, gravelly sandy loam, gravelly coarse sandy loam.	SM, SC, SC-SM, ML	A-4, A-2-4	0	0-5	85-100	50-85	30-75	15-55	20-28	NP-9
	31-35	Loamy sand, gravelly loamy coarse sand, gravelly loamy sand.	GM, GP-GM, SP-SM, SM	A-1-b, A-2-4, A-4	0	0-5	50-85	50-85	20-65	5-25	---	NP
	35-80	Gravelly coarse sand, sand, gravelly sand.	GP, GW, GP-GM, SP	A-3, A-1-b, A-2-4	0	0-5	50-85	50-85	20-60	2-10	---	NP

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
1218C:												
Snellman--------	0-3	Fine sandy loam	SM, SC-SM	A-4	0	0-10	90-100	80-95	65-80	40-50	25-30	2-5
	3-10	Loamy sand, sandy loam, fine sandy loam.	SM, SC-SM	A-4, A-2	0	0-10	88-100	80-95	65-80	30-50	15-20	NP-5
	10-39	Sandy clay loam, sandy loam, clay loam.	SC, CL	A-6	0	0-10	90-100	80-95	70-80	35-50	25-40	10-20
	39-80	Sandy loam, fine sandy loam.	SC-SM, SC	A-4	0	0-10	85-95	80-95	65-80	35-50	15-25	5-10
Lida----------	0-6	Sandy loam-----	SC-SM, SM, SC, ML	A-4, A-2-4	0	0-10	85-100	85-100	30-85	15-55	0-28	NP-9
	6-13	Loamy sand, loamy coarse sand, sandy loam.	SM, SP-SM	A-4, A-3, A-2-4	0	0-10	85-100	85-100	30-85	10-55	0-25	NP-7
	13-20	Sandy loam, gravelly sandy loam, gravelly coarse sandy loam.	SM, SC, SC-SM, ML	A-4, A-2-4	0	0-5	85-100	50-85	30-75	15-55	20-28	NP-9
	20-80	Gravelly coarse sand, sand, gravelly sand.	GP, GW, GP-GM, SP	A-3, A-1-b, A-2-4	0	0-5	50-85	50-85	20-60	2-10	---	NP
1218E:												
Snellman--------	0-3	Sandy loam-----	SM, SC-SM	A-4	0	0-10	90-100	80-95	65-80	40-50	25-30	2-5
	3-8	Loamy sand, sandy loam, fine sandy loam.	SM, SC-SM	A-4, A-2	0	0-10	88-100	80-95	65-80	30-50	15-20	NP-5
	8-30	Sandy clay loam, sandy loam, clay loam.	SC, CL	A-6	0	0-10	90-100	80-95	70-80	35-50	25-40	10-20
	30-60	Sandy loam, fine sandy loam.	SC-SM, SC	A-4	0	0-10	85-95	80-95	65-80	35-50	15-25	5-10

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
1218E:												
Lida----------	0-6	Sandy loam-----	SC-SM, SM, SC, ML	A-4, A-2-4	0	0-10	85-100	85-100	30-85	15-55	0-28	NP-9
	6-13	Loamy sand, loamy coarse sand, sandy loam.	SM, SP-SM	A-4, A-3, A-2-4	0	0-10	85-100	85-100	30-85	10-55	0-25	NP-7
	13-28	Sandy loam, gravelly sandy loam, gravelly coarse sandy loam.	SM, SC, SC-SM, ML	A-4, A-2-4	0	0-5	85-100	50-85	30-75	15-55	20-28	NP-9
	28-42	Loamy sand, gravelly loamy coarse sand, gravelly loamy sand.	GM, GP-GM, SP-SM, SM	A-1-b, A-2-4, A-4	0	0-5	50-85	50-85	20-65	5-25	---	NP
	42-60	Gravelly coarse sand, sand, gravelly sand.	GP, GW, GP-GM, SP	A-3, A-1-b, A-2-4	0	0-5	50-85	50-85	20-60	2-10	---	NP
1218F:												
Snellman--------	0-3	Sandy loam-----	SM, SC-SM	A-4	0	0-10	90-100	80-95	65-80	40-50	25-30	2-5
	3-13	Loamy sand, sandy loam, fine sandy loam.	SM, SC-SM	A-4, A-2	0	0-10	88-100	80-95	65-80	30-50	15-20	NP-5
	13-23	Sandy clay loam, sandy loam, clay loam.	SC, CL	A-6	0	0-10	90-100	80-95	70-80	35-50	25-40	10-20
	23-40	Sandy loam, fine sandy loam.	SC-SM, SC	A-4	0	0-10	85-95	80-95	65-80	35-50	15-25	5-10
	40-60	Sandy loam, fine sandy loam.	SC-SM, SC	A-4	0	0-10	85-95	80-95	65-80	35-50	15-25	5-10

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
1218F:												
Lida----------	0-4	Sandy loam-----	SC-SM, SM, SC, ML	A-4, A-2-4	0	0-10	85-100	85-100	30-85	15-55	0-28	NP-9
	4-14	Loamy sand, loamy coarse sand, sandy loam.	SM, SP-SM	A-4, A-3, A-2-4	0	0-10	85-100	85-100	30-85	10-55	0-25	NP-7
	14-24	Sandy loam, gravelly sandy loam, gravelly coarse sandy loam.	SM, SC, SC-SM, ML	A-4, A-2-4	0	0-5	85-100	50-85	30-75	15-55	20-28	NP-9
	24-35	Loamy sand, gravelly loamy coarse sand, gravelly loamy sand.	GM, GP-GM, SP-SM, SM	A-1-b, A-2-4, A-4	0	0-5	50-85	50-85	20-65	5-25	---	NP
	35-60	Gravelly coarse sand, sand, gravelly sand.	GP, GW, GP-GM, SP	A-3, A-1-b, A-2-4	0	0-5	50-85	50-85	20-60	2-10	---	NP
1219C:												
Sandberg---------	0-8	Sandy loam-----	SM	A-2	0-3	0-5	85-100	50-95	50-65	25-35	15-20	NP-7
	8-25	Gravelly loamy coarse sand, gravelly coarse sand, loamy sand.	SP-SM, SM	A-1, A-2, A-3	0-3	0-5	75-95	50-95	35-70	5-25	---	NP-4
	25-36	Gravelly coarse sand, coarse sand, sand.	SP, SP-SM	A-1, A-3, A-2	0-3	0-5	60-95	50-95	30-65	2-10	---	NP
	36-60	Gravelly coarse sand, coarse sand, sand.	SP, SP-SM	A-1, A-3, A-2	0-3	0-5	60-95	50-95	30-65	2-10	---	NP
Sverdrup---------	0-12	Sandy loam-----	SM	A-4	0	0	100	95-100	60-70	35-50	---	NP
	12-24	Loam, sandy loam, loamy sand.	ML, SM	A-2, A-4	0	0	100	95-100	50-75	30-70	15-30	NP-5
	24-60	Sand, fine sand	SP, SP-SM	A-3, A-2	0	0	100	95-100	50-90	2-10	---	NP

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
1221B:												
Sverdrup--------	0-15	Sandy loam-----	SM	A-4	0	0	100	95-100	60-70	35-50	---	NP
	15-28	Loam, sandy loam, loamy sand.	ML, SM	A-2, A-4	0	0	100	95-100	50-75	30-70	15-30	NP-5
	28-60	Sand, fine sand	SP, SP-SM	A-3, A-2	0	0	100	95-100	50-90	2-10	---	NP
Sandberg--------	0-8	Sandy loam-----	SM	A-2	0-3	0-5	85-100	50-95	50-65	25-35	15-20	NP-7
	8-14	Gravelly loamy coarse sand, gravelly coarse sand, loamy sand.	SP-SM, SM	A-1, A-2, A-3	0-3	0-5	75-95	50-95	35-70	5-25	---	NP-4
	14-24	Gravelly coarse sand, coarse sand, sand.	SP, SP-SM	A-1, A-3, A-2	0-3	0-5	60-95	50-95	30-65	2-10	---	NP
	24-60	Gravelly coarse sand, coarse sand, sand.	SP, SP-SM	A-1, A-3, A-2	0-3	0-5	60-95	50-95	30-65	2-10	---	NP
1223D:												
Sandberg--------	0-7	Coarse sandy loam.	SM	A-2	0-3	0-5	85-100	50-95	50-65	25-35	15-20	NP-7
	7-13	Gravelly loamy coarse sand, gravelly coarse sand, loamy sand.	SP-SM, SM	A-1, A-2, A-3	0-3	0-5	75-95	50-95	35-70	5-25	---	NP-4
	13-60	Gravelly coarse sand, coarse sand, sand.	SP, SP-SM	A-1, A-3, A-2	0-3	0-5	60-95	50-95	30-65	2-10	---	NP
Arvilla---------	0-10	Sandy loam-----	SM, SC, SC-SM	A-2, A-4, A-6	0	0	95-100	90-100	50-80	20-45	15-30	NP-15
	10-19	Sandy loam, loam, coarse sandy loam.	SM, SC, SC-SM	A-2, A-4, A-6	0	0	90-100	85-100	50-80	20-45	15-40	NP-15
	19-60	Gravelly coarse sand, coarse sand, very gravelly coarse sand.	SP-SM, GM, SP, GP-GM	A-1, A-2, A-3	0	0	35-100	25-100	10-60	0-15	---	NP

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
1227:												
Quam----------	0-33	Silt loam------	OL, ML	A-7, A-4, A-6, A-5	0	0	100	100	80-100	70-95	30-50	5-20
	33-50	Silty clay loam, silt loam, loam.	CL, ML	A-7, A-6, A-4	0	0	100	100	80-100	70-95	30-50	5-25
	50-60	Clay loam, silty clay loam, silt loam.	CL, ML, CL-ML	A-4, A-6, A-7	0	0	100	90-100	85-95	70-90	20-50	5-20
Cathro----------	0-12	Muck----------	PT	A-8	0	0	0	0	0	0	---	NP
	12-24	Muck----------	PT	A-8	0	0	0	0	0	0	---	NP
	24-60	Sandy loam, silt loam, clay loam.	SC-SM, CL-ML, SC, CL	A-4, A-6	0	0-5	80-100	65-100	60-100	35-90	20-40	4-20
Urness----------	0-20	Mucky silt loam	OL, CL, CL-ML	A-4, A-6, A-7	0	0	100	100	90-100	70-95	20-50	3-20
	20-45	Mucky silt loam, mucky silty clay loam, silty clay loam.	CL, CL-ML, OL	A-4, A-6, A-7	0	0	95-100	90-100	85-100	70-95	20-50	3-30
	45-60	Silty clay loam, very fine sandy loam, loam.	CL, ML	A-6, A-7	0	0-2	95-100	85-100	75-100	65-95	35-50	11-20
1230:												
Haslie----------	0-44	Muck----------	PT	A-8	0	0	0	0	0	0	---	NP
	44-60	Coprogenous earth, mucky silty clay.	OL	A-5	0	0	100	95-100	85-100	75-96	41-50	2-10
Nidaros---------	0-38	Muck----------	PT	A-8	0	0	0	0	0	0	---	NP
	38-54	Coarse sandy loam, sandy clay loam, loam.	SC-SM, SC, CL, CL-ML	A-6, A-2-6, A-4	0	0	95-100	85-100	45-95	25-70	21-40	NP-20
	54-60	Coarse sand, sand, gravelly coarse sand.	SP, SM, SP-SM, SW	A-1-b, A-3, A-2-4	0	0	60-100	50-100	30-70	3-15	---	NP

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
1232B:												
Chapett	0-8	Loam	ML, CL, CL-ML	A-4, A-6	0-1	0-5	95-100	85-95	55-85	50-70	15-30	3-15
	8-21	Sandy clay loam, sandy loam, loam.	ML, CL	A-4, A-6	0-1	0-5	95-100	85-95	55-85	55-70	20-40	8-20
	21-36	Fine sandy loam, loam, sandy loam.	SC, ML, CL, SM	A-4, A-6	0-1	0-5	95-100	85-95	50-85	35-65	15-30	3-12
	36-60	Fine sandy loam, loam, sandy loam.	SC, ML, CL, SM	A-4, A-6	0-1	0-5	95-100	85-95	50-85	35-65	15-30	3-12
1232E:												
Chapett	0-9	Loam	ML, CL, CL-ML	A-4, A-6	0-1	0-5	95-100	85-95	55-85	50-70	15-30	3-15
	9-26	Sandy clay loam, sandy loam, loam.	ML, CL	A-4, A-6	0-1	0-5	95-100	85-95	55-85	55-70	20-40	8-20
	26-33	Fine sandy loam, loam, sandy loam.	SC, ML, CL, SM	A-4, A-6	0-1	0-5	95-100	85-95	50-85	35-65	15-30	3-12
	33-60	Fine sandy loam, loam, sandy loam.	SC, ML, CL, SM	A-4, A-6	0-1	0-5	95-100	85-95	50-85	35-65	15-30	3-12
1234B:												
Formdale	0-11	Clay loam	CL	A-7, A-6	0	0-3	95-100	90-100	85-100	75-90	35-50	15-30
	11-18	Clay loam, loam	CL	A-7, A-6	0	0-3	95-100	90-100	85-95	70-80	35-50	15-30
	18-30	Clay loam, silty clay loam, loam.	CL	A-7, A-6	0	0-3	95-100	90-100	85-95	70-80	35-50	15-30
	30-60	Clay loam, silty clay loam, loam.	CL	A-7, A-6	0	0-3	95-100	90-100	85-95	70-80	35-50	15-30
Buse	0-8	Clay loam	CL, ML	A-6, A-7	0	0	90-100	85-95	70-95	55-90	35-45	10-20
	8-27	Loam, clay loam	CL, CL-ML, ML	A-4, A-6, A-7	0	0	90-100	85-100	70-90	55-85	25-45	5-20
	27-60	Loam, clay loam	CL, CL-ML, ML	A-4, A-6, A-7	0	0	90-100	85-100	70-90	55-85	25-45	5-20

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
1237:												
Lakepark--------	0-9	Loam----------	ML, CL, CL-ML	A-4, A-6	0	0	100	95-100	90-100	65-90	20-40	2-15
	9-35	Clay loam, silty clay loam, silt loam.	ML, CL	A-4, A-6	0	0	100	95-100	90-100	65-90	30-40	2-12
	35-44	Silty clay loam, clay loam, loam.	CL	A-6, A-7	0	0-5	95-100	95-100	85-100	65-90	30-45	15-30
	44-60	Clay loam, loam	CL	A-6	0	0-5	95-100	90-100	75-85	55-75	30-40	10-20
1239:												
Quam----------	0-9	Silt loam------	OL, ML	A-7, A-4, A-6, A-5	0	0	100	100	80-100	70-95	30-50	5-20
	9-56	Silty clay loam, silt loam, loam.	CL, ML	A-7, A-6, A-4	0	0	100	100	80-100	70-95	30-50	5-25
	56-80	Clay loam, silty clay loam, silt loam.	CL, ML, CL-ML	A-4, A-6, A-7	0	0	100	90-100	85-95	70-90	20-50	5-20
1240:												
Roliss----------	0-14	Clay loam------	CL	A-6, A-7	0	0	95-100	80-100	80-100	60-80	35-50	15-25
	14-17	Loam, clay loam, silty clay loam.	CL	A-6, A-7	0	0	95-100	80-100	80-90	60-80	20-50	10-30
	17-27	Loam, clay loam	CL, CL-ML	A-6, A-7, A-4	0	0	95-100	80-100	80-95	60-80	20-50	5-30
	27-60	Loam, clay loam, silty clay loam.	CL, CL-ML	A-6, A-7, A-4	0	0	95-100	80-100	80-95	60-80	20-50	5-30
1247D:												
Corliss---------	0-7	Loamy coarse sand.	SM, SP-SM	A-1-b, A-2-4	0	0-5	85-100	80-100	40-70	10-25	15-21	NP-4
	7-10	Loamy sand, gravelly sand, coarse sand.	SP-SM, SM, SP	A-1-b, A-2-4, A-3	0	0-5	75-95	50-85	35-70	2-25	15-21	NP-4
	10-60	Coarse sand, sand, gravelly coarse sand.	SP, SP-SM	A-1-b, A-3	0	0-5	60-95	50-85	30-65	2-10	---	NP

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
1247D:												
Dorset----------	0-8	Sandy loam-----	SM, SC-SM	A-4, A-2	0	0	90-100	85-100	50-70	25-50	0-25	NP-5
	8-17	Loam, sandy loam, coarse sandy loam.	SC-SM, SC, CL-ML, CL	A-4, A-6	0	0	90-100	85-100	50-90	35-75	15-30	4-14
	17-22	Gravelly loamy sand, gravelly loamy coarse sand, gravelly coarse sand.	SP-SM, SM, SC-SM, GM	A-1, A-2	0	0-5	50-90	35-75	20-50	10-25	0-20	NP-7
	22-60	Gravelly coarse sand, gravelly sand.	SP, SP-SM, GP, GP-GM	A-1	0	0-5	50-90	35-75	15-40	0-10	0-20	NP
1250C:												
Abbeylake-------	0-8	Loamy coarse sand.	SM, SP-SM	A-2-4	0	0	100	85-100	55-70	10-25	---	NP-4
	8-18	Sand, coarse sand, loamy sand.	SP, SP-SM, SM	A-3, A-2-4	0	0	100	85-100	55-75	2-15	---	NP-4
	18-60	Sand, coarse sand.	SP, SP-SM	A-3, A-1	0	0	100	85-100	40-75	2-10	---	NP
Verndale--------	0-9	Coarse sandy loam.	SM, SC-SM	A-4, A-2-4	0	0	100	85-100	60-85	25-45	15-20	3-6
	9-17	Sandy loam, fine sandy loam, loam.	SC, SC-SM	A-4, A-2-4	0	0	98-100	85-100	60-85	25-45	20-26	5-10
	17-24	Sand, coarse sand, loamy coarse sand.	SM, SP-SM	A-3, A-2-4	0	0	98-100	85-100	50-65	5-20	---	NP-2
	24-60	Sand, coarse sand.	SP, SP-SM	A-3, A-1-b, A-2-4	0	0	96-100	75-100	45-60	3-10	---	NP
1259:												
Hamerly---------	0-8	Clay loam------	CL	A-6, A-7	0	0-5	95-100	90-100	80-95	75-95	35-45	15-25
	8-40	Loam, clay loam	CL, CL-ML	A-4, A-6, A-7	0	0-5	95-100	90-100	80-95	60-75	25-45	10-25
	40-60	Loam, clay loam	CL, CL-ML	A-4, A-6, A-7	0	0-5	95-100	90-100	75-95	55-75	25-45	10-25

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
1259:												
Mustinka---------	0-8	Silty clay loam	CL, CH	A-7	0	0	100	100	90-100	70-95	40-52	20-30
	8-25	Silty clay, silty clay loam, clay.	CH, CL	A-7	0	0	100	100	90-100	75-95	47-72	25-44
	25-36	Silty clay loam, clay loam, silt loam.	CL	A-6, A-7	0	0	100	95-100	85-100	70-95	31-47	12-25
	36-60	Clay loam, silty clay loam, loam.	CL, CH	A-4, A-5, A-6, A-7	0	0	95-100	85-98	75-95	50-90	31-47	12-25
1275B:												
Kandota---------	0-9	Sandy loam-----	SC-SM, SC	A-4, A-6	0	0-5	95-100	75-98	65-85	35-50	21-35	4-11
	9-11	Fine sandy loam, sandy loam, loamy sand.	SM, SC-SM, SC	A-4, A-2-4	0	0-5	95-100	75-98	45-85	20-65	15-28	NP-10
	11-45	Sandy clay loam, loam, fine sandy loam.	SC, CL	A-4, A-6	0	0-10	90-100	75-98	70-85	35-55	28-39	9-18
	45-57	Sandy loam, fine sandy loam, loam.	SC, SC-SM, CL-ML	A-4	0	0-10	85-100	75-98	65-85	35-55	23-28	4-9
	57-80	Sandy loam, fine sandy loam, loam.	SC, SC-SM, CL-ML	A-4	0	0-10	85-100	80-95	65-85	35-55	23-28	5-10
Egglake---------	0-6	Silt loam------	CL, ML, CL-ML	A-4, A-6	0-1	0-5	95-100	85-98	60-90	55-85	20-30	3-12
	6-12	Sandy loam, fine sandy loam, loam.	SM, SC-SM, CL-ML	A-2-4, A-4	0-1	0-5	95-100	85-98	60-85	30-65	15-25	2-6
	12-17	Sandy loam, loam.	SM, SC-SM, CL, CL-ML	A-4, A-2-4, A-2-6	0-1	0-5	90-100	85-98	60-85	30-65	20-30	6-15
	17-52	Sandy clay loam, loam, clay loam.	SC, CL	A-4, A-6	0-1	0-5	90-100	85-98	65-85	40-60	28-39	9-18
	52-80	Sandy loam, fine sandy loam, loam.	SM, SC-SM, SC, CL-ML	A-2-4, A-4, A-2-6	0-1	0-5	90-100	85-98	60-85	30-55	21-28	3-9

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
1275C:												
Kandota	0-9	Sandy loam	SC-SM, SC	A-4, A-6	0	0-5	95-100	75-98	65-85	35-50	21-35	4-11
	9-13	Fine sandy loam, sandy loam, loamy sand.	SM, SC-SM, SC	A-4, A-2-4	0	0-5	95-100	75-98	45-85	20-65	15-28	NP-10
	13-38	Sandy clay loam, loam, fine sandy loam.	SC, CL	A-4, A-6	0	0-10	90-100	75-98	70-85	35-55	28-39	9-18
	38-55	Sandy loam, fine sandy loam, loam.	SC, SC-SM, CL-ML	A-4	0	0-10	85-100	75-98	65-85	35-55	23-28	4-9
	55-80	Sandy loam, fine sandy loam, loam.	SC, SC-SM, CL-ML	A-4	0	0-10	85-100	80-95	65-85	35-55	23-28	5-10
Egglake	0-9	Loam	CL, ML, CL-ML	A-4, A-6	0-1	0-5	95-100	85-98	60-90	55-85	20-30	3-12
	9-14	Sandy loam, fine sandy loam, loam.	SM, SC-SM, CL-ML	A-2-4, A-4	0-1	0-5	95-100	85-98	60-85	30-65	15-25	2-6
	14-22	Sandy loam, loam.	SM, SC-SM, CL, CL-ML	A-4, A-2-4, A-2-6	0-1	0-5	90-100	85-98	60-85	30-65	20-30	6-15
	22-41	Sandy clay loam, loam, clay loam.	SC, CL	A-4, A-6	0-1	0-5	90-100	85-98	65-85	40-60	28-39	9-18
	41-80	Sandy loam, fine sandy loam, loam.	SM, SC-SM, SC, CL-ML	A-2-4, A-4, A-2-6	0-1	0-5	90-100	85-98	60-85	30-55	21-28	3-9
1276:												
Knute	0-10	Fine sandy loam	SM, SC, SC-SM	A-2-4, A-4	0	0-5	95-100	85-95	50-80	30-50	20-30	2-10
	10-12	Sandy clay loam, loam, fine sandy loam.	CL	A-4, A-6	0	0-5	95-100	85-95	55-85	55-70	30-40	8-20
	12-34	Fine sandy loam, sandy loam, loam.	SM, SC, ML, CL	A-4, A-6	0	0-5	95-100	85-95	50-85	35-65	20-30	3-12
	34-48	Fine sandy loam, sandy loam, loam.	SM, SC, ML, CL	A-4, A-6	0	0-5	95-100	85-95	50-85	35-65	15-25	3-12
	48-60	Fine sandy loam, sandy loam, loam.	SM, SC, ML, CL	A-4, A-6	0	0-5	95-100	85-95	50-85	35-60	15-25	3-12

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
1276:												
Brandsvold------	0-11	Fine sandy loam	SC, SC-SM	A-4, A-2, A-6	0-1	0-5	95-100	80-95	60-80	30-50	20-30	5-15
	11-15	Fine sandy loam, sandy loam.	SC, SC-SM	A-4, A-2, A-6	0-1	0-5	95-100	80-95	60-80	30-50	20-30	5-15
	15-29	Sandy clay loam, loam, fine sandy loam.	CL, SC	A-4, A-6	0-1	0-5	95-100	80-95	70-85	45-65	30-40	10-20
	29-60	Fine sandy loam, loam, sandy loam.	CL-ML, ML, SC-SM, SM	A-4	0-1	0-5	95-100	80-95	65-85	35-60	20-30	5-10
1277D:												
Corliss---------	0-8	Loamy sand-----	SM, SP-SM	A-1-b, A-2-4	0	0-5	85-100	80-100	40-70	10-25	15-21	NP-4
	8-20	Loamy sand, gravelly sand, coarse sand.	SP-SM, SM, SP	A-1-b, A-2-4, A-3	0	0-5	75-95	50-85	35-70	2-25	15-21	NP-4
	20-60	Coarse sand, sand, gravelly coarse sand.	SP, SP-SM	A-1-b, A-3	0	0-5	60-95	50-85	30-65	2-10	---	NP
Sverdrup--------	0-9	Sandy loam-----	SM	A-4	0	0	100	95-100	60-70	35-50	---	NP
	9-25	Loam, sandy loam, loamy sand.	ML, SM	A-2, A-4	0	0	100	95-100	50-75	30-70	15-30	NP-5
	25-60	Sand, fine sand	SP, SP-SM	A-3, A-2	0	0	100	95-100	50-90	2-10	---	NP
1289:												
Knute-----------	0-10	Fine sandy loam	SM, SC, SC-SM	A-2-4, A-4	0	0-5	95-100	85-95	50-80	30-50	20-30	2-10
	10-13	Sandy clay loam, loam, fine sandy loam.	CL	A-4, A-6	0	0-5	95-100	85-95	55-85	55-70	30-40	8-20
	13-41	Fine sandy loam, sandy loam, loam.	SM, SC, ML, CL	A-4, A-6	0	0-5	95-100	85-95	50-85	35-65	20-30	3-12
	41-53	Fine sandy loam, sandy loam, loam.	SM, SC, ML, CL	A-4, A-6	0	0-5	95-100	85-95	50-85	35-65	15-25	3-12
	53-60	Fine sandy loam, sandy loam, loam.	SM, SC, ML, CL	A-4, A-6	0	0-5	95-100	85-95	50-85	35-65	15-25	3-12

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
1290:												
Brandsvold------	0-12	Fine sandy loam	SC, SC-SM	A-4, A-2, A-6	0-1	0-5	95-100	80-95	60-80	30-50	20-30	5-15
	12-17	Fine sandy loam, sandy loam.	SC, SC-SM	A-4, A-2, A-6	0-1	0-5	95-100	80-95	60-80	30-50	20-30	5-15
	17-37	Sandy clay loam, loam, fine sandy loam.	CL, SC	A-4, A-6	0-1	0-5	95-100	80-95	70-85	45-65	30-40	10-20
	37-45	Fine sandy loam, loam, sandy loam.	CL-ML, ML, SC-SM, SM	A-4	0-1	0-5	95-100	80-95	65-85	35-60	20-30	5-10
	45-80	Fine sandy loam, loam, sandy loam.	CL-ML, ML, SC-SM, SM	A-4	0-1	0-5	95-100	80-95	65-85	35-60	20-30	5-10
1291:												
Sedgeville------	0-8	Loam----------	CL, CL-ML, SC, SC-SM	A-4, A-6	0	0-5	80-100	75-100	65-100	45-85	20-35	4-15
	8-34	Silt loam, sandy loam, coarse sandy loam.	SM, SC, CL, SC-SM	A-2-4, A-4, A-1	0	0-5	80-100	75-100	35-100	20-90	15-30	3-10
	34-60	Sand, coarse sand, gravelly loamy coarse sand.	SP, SM, GP, SP-SM	A-1	0	0-5	80-100	50-100	15-25	1-20	---	NP
1293:												
Sedgeville------	0-21	Fine sandy loam	SM, SC-SM, ML, CL-ML	A-4, A-2-4, A-1-b	0	0-5	80-100	75-100	45-95	20-65	15-25	3-7
	21-40	Silt loam, sandy loam, coarse sandy loam.	SM, SC, CL, SC-SM	A-2-4, A-4, A-1	0	0-5	80-100	75-100	35-100	20-90	15-30	3-10
	40-60	Sand, coarse sand, gravelly loamy coarse sand.	SP, SM, GP, SP-SM	A-1	0	0-5	80-100	50-100	15-25	1-20	---	NP

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
1304A:												
Glyndon	0-16	Very fine sandy loam.	ML, CL-ML	A-4	0	0	100	100	95-100	70-95	20-30	NP-5
	16-29	Silt loam, very fine sandy loam, loam.	ML, CL-ML, CL	A-4	0	0	100	100	90-100	85-95	20-30	NP-10
	29-60	Loamy very fine sand, very fine sand, very fine sandy loam.	ML, SM, SC, CL	A-4	0	0	100	100	85-100	35-75	10-30	NP-10
1307:												
Rushlake	0-5	Sand	SM, SP, SP-SM	A-1-b, A-2-4, A-3	0	0	95-100	75-100	10-55	2-15	---	NP
	5-60	Gravelly sand, gravelly loamy sand, sand.	SP, SP-SM	A-1-b, A-3	0	0-3	55-95	50-90	15-60	2-10	---	NP
1317:												
Vallers	0-14	Silty clay loam	OL, CL, ML	A-6, A-7	0	0	95-100	95-100	95-100	85-95	30-50	11-20
	14-24	Clay loam, silty clay loam, sandy clay loam.	CL	A-6	0	0	95-100	90-100	80-95	50-80	30-40	11-20
	24-60	Loam, clay loam	CL, CL-ML	A-4, A-6	0	0	95-100	90-100	85-95	60-85	20-40	5-20
1319B:												
Rockwood	0-8	Sandy loam	SM	A-2, A-4	0	5-10	85-100	85-100	60-80	30-40	15-25	NP-4
	8-18	Sandy loam, loamy sand.	SM, SC-SM, SC	A-2, A-4	0	5-10	85-95	85-90	60-75	30-40	15-20	1-8
	18-26	Sandy loam	SM, SC-SM, SC	A-2, A-4	0	5-10	85-95	85-95	60-75	30-40	15-25	2-10
	26-42	Sandy loam	SM, SC-SM, SC	A-2, A-4	0	5-10	85-95	85-95	60-75	30-40	15-25	2-10
	42-60	Sandy loam, loamy sand.	SM, SC-SM, SC	A-2, A-4	0	5-10	85-95	80-90	60-75	25-40	15-25	2-10
1319C:												
Rockwood	0-9	Sandy loam	SM	A-2, A-4	0	5-10	85-100	85-100	60-80	30-40	15-25	NP-4
	9-16	Sandy loam, loamy sand.	SM, SC-SM, SC	A-2, A-4	0	5-10	85-95	85-90	60-75	30-40	15-20	1-8
	16-27	Sandy loam	SM, SC-SM, SC	A-2, A-4	0	5-10	85-95	85-95	60-75	30-40	15-25	2-10
	27-41	Sandy loam	SM, SC-SM, SC	A-2, A-4	0	5-10	85-95	85-95	60-75	30-40	15-25	2-10
	41-60	Sandy loam, loamy sand.	SM, SC-SM, SC	A-2, A-4	0	5-10	85-95	80-90	60-75	25-40	15-25	2-10

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
1319D:												
Rockwood--------	0-5	Sandy loam-----	SM	A-2, A-4	0	5-10	85-100	85-100	60-80	30-40	15-25	NP-4
	5-9	Sandy loam, loamy sand.	SM, SC-SM, SC	A-2, A-4	0	5-10	85-95	85-90	60-75	30-40	15-20	1-8
	9-38	Sandy loam-----	SM, SC-SM, SC	A-2, A-4	0	5-10	85-95	85-95	60-75	30-40	15-25	2-10
	38-45	Sandy loam-----	SM, SC-SM, SC	A-2, A-4	0	5-10	85-95	85-95	60-75	30-40	15-25	2-10
	45-60	Sandy loam, loamy sand.	SM, SC-SM, SC	A-2, A-4	0	5-10	85-95	80-90	60-75	25-40	15-25	2-10
1320B:												
Blowers---------	0-7	Sandy loam-----	SM, SC-SM	A-2, A-4	0	0-10	85-100	85-100	60-80	30-40	20-30	1-7
	7-19	Sandy loam-----	SM, SC-SM	A-2, A-4	0	0-10	85-95	85-90	60-75	30-40	15-20	1-5
	19-36	Sandy loam-----	SM, SC-SM, SC	A-2, A-4	0	0-10	85-95	85-95	60-75	30-40	15-25	2-10
	36-43	Sandy loam-----	SM, SC-SM, SC	A-2, A-4	0	0-10	85-95	80-95	60-75	30-40	15-25	2-10
	43-60	Sandy loam, loamy sand.	SM, SC-SM, SC	A-2, A-4	0	0-10	85-95	80-90	60-75	25-40	15-25	2-10
1321:												
Paddock---------	0-8	Fine sandy loam	SM, SC-SM	A-2, A-4	0	2-10	85-100	80-100	60-80	25-40	15-25	3-7
	8-15	Sandy loam, fine sandy loam.	SM, SC-SM	A-2, A-4	0	0-10	85-95	85-90	60-75	25-40	0-20	NP-5
	15-40	Sandy loam-----	SM, SC-SM, SC	A-2, A-4	0	0-10	85-95	80-95	60-75	25-45	15-30	3-10
	40-60	Sandy loam, loamy sand.	SM, SC-SM, SC	A-2, A-4	0	0-10	85-90	80-90	60-75	25-40	15-25	NP-10
Becida----------	0-8	Loam-----------	ML, CL	A-4, A-6	0-1	0-10	95-100	90-95	80-90	55-80	30-40	7-15
	8-13	Sandy loam, fine sandy loam, loamy sand.	SM, SC-SM	A-2, A-4	0-1	0-10	85-95	75-95	60-75	25-40	0-20	NP-5
	13-27	Sandy loam, fine sandy loam, loamy sand.	SM, SC-SM, SC	A-2, A-4	0-1	0-5	85-95	75-95	60-75	25-45	15-25	2-10
	27-58	Sandy loam, fine sandy loam, loamy sand.	SM, SC-SM, SC	A-2, A-4	0-1	0-5	85-95	75-95	60-75	25-40	15-25	2-10
	58-80	Sandy loam, fine sandy loam.	SM, SC, SC-SM	A-2, A-4	0-1	0-5	85-95	75-95	60-75	25-40	15-25	2-8

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
1322:												
Wolverton-------	0-16	Very fine sandy loam.	CL-ML, SC-SM, CL	A-4, A-6	0	0	100	100	90-100	40-90	15-30	4-11
	16-34	Loamy very fine sand, loamy fine sand, loamy sand.	SM, SC-SM	A-2-4, A-4	0	0	100	100	85-100	30-50	15-25	NP-7
	34-45	Loamy very fine sand, loamy fine sand, fine sand.	SM, SC-SM, SP-SM	A-2-4, A-4	0	0-3	100	90-100	75-90	10-50	15-21	NP-4
	45-80	Clay loam, silty clay loam, loam.	CL	A-4, A-6, A-7	0	1-10	95-100	90-100	50-90	50-80	28-43	9-21
1324B:												
Heimdal---------	0-8	Loam-----------	ML, CL, CL-ML	A-4, A-6	0-1	0-1	95-100	85-95	55-85	50-70	20-35	3-15
	8-18	Loam, fine sandy loam, sandy loam.	SM, SC, ML, CL	A-4, A-6	0-1	0-1	95-100	85-95	50-80	35-65	15-30	3-15
	18-25	Fine sandy loam, loam, sandy loam.	SM, SC, ML, CL	A-4, A-6	0-1	0-1	95-100	85-95	50-80	35-65	15-30	2-12
	25-60	Fine sandy loam, loam, sandy loam.	SM, SC, ML, CL	A-4, A-6	0-1	0-3	95-100	85-95	50-80	35-65	15-30	2-12
Sisseton--------	0-8	Loam-----------	ML, CL	A-4, A-6	0	0-5	95-100	90-100	90-100	60-75	30-40	5-15
	8-22	Loam, silt loam	ML, CL, CL-ML	A-4, A-6	0	0-5	90-100	85-100	75-100	60-90	20-40	3-15
	22-60	Stratified silt loam to sandy loam.	ML, CL, CL-ML	A-4, A-6	0	0-5	90-100	85-100	70-95	50-75	20-35	NP-15
1338:												
Oakcreek--------	0-14	Loam-----------	CL-ML, ML	A-4	0	0	95-100	85-100	85-95	60-85	20-25	3-7
	14-33	Sandy clay loam, loam, silt loam.	SC, SC-SM, CL-ML, SM	A-4, A-2-4, A-1-b	0	0	95-100	85-100	50-80	15-65	20-30	4-9
	33-47	Loamy sand, loamy coarse sand, sand.	SP-SM, SM	A-3, A-2-4, A-4	0	0	80-100	50-85	10-65	10-45	0-20	NP-3
	47-80	Gravelly coarse sand, coarse sand, sand.	SW, SP-SM, GM, SP	A-3, A-1-b, A-2-4	0	0-2	55-100	50-85	10-50	2-35	---	NP

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
1339:												
Borup----------	0-10	Mucky silt loam	ML, OL	A-4, A-8	0	0	100	100	95-100	70-95	20-34	NP-7
	10-16	Very fine sandy loam, loamy very fine sand, silt loam.	ML	A-4	0	0	100	100	95-100	60-95	0-30	NP-5
	16-60	Loamy very fine sand, very fine sand, very fine sandy loam.	ML	A-4	0	0	100	100	85-100	50-90	0-30	NP-5
1340:												
Bluffcreek------	0-8	Sandy loam-----	SM, SC-SM	A-4, A-2-4, A-1-b	0	0-1	95-100	75-100	40-85	25-45	15-25	2-10
	8-31	Sandy loam, coarse sandy loam, gravelly sandy loam.	SM, SC-SM, SC, CL	A-2-4, A-4, A-1-b	0	0	60-95	50-95	30-80	25-70	20-30	3-12
	31-60	Gravelly coarse sand, coarse sand, sand.	SP, SP-SM, SW, GP	A-2, A-3, A-1-b	0	0	50-95	50-95	20-55	2-15	---	NP
Epoufette-------	0-7	Sandy loam-----	SM, SC-SM	A-2, A-4	0	0-5	95-100	65-95	60-75	25-40	15-25	NP-7
	7-10	Loamy sand, sand, gravelly loamy sand.	SM, SP, SP-SM	A-2, A-3	0	0-5	95-100	65-95	50-75	0-30	---	NP
	10-22	Gravelly sandy loam, sandy loam, gravelly loamy sand.	SM, SC-SM, SC	A-2, A-4	0	0-5	95-100	70-95	60-80	25-40	15-25	2-10
	22-60	Gravelly sand, coarse sand, sand.	SP, SP-SM, GP, GP-GM	A-1, A-3, A-2-4	0	0-10	50-90	45-85	30-60	0-10	---	NP

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
1341:												
Clitherall------	0-11	Coarse sandy loam.	SM, SC-SM	A-2-4, A-4	0	0	95-100	85-98	50-85	15-70	15-20	3-9
	11-16	Coarse sandy loam, sandy loam, loam.	SC, SC-SM, CL-ML	A-4, A-2-4, A-1-b	0	0	95-100	85-100	50-85	15-70	15-30	4-14
	16-30	Gravelly coarse sandy loam, loamy sand, gravelly loamy sand.	SM, SP-SM, SC-SM	A-2-4, A-1-b, A-3	0	0-1	55-95	50-90	10-75	10-45	5-25	NP-9
	30-45	Gravelly loamy sand, gravelly sand, gravelly coarse sand.	SP-SM, SM, GP-GM	A-1-a, A-1-b, A-3	0	0-1	50-95	50-90	5-65	2-30	0-20	NP
	45-80	Fine sandy loam, sandy loam, loam.	SC, SC-SM, CL-ML	A-4, A-2-4	0	0-5	85-98	85-98	65-80	35-50	23-28	4-9
Wykeham---------	0-8	Sandy loam-----	SM, SC-SM	A-4	0	0-5	90-100	85-100	65-80	40-50	25-30	2-5
	8-17	Fine sandy loam, loamy sand, sandy loam.	SM, SC-SM	A-4, A-2	0	0-5	85-100	70-95	65-80	25-50	15-20	1-5
	17-32	Loam, sandy clay loam, sandy loam.	SC, CL	A-6	0	0-5	90-100	85-95	70-80	35-60	30-35	10-15
	32-60	Fine sandy loam, sandy loam.	SC-SM, SC	A-4	0	0-5	85-95	85-95	65-80	35-50	20-25	5-10
1342:												
Pinelake--------	0-10	Fine sandy loam	SM, SC-SM	A-4, A-2, A-2-4	0	0	100	85-100	45-95	30-50	15-30	3-9
	10-29	Sandy loam, loam, coarse sandy loam.	SC, CL, SC-SM, SM	A-4, A-6	0	0	95-100	85-100	50-85	40-70	23-30	5-9
	29-70	Loamy sand, gravelly loamy sand.	SP, SW, SP-SM, SW-SM	A-1-b, A-2-4, A-3	0	0-2	85-95	50-95	10-50	2-35	---	NP
	70-80	Sandy loam, sandy clay loam, loam.	SC, SC-SM, SM, CL	A-4, A-6, A-2-4	0	0-2	90-100	85-95	70-80	35-50	23-35	5-15

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
1342:												
Brandsvold------	0-10	Fine sandy loam	SC, SC-SM	A-4, A-2, A-6	0-1	0-5	95-100	80-95	60-80	30-50	20-30	5-15
	10-12	Fine sandy loam, sandy loam.	SC, SC-SM	A-4, A-2, A-6	0-1	0-5	95-100	80-95	60-80	30-50	20-30	5-15
	12-41	Sandy clay loam, loam, fine sandy loam.	CL, SC	A-4, A-6	0-1	0-5	95-100	80-95	70-85	45-65	30-40	10-20
	41-80	Fine sandy loam, loam, sandy loam.	CL-ML, ML, SC-SM, SM	A-4	0-1	0-5	95-100	80-95	65-85	35-60	20-30	5-10
1343C:												
Lida----------	0-8	Sandy loam-----	SC-SM, SM, SC, ML	A-4, A-2-4	0	0-10	85-100	85-100	30-85	15-55	0-28	NP-9
	8-13	Loamy sand, loamy coarse sand, sandy loam.	SM, SP-SM	A-4, A-3, A-2-4	0	0-10	85-100	85-100	30-85	10-55	0-25	NP-7
	13-22	Sandy loam, gravelly sandy loam, gravelly coarse sandy loam.	SM, SC, SC-SM, ML	A-4, A-2-4	0	0-5	85-100	50-85	30-75	15-55	20-28	NP-9
	22-38	Loamy sand, gravelly loamy coarse sand, gravelly loamy sand.	GM, GP-GM, SP-SM, SM	A-1-b, A-2-4, A-4	0	0-5	50-85	50-85	20-65	5-25	---	NP
	38-80	Gravelly coarse sand, sand, gravelly sand.	GP, GW, GP-GM, SP	A-3, A-1-b, A-2-4	0	0-5	50-85	50-85	20-60	2-10	---	NP

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
1343C:												
Almora----------	0-9	Sandy loam-----	SC, SC-SM	A-4	0	0	95-100	85-100	45-75	35-50	23-30	6-11
	9-12	Sandy loam, fine sandy loam, loam.	SC, SC-SM, CL-ML	A-4	0	0	95-100	85-100	45-85	35-65	23-30	6-11
	12-25	Sandy clay loam, gravelly sandy clay loam, loam.	SC, ML, CL	A-4, A-6	0	0-5	95-100	60-98	40-80	40-75	34-39	9-18
	25-28	Gravelly loamy coarse sand, sand, loamy sand.	SM, SP-SM, SC-SM	A-1-a, A-1-b, A-3	0	0-5	90-100	30-98	20-70	5-20	15-20	NP-6
	28-80	Gravelly coarse sand, sand, coarse sand.	SW, SP-SM, SP	A-1-a, A-1-b	0	0-5	90-100	30-98	5-30	0-10	---	NP
Lizzie----------	0-8	Very fine sandy loam.	SM, SC, SC-SM	A-4	0	0	100	97-100	75-95	35-65	15-28	NP-9
	8-18	Silt loam, silty clay loam, loam.	CL, ML	A-4, A-6	0	0	100	97-100	80-100	75-95	28-43	9-21
	18-42	Silt loam, loam, fine sandy loam.	CL, CL-ML	A-4, A-6	0	0	100	97-100	85-100	60-90	15-30	NP-11
	42-80	Very fine sandy loam, silt loam, loamy very fine sand.	CL-ML, SM, SC-SM	A-2-4, A-4	0	0	100	97-100	65-95	15-90	15-26	NP-8

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
1344B:												
Lida----------	0-7	Sandy loam-----	SC-SM, SM, SC, ML	A-4, A-2-4	0	0-10	85-100	85-100	30-85	15-55	0-28	NP-9
	7-23	Sandy loam, gravelly sandy loam, gravelly coarse sandy loam.	SM, SC, SC-SM, ML	A-4, A-2-4	0	0-5	85-100	50-85	30-75	15-55	20-28	NP-9
	23-30	Loamy sand, gravelly loamy coarse sand, gravelly loamy sand.	GM, GP-GM, SP-SM, SM	A-1-b, A-2-4, A-4	0	0-5	50-85	50-85	20-65	5-25	---	NP
	30-80	Gravelly coarse sand, sand, gravelly sand.	GP, GW, GP-GM, SP	A-3, A-1-b, A-2-4	0	0-5	50-85	50-85	20-60	2-10	---	NP
Almora----------	0-10	Fine sandy loam	SC, SC-SM	A-4	0	0	95-100	85-100	45-75	35-50	23-30	6-11
	10-15	Sandy loam, fine sandy loam, loam.	SC, SC-SM, CL-ML	A-4	0	0	95-100	85-100	45-85	35-65	23-30	6-11
	15-39	Sandy clay loam, gravelly sandy clay loam, loam.	SC, ML, CL	A-4, A-6	0	0-5	95-100	60-98	40-80	40-75	34-39	9-18
	39-80	Gravelly coarse sand, sand, coarse sand.	SW, SP-SM, SP	A-1-a, A-1-b	0	0-5	90-100	30-98	5-30	0-10	---	NP
Dent----------	0-15	Fine sandy loam	SM, SC, CL, SC-SM	A-4, A-2-4	0	0	100	95-100	75-95	35-65	15-30	3-10
	15-38	Silt loam, silty clay loam, loam.	CL, CL-ML, ML	A-4, A-6, A-7, A-5	0	0	100	95-100	80-100	75-95	30-50	10-25
	38-62	Silt loam, loam, very fine sandy loam.	CL, CL-ML, ML	A-4, A-6	0	0	100	95-100	85-100	60-95	20-40	3-17
	62-80	Very fine sandy loam, silt loam, loamy very fine sand.	CL-ML, ML, SM, SC-SM	A-2-4, A-4	0	0	100	95-100	65-100	15-90	15-32	NP-12

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
1345:												
Bluffcreek------	0-8	Sandy loam-----	SM, SC-SM	A-4, A-2-4, A-1-b	0	0-1	95-100	75-100	40-85	25-45	15-25	2-10
	8-19	Loamy sand, sand, loamy coarse sand.	SM, SP-SM	A-3, A-1-b, A-2-4	0	0-1	90-100	75-100	35-75	10-35	0-20	NP-5
	19-47	Sandy loam, coarse sandy loam, gravelly sandy loam.	SM, SC-SM, SC, CL	A-2-4, A-4, A-1-b	0	0	60-95	50-95	30-80	25-70	20-30	3-12
	47-60	Gravelly coarse sand, coarse sand, sand.	SP, SP-SM, SW, GP	A-2, A-3, A-1-b	0	0	50-95	50-95	20-55	2-15	---	NP
Rosy----------	0-9	Fine sandy loam	ML, SM, CL-ML, SC-SM	A-4	0	0	100	95-100	70-95	40-65	15-25	NP-6
	9-48	Loam, very fine sandy loam, fine sandy loam.	ML, CL-ML, SM, SC	A-4, A-6	0	0	100	95-100	70-95	40-75	20-35	3-12
	48-60	Stratified sand to silty clay loam.	SM, SC, SC-SM, ML	A-4, A-2-4	0	0	95-100	95-100	60-95	30-75	15-35	2-12
1346:												
Nidaros---------	0-25	Muck----------	PT	A-8	0	0	0	0	0	0	---	NP
	25-42	Mucky loam, sandy loam, sandy clay loam.	SC, CL, SC-SM, OL	A-6, A-2-6, A-2-4	0	0	95-100	85-100	20-85	20-75	20-45	5-25
	42-60	Coarse sand, loamy sand, gravelly coarse sand.	SP, SP-SM, SW-SM	A-1-b, A-3, A-2-4	0	0	60-100	60-100	10-70	3-20	---	NP

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
1347B:												
Kandota	0-8	Loam	SC-SM, CL, CL-ML	A-4, A-6	0	0-5	95-100	75-98	65-95	45-55	21-35	4-11
	8-11	Fine sandy loam, sandy loam, loamy sand.	SM, SC-SM, SC	A-4, A-2-4	0	0-5	95-100	75-98	45-85	20-65	15-28	NP-10
	11-26	Sandy clay loam, loam, fine sandy loam.	SC, CL	A-4, A-6	0	0-10	90-100	75-98	70-85	35-55	28-39	9-18
	26-46	Sandy loam, fine sandy loam, loam.	SC, SC-SM, CL-ML	A-4	0	0-10	85-100	75-98	65-85	35-55	23-28	4-9
	46-80	Sandy loam, fine sandy loam, loam.	SC, SC-SM, CL-ML	A-4	0	0-10	85-100	80-95	65-85	35-55	23-28	5-10
1348:												
Knute	0-11	Loam	ML, CL, CL-ML	A-4, A-6	0	0-5	95-100	85-95	55-85	50-70	20-30	3-15
	11-16	Sandy clay loam, loam, fine sandy loam.	CL	A-4, A-6	0	0-5	95-100	85-95	55-85	55-70	30-40	8-20
	16-45	Fine sandy loam, sandy loam, loam.	SM, SC, ML, CL	A-4, A-6	0	0-5	95-100	85-95	50-85	35-65	20-30	3-12
	45-65	Fine sandy loam, sandy loam, loam.	SM, SC, ML, CL	A-4, A-6	0	0-5	95-100	85-95	50-85	35-65	15-25	3-12
	65-80	Fine sandy loam, sandy loam, loam.	SM, SC, ML, CL	A-4, A-6	0	0-5	95-100	85-95	50-85	35-60	15-25	3-12
1349:												
Clotho	0-14	Loam	ML, CL	A-4, A-6	0	2-5	95-100	90-100	80-90	50-70	30-40	7-15
	14-28	Sandy loam, fine sandy loam, loam.	SM, SC-SM, ML, CL-ML	A-2, A-4, A-6	0	5-10	85-100	80-100	65-85	30-60	20-30	4-12
	28-60	Sandy loam, fine sandy loam, loam.	SM, SC-SM, ML, CL-ML	A-4, A-2, A-6	0	5-10	90-100	80-95	65-85	35-60	20-30	3-10

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
1350:												
Brandsvold------	0-13	Loam----------	CL, CL-ML	A-4, A-6	0-1	0-5	95-100	85-95	65-85	50-65	20-30	5-15
	13-61	Sandy clay loam, loam, fine sandy loam.	CL, SC	A-4, A-6	0-1	0-5	95-100	80-95	70-85	45-65	30-40	10-20
	61-80	Fine sandy loam, loam, sandy loam.	CL-ML, ML, SC-SM, SM	A-4	0-1	0-5	95-100	80-95	65-85	35-60	20-30	5-10
1351:												
Bluffton--------	0-10	Loam----------	CL, ML	A-6, A-7, A-4	0	0	98-100	85-100	85-95	50-80	30-45	10-20
	10-53	Fine sandy loam, loam, sandy clay loam.	SM, ML, CL, SC	A-4, A-6	0-2	0-3	95-100	85-100	70-90	40-60	20-35	3-18
	53-80	Loam, sandy clay loam, fine sandy loam.	CL, ML, SC, SM	A-6, A-4	0-2	0-5	90-100	85-100	70-90	40-65	20-40	3-20
1365:												
Hillview--------	0-7	Fine sandy loam	SM, SC, SC-SM	A-2, A-4, A-2-4	0	0	98-100	93-100	60-85	30-50	15-25	2-10
	7-15	Sandy loam, loamy fine sand, loamy sand.	SM, SC-SM, ML, CL-ML	A-2, A-2-4, A-4	0	0	98-100	93-100	45-85	20-60	10-20	NP-7
	15-29	Sandy loam, fine sandy loam, loam.	SM, SC, CL, ML	A-2, A-2-4, A-4	0	0	98-100	93-100	60-90	35-65	15-30	2-12
	29-60	Stratified very fine sandy loam to fine sand.	SM, SC-SM, ML, CL-ML	A-2, A-2-4, A-4	0	0	98-100	93-100	60-90	20-70	10-20	NP-7

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
1396:												
Sedgeville------	0-7	Loam----------	CL, CL-ML, SC, SC-SM	A-4, A-6	0	0-5	80-100	75-100	65-100	45-85	20-35	4-15
	7-24	Silt loam, sandy loam, coarse sandy loam.	SM, SC, CL, SC-SM	A-2-4, A-4, A-1	0	0-5	80-100	75-100	35-100	20-90	15-30	3-10
	24-60	Sand, coarse sand, gravelly loamy coarse sand.	SP, SM, GP, SP-SM	A-1	0	0-5	80-100	50-100	15-25	1-20	---	NP
Nidaros---------	0-21	Muck----------	PT	A-8	0	0	0	0	0	0	---	NP
	21-27	Sandy clay loam, sandy loam, loam.	SC, CL, CL-ML, SC-SM	A-6, A-2-6, A-4	0	0	95-100	85-100	50-95	30-75	21-40	NP-20
	27-80	Coarse sand, loamy sand, gravelly sand.	SP, SM, SP-SM, SW	A-1-b, A-3, A-2-4	0	0	60-100	50-100	30-70	3-30	---	NP
Aquolls---------	0-10	Loam----------	CL, CL-ML	A-4, A-6	0-5	0-5	95-100	85-100	65-80	50-65	20-30	5-15
	10-24	Sandy loam, sandy clay loam, loam.	CL, SC	A-4, A-6, A-2-4	0-1	0-5	95-100	80-95	65-85	30-65	25-40	10-20
	24-60	Variable-------	SP, SW, SM, ML	A-3, A-4, A-2-4	0-1	0-5	50-95	50-95	20-85	5-60	0-30	NP-10
1397:												
Bemidji---------	0-8	Loamy sand-----	SM, SP-SM, SP	A-2-4, A-2, A-1, A-3	0	0	100	85-100	60-85	10-35	0-20	NP-4
	8-36	Loamy sand, loamy coarse sand, sand.	SM, SP-SM, SP	A-2-4, A-3, A-2, A-1	0	0	100	75-100	60-85	10-35	0-20	NP-4
	36-45	Sandy loam, sandy clay loam, fine sandy loam.	SC, CL, CL-ML, SC-SM	A-4, A-6	0	0-1	100	85-100	70-85	35-65	20-35	10-20
	45-60	Sandy loam, fine sandy loam.	SC, SC-SM	A-4	0	0-1	100	85-100	70-85	35-60	15-25	5-10

Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
1825B:												
Seelyeville-----	0-60	Muck----------	PT	A-8	0	0	0	0	0	0	---	NP
1874:												
Radium----------	0-11	Loamy sand-----	SM, SP-SM	A-2-4	0	0	95-100	95-100	50-70	5-20	0-15	NP
	11-18	Sand, loamy sand, gravelly loamy coarse sand.	SP, SM, SP-SM	A-1, A-2, A-3	0	0-5	75-100	65-95	35-60	3-15	0-15	NP
	18-24	Gravelly sand, gravelly coarse sand, very gravelly coarse sand.	GP, SP, SM, SP-SM	A-1	0	0-5	55-85	25-75	15-40	2-10	0-15	NP
	24-60	Sand, coarse sand, loamy sand.	SP, SM, SP-SM	A-1, A-2, A-3	0	0-5	75-90	75-90	40-80	2-10	---	NP
1943:												
Roscommon-------	0-6	Loamy sand-----	SM, SP-SM	A-2, A-3, A-4	0	0	100	95-100	50-75	5-40	0-14	NP
	6-60	Sand, loamy sand, coarse sand.	SP, SP-SM, SM	A-1, A-2, A-3	0	0	95-100	85-100	40-70	0-15	0-14	NP
1975:												
Oylen-----------	0-13	Sandy loam-----	SM, SC-SM	A-2-4, A-4	0	0	100	85-100	60-85	25-45	15-20	3-6
	13-22	Loam, sandy loam.	SC, SC-SM, CL, CL-ML	A-4	0	0	100	85-100	60-85	35-60	20-30	5-10
	22-26	Loamy sand, sand, coarse sand.	SM, SP-SM	A-3, A-2-4	0	0	98-100	85-100	50-65	5-20	---	NP
	26-60	Sand, coarse sand, gravelly sand.	SP, SP-SM	A-3, A-1-b, A-2-4	0	0	90-100	60-100	35-55	3-10	---	NP

Physical Properties of the Soils

(Entries under "Erosion factors--T" apply to the entire profile. Entries under "Wind erodibility group" and "Wind erodibility index" apply only to the surface layer. Absence of an entry indicates that data were not estimated)

Map symbol and soil name	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Shrink-swell potential	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
								K	Kf	T		
	In	Pct	g/cc	In/hr	In/in		Pct					
7A:												
Hubbard	0-20	4-10	1.45-1.60	6.00-20.00	0.08-0.12	Low	2.0-5.0	0.15	0.15	5	2	134
	20-45	1-5	1.55-1.65	6.00-20.00	0.03-0.07	Low	0.0-0.5	0.15	0.15			
	45-60	0-5	1.55-1.65	6.00-20.00	0.03-0.07	Low	0.0-0.5	0.15	---			
7B:												
Hubbard	0-12	4-10	1.45-1.60	6.00-20.00	0.08-0.12	Low	2.0-5.0	0.15	0.15	5	2	134
	12-42	1-5	1.55-1.65	6.00-20.00	0.03-0.07	Low	0.0-0.5	0.15	0.15			
	42-60	0-5	1.55-1.65	6.00-20.00	0.03-0.07	Low	0.0-0.5	0.15	---			
7C:												
Hubbard	0-9	4-10	1.45-1.60	6.00-20.00	0.08-0.12	Low	2.0-5.0	0.15	0.15	5	2	134
	9-34	1-5	1.55-1.65	6.00-20.00	0.03-0.07	Low	0.0-0.5	0.15	0.15			
	34-60	0-5	1.55-1.65	6.00-20.00	0.03-0.07	Low	0.0-0.5	0.15	---			
26:												
Aazdahl	0-13	27-35	1.30-1.50	0.60-2.00	0.17-0.19	Moderate	4.0-6.0	0.24	0.24	5	6	48
	13-23	27-35	1.40-1.60	0.20-0.60	0.17-0.19	Moderate	1.0-3.0	0.37	0.37			
	23-36	24-35	1.50-1.65	0.20-0.60	0.14-0.17	Moderate	0.0-0.5	0.37	0.37			
	36-60	24-35	1.50-1.65	0.20-0.60	0.14-0.17	Moderate	0.0-0.5	0.37	0.37			
34:												
Parnell	0-18	27-40	1.20-1.30	0.20-0.60	0.18-0.22	Moderate	6.0-10	0.37	0.37	5	7	38
	18-50	35-60	1.20-1.30	0.06-0.20	0.13-0.19	High	1.0-5.0	0.37	0.37			
	50-60	35-45	1.20-1.40	0.06-0.20	0.11-0.19	High	0.0-0.5	0.43	0.43			
38B:												
Waukon	0-8	12-27	1.40-1.60	0.60-2.00	0.20-0.24	Moderate	2.0-6.0	0.24	0.24	5	6	48
	8-32	18-35	1.40-1.60	0.60-2.00	0.15-0.19	Moderate	0.0-0.5	0.32	0.32			
	32-60	18-30	1.45-1.65	0.60-2.00	0.15-0.19	Low	0.0-0.5	0.32	0.32			
38C2:												
Waukon	0-8	12-27	1.40-1.60	0.60-2.00	0.20-0.24	Moderate	2.0-6.0	0.24	0.24	5	6	48
	8-27	18-35	1.40-1.60	0.60-2.00	0.15-0.19	Moderate	0.0-0.5	0.32	0.32			
	27-60	18-30	1.45-1.65	0.60-2.00	0.15-0.19	Low	0.0-0.5	0.32	0.32			
38D2:												
Waukon	0-7	12-27	1.40-1.60	0.60-2.00	0.20-0.24	Moderate	2.0-6.0	0.24	0.24	5	6	48
	7-22	18-35	1.40-1.60	0.60-2.00	0.15-0.19	Moderate	0.0-0.5	0.32	0.32			
	22-60	18-30	1.45-1.65	0.60-2.00	0.15-0.19	Low	0.0-0.5	0.32	0.32			
38E:												
Waukon	0-9	12-27	1.40-1.60	0.60-2.00	0.20-0.24	Moderate	2.0-6.0	0.24	0.24	5	6	48
	9-26	18-35	1.40-1.60	0.60-2.00	0.15-0.19	Moderate	0.0-0.5	0.32	0.32			
	26-60	18-30	1.45-1.65	0.60-2.00	0.15-0.19	Low	0.0-0.5	0.32	0.32			
46:												
Borup	0-13	15-27	1.20-1.40	2.00-6.00	0.20-0.23	Low	4.0-8.0	0.28	0.28	5	4L	86
	13-32	10-18	1.30-1.50	2.00-6.00	0.17-0.20	Low	1.0-3.0	0.32	0.32			
	32-60	5-18	1.35-1.65	2.00-20.00	0.15-0.19	Low	0.0-0.5	0.24	0.24			
53B:												
Kandota	0-8	10-20	1.35-1.60	0.60-6.00	0.14-0.17	Low	2.0-4.0	0.20	0.20	5	3	86
	8-11	5-18	1.35-1.65	0.60-6.00	0.11-0.17	Low	0.5-1.0	0.24	0.24			
	11-32	18-30	1.50-1.75	0.60-2.00	0.16-0.19	Low	0.0-0.5	0.32	0.32			
	32-68	12-18	1.40-1.65	0.60-2.00	0.12-0.17	Low	0.0-0.5	0.28	0.28			
	68-80	7-18	1.50-1.65	0.60-2.00	0.12-0.17	Low	0.0-0.5	0.28	0.28			

Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Shrink-swell potential	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
								K	Kf	T		
	In	Pct	g/cc	In/hr	In/in		Pct					
53C:												
Kandota	0-8	10-20	1.35-1.60	0.60-6.00	0.14-0.17	Low	2.0-4.0	0.20	0.20	5	3	86
	8-24	18-30	1.50-1.75	0.60-2.00	0.16-0.19	Low	0.0-0.5	0.32	0.32			
	24-60	7-18	1.50-1.65	0.60-2.00	0.12-0.17	Low	0.0-0.5	0.28	0.28			
53D:												
Kandota	0-7	10-20	1.35-1.60	0.60-6.00	0.14-0.17	Low	2.0-4.0	0.20	0.20	5	3	86
	7-9	5-18	1.35-1.65	0.60-6.00	0.11-0.17	Low	0.5-1.0	0.24	0.24			
	9-28	18-30	1.50-1.75	0.60-2.00	0.16-0.19	Low	0.0-0.5	0.32	0.32			
	28-60	7-18	1.50-1.65	0.60-2.00	0.12-0.17	Low	0.0-0.5	0.28	0.28			
58:												
Kittson	0-7	10-27	1.30-1.45	0.60-2.00	0.20-0.22	Low	4.0-6.0	0.24	0.24	5	5	56
	7-18	18-30	1.35-1.55	0.60-2.00	0.17-0.19	Low	1.0-3.0	0.32	0.32			
	18-32	18-30	1.40-1.65	0.20-2.00	0.15-0.18	Moderate	0.0-0.5	0.32	0.32			
	32-60	18-30	1.40-1.65	0.20-2.00	0.15-0.18	Moderate	0.0-0.5	0.32	0.32			
59:												
Grimstad	0-10	10-18	1.30-1.45	2.00-6.00	0.13-0.18	Low	2.0-4.0	0.20	0.20	5	3	86
	10-27	2-15	1.45-1.60	6.00-20.00	0.08-0.14	Low	1.0-2.0	0.20	0.20			
	27-60	10-30	1.50-1.65	0.60-2.00	0.11-0.19	Low	0.0-0.5	0.37	0.37			
61:												
Arveson	0-10	20-27	1.20-1.35	0.60-2.00	0.16-0.18	Low	5.0-8.0	0.24	0.24	5	4L	86
	10-30	10-27	1.40-1.55	0.60-6.00	0.15-0.17	Low	1.0-5.0	0.24	0.24			
	30-60	5-20	1.50-1.65	2.00-20.00	0.05-0.15	Low	0.5-1.0	0.17	0.17			
63:												
Rockwell	0-10	20-30	1.20-1.45	0.60-2.00	0.18-0.22	Low	4.0-8.0	0.24	0.24	5	4L	86
	10-27	5-30	1.35-1.50	2.00-6.00	0.15-0.17	Low	0.5-1.0	0.24	0.24			
	27-36	3-10	1.40-1.60	6.00-20.00	0.05-0.07	Low	0.0-0.5	0.24	0.24			
	36-60	15-30	1.40-1.60	0.20-2.00	0.18-0.22	Low	0.0-0.5	0.24	0.24			
65:												
Foxhome	0-13	10-20	1.35-1.50	2.00-6.00	0.13-0.18	Low	3.0-7.0	0.20	0.20	3	3	86
	13-16	10-25	1.35-1.50	2.00-20.00	0.09-0.19	Low	1.0-3.0	0.17	0.24			
	16-35	5-15	1.50-1.70	6.00-20.00	0.02-0.07	Low	0.5-1.0	0.05	0.15			
	35-60	12-35	1.40-1.70	0.60-2.00	0.15-0.22	Low	0.0-0.5	0.32	0.37			
66:												
Flaming	0-16	2-10	1.40-1.55	6.00-20.00	0.11-0.13	Low	2.0-4.0	0.17	0.17	5	2	134
	16-60	2-10	1.50-1.70	6.00-20.00	0.06-0.10	Low	0.5-1.0	0.17	0.17			
68:												
Arveson	0-16	20-27	1.20-1.35	0.60-2.00	0.16-0.18	Low	6.0-10	0.24	0.24	5	4L	86
	16-23	10-27	1.40-1.55	0.60-6.00	0.15-0.17	Low	0.5-1.0	0.24	0.24			
	23-60	5-20	1.50-1.65	2.00-20.00	0.05-0.15	Low	0.0-0.5	0.17	0.17			
107:												
Winger	0-16	18-27	1.20-1.40	0.60-2.00	0.22-0.24	Low	4.0-6.0	0.28	0.28	5	4L	86
	16-29	18-35	1.30-1.50	0.60-2.00	0.22-0.24	Low	0.5-2.0	0.28	0.28			
	29-60	18-32	1.50-1.70	0.20-2.00	0.14-0.19	Low	0.0-0.5	0.28	0.28			
108:												
McIntosh	0-12	18-27	1.35-1.50	0.60-2.00	0.20-0.24	Low	4.0-7.0	0.28	0.28	5	4L	86
	12-25	18-35	1.40-1.50	0.60-2.00	0.16-0.22	Moderate	0.5-1.0	0.43	0.43			
	25-60	18-35	1.30-1.60	0.20-2.00	0.14-0.19	Moderate	0.0-0.5	0.37	0.37			

Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Shrink-swell potential	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
								K	Kf	T		
	In	Pct	g/cc	In/hr	In/in		Pct					
121:												
Wykeham	0-8	5-18	1.30-1.55	0.60-6.00	0.13-0.18	Low	2.0-6.0	0.17	0.20	5	3	86
	8-14	5-15	1.50-1.70	0.60-2.00	0.10-0.17	Low	1.0-2.0	0.24	0.28			
	14-28	18-30	1.50-1.70	0.60-2.00	0.12-0.18	Moderate	0.5-1.0	0.24	0.28			
	28-60	10-18	1.55-1.75	0.60-2.00	0.11-0.16	Low	0.0-0.5	0.24	0.28			
127A:												
Sverdrup	0-7	10-18	1.35-1.50	2.00-6.00	0.13-0.15	Low	2.0-4.0	0.20	0.20	4	3	86
	7-17	6-18	1.40-1.55	2.00-6.00	0.08-0.14	Low	0.5-2.0	0.20	0.20			
	17-60	0-10	1.50-1.65	6.00-20.00	0.02-0.06	Low	0.0-0.5	0.15	0.15			
127B:												
Sverdrup	0-12	10-18	1.35-1.50	2.00-6.00	0.13-0.15	Low	2.0-4.0	0.20	0.20	4	3	86
	12-24	6-18	1.40-1.55	2.00-6.00	0.08-0.14	Low	0.5-2.0	0.20	0.20			
	24-60	0-10	1.50-1.65	6.00-20.00	0.02-0.06	Low	0.0-0.5	0.15	0.15			
127C:												
Sverdrup	0-8	10-18	1.35-1.50	2.00-6.00	0.13-0.15	Low	2.0-4.0	0.20	0.20	4	3	86
	8-15	6-18	1.40-1.55	2.00-6.00	0.08-0.14	Low	0.5-2.0	0.20	0.20			
	15-60	0-10	1.50-1.65	6.00-20.00	0.02-0.06	Low	0.0-0.5	0.15	0.15			
141B:												
Egeland	0-15	10-18	1.25-1.35	2.00-6.00	0.11-0.17	Low	1.0-3.0	0.20	0.20	5	3	86
	15-42	10-18	1.30-1.45	2.00-6.00	0.09-0.15	Low	0.5-2.0	0.20	0.20			
	42-60	5-10	1.40-1.65	2.00-6.00	0.08-0.10	Low	0.0-0.5	0.17	0.17			
141C:												
Egeland	0-11	10-18	1.25-1.35	2.00-6.00	0.11-0.17	Low	1.0-3.0	0.20	0.20	5	3	86
	11-35	10-18	1.30-1.45	2.00-6.00	0.09-0.15	Low	0.5-2.0	0.20	0.20			
	35-60	5-10	1.40-1.65	2.00-6.00	0.08-0.10	Low	0.0-0.5	0.17	0.17			
141D:												
Egeland	0-9	10-18	1.25-1.35	2.00-6.00	0.11-0.17	Low	1.0-3.0	0.20	0.20	5	3	86
	9-30	10-18	1.30-1.45	2.00-6.00	0.09-0.15	Low	0.5-2.0	0.20	0.20			
	30-60	5-10	1.40-1.65	2.00-6.00	0.08-0.10	Low	0.0-0.5	0.17	0.17			
168B:												
Forman	0-9	27-30	1.20-1.40	0.60-2.00	0.17-0.19	Moderate	4.0-8.0	0.24	0.28	5	6	48
	9-24	30-35	1.30-1.50	0.60-2.00	0.15-0.19	Moderate	0.5-1.0	0.28	0.32			
	24-60	18-35	1.30-1.50	0.20-0.60	0.14-0.19	Moderate	0.0-0.5	0.37	0.43			
180:												
Gonvick	0-15	10-27	1.30-1.45	0.60-2.00	0.20-0.22	Moderate	2.0-5.0	0.24	0.24	5	6	48
	15-35	22-35	1.35-1.50	0.20-2.00	0.15-0.19	Moderate	1.0-3.0	0.32	0.32			
	35-60	18-35	1.40-1.65	0.60-2.00	0.15-0.19	Low	0.0-0.5	0.32	0.32			
184:												
Hamerly	0-10	18-27	1.20-1.60	0.60-2.00	0.20-0.24	Low	4.0-7.0	0.28	0.28	5	4L	86
	10-38	18-30	1.20-1.60	0.60-2.00	0.15-0.19	Low	0.5-1.0	0.28	0.32			
	38-60	18-30	1.30-1.60	0.60-2.00	0.14-0.19	Low	0.0-0.5	0.37	0.37			
187:												
Haug	0-14	---	0.13-0.42	0.60-6.00	0.35-0.48	---	50-90	---	---	5	2	134
	14-20	10-18	1.20-1.60	0.60-6.00	0.12-0.24	Low	4.0-6.0	0.20	0.20			
	20-60	10-18	1.40-1.60	0.60-2.00	0.11-0.19	Low	0.5-1.0	0.20	0.20			
191:												
Epoufette	0-7	5-15	1.35-1.50	2.00-6.00	0.09-0.14	Low	2.0-6.0	0.20	---	4	3	86
	7-33	8-18	1.40-1.60	2.00-6.00	0.08-0.14	Low	0.0-0.5	0.17	0.17			
	33-60	0-8	1.40-1.65	>20.00	0.01-0.03	Low	0.0-0.5	0.10	0.15			

Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Shrink-swell potential	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
								K	Kf	T		
	In	Pct	g/cc	In/hr	In/in		Pct					
202:												
Meehan----------	0-8	4-10	1.35-1.65	2.00-6.00	0.10-0.12	Low------	0.5-3.0	0.17	0.17	5	2	134
	8-24	4-9	1.60-1.70	6.00-20.00	0.06-0.11	Low------	0.0-0.5	0.15	0.15			
	24-60	1-4	1.60-1.70	6.00-20.00	0.02-0.07	Low------	0.0-0.5	0.15	0.15			
258A:												
Sandberg--------	0-11	2-10	1.40-1.60	6.00-20.00	0.10-0.12	Low------	1.0-3.0	0.15	0.15	5	2	134
	11-33	0-10	1.50-1.65	6.00-20.00	0.03-0.10	Low------	0.5-1.0	0.05	0.10			
	33-60	0-5	1.50-1.65	>20.00	0.02-0.06	Low------	0.0-0.5	0.05	0.10			
258B:												
Sandberg--------	0-12	2-10	1.40-1.60	6.00-20.00	0.10-0.12	Low------	1.0-3.0	0.15	0.15	5	2	134
	12-19	0-10	1.50-1.65	6.00-20.00	0.03-0.10	Low------	0.5-1.0	0.05	0.10			
	19-29	0-5	1.50-1.65	>20.00	0.02-0.06	Low------	0.5-1.0	0.05	0.10			
	29-80	0-5	1.50-1.65	>20.00	0.02-0.06	Low------	0.0-0.5	0.05	0.10			
258C:												
Sandberg--------	0-10	2-10	1.40-1.60	6.00-20.00	0.10-0.12	Low------	1.0-3.0	0.15	0.15	5	2	134
	10-17	0-10	1.50-1.65	6.00-20.00	0.03-0.10	Low------	0.5-1.0	0.05	0.10			
	17-44	0-5	1.50-1.65	>20.00	0.02-0.06	Low------	0.5-1.0	0.05	0.10			
	44-60	0-5	1.50-1.65	>20.00	0.02-0.06	Low------	0.0-0.5	0.05	0.10			
260:												
Duelm-----------	0-16	2-10	1.40-1.60	6.00-20.00	0.08-0.12	Low------	2.0-6.0	0.17	0.17	5	2	134
	16-56	1-8	1.55-1.65	6.00-20.00	0.06-0.11	Low------	0.0-0.5	0.15	0.15			
	56-60	0-6	1.55-1.65	6.00-20.00	0.02-0.07	Low------	0.0-0.5	0.15	0.15			
267B:												
Snellman--------	0-9	5-18	1.35-1.60	0.60-6.00	0.13-0.18	Low------	1.0-3.0	0.20	0.20	5	3	86
	9-15	5-15	1.50-1.70	0.60-2.00	0.09-0.14	Low------	0.5-2.0	0.28	0.28			
	15-31	18-30	1.50-1.70	0.60-2.00	0.12-0.18	Moderate	0.0-0.5	0.28	0.28			
	31-60	7-18	1.60-1.80	0.60-2.00	0.11-0.16	Low------	0.0-0.5	0.28	0.28			
267C:												
Snellman--------	0-7	5-18	1.35-1.60	0.60-6.00	0.13-0.18	Low------	1.0-3.0	0.20	0.20	5	3	86
	7-15	5-15	1.50-1.70	0.60-2.00	0.09-0.14	Low------	0.5-2.0	0.28	0.28			
	15-31	18-30	1.50-1.70	0.60-2.00	0.12-0.18	Moderate	0.0-0.5	0.28	0.28			
	31-45	7-18	1.60-1.80	0.60-2.00	0.11-0.16	Low------	0.0-0.5	0.28	0.28			
	45-60	7-18	1.60-1.80	0.60-2.00	0.11-0.16	Low------	0.0-0.5	0.28	0.28			
267E:												
Snellman--------	0-3	5-18	1.35-1.60	0.60-6.00	0.13-0.18	Low------	1.0-3.0	0.20	0.20	5	3	86
	3-14	5-15	1.50-1.70	0.60-2.00	0.09-0.14	Low------	0.5-2.0	0.28	0.28			
	14-26	18-30	1.50-1.70	0.60-2.00	0.12-0.18	Moderate	0.0-0.5	0.28	0.28			
	26-39	7-18	1.60-1.80	0.60-2.00	0.11-0.16	Low------	0.0-0.5	0.28	0.28			
	39-60	7-18	1.60-1.80	0.60-2.00	0.11-0.16	Low------	0.0-0.5	0.28	0.28			
267F:												
Snellman--------	0-3	5-18	1.35-1.60	0.60-6.00	0.13-0.18	Low------	1.0-3.0	0.20	0.20	5	3	86
	3-16	5-15	1.50-1.70	0.60-2.00	0.09-0.14	Low------	0.5-2.0	0.28	0.28			
	16-32	18-30	1.50-1.70	0.60-2.00	0.12-0.18	Moderate	0.0-0.5	0.28	0.28			
	32-40	7-18	1.60-1.80	0.60-2.00	0.11-0.16	Low------	0.0-0.5	0.28	0.28			
	40-60	7-18	1.60-1.80	0.60-2.00	0.11-0.16	Low------	0.0-0.5	0.28	0.28			
290:												
Rothsay---------	0-14	10-18	1.20-1.40	0.60-2.00	0.22-0.24	Low------	3.0-6.0	0.32	0.32	5	5	56
	14-22	10-18	1.20-1.40	0.60-2.00	0.17-0.22	Low------	0.5-1.0	0.43	0.43			
	22-31	5-18	1.20-1.40	0.60-6.00	0.20-0.22	Low------	0.0-0.5	0.43	0.43			
	31-60	5-18	1.20-1.40	0.60-6.00	0.20-0.22	Low------	0.0-0.5	0.43	0.43			

Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Shrink-swell potential	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
								K	Kf	T		
	In	Pct	g/cc	In/hr	In/in		Pct					
293B:												
Swenoda	0-15	10-20	1.25-1.35	2.00-6.00	0.11-0.17	Low	2.0-7.0	0.20	0.20	5	3	86
	15-29	10-18	1.30-1.45	2.00-6.00	0.11-0.17	Low	1.0-3.0	0.20	0.20			
	29-60	20-35	1.35-1.65	0.20-2.00	0.17-0.20	Moderate	0.0-1.0	0.43	0.43			
335:												
Urness	0-9	18-27	0.25-0.50	0.20-2.00	0.18-0.24	Moderate	10-50	0.28	0.28	5	4L	86
	9-60	18-35	0.30-1.00	0.20-2.00	0.16-0.22	Moderate	10-50	0.28	0.28			
339:												
Fordville	0-10	18-25	1.20-1.30	0.60-2.00	0.18-0.20	Low	3.0-7.0	0.24	0.24	4	6	48
	10-29	18-30	1.25-1.40	0.60-2.00	0.18-0.21	Moderate	1.0-4.0	0.28	0.28			
	29-37	15-30	1.25-1.45	0.60-6.00	0.12-0.18	Low	0.0-2.0	0.28	0.28			
	37-60	0-5	1.60-1.80	6.00-60.00	0.03-0.06	Low	0.0-0.5	0.10	0.17			
341A:												
Arvilla	0-13	6-18	1.40-1.60	2.00-6.00	0.13-0.15	Low	1.0-4.0	0.20	0.20	3	3	86
	13-20	6-18	1.40-1.60	2.00-6.00	0.11-0.14	Low	1.0-2.0	0.20	0.20			
	20-60	2-10	1.40-1.60	6.00-20.00	0.02-0.05	Low	0.0-0.5	0.10	0.20			
341B:												
Arvilla	0-9	6-18	1.40-1.60	2.00-6.00	0.13-0.15	Low	1.0-4.0	0.20	0.20	3	3	86
	9-19	6-18	1.40-1.60	2.00-6.00	0.11-0.14	Low	1.0-2.0	0.20	0.20			
	19-60	2-10	1.40-1.60	6.00-20.00	0.02-0.05	Low	0.0-0.5	0.10	0.20			
371:												
Clontarf	0-13	10-18	1.35-1.55	2.00-6.00	0.13-0.18	Low	2.0-4.0	0.20	0.20	4	3	86
	13-24	10-18	1.45-1.60	2.00-6.00	0.12-0.19	Low	0.5-1.0	0.20	0.20			
	24-60	5-10	1.55-1.70	6.00-20.00	0.05-0.09	Low	0.0-0.5	0.15	0.15			
375:												
Forada	0-18	10-22	1.20-1.40	0.60-2.00	0.20-0.22	Low	5.0-9.0	0.24	0.24	4	5	56
	18-36	8-18	1.30-1.50	0.60-6.00	0.12-0.19	Low	0.5-1.0	0.28	0.28			
	36-60	0-5	1.50-1.70	6.00-20.00	0.02-0.10	Low	0.0-0.5	0.15	0.17			
402C:												
Sioux	0-10	3-10	1.40-1.50	2.00-6.00	0.08-0.12	Low	1.0-2.0	0.17	0.17	2	2	134
	10-60	0-10	1.60-1.70	6.00-20.00	0.03-0.06	Low	0.0-0.5	0.10	0.32			
402E:												
Sioux	0-10	3-10	1.40-1.50	2.00-6.00	0.08-0.12	Low	1.0-2.0	0.17	0.17	2	2	134
	10-60	0-10	1.60-1.70	6.00-20.00	0.03-0.06	Low	0.0-0.5	0.10	0.32			
406A:												
Dorset	0-11	4-18	1.40-1.55	2.00-6.00	0.13-0.15	Low	3.0-5.0	0.20	0.20	4	3	86
	11-20	10-18	1.45-1.65	2.00-6.00	0.12-0.19	Low	1.0-2.0	0.28	0.28			
	20-60	0-5	1.55-1.65	6.00-20.00	0.02-0.04	Low	0.0-0.5	0.10	0.15			
406B:												
Dorset	0-11	4-18	1.40-1.55	2.00-6.00	0.13-0.15	Low	3.0-5.0	0.20	0.20	4	3	86
	11-20	10-18	1.45-1.65	2.00-6.00	0.12-0.19	Low	1.0-2.0	0.28	0.28			
	20-38	5-10	1.55-1.65	6.00-20.00	0.06-0.10	Low	0.0-0.5	0.10	0.17			
	38-60	0-5	1.55-1.65	6.00-20.00	0.02-0.04	Low	0.0-0.5	0.10	0.15			
418:												
Lamoure	0-32	27-34	1.15-1.25	0.20-2.00	0.19-0.22	Moderate	4.0-8.0	0.28	0.28	5	4L	86
	32-40	20-34	1.20-1.35	0.20-2.00	0.17-0.20	Moderate	1.0-3.0	0.32	0.32			
	40-48	20-34	1.20-1.35	0.20-2.00	0.17-0.20	Moderate	0.5-1.0	0.43	0.43			
	48-60	20-34	1.25-1.40	0.20-2.00	0.09-0.18	Moderate	0.0-0.5	0.28	0.28			

Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Shrink-swell potential	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
								K	Kf	T		
	In	Pct	g/cc	In/hr	In/in		Pct					
422B:												
Bygland	0-10	27-40	1.20-1.40	0.20-0.60	0.18-0.22	High	4.0-8.0	0.28	0.28	5	7	38
	10-41	35-60	1.20-1.40	0.06-0.60	0.10-0.19	High	1.0-3.0	0.32	0.32			
	41-46	18-40	1.30-1.50	0.20-0.60	0.16-0.22	Moderate	0.5-1.0	0.43	0.43			
	46-60	18-40	1.30-1.50	0.20-0.60	0.16-0.22	Moderate	0.0-0.5	0.43	0.43			
422C:												
Bygland	0-8	27-40	1.20-1.40	0.20-0.60	0.18-0.22	High	4.0-8.0	0.28	0.28	5	7	38
	8-16	35-60	1.20-1.40	0.06-0.60	0.10-0.19	High	1.0-3.0	0.32	0.32			
	16-22	18-40	1.30-1.50	0.20-0.60	0.16-0.22	Moderate	0.5-1.0	0.43	0.43			
	22-60	18-40	1.30-1.50	0.20-0.60	0.16-0.22	Moderate	0.0-0.5	0.43	0.43			
426:												
Foldahl	0-14	4-9	1.40-1.55	6.00-20.00	0.10-0.14	Low	1.0-4.0	0.20	0.20	5	2	134
	14-26	2-10	1.45-1.60	6.00-20.00	0.07-0.12	Low	0.5-1.0	0.20	0.20			
	26-40	18-35	1.50-1.65	0.20-2.00	0.14-0.19	Moderate	0.0-0.5	0.37	0.37			
	40-60	18-35	1.50-1.65	0.20-2.00	0.14-0.19	Moderate	0.0-0.5	0.37	0.37			
441A:												
Almora	0-11	12-20	1.30-1.55	0.60-2.00	0.20-0.22	Low	3.0-5.0	0.24	0.24	4	5	56
	11-15	12-20	1.30-1.55	0.60-2.00	0.12-0.19	Low	1.0-2.0	0.28	0.28			
	15-38	18-30	1.30-1.55	0.60-2.00	0.14-0.19	Moderate	0.5-1.0	0.32	0.32			
	38-46	3-12	1.55-1.65	6.00-20.00	0.02-0.11	Low	0.0-0.5	0.10	0.15			
	46-60	1-4	1.55-1.65	6.00-20.00	0.02-0.07	Low	0.0-0.5	0.10	0.15			
441B:												
Almora	0-9	12-20	1.30-1.55	0.60-2.00	0.20-0.22	Low	3.0-5.0	0.24	0.24	4	5	56
	9-13	12-20	1.30-1.55	0.60-2.00	0.12-0.19	Low	1.0-2.0	0.28	0.28			
	13-27	18-30	1.30-1.55	0.60-2.00	0.14-0.19	Moderate	0.5-1.0	0.32	0.32			
	27-60	1-4	1.55-1.65	6.00-20.00	0.02-0.07	Low	0.0-0.5	0.10	0.15			
441C:												
Almora	0-10	12-20	1.30-1.55	0.60-2.00	0.20-0.22	Low	3.0-5.0	0.24	0.24	4	5	56
	10-13	12-20	1.30-1.55	0.60-2.00	0.12-0.19	Low	1.0-2.0	0.28	0.28			
	13-33	18-30	1.30-1.55	0.60-2.00	0.14-0.19	Moderate	0.5-1.0	0.32	0.32			
	33-60	1-4	1.55-1.65	6.00-20.00	0.02-0.07	Low	0.0-0.5	0.10	0.15			
481:												
Kratka	0-9	5-15	1.20-1.50	2.00-6.00	0.13-0.18	Low	2.0-5.0	0.20	0.20	5	3	86
	9-25	2-10	1.30-1.60	6.00-20.00	0.06-0.11	Low	0.5-1.0	0.17	0.17			
	25-60	10-35	1.50-1.80	0.20-2.00	0.11-0.19	Moderate	0.0-0.5	0.37	0.37			
494:												
Darnen	0-36	18-27	1.25-1.40	0.60-2.00	0.20-0.24	Low	4.0-9.0	0.28	0.28	5	6	48
	36-43	18-30	1.40-1.60	0.60-2.00	0.15-0.19	Moderate	1.0-3.0	0.28	0.28			
	43-60	18-30	1.55-1.65	0.60-2.00	0.14-0.19	Moderate	0.0-0.5	0.37	0.37			
497:												
Hantho	0-9	10-27	1.20-1.40	0.20-2.00	0.22-0.24	Low	4.0-6.0	0.28	0.28	5	5	56
	9-22	10-18	1.30-1.50	0.60-2.00	0.17-0.22	Low	2.0-4.0	0.28	0.28			
	22-31	10-18	1.30-1.55	0.60-2.00	0.17-0.22	Low	0.0-1.0	0.43	0.43			
	31-60	10-35	1.30-1.60	0.60-2.00	0.17-0.22	Low	0.0-0.5	0.43	0.43			
508:												
Wyndmere	0-12	5-15	1.10-1.35	2.00-6.00	0.13-0.18	Low	5.0-8.0	0.20	0.20	5	3	86
	12-38	3-15	1.30-1.50	2.00-6.00	0.12-0.17	Low	1.0-5.0	0.24	0.24			
	38-60	3-15	1.30-1.70	2.00-20.00	0.05-0.16	Low	0.0-1.0	0.24	0.24			
540:												
Seelyeville	0-8	---	0.10-0.25	0.20-6.00	0.35-0.45	---	25-99	---	---	3	2	134
	8-80	---	0.10-0.25	0.20-6.00	0.35-0.45	---	25-99	---	---			

Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Shrink-swell potential	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
								K	Kf	T		
	In	Pct	g/cc	In/hr	In/in		Pct					
541:												
Rifle	0-21	---	0.20-0.35	0.60-6.00	0.48-0.58		75-99	---	---	3	5	56
	21-80	---	0.08-0.20	0.60-6.00	0.48-0.58		25-99	---	---			
544:												
Cathro	0-16	---	0.28-0.45	0.20-6.00	0.45-0.55		60-85	---	---	2	2	134
	16-38	---	0.15-0.30	0.20-6.00	0.35-0.45		60-85	---	---			
	38-60	10-30	1.50-1.70	0.20-2.00	0.11-0.22	Low	1.0-5.0	0.20	0.24			
567A:												
Verndale	0-9	7-12	1.50-1.70	2.00-6.00	0.13-0.17	Low	2.0-4.0	0.20	0.20	3	3	86
	9-21	7-18	1.60-1.70	0.60-2.00	0.14-0.18	Low	0.5-1.0	0.24	0.24			
	21-38	2-6	1.45-1.60	6.00-20.00	0.06-0.08	Low	0.0-0.5	0.10	0.10			
	38-60	0-4	1.45-1.60	6.00-20.00	0.02-0.06	Low	0.0-0.5	0.10	0.10			
567B:												
Verndale	0-10	7-12	1.50-1.70	2.00-6.00	0.13-0.17	Low	2.0-4.0	0.20	0.20	3	3	86
	10-18	7-18	1.60-1.70	0.60-2.00	0.14-0.18	Low	0.5-1.0	0.24	0.24			
	18-29	2-6	1.45-1.60	6.00-20.00	0.06-0.08	Low	0.0-0.5	0.10	0.10			
	29-60	0-4	1.45-1.60	6.00-20.00	0.02-0.06	Low	0.0-0.5	0.10	0.10			
609B:												
Dickey	0-13	2-14	1.40-1.60	6.00-20.00	0.08-0.12	Low	1.0-3.0	0.17	0.17	5	2	134
	13-28	2-14	1.40-1.60	6.00-20.00	0.06-0.12	Low	---	0.17	0.17			
	28-60	18-39	1.30-1.70	0.20-2.00	0.14-0.19	Moderate	---	0.37	0.37			
624:												
Rosy	0-9	3-12	1.40-1.55	0.60-2.00	0.14-0.19	Low	0.5-2.0	0.24	0.24	5	3	86
	9-26	8-18	1.50-1.65	0.60-2.00	0.14-0.19	Low	0.0-0.5	0.28	0.28			
	26-60	6-18	1.55-1.70	0.60-2.00	0.11-0.17	Low	0.0-0.5	0.28	0.28			
646C:												
Peever	0-9	27-35	1.25-1.35	0.20-0.60	0.19-0.22	Moderate	3.0-6.0	0.24	0.24	5	6	48
	9-18	35-50	1.25-1.40	0.06-0.60	0.11-0.19	High	1.0-4.0	0.37	0.37			
	18-37	30-45	1.50-1.70	0.06-0.60	0.08-0.17	High	0.0-1.0	0.37	0.37			
	37-60	30-45	1.50-1.70	0.06-0.60	0.08-0.17	High	0.0-0.5	0.37	0.37			
646D:												
Peever	0-8	27-35	1.25-1.35	0.20-0.60	0.19-0.22	Moderate	3.0-6.0	0.24	0.24	5	6	48
	8-21	35-50	1.25-1.40	0.06-0.60	0.11-0.19	High	1.0-4.0	0.37	0.37			
	21-60	30-45	1.50-1.70	0.06-0.60	0.08-0.17	High	0.0-0.5	0.37	0.37			
670:												
Knute	0-9	10-18	1.35-1.65	0.60-2.00	0.13-0.18	Low	2.0-4.0	0.20	0.20	5	3	86
	9-22	18-28	1.30-1.65	0.60-2.00	0.15-0.19	Low	1.0-2.0	0.32	0.32			
	22-29	10-18	1.40-1.65	0.60-2.00	0.11-0.19	Low	0.5-1.0	0.28	0.28			
	29-60	10-18	1.45-1.70	0.60-2.00	0.11-0.19	Low	0.0-0.5	0.28	0.28			
680:												
Parnell	0-27	22-27	1.25-1.35	0.60-2.00	0.20-0.24	Low	5.0-8.0	0.28	0.28	5	6	48
	27-49	35-60	1.45-1.65	0.06-0.20	0.13-0.19	High	1.0-5.0	0.28	0.28			
	49-60	22-40	1.50-1.70	0.06-0.60	0.14-0.19	Moderate	0.0-0.5	0.28	0.28			
698:												
Doran	0-9	27-35	1.25-1.45	0.20-0.60	0.18-0.23	Moderate	4.0-8.0	0.32	0.32	5	6	48
	9-19	35-50	1.30-1.60	0.06-0.60	0.15-0.19	High	0.5-3.0	0.32	0.32			
	19-32	20-40	1.45-1.65	0.06-0.20	0.14-0.16	High	0.5-1.0	0.37	0.37			
	32-60	20-40	1.45-1.65	0.20-2.00	0.14-0.16	High	0.0-0.5	0.37	0.37			

Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Shrink-swell potential	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
								K	Kf	T		
	In	Pct	g/cc	In/hr	In/in		Pct					
701:												
Runeberg	0-10	10-25	1.40-1.55	0.60-2.00	0.18-0.25	Low	4.0-12	0.24	0.24	5	5	56
	10-36	10-18	1.60-1.75	0.20-0.60	0.12-0.18	Low	0.5-2.0	0.24	0.24			
	36-60	6-15	1.65-1.75	0.06-0.60	0.06-0.13	Low	0.0-0.5	0.24	0.24			
705B:												
Nitche	0-16	8-18	1.45-1.65	2.00-6.00	0.13-0.19	Low	3.0-5.0	0.20	0.20	4	3	86
	16-24	8-18	1.45-1.65	0.60-6.00	0.12-0.19	Low	0.5-1.0	0.17	0.24			
	24-33	5-10	1.55-1.65	6.00-20.00	0.06-0.10	Low	0.0-0.5	0.10	0.17			
	33-55	1-5	1.55-1.65	6.00-20.00	0.02-0.04	Low	0.0-0.5	0.05	0.15			
	55-80	10-18	1.65-1.80	0.60-2.00	0.12-0.17	Low	0.0-0.5	0.24	0.24			
Kandota	0-7	10-20	1.35-1.60	0.60-6.00	0.14-0.17	Low	2.0-4.0	0.20	0.20	5	3	86
	7-11	5-18	1.35-1.65	0.60-6.00	0.11-0.17	Low	0.5-1.0	0.24	0.24			
	11-28	18-30	1.50-1.75	0.60-2.00	0.16-0.19	Low	0.0-0.5	0.32	0.32			
	28-48	12-18	1.40-1.65	0.60-2.00	0.12-0.17	Low	0.0-0.5	0.28	0.28			
	48-80	7-18	1.50-1.65	0.60-2.00	0.12-0.17	Low	0.0-0.5	0.28	0.28			
Lida	0-9	5-18	1.40-1.60	2.00-6.00	0.13-0.18	Low	2.0-4.0	0.17	0.20	5	3	86
	9-19	3-15	1.40-1.60	2.00-20.00	0.08-0.13	Low	0.0-0.5	0.10	0.17			
	19-28	8-18	1.45-1.65	2.00-6.00	0.08-0.17	Low	0.5-1.0	0.15	0.24			
	28-60	1-5	1.60-1.70	6.00-20.00	0.01-0.07	Low	0.0-0.5	0.05	0.10			
705C:												
Nitche	0-15	8-18	1.45-1.65	2.00-6.00	0.13-0.19	Low	3.0-5.0	0.20	0.20	4	3	86
	15-23	8-18	1.45-1.65	0.60-6.00	0.12-0.19	Low	0.5-1.0	0.17	0.24			
	23-41	5-10	1.55-1.65	6.00-20.00	0.06-0.10	Low	0.0-0.5	0.10	0.17			
	41-60	10-18	1.65-1.80	0.60-2.00	0.12-0.17	Low	0.0-0.5	0.24	0.24			
Kandota	0-7	10-20	1.35-1.60	0.60-6.00	0.14-0.17	Low	2.0-4.0	0.20	0.20	5	3	86
	7-13	5-18	1.35-1.65	0.60-6.00	0.11-0.17	Low	0.5-1.0	0.24	0.24			
	13-33	18-30	1.50-1.75	0.60-2.00	0.16-0.19	Low	0.0-0.5	0.32	0.32			
	33-47	12-18	1.40-1.65	0.60-2.00	0.12-0.17	Low	0.0-0.5	0.28	0.28			
	47-60	7-18	1.50-1.65	0.60-2.00	0.12-0.17	Low	0.0-0.5	0.28	0.28			
Lida	0-6	5-18	1.40-1.60	2.00-6.00	0.13-0.18	Low	2.0-4.0	0.17	0.20	5	3	86
	6-17	3-15	1.40-1.60	2.00-20.00	0.08-0.13	Low	0.0-0.5	0.10	0.17			
	17-28	8-18	1.45-1.65	2.00-6.00	0.08-0.17	Low	0.5-1.0	0.15	0.24			
	28-60	1-5	1.60-1.70	6.00-20.00	0.01-0.07	Low	0.0-0.5	0.05	0.10			
707B:												
Lizzie	0-9	18-22	1.20-1.40	0.60-2.00	0.20-0.24	Moderate	2.0-5.0	0.28	0.28	5	5	56
	9-26	18-35	1.20-1.40	0.60-2.00	0.15-0.22	Moderate	0.0-0.5	0.37	0.37			
	26-32	8-20	1.20-1.40	0.60-2.00	0.15-0.22	Low	0.0-0.5	0.32	0.32			
	32-60	3-16	1.30-1.65	0.60-6.00	0.08-0.22	Low	0.0-0.5	0.32	0.32			
707C2:												
Lizzie	0-10	18-22	1.20-1.40	0.60-2.00	0.20-0.24	Moderate	2.0-5.0	0.28	0.28	5	5	56
	10-35	18-35	1.20-1.40	0.60-2.00	0.15-0.22	Moderate	0.0-0.5	0.37	0.37			
	35-40	8-20	1.20-1.40	0.60-2.00	0.15-0.22	Low	0.0-0.5	0.32	0.32			
	40-80	3-16	1.30-1.65	0.60-6.00	0.08-0.22	Low	0.0-0.5	0.32	0.32			
707D2:												
Lizzie	0-8	18-22	1.20-1.40	0.60-2.00	0.20-0.24	Moderate	2.0-5.0	0.28	0.28	5	5	56
	8-21	18-35	1.20-1.40	0.60-2.00	0.15-0.22	Moderate	0.0-0.5	0.37	0.37			
	21-35	8-20	1.20-1.40	0.60-2.00	0.15-0.22	Low	0.0-0.5	0.32	0.32			
	35-60	3-16	1.30-1.65	0.60-6.00	0.08-0.22	Low	0.0-0.5	0.32	0.32			

Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Shrink-swell potential	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
								K	Kf	T		
	In	Pct	g/cc	In/hr	In/in		Pct					
710:												
Friberg---------	0-19	10-24	1.30-1.60	0.60-2.00	0.20-0.24	Low------	5.0-7.0	0.28	0.28	5	5	56
	19-47	22-35	1.30-1.65	0.60-2.00	0.15-0.19	Moderate	0.5-2.0	0.32	0.32			
	47-60	10-22	1.40-1.65	0.60-2.00	0.11-0.19	Low------	0.0-0.5	0.32	0.32			
Weetown---------	0-9	10-20	1.35-1.65	0.60-2.00	0.13-0.18	Low------	4.0-12	0.20	0.20	5	3	86
	9-31	10-22	1.40-1.65	0.60-2.00	0.13-0.18	Low------	2.0-8.0	0.28	0.28			
	31-51	18-28	1.30-1.60	0.60-2.00	0.15-0.19	Low------	0.5-1.0	0.32	0.32			
	51-60	10-18	1.40-1.65	0.60-2.00	0.11-0.19	Low------	0.0-0.5	0.32	0.32			
711B:												
Arvilla---------	0-13	6-18	1.40-1.60	2.00-6.00	0.13-0.15	Low------	1.0-4.0	0.20	0.20	3	3	86
	13-19	6-18	1.40-1.60	2.00-6.00	0.11-0.14	Low------	1.0-2.0	0.20	0.20			
	19-60	2-10	1.40-1.60	6.00-20.00	0.02-0.05	Low------	0.0-0.5	0.10	0.20			
Sandberg--------	0-12	5-15	1.35-1.55	2.00-6.00	0.13-0.15	Low------	1.0-4.0	0.17	0.17	3	3	86
	12-20	0-10	1.50-1.65	6.00-20.00	0.03-0.10	Low------	0.5-1.0	0.05	0.10			
	20-32	0-5	1.50-1.65	>20.00	0.02-0.06	Low------	0.5-1.0	0.05	0.10			
	32-60	0-5	1.50-1.65	>20.00	0.02-0.06	Low------	0.0-0.5	0.05	0.10			
711C:												
Arvilla---------	0-8	6-18	1.40-1.60	2.00-6.00	0.13-0.15	Low------	1.0-4.0	0.20	0.20	3	3	86
	8-15	6-18	1.40-1.60	2.00-6.00	0.11-0.14	Low------	1.0-2.0	0.20	0.20			
	15-60	2-10	1.40-1.60	6.00-20.00	0.02-0.05	Low------	0.0-0.5	0.10	0.20			
Sandberg--------	0-7	5-15	1.35-1.55	2.00-6.00	0.13-0.15	Low------	1.0-4.0	0.17	0.17	3	3	86
	7-14	0-10	1.50-1.65	6.00-20.00	0.03-0.10	Low------	0.5-1.0	0.05	0.10			
	14-60	0-5	1.50-1.65	>20.00	0.02-0.06	Low------	0.0-0.5	0.05	0.10			
715:												
Bluffcreek------	0-8	5-14	1.40-1.60	2.00-6.00	0.13-0.18	Low------	2.0-5.0	0.20	0.20	5	3	86
	8-26	3-10	1.45-1.65	6.00-20.00	0.08-0.10	Low------	0.0-0.5	0.15	0.15			
	26-42	8-18	1.45-1.65	2.00-6.00	0.10-0.14	Low------	0.0-0.5	0.15	0.20			
	42-80	1-5	1.60-1.70	6.00-20.00	0.02-0.07	Low------	0.0-0.5	0.10	0.15			
Clearriver------	0-9	5-15	1.40-1.60	6.00-20.00	0.10-0.12	Low------	1.0-2.0	0.17	0.17	5	2	134
	9-48	3-10	1.55-1.70	6.00-20.00	0.06-0.11	Low------	0.0-0.5	0.15	0.15			
	48-60	1-5	1.55-1.70	6.00-20.00	0.02-0.06	Low------	0.0-0.5	0.10	0.15			
716B:												
Leaflake--------	0-8	2-10	1.40-1.60	6.00-20.00	0.10-0.12	Low------	0.5-4.0	0.17	0.17	5	2	134
	8-26	2-10	1.40-1.70	6.00-20.00	0.06-0.09	Low------	0.0-0.5	0.15	0.15			
	26-51	15-28	1.50-1.70	0.60-2.00	0.12-0.18	Low------	0.0-0.5	0.28	0.32			
	51-60	10-18	1.60-1.80	0.60-2.00	0.11-0.17	Low------	0.0-0.5	0.24	0.28			
Eagleview-------	0-9	2-10	1.40-1.60	6.00-20.00	0.10-0.12	Low------	0.5-2.0	0.17	0.17	5	2	134
	9-36	2-10	1.50-1.65	6.00-20.00	0.09-0.11	Low------	0.5-1.0	0.17	0.17			
	36-54	2-10	1.50-1.65	6.00-20.00	0.06-0.08	Low------	0.0-0.5	0.15	0.15			
	54-60	2-10	1.50-1.65	6.00-20.00	0.05-0.07	Low------	0.0-0.5	0.15	0.15			
716C:												
Leaflake--------	0-3	2-10	1.40-1.60	6.00-20.00	0.10-0.12	Low------	0.5-4.0	0.17	0.17	5	2	134
	3-34	2-10	1.40-1.70	6.00-20.00	0.06-0.09	Low------	0.0-0.5	0.15	0.15			
	34-71	15-28	1.50-1.70	0.60-2.00	0.12-0.18	Low------	0.0-0.5	0.28	0.32			
	71-80	10-18	1.60-1.80	0.60-2.00	0.11-0.17	Low------	0.0-0.5	0.24	0.28			
Eagleview-------	0-3	2-10	1.40-1.60	6.00-20.00	0.10-0.12	Low------	0.5-2.0	0.17	0.17	5	2	134
	3-46	2-10	1.50-1.65	6.00-20.00	0.09-0.11	Low------	0.5-1.0	0.17	0.17			
	46-78	2-10	1.50-1.65	6.00-20.00	0.06-0.08	Low------	0.0-0.5	0.15	0.15			
	78-80	2-10	1.50-1.65	6.00-20.00	0.05-0.07	Low------	0.0-0.5	0.15	0.15			

Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Shrink-swell potential	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
								K	Kf	T		
	In	Pct	g/cc	In/hr	In/in		Pct					
716D:												
Leaflake--------	0-6	2-10	1.40-1.60	6.00-20.00	0.10-0.12	Low------	0.5-4.0	0.17	0.17	5	2	134
	6-23	2-10	1.40-1.70	6.00-20.00	0.06-0.09	Low------	0.0-0.5	0.15	0.15			
	23-39	15-28	1.50-1.70	0.60-2.00	0.12-0.18	Low------	0.0-0.5	0.28	0.32			
	39-60	10-18	1.60-1.80	0.60-2.00	0.11-0.17	Low------	0.0-0.5	0.24	0.28			
Eagleview-------	0-3	2-10	1.40-1.60	6.00-20.00	0.10-0.12	Low------	0.5-2.0	0.17	0.17	5	2	134
	3-42	2-10	1.50-1.65	6.00-20.00	0.09-0.11	Low------	0.5-1.0	0.17	0.17			
	42-60	2-10	1.50-1.65	6.00-20.00	0.06-0.08	Low------	0.0-0.5	0.15	0.15			
718E:												
Naytahwaush-----	0-5	10-20	1.30-1.55	0.60-2.00	0.20-0.24	Moderate	3.0-6.0	0.28	0.28	5	6	48
	5-10	8-15	1.30-1.50	0.20-2.00	0.16-0.24	Moderate	0.5-1.0	0.28	0.28			
	10-31	35-60	1.25-1.40	0.06-0.20	0.10-0.19	High-----	0.5-1.0	0.32	0.32			
	31-60	22-35	1.30-1.55	0.20-0.60	0.14-0.19	Moderate	0.0-0.5	0.37	0.37			
721B:												
Corliss---------	0-8	2-10	1.40-1.60	6.00-20.00	0.10-0.12	Low------	1.0-3.0	0.15	0.15	5	2	134
	8-19	0-10	1.50-1.65	6.00-20.00	0.03-0.10	Low------	0.0-0.5	0.10	0.15			
	19-60	0-5	1.50-1.65	6.00-20.00	0.02-0.06	Low------	0.0-0.5	0.10	0.15			
721C:												
Corliss---------	0-7	2-10	1.40-1.60	6.00-20.00	0.10-0.12	Low------	1.0-3.0	0.15	0.15	5	2	134
	7-28	0-10	1.50-1.65	6.00-20.00	0.03-0.10	Low------	0.0-0.5	0.10	0.15			
	28-80	0-5	1.50-1.65	6.00-20.00	0.02-0.06	Low------	0.0-0.5	0.10	0.15			
721D:												
Corliss---------	0-6	2-10	1.40-1.60	6.00-20.00	0.10-0.12	Low------	1.0-3.0	0.15	0.15	5	2	134
	6-20	0-10	1.50-1.65	6.00-20.00	0.03-0.10	Low------	0.0-0.5	0.10	0.15			
	20-60	0-5	1.50-1.65	6.00-20.00	0.02-0.06	Low------	0.0-0.5	0.10	0.15			
721E:												
Corliss---------	0-2	2-10	1.40-1.60	6.00-20.00	0.10-0.12	Low------	1.0-3.0	0.15	0.15	5	2	134
	2-22	0-10	1.50-1.65	6.00-20.00	0.03-0.10	Low------	0.0-0.5	0.10	0.15			
	22-60	0-5	1.50-1.65	6.00-20.00	0.02-0.06	Low------	0.0-0.5	0.10	0.15			
726:												
Kratka----------	0-8	5-15	1.20-1.50	2.00-6.00	0.13-0.18	Low------	2.0-5.0	0.17	0.17	3	3	86
	8-33	2-10	1.30-1.60	6.00-20.00	0.06-0.11	Low------	0.5-1.0	0.17	0.17			
	33-60	10-35	1.50-1.80	0.20-2.00	0.11-0.19	Moderate	0.0-0.5	0.32	0.32			
746:												
Haslie----------	0-21	---	0.10-0.30	0.60-6.00	0.35-0.48	---------	60-90	---	---	1	2	134
	21-24	---	0.10-0.30	0.60-6.00	0.35-0.48	---------	60-90	---	---			
	24-60	18-35	0.10-0.50	0.06-0.60	0.18-0.24	Moderate	6.0-20	0.28	0.28			
760C2:												
Chapett---------	0-7	10-20	1.30-1.60	0.60-2.00	0.20-0.22	Low------	2.0-4.0	0.24	0.24	5	5	56
	7-19	18-28	1.30-1.65	0.60-2.00	0.15-0.19	Low------	0.5-1.0	0.32	0.32			
	19-27	10-18	1.40-1.65	0.60-2.00	0.11-0.19	Low------	0.0-0.5	0.28	0.28			
	27-60	10-18	1.65-1.80	0.60-2.00	0.10-0.16	Low------	0.0-0.5	0.28	0.28			
Sisseton--------	0-7	15-20	1.20-1.30	0.60-2.00	0.16-0.18	Low------	1.0-3.0	0.32	0.32	5	4L	86
	7-22	10-18	1.20-1.35	0.60-2.00	0.16-0.20	Low------	0.0-1.0	0.32	0.32			
	22-60	10-18	1.30-1.50	0.60-2.00	0.14-0.19	Low------	0.0-0.5	0.37	0.37			
760D2:												
Chapett---------	0-7	10-20	1.30-1.60	0.60-2.00	0.20-0.22	Low------	2.0-4.0	0.24	0.24	5	5	56
	7-15	18-28	1.30-1.65	0.60-2.00	0.15-0.19	Low------	0.5-1.0	0.32	0.32			
	15-23	10-18	1.40-1.65	0.60-2.00	0.11-0.19	Low------	0.0-0.5	0.28	0.28			
	23-60	10-18	1.65-1.80	0.60-2.00	0.10-0.16	Low------	0.0-0.5	0.28	0.28			

Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Shrink-swell potential	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
								K	Kf	T		
	In	Pct	g/cc	In/hr	In/in		Pct					
760D2:												
Sisseton	0-8	15-20	1.20-1.30	0.60-2.00	0.16-0.18	Low	1.0-3.0	0.32	0.32	5	4L	86
	8-16	10-18	1.20-1.35	0.60-2.00	0.16-0.20	Low	0.0-1.0	0.32	0.32			
	16-60	10-18	1.30-1.50	0.60-2.00	0.14-0.19	Low	0.0-0.5	0.37	0.37			
769B:												
Mehurin	0-13	27-35	1.25-1.35	0.20-0.60	0.17-0.19	Moderate	4.0-8.0	0.24	0.24	5	6	48
	13-26	35-60	1.25-1.40	0.06-0.60	0.10-0.19	High	1.0-2.0	0.32	0.32			
	26-34	20-35	1.20-1.60	0.20-2.00	0.15-0.19	Moderate	0.0-0.5	0.37	0.37			
	34-60	20-30	1.20-1.60	0.20-2.00	0.15-0.19	Moderate	0.0-0.5	0.37	0.37			
776B:												
Snellman	0-3	5-18	1.35-1.60	0.60-6.00	0.13-0.18	Low	1.0-3.0	0.20	0.20	5	3	86
	3-12	5-15	1.50-1.70	0.60-2.00	0.09-0.14	Low	0.5-2.0	0.28	0.28			
	12-32	18-30	1.50-1.70	0.60-2.00	0.12-0.18	Moderate	0.0-0.5	0.28	0.28			
	32-60	7-18	1.60-1.80	0.60-2.00	0.11-0.16	Low	0.0-0.5	0.28	0.28			
Sugarbush	0-3	5-15	1.30-1.50	2.00-6.00	0.13-0.15	Low	1.0-2.0	0.20	0.20	4	3	86
	3-17	2-10	1.40-1.60	6.00-20.00	0.09-0.11	Low	0.5-1.0	0.17	0.17			
	17-28	10-18	1.40-1.60	2.00-6.00	0.12-0.15	Low	0.0-0.5	0.24	0.24			
	28-60	1-5	1.60-1.80	20.00-40.00	0.02-0.06	Low	0.0-0.5	0.10	0.15			
776C:												
Snellman	0-2	5-18	1.35-1.60	0.60-6.00	0.13-0.18	Low	1.0-3.0	0.20	0.20	5	3	86
	2-16	5-15	1.50-1.70	0.60-2.00	0.09-0.14	Low	0.5-2.0	0.28	0.28			
	16-32	18-30	1.50-1.70	0.60-2.00	0.12-0.18	Moderate	0.0-0.5	0.28	0.28			
	32-60	7-18	1.60-1.80	0.60-2.00	0.11-0.16	Low	0.0-0.5	0.28	0.28			
Sugarbush	0-2	5-15	1.30-1.50	2.00-6.00	0.13-0.15	Low	1.0-2.0	0.20	0.20	4	3	86
	2-14	2-10	1.40-1.60	6.00-20.00	0.09-0.11	Low	0.5-1.0	0.17	0.17			
	14-21	10-18	1.40-1.60	2.00-6.00	0.12-0.15	Low	0.0-0.5	0.24	0.24			
	21-60	1-5	1.60-1.80	20.00-40.00	0.02-0.06	Low	0.0-0.5	0.10	0.15			
776E:												
Snellman	0-3	5-18	1.35-1.60	0.60-6.00	0.13-0.18	Low	1.0-3.0	0.20	0.20	5	3	86
	3-14	5-15	1.50-1.70	0.60-2.00	0.09-0.14	Low	0.5-2.0	0.28	0.28			
	14-26	18-30	1.50-1.70	0.60-2.00	0.12-0.18	Moderate	0.0-0.5	0.28	0.28			
	26-60	7-18	1.60-1.80	0.60-2.00	0.11-0.16	Low	0.0-0.5	0.28	0.28			
Sugarbush	0-2	5-15	1.30-1.50	2.00-6.00	0.13-0.15	Low	1.0-2.0	0.20	0.20	4	3	86
	2-10	2-10	1.40-1.60	6.00-20.00	0.09-0.11	Low	0.5-1.0	0.17	0.17			
	10-19	10-18	1.40-1.60	2.00-6.00	0.12-0.15	Low	0.0-0.5	0.24	0.24			
	19-60	1-5	1.60-1.80	20.00-40.00	0.02-0.06	Low	0.0-0.5	0.10	0.15			
777C2:												
Sisseton	0-9	15-20	1.20-1.30	0.60-2.00	0.16-0.18	Low	1.0-3.0	0.32	0.32	5	4L	86
	9-19	10-18	1.20-1.35	0.60-2.00	0.16-0.20	Low	0.0-1.0	0.32	0.32			
	19-60	10-18	1.30-1.50	0.60-2.00	0.14-0.19	Low	0.0-0.5	0.37	0.37			
Heimdal	0-7	10-20	1.30-1.60	0.60-2.00	0.20-0.22	Low	3.0-6.0	0.24	0.24	5	5	56
	7-17	10-18	1.35-1.65	0.60-2.00	0.12-0.19	Low	0.5-1.0	0.32	0.32			
	17-34	10-18	1.45-1.65	0.60-2.00	0.11-0.19	Low	0.0-0.5	0.32	0.32			
	34-60	7-18	1.65-1.80	0.60-2.00	0.11-0.16	Low	0.0-0.5	0.32	0.32			
777D2:												
Sisseton	0-8	15-20	1.20-1.30	0.60-2.00	0.16-0.18	Low	1.0-3.0	0.32	0.32	5	4L	86
	8-16	10-18	1.20-1.35	0.60-2.00	0.16-0.20	Low	0.0-1.0	0.32	0.32			
	16-60	10-18	1.30-1.50	0.60-2.00	0.14-0.19	Low	0.0-0.5	0.37	0.37			
Heimdal	0-8	10-20	1.30-1.60	0.60-2.00	0.20-0.22	Low	3.0-6.0	0.24	0.24	5	5	56
	8-12	10-18	1.35-1.65	0.60-2.00	0.12-0.19	Low	0.5-1.0	0.32	0.32			
	12-25	10-18	1.45-1.65	0.60-2.00	0.11-0.19	Low	0.0-0.5	0.32	0.32			
	25-60	7-18	1.65-1.80	0.60-2.00	0.11-0.16	Low	0.0-0.5	0.32	0.32			

Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Shrink-swell potential	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
								K	Kf	T		
	In	Pct	g/cc	In/hr	In/in		Pct					
777E:												
Sisseton	0-3	15-20	1.20-1.30	0.60-2.00	0.16-0.18	Low	1.0-3.0	0.32	0.32	5	4L	86
	3-12	10-18	1.20-1.35	0.60-2.00	0.16-0.20	Low	0.0-1.0	0.32	0.32			
	12-60	10-18	1.30-1.50	0.60-2.00	0.14-0.19	Low	0.0-0.5	0.37	0.37			
Heimdal	0-8	10-20	1.30-1.60	0.60-2.00	0.20-0.22	Low	3.0-6.0	0.24	0.24	5	5	56
	8-12	10-18	1.35-1.65	0.60-2.00	0.12-0.19	Low	0.5-1.0	0.32	0.32			
	12-19	10-18	1.45-1.65	0.60-2.00	0.11-0.19	Low	0.0-0.5	0.32	0.32			
	19-60	7-18	1.65-1.80	0.60-2.00	0.11-0.16	Low	0.0-0.5	0.32	0.32			
778B:												
Dorset	0-10	4-18	1.40-1.55	2.00-6.00	0.13-0.15	Low	3.0-5.0	0.20	0.20	4	3	86
	10-20	10-18	1.45-1.65	2.00-6.00	0.12-0.19	Low	1.0-2.0	0.28	0.28			
	20-38	5-10	1.55-1.65	6.00-20.00	0.06-0.10	Low	0.0-0.5	0.10	0.17			
	38-60	0-5	1.55-1.65	6.00-20.00	0.02-0.04	Low	0.0-0.5	0.10	0.15			
Corliss	0-7	2-10	1.40-1.60	6.00-20.00	0.10-0.12	Low	1.0-3.0	0.15	0.15	5	2	134
	7-16	0-10	1.50-1.65	6.00-20.00	0.03-0.10	Low	0.0-0.5	0.10	0.15			
	16-60	0-5	1.50-1.65	6.00-20.00	0.02-0.06	Low	0.0-0.5	0.10	0.15			
778C:												
Dorset	0-9	4-18	1.40-1.55	2.00-6.00	0.13-0.15	Low	3.0-5.0	0.20	0.20	4	3	86
	9-16	10-18	1.45-1.65	2.00-6.00	0.12-0.19	Low	1.0-2.0	0.28	0.28			
	16-43	5-10	1.55-1.65	6.00-20.00	0.06-0.10	Low	0.0-0.5	0.10	0.17			
	43-60	0-5	1.55-1.65	6.00-20.00	0.02-0.04	Low	0.0-0.5	0.10	0.15			
Corliss	0-7	2-10	1.40-1.60	6.00-20.00	0.10-0.12	Low	1.0-3.0	0.15	0.15	5	2	134
	7-11	0-10	1.50-1.65	6.00-20.00	0.03-0.10	Low	0.0-0.5	0.10	0.15			
	11-60	0-5	1.50-1.65	6.00-20.00	0.02-0.06	Low	0.0-0.5	0.10	0.15			
779B:												
Peever	0-11	27-35	1.25-1.35	0.20-0.60	0.19-0.22	Moderate	3.0-6.0	0.24	0.24	5	6	48
	11-29	35-50	1.25-1.40	0.06-0.60	0.11-0.19	High	1.0-4.0	0.37	0.37			
	29-60	30-45	1.50-1.70	0.06-0.60	0.08-0.17	High	0.0-0.5	0.37	0.37			
Mehurin	0-13	27-35	1.25-1.35	0.20-0.60	0.17-0.19	Moderate	4.0-8.0	0.24	0.24	5	6	48
	13-35	35-60	1.25-1.40	0.06-0.60	0.10-0.19	High	1.0-2.0	0.32	0.32			
	35-48	20-35	1.20-1.60	0.20-2.00	0.15-0.19	Moderate	0.0-0.5	0.37	0.37			
	48-60	20-30	1.20-1.60	0.20-2.00	0.15-0.19	Moderate	0.0-0.5	0.37	0.37			
902B:												
Barnes	0-9	18-27	1.40-1.50	0.60-2.00	0.18-0.24	Low	2.0-5.0	0.28	0.32	5	6	48
	9-17	18-27	1.50-1.60	0.60-2.00	0.15-0.19	Low	0.5-1.0	0.28	0.32			
	17-60	18-27	1.50-1.60	0.60-2.00	0.14-0.19	Low	0.0-0.5	0.37	0.43			
Buse	0-8	18-27	1.40-1.50	0.60-2.00	0.17-0.22	Low	1.0-3.0	0.28	0.28	5	4L	86
	8-40	18-27	1.50-1.60	0.60-2.00	0.14-0.19	Low	0.5-1.0	0.37	0.37			
	40-60	18-27	1.50-1.60	0.60-2.00	0.14-0.19	Low	0.5-1.0	0.37	0.37			
903C2:												
Barnes	0-10	18-27	1.40-1.50	0.60-2.00	0.18-0.24	Low	2.0-5.0	0.28	0.32	5	6	48
	10-16	18-27	1.50-1.60	0.60-2.00	0.15-0.19	Low	0.5-1.0	0.28	0.32			
	16-60	18-27	1.50-1.60	0.60-2.00	0.14-0.19	Low	0.0-0.5	0.37	0.43			
Langhei	0-7	18-27	1.40-1.50	0.60-2.00	0.17-0.22	Low	0.5-3.0	0.32	0.32	5	4L	86
	7-30	18-32	1.50-1.65	0.60-2.00	0.15-0.19	Low	0.0-0.5	0.32	0.32			
	30-60	18-32	1.50-1.65	0.60-2.00	0.15-0.19	Low	0.0-0.5	0.32	0.32			
915C2:												
Forman	0-8	27-30	1.20-1.40	0.60-2.00	0.17-0.19	Moderate	4.0-8.0	0.24	0.28	5	6	48
	8-23	30-35	1.30-1.50	0.60-2.00	0.15-0.19	Moderate	0.5-1.0	0.28	0.32			
	23-60	18-35	1.30-1.50	0.20-0.60	0.14-0.19	Moderate	0.0-0.5	0.37	0.43			

Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Shrink-swell potential	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
								K	Kf	T		
	In	Pct	g/cc	In/hr	In/in		Pct					
915C2:												
Buse	0-7	18-27	1.40-1.50	0.60-2.00	0.17-0.22	Low	1.0-3.0	0.28	0.28	5	4L	86
	7-30	18-27	1.50-1.60	0.60-2.00	0.14-0.19	Low	0.5-1.0	0.37	0.37			
	30-60	18-27	1.50-1.60	0.60-2.00	0.14-0.19	Low	0.5-1.0	0.37	0.37			
915D2:												
Forman	0-9	27-30	1.20-1.40	0.60-2.00	0.17-0.19	Moderate	4.0-8.0	0.24	0.28	5	6	48
	9-23	30-35	1.30-1.50	0.60-2.00	0.15-0.19	Moderate	0.5-1.0	0.28	0.32			
	23-60	18-35	1.30-1.50	0.20-0.60	0.14-0.19	Moderate	0.0-0.5	0.37	0.43			
Buse	0-9	18-27	1.40-1.50	0.60-2.00	0.17-0.22	Low	1.0-3.0	0.28	0.28	5	4L	86
	9-16	18-27	1.50-1.60	0.60-2.00	0.14-0.19	Low	0.5-1.0	0.37	0.37			
	16-60	18-27	1.50-1.60	0.60-2.00	0.14-0.19	Low	0.5-1.0	0.37	0.37			
931C2:												
Formdale	0-8	27-35	1.30-1.50	0.60-2.00	0.17-0.19	Moderate	2.0-5.0	0.24	0.24	5	6	48
	8-18	24-35	1.40-1.60	0.20-0.60	0.17-0.19	Moderate	0.5-2.0	0.37	0.37			
	18-39	18-35	1.50-1.65	0.20-0.60	0.14-0.19	Moderate	0.0-0.5	0.37	0.37			
	39-60	18-35	1.50-1.65	0.20-0.60	0.14-0.19	Moderate	0.0-0.5	0.37	0.37			
Langhei	0-7	28-35	1.40-1.50	0.20-0.60	0.17-0.22	Low	0.5-3.0	0.28	0.32	5	4L	86
	7-16	28-35	1.50-1.65	0.20-0.60	0.14-0.19	Low	0.0-0.5	0.32	0.37			
	16-60	28-35	1.50-1.65	0.20-0.60	0.14-0.19	Low	0.0-0.5	0.32	0.37			
931D2:												
Formdale	0-8	27-35	1.30-1.50	0.60-2.00	0.17-0.19	Moderate	2.0-5.0	0.24	0.24	5	6	48
	8-12	24-35	1.40-1.60	0.20-0.60	0.17-0.19	Moderate	0.5-2.0	0.37	0.37			
	12-26	18-35	1.50-1.65	0.20-0.60	0.14-0.19	Moderate	0.0-0.5	0.37	0.37			
	26-60	18-35	1.50-1.65	0.20-0.60	0.14-0.19	Moderate	0.0-0.5	0.37	0.37			
Langhei	0-5	28-35	1.40-1.50	0.20-0.60	0.17-0.22	Low	0.5-3.0	0.28	0.32	5	4L	86
	5-21	28-35	1.50-1.65	0.20-0.60	0.14-0.19	Low	0.0-0.5	0.32	0.37			
	21-60	28-35	1.50-1.65	0.20-0.60	0.14-0.19	Low	0.0-0.5	0.32	0.37			
942D2:												
Langhei	0-7	18-27	1.40-1.50	0.60-2.00	0.17-0.22	Low	0.5-3.0	0.32	0.32	5	4L	86
	7-13	18-32	1.50-1.65	0.60-2.00	0.15-0.19	Low	0.0-0.5	0.32	0.32			
	13-60	18-32	1.50-1.65	0.60-2.00	0.15-0.19	Low	0.0-0.5	0.32	0.32			
Barnes	0-7	18-27	1.40-1.50	0.60-2.00	0.18-0.24	Low	2.0-5.0	0.28	0.32	5	6	48
	7-14	18-27	1.50-1.60	0.60-2.00	0.15-0.19	Low	0.5-1.0	0.28	0.32			
	14-60	18-27	1.50-1.60	0.60-2.00	0.14-0.19	Low	0.0-0.5	0.37	0.43			
957B2:												
Rothsay	0-15	10-18	1.20-1.40	0.60-2.00	0.22-0.24	Low	3.0-6.0	0.32	0.32	5	5	56
	15-27	10-18	1.20-1.40	0.60-2.00	0.17-0.22	Low	0.5-1.0	0.43	0.43			
	27-33	5-18	1.20-1.40	0.60-6.00	0.20-0.22	Low	0.0-0.5	0.43	0.43			
	33-60	5-18	1.20-1.40	0.60-6.00	0.20-0.22	Low	0.0-0.5	0.43	0.43			
Zell	0-9	10-18	1.15-1.30	0.60-2.00	0.19-0.22	Low	2.0-5.0	0.32	0.32	5	4L	86
	9-18	10-18	1.25-1.40	0.60-2.00	0.15-0.20	Low	0.0-1.0	0.43	0.43			
	18-60	5-18	1.25-1.40	0.60-2.00	0.15-0.20	Low	0.0-0.5	0.43	0.43			
969C2:												
Zell	0-8	10-18	1.15-1.30	0.60-2.00	0.19-0.22	Low	2.0-5.0	0.32	0.32	5	4L	86
	8-31	10-18	1.25-1.40	0.60-2.00	0.15-0.20	Low	0.0-1.0	0.43	0.43			
	31-60	5-18	1.25-1.40	0.60-2.00	0.15-0.20	Low	0.0-0.5	0.43	0.43			
Rothsay	0-9	10-18	1.20-1.40	0.60-2.00	0.22-0.24	Low	3.0-6.0	0.32	0.32	5	5	56
	9-17	10-18	1.20-1.40	0.60-2.00	0.17-0.22	Low	0.5-1.0	0.43	0.43			
	17-28	5-18	1.20-1.40	0.60-6.00	0.20-0.22	Low	0.0-0.5	0.43	0.43			
	28-60	5-18	1.20-1.40	0.60-6.00	0.20-0.22	Low	0.0-0.5	0.43	0.43			

Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Shrink-swell potential	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
								K	Kf	T		
	In	Pct	g/cc	In/hr	In/in		Pct					
969D2:												
Zell	0-8	10-18	1.15-1.30	0.60-2.00	0.19-0.22	Low	2.0-5.0	0.32	0.32	5	4L	86
	8-13	10-18	1.25-1.40	0.60-2.00	0.15-0.20	Low	0.0-1.0	0.43	0.43			
	13-60	5-18	1.25-1.40	0.60-2.00	0.15-0.20	Low	0.0-0.5	0.43	0.43			
Rothsay	0-6	10-18	1.20-1.40	0.60-2.00	0.22-0.24	Low	3.0-6.0	0.32	0.32	5	5	56
	6-12	10-18	1.20-1.40	0.60-2.00	0.17-0.22	Low	0.5-1.0	0.43	0.43			
	12-32	5-18	1.20-1.40	0.60-6.00	0.20-0.22	Low	0.0-0.5	0.43	0.43			
	32-60	5-18	1.20-1.40	0.60-6.00	0.20-0.22	Low	0.0-0.5	0.43	0.43			
1015:												
Udipsamments	0-14	1-15	1.50-1.70	2.00-20.00	0.05-0.10	Low	0.0-0.5	0.15	0.15	5	2	220
	14-60	1-10	1.50-1.70	6.00-20.00	0.05-0.08	Low	---	0.10	0.10			
	60-80	1-10	1.50-1.70	>20.00	0.03-0.05	Low	---	0.05	0.10			
1016:												
Udorthents	0-60	---	---	---	---	---	---	---	---	---	---	---
	60-80	---	---	0.06-6.00	---	---	---	---	---			
1027:												
Udorthents.												
1030:												
Pits.												
Udipsamments	0-14	1-15	1.50-1.70	2.00-20.00	0.05-0.10	Low	0.0-0.5	0.15	0.15	5	2	220
	14-60	1-10	1.50-1.70	6.00-20.00	0.05-0.08	Low	---	0.10	0.10			
	60-80	1-10	1.50-1.70	>20.00	0.03-0.05	Low	---	0.05	0.10			
1077:												
Forada	0-16	10-22	1.00-1.40	0.60-2.00	0.20-0.22	Low	5.0-15	0.28	0.28	4	5	56
	16-27	8-18	1.30-1.50	2.00-6.00	0.12-0.19	Low	0.5-1.0	0.28	0.28			
	27-60	0-5	1.50-1.70	6.00-20.00	0.02-0.04	Low	0.0-0.5	0.15	0.15			
Leafriver	0-12	---	0.10-0.25	0.60-6.00	0.35-0.50	---	50-90	---	---	5	2	134
	12-20	3-18	1.40-1.65	2.00-20.00	0.08-0.14	Low	5.0-20	0.17	0.17			
	20-60	0-10	1.50-1.65	6.00-20.00	0.03-0.08	Low	0.5-5.0	0.17	0.17			
1102B:												
Chapett	0-10	10-20	1.30-1.60	0.60-2.00	0.20-0.22	Low	2.0-4.0	0.24	0.24	5	5	56
	10-25	18-28	1.30-1.65	0.60-2.00	0.15-0.19	Low	0.5-1.0	0.32	0.32			
	25-37	10-18	1.40-1.65	0.60-2.00	0.11-0.19	Low	0.0-0.5	0.28	0.28			
	37-60	10-18	1.65-1.80	0.60-2.00	0.10-0.16	Low	0.0-0.5	0.28	0.28			
Dorset	0-12	4-18	1.40-1.55	2.00-6.00	0.13-0.15	Low	3.0-5.0	0.20	0.20	4	3	86
	12-15	10-18	1.45-1.65	2.00-6.00	0.12-0.19	Low	1.0-2.0	0.28	0.28			
	15-32	5-10	1.55-1.65	6.00-20.00	0.06-0.10	Low	0.0-0.5	0.10	0.17			
	32-60	0-5	1.55-1.65	6.00-20.00	0.02-0.04	Low	0.0-0.5	0.10	0.15			
1102C:												
Chapett	0-9	10-20	1.30-1.60	0.60-2.00	0.20-0.22	Low	2.0-4.0	0.24	0.24	5	5	56
	9-20	18-28	1.30-1.65	0.60-2.00	0.15-0.19	Low	0.5-1.0	0.32	0.32			
	20-34	10-18	1.40-1.65	0.60-2.00	0.11-0.19	Low	0.0-0.5	0.28	0.28			
	34-60	10-18	1.65-1.80	0.60-2.00	0.10-0.16	Low	0.0-0.5	0.28	0.28			
Dorset	0-10	4-18	1.40-1.55	2.00-6.00	0.13-0.15	Low	3.0-5.0	0.20	0.20	4	3	86
	10-18	10-18	1.45-1.65	2.00-6.00	0.12-0.19	Low	1.0-2.0	0.28	0.28			
	18-29	5-10	1.55-1.65	6.00-20.00	0.06-0.10	Low	0.0-0.5	0.10	0.17			
	29-60	0-5	1.55-1.65	6.00-20.00	0.02-0.04	Low	0.0-0.5	0.10	0.15			

Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Shrink-swell potential	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
								K	Kf	T		
	In	Pct	g/cc	In/hr	In/in		Pct					
1103:												
Clitherall------	0-10	8-15	1.45-1.60	2.00-6.00	0.13-0.18	Low------	2.0-6.0	0.20	0.20	4	3	86
	10-16	8-18	1.45-1.65	2.00-6.00	0.12-0.19	Low------	0.5-2.0	0.24	0.24			
	16-38	1-5	1.55-1.65	6.00-20.00	0.02-0.07	Low------	0.0-0.5	0.10	0.15			
	38-80	10-18	1.65-1.80	0.60-2.00	0.11-0.16	Low------	0.0-0.5	0.24	0.24			
1104B:												
Waukon----------	0-9	12-27	1.40-1.60	0.60-2.00	0.20-0.24	Moderate	2.0-6.0	0.24	0.24	5	6	48
	9-34	18-35	1.40-1.60	0.60-2.00	0.15-0.19	Moderate	0.0-0.5	0.32	0.32			
	34-60	18-30	1.45-1.65	0.60-2.00	0.15-0.19	Low------	0.0-0.5	0.32	0.32			
Dorset----------	0-9	4-18	1.40-1.55	2.00-6.00	0.13-0.15	Low------	3.0-5.0	0.20	0.20	4	3	86
	9-23	10-18	1.45-1.65	2.00-6.00	0.12-0.19	Low------	1.0-2.0	0.28	0.28			
	23-33	5-10	1.55-1.65	6.00-20.00	0.06-0.10	Low------	0.0-0.5	0.10	0.17			
	33-60	0-5	1.55-1.65	6.00-20.00	0.02-0.04	Low------	0.0-0.5	0.10	0.15			
1104C:												
Waukon----------	0-9	12-27	1.40-1.60	0.60-2.00	0.20-0.24	Moderate	2.0-6.0	0.24	0.24	5	6	48
	9-28	18-35	1.40-1.60	0.60-2.00	0.15-0.19	Moderate	0.0-0.5	0.32	0.32			
	28-60	18-30	1.45-1.65	0.60-2.00	0.15-0.19	Low------	0.0-0.5	0.32	0.32			
Dorset----------	0-10	4-18	1.40-1.55	2.00-6.00	0.13-0.15	Low------	3.0-5.0	0.20	0.20	4	3	86
	10-14	10-18	1.45-1.65	2.00-6.00	0.12-0.19	Low------	1.0-2.0	0.28	0.28			
	14-20	5-10	1.55-1.65	6.00-20.00	0.06-0.10	Low------	0.0-0.5	0.10	0.17			
	20-60	0-5	1.55-1.65	6.00-20.00	0.02-0.04	Low------	0.0-0.5	0.10	0.15			
1104D:												
Waukon----------	0-9	12-27	1.40-1.60	0.60-2.00	0.20-0.24	Moderate	2.0-6.0	0.24	0.24	5	6	48
	9-21	18-35	1.40-1.60	0.60-2.00	0.15-0.19	Moderate	0.0-0.5	0.32	0.32			
	21-60	18-30	1.45-1.65	0.60-2.00	0.15-0.19	Low------	0.0-0.5	0.32	0.32			
Dorset----------	0-8	4-18	1.40-1.55	2.00-6.00	0.13-0.15	Low------	3.0-5.0	0.20	0.20	4	3	86
	8-18	10-18	1.45-1.65	2.00-6.00	0.12-0.19	Low------	1.0-2.0	0.28	0.28			
	18-60	0-5	1.55-1.65	6.00-20.00	0.02-0.04	Low------	0.0-0.5	0.10	0.15			
1105B:												
Dent----------	0-12	8-22	1.20-1.40	0.60-2.00	0.20-0.24	Low------	2.0-6.0	0.28	0.28	5	5	56
	12-26	18-35	1.20-1.40	0.60-2.00	0.17-0.22	Moderate	0.5-1.0	0.43	0.43			
	26-54	8-27	1.20-1.40	0.60-2.00	0.15-0.22	Low------	0.0-0.5	0.43	0.43			
	54-80	5-20	1.30-1.65	0.60-2.00	0.12-0.22	Low------	0.0-0.5	0.43	0.43			
1110:												
Isan----------	0-16	5-14	1.30-1.55	2.00-6.00	0.10-0.15	Low------	3.0-10	0.20	0.20	3	3	86
	16-26	2-8	1.50-1.65	6.00-20.00	0.06-0.10	Low------	0.5-3.0	0.17	0.17			
	26-60	1-5	1.55-1.70	6.00-20.00	0.04-0.06	Low------	0.0-0.5	0.15	0.15			
1111:												
Nidaros---------	0-32	---	0.15-0.45	0.20-6.00	0.35-0.45	---------	55-85	---	---	2	2	134
	32-38	8-35	1.50-1.80	0.60-2.00	0.13-0.22	Low------	5.0-15	0.20	0.24			
	38-60	0-4	1.40-1.65	6.00-20.00	0.03-0.08	Low------	0.0-0.5	0.10	0.15			
1112D:												
Chapett---------	0-8	10-20	1.30-1.60	0.60-2.00	0.20-0.22	Low------	2.0-4.0	0.24	0.24	5	5	56
	8-18	18-28	1.30-1.65	0.60-2.00	0.15-0.19	Low------	0.5-1.0	0.32	0.32			
	18-30	10-18	1.40-1.65	0.60-2.00	0.11-0.19	Low------	0.0-0.5	0.28	0.28			
	30-60	10-18	1.65-1.80	0.60-2.00	0.10-0.16	Low------	0.0-0.5	0.28	0.28			
Corliss---------	0-6	2-10	1.40-1.60	6.00-20.00	0.10-0.12	Low------	1.0-3.0	0.15	0.15	5	2	134
	6-18	0-10	1.50-1.65	6.00-20.00	0.03-0.10	Low------	0.0-0.5	0.10	0.15			
	18-60	0-5	1.50-1.65	6.00-20.00	0.02-0.06	Low------	0.0-0.5	0.10	0.15			

Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Shrink-swell potential	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
								K	Kf	T		
	In	Pct	g/cc	In/hr	In/in		Pct					
1112E:												
Chapett	0-7	10-20	1.30-1.60	0.60-2.00	0.20-0.22	Low	2.0-4.0	0.24	0.24	5	5	56
	7-20	18-28	1.30-1.65	0.60-2.00	0.15-0.19	Low	0.5-1.0	0.32	0.32			
	20-37	10-18	1.40-1.65	0.60-2.00	0.11-0.19	Low	0.0-0.5	0.28	0.28			
	37-60	10-18	1.65-1.80	0.60-2.00	0.10-0.16	Low	0.0-0.5	0.28	0.28			
Corliss	0-7	2-10	1.40-1.60	6.00-20.00	0.10-0.12	Low	1.0-3.0	0.15	0.15	5	2	134
	7-10	0-10	1.50-1.65	6.00-20.00	0.03-0.10	Low	0.0-0.5	0.10	0.15			
	10-60	0-5	1.50-1.65	6.00-20.00	0.02-0.06	Low	0.0-0.5	0.10	0.15			
1113:												
Haslie	0-44	---	0.10-0.30	0.60-6.00	0.35-0.48	---	60-90	---	---	1	8	---
	44-60	18-35	0.10-0.50	0.06-0.60	0.18-0.24	Moderate	6.0-20	0.28	0.28			
Seelyeville	0-30	---	0.10-0.25	0.20-6.00	0.35-0.45	---	25-99	---	---	3	8	---
	30-60	---	0.10-0.25	0.20-6.00	0.35-0.45	---	25-99	---	---			
Cathro	0-30	---	0.28-0.45	0.20-6.00	0.45-0.55	---	60-85	---	---	2	8	---
	30-60	10-30	1.50-1.70	0.20-2.00	0.11-0.22	Low	1.0-5.0	---	---			
1114:												
Hangaard	0-8	5-15	1.50-1.70	6.00-20.00	0.10-0.12	Low	1.0-4.0	0.17	0.17	5	2	134
	8-60	2-10	1.50-1.70	6.00-40.00	0.02-0.04	Low	0.0-0.5	0.10	0.15			
1120:												
Rushlake	0-5	3-10	1.50-1.70	6.00-20.00	0.10-0.12	Low	0.5-4.0	0.17	0.17	5	2	134
	5-60	1-10	1.50-1.70	6.00-20.00	0.02-0.10	Low	0.0-0.5	0.05	0.10			
Hangaard	0-4	5-15	1.50-1.70	6.00-20.00	0.10-0.12	Low	1.0-4.0	0.17	0.17	5	2	134
	4-60	2-10	1.50-1.70	6.00-40.00	0.02-0.04	Low	0.0-0.5	0.10	0.15			
1129:												
Lindaas	0-15	27-35	1.10-1.30	0.60-2.00	0.14-0.17	Moderate	4.0-7.0	0.28	0.28	5	7	38
	15-25	35-60	1.20-1.40	0.06-0.20	0.10-0.14	High	2.0-4.0	0.32	0.32			
	25-60	25-40	1.20-1.50	0.20-0.60	0.11-0.15	Moderate	0.5-1.0	0.32	0.32			
1131B:												
Verndale	0-9	7-12	1.50-1.70	2.00-6.00	0.13-0.17	Low	2.0-4.0	0.20	0.20	3	3	86
	9-19	7-18	1.60-1.70	0.60-2.00	0.14-0.18	Low	0.5-1.0	0.24	0.24			
	19-49	2-6	1.45-1.60	6.00-20.00	0.06-0.08	Low	0.0-0.5	0.10	0.10			
	49-60	0-4	1.45-1.60	6.00-20.00	0.02-0.06	Low	0.0-0.5	0.10	0.10			
Abbeylake	0-8	2-10	1.40-1.60	6.00-20.00	0.10-0.12	Low	1.0-3.0	0.15	0.15	5	2	134
	8-19	0-10	1.50-1.65	6.00-20.00	0.03-0.11	Low	0.0-0.5	0.10	0.10			
	19-60	0-3	1.50-1.65	6.00-20.00	0.03-0.08	Low	0.0-0.5	0.10	0.10			
1136:												
Nidaros	0-27	---	0.15-0.45	0.20-6.00	0.35-0.45	---	55-85	---	---	2	2	134
	27-38	8-35	1.50-1.80	0.60-2.00	0.13-0.22	Low	5.0-15	0.24	0.24			
	38-60	0-4	1.40-1.65	6.00-20.00	0.03-0.08	Low	0.0-0.5	0.10	0.15			
1149:												
Hamerly	0-16	27-35	1.10-1.50	0.20-2.00	0.17-0.19	Moderate	4.0-7.0	0.24	0.24	5	4L	86
	16-25	18-35	1.20-1.50	0.20-2.00	0.15-0.19	Moderate	1.0-4.0	0.28	0.28			
	25-60	18-35	1.20-1.60	0.20-2.00	0.14-0.19	Moderate	0.0-1.0	0.37	0.37			
1195A:												
Sybil	0-6	3-10	1.35-1.65	6.00-20.00	0.07-0.12	Low	1.0-4.0	0.17	0.17	5	2	134
	6-14	3-15	1.35-1.65	2.00-20.00	0.10-0.18	Low	0.0-0.5	0.17	0.17			
	14-19	8-18	1.45-1.65	2.00-6.00	0.12-0.17	Low	0.5-1.0	0.24	0.24			
	19-34	3-10	1.50-1.65	6.00-20.00	0.06-0.11	Low	0.0-0.5	0.15	0.17			
	34-80	2-5	1.55-1.70	6.00-20.00	0.05-0.07	Low	0.0-0.5	0.10	0.15			

Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Shrink-swell potential	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
								K	Kf	T		
	In	Pct	g/cc	In/hr	In/in		Pct					
1195A:												
Eagleview-------	0-8	2-10	1.40-1.60	6.00-20.00	0.10-0.12	Low------	0.5-2.0	0.17	0.17	5	2	134
	8-32	2-10	1.50-1.65	6.00-20.00	0.09-0.11	Low------	0.5-1.0	0.17	0.17			
	32-60	2-10	1.50-1.65	6.00-20.00	0.06-0.08	Low------	0.0-0.5	0.15	0.15			
	60-80	2-10	1.50-1.65	6.00-20.00	0.05-0.07	Low------	0.0-0.5	0.15	0.15			
1195B:												
Sybil-----------	0-5	3-10	1.35-1.65	6.00-20.00	0.07-0.12	Low------	1.0-4.0	0.17	0.17	5	2	134
	5-10	3-15	1.35-1.65	2.00-20.00	0.10-0.18	Low------	0.0-0.5	0.17	0.17			
	10-15	8-18	1.45-1.65	2.00-6.00	0.12-0.17	Low------	0.5-1.0	0.24	0.24			
	15-32	3-10	1.50-1.65	6.00-20.00	0.06-0.11	Low------	0.0-0.5	0.15	0.17			
	32-80	2-5	1.55-1.70	6.00-20.00	0.05-0.07	Low------	0.0-0.5	0.10	0.15			
Eagleview-------	0-4	2-10	1.40-1.60	6.00-20.00	0.10-0.12	Low------	0.5-2.0	0.17	0.17	5	2	134
	4-36	2-10	1.50-1.65	6.00-20.00	0.09-0.11	Low------	0.5-1.0	0.17	0.17			
	36-60	2-10	1.50-1.65	6.00-20.00	0.06-0.08	Low------	0.0-0.5	0.15	0.15			
1195C:												
Sybil-----------	0-8	3-10	1.35-1.65	6.00-20.00	0.07-0.12	Low------	1.0-4.0	0.17	0.17	5	2	134
	8-17	3-15	1.35-1.65	2.00-20.00	0.10-0.18	Low------	0.0-0.5	0.17	0.17			
	17-26	8-18	1.45-1.65	2.00-6.00	0.12-0.17	Low------	0.5-1.0	0.24	0.24			
	26-37	3-10	1.50-1.65	6.00-20.00	0.06-0.11	Low------	0.0-0.5	0.15	0.17			
	37-80	2-5	1.55-1.70	6.00-20.00	0.05-0.07	Low------	0.0-0.5	0.10	0.15			
Eagleview-------	0-3	2-10	1.40-1.60	6.00-20.00	0.10-0.12	Low------	0.5-2.0	0.17	0.17	5	2	134
	3-37	2-10	1.50-1.65	6.00-20.00	0.09-0.11	Low------	0.5-1.0	0.17	0.17			
	37-60	2-10	1.50-1.65	6.00-20.00	0.06-0.08	Low------	0.0-0.5	0.15	0.15			
	60-80	2-10	1.50-1.65	6.00-20.00	0.05-0.07	Low------	0.0-0.5	0.15	0.15			
1195E:												
Sybil-----------	0-4	5-18	1.40-1.60	2.00-6.00	0.13-0.18	Low------	2.0-4.0	0.20	0.20	5	3	86
	4-15	3-15	1.35-1.65	2.00-20.00	0.10-0.18	Low------	0.0-0.5	0.17	0.17			
	15-25	8-18	1.45-1.65	2.00-6.00	0.12-0.17	Low------	0.5-1.0	0.24	0.24			
	25-78	3-10	1.50-1.65	6.00-20.00	0.06-0.11	Low------	0.0-0.5	0.15	0.17			
	78-80	2-5	1.55-1.70	6.00-20.00	0.05-0.07	Low------	0.0-0.5	0.10	0.15			
Eagleview-------	0-7	2-10	1.40-1.60	6.00-20.00	0.10-0.12	Low------	0.5-2.0	0.17	0.17	5	2	134
	7-17	2-10	1.50-1.65	6.00-20.00	0.09-0.11	Low------	0.5-1.0	0.17	0.17			
	17-55	2-10	1.50-1.65	6.00-20.00	0.06-0.08	Low------	0.0-0.5	0.15	0.15			
	55-80	2-10	1.50-1.65	6.00-20.00	0.05-0.07	Low------	0.0-0.5	0.15	0.15			
1196B:												
Lida------------	0-9	5-18	1.40-1.60	2.00-6.00	0.13-0.18	Low------	2.0-4.0	0.17	0.20	5	3	86
	9-13	3-15	1.40-1.60	2.00-20.00	0.08-0.13	Low------	0.0-0.5	0.10	0.17			
	13-25	8-18	1.45-1.65	2.00-6.00	0.08-0.17	Low------	0.5-1.0	0.15	0.24			
	25-45	1-5	1.55-1.70	6.00-20.00	0.02-0.10	Low------	0.0-0.5	0.05	0.15			
	45-60	1-5	1.60-1.70	6.00-20.00	0.01-0.07	Low------	0.0-0.5	0.05	0.10			
Two Inlets------	0-7	5-10	1.40-1.60	2.00-6.00	0.10-0.15	Low------	1.0-2.0	0.10	0.15	5	3	86
	7-14	2-10	1.40-1.60	6.00-20.00	0.09-0.11	Low------	0.0-0.5	0.10	0.15			
	14-29	5-15	1.40-1.60	6.00-20.00	0.09-0.11	Low------	0.0-0.5	0.10	0.15			
	29-60	0-3	1.60-1.80	20.00-40.00	0.02-0.04	Low------	0.0-0.5	0.05	0.10			
1196C:												
Lida------------	0-8	5-18	1.40-1.60	2.00-6.00	0.13-0.18	Low------	2.0-4.0	0.17	0.20	5	3	86
	8-17	3-15	1.40-1.60	2.00-20.00	0.08-0.13	Low------	0.0-0.5	0.10	0.17			
	17-25	8-18	1.45-1.65	2.00-6.00	0.08-0.17	Low------	0.5-1.0	0.15	0.24			
	25-41	1-5	1.55-1.70	6.00-20.00	0.02-0.10	Low------	0.0-0.5	0.05	0.15			
	41-80	1-5	1.60-1.70	6.00-20.00	0.01-0.07	Low------	0.0-0.5	0.05	0.10			

Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Shrink-swell potential	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
								K	Kf	T		
	In	Pct	g/cc	In/hr	In/in		Pct					
1196C:												
Two Inlets------	0-4	5-10	1.40-1.60	2.00-6.00	0.10-0.15	Low------	1.0-2.0	0.10	0.15	5	3	86
	4-9	2-10	1.40-1.60	6.00-20.00	0.09-0.11	Low------	0.0-0.5	0.10	0.15			
	9-38	5-15	1.40-1.60	6.00-20.00	0.09-0.11	Low------	0.0-0.5	0.10	0.15			
	38-60	0-3	1.60-1.80	20.00-40.00	0.02-0.04	Low------	0.0-0.5	0.05	0.10			
1196E:												
Lida----------	0-3	5-18	1.40-1.60	2.00-6.00	0.13-0.18	Low------	2.0-4.0	0.17	0.20	5	3	86
	3-14	3-15	1.40-1.60	2.00-20.00	0.08-0.13	Low------	0.0-0.5	0.10	0.17			
	14-20	8-18	1.45-1.65	2.00-6.00	0.08-0.17	Low------	0.5-1.0	0.15	0.24			
	20-27	1-5	1.55-1.70	6.00-20.00	0.02-0.10	Low------	0.0-0.5	0.05	0.15			
	27-60	1-5	1.60-1.70	6.00-20.00	0.01-0.07	Low------	0.0-0.5	0.05	0.10			
Two Inlets------	0-3	5-10	1.40-1.60	2.00-6.00	0.10-0.15	Low------	1.0-2.0	0.10	0.15	5	3	86
	3-7	2-10	1.40-1.60	6.00-20.00	0.09-0.11	Low------	0.0-0.5	0.10	0.15			
	7-21	5-15	1.40-1.60	6.00-20.00	0.09-0.11	Low------	0.0-0.5	0.10	0.15			
	21-60	0-3	1.60-1.80	20.00-40.00	0.02-0.04	Low------	0.0-0.5	0.05	0.10			
1196F:												
Lida----------	0-4	5-18	1.40-1.60	2.00-6.00	0.13-0.18	Low------	2.0-4.0	0.17	0.20	5	3	86
	4-17	3-15	1.40-1.60	2.00-20.00	0.08-0.13	Low------	0.0-0.5	0.10	0.17			
	17-25	8-18	1.45-1.65	2.00-6.00	0.08-0.17	Low------	0.5-1.0	0.15	0.24			
	25-28	1-5	1.55-1.70	6.00-20.00	0.02-0.10	Low------	0.0-0.5	0.05	0.15			
	28-60	1-5	1.60-1.70	6.00-20.00	0.01-0.07	Low------	0.0-0.5	0.05	0.10			
Two Inlets------	0-3	5-10	1.40-1.60	2.00-6.00	0.10-0.15	Low------	1.0-2.0	0.10	0.15	5	3	86
	3-7	2-10	1.40-1.60	6.00-20.00	0.09-0.11	Low------	0.0-0.5	0.10	0.15			
	7-14	5-15	1.40-1.60	6.00-20.00	0.09-0.11	Low------	0.0-0.5	0.10	0.15			
	14-60	0-3	1.60-1.80	20.00-40.00	0.02-0.04	Low------	0.0-0.5	0.05	0.10			
1200:												
Egglake---------	0-4	8-15	1.35-1.60	0.60-6.00	0.10-0.21	Low------	2.0-4.0	0.28	0.28	5	5	56
	4-9	3-10	1.50-1.70	0.60-6.00	0.12-0.14	Low------	0.5-2.0	0.24	0.24			
	9-25	18-30	1.50-1.70	0.60-2.00	0.16-0.18	Moderate	0.0-0.5	0.32	0.32			
	25-60	10-18	1.60-1.80	0.60-2.00	0.11-0.13	Low------	0.0-0.5	0.24	0.24			
1208B:												
Naytahwaush-----	0-7	27-35	1.30-1.55	0.20-0.60	0.17-0.20	Moderate	3.0-6.0	0.28	0.28	5	6	48
	7-25	35-60	1.25-1.40	0.06-0.20	0.10-0.19	High-----	0.5-1.0	0.32	0.32			
	25-60	22-35	1.30-1.55	0.20-0.60	0.14-0.19	Moderate	0.0-0.5	0.37	0.37			
Mahkonce--------	0-7	22-35	1.30-1.55	0.20-0.60	0.17-0.22	Moderate	3.0-6.0	0.32	0.32	5	6	48
	7-37	35-60	1.25-1.40	0.06-0.20	0.13-0.19	High-----	0.0-0.5	0.24	0.24			
	37-55	30-45	1.30-1.55	0.20-0.60	0.13-0.19	Moderate	0.0-0.5	0.32	0.32			
	55-60	25-35	1.30-1.55	0.20-0.60	0.13-0.19	Moderate	0.0-0.5	0.32	0.32			
1209C:												
Naytahwaush-----	0-7	27-35	1.30-1.55	0.20-0.60	0.17-0.20	Moderate	3.0-6.0	0.28	0.28	5	6	48
	7-24	35-60	1.25-1.40	0.06-0.20	0.10-0.19	High-----	0.5-1.0	0.32	0.32			
	24-60	22-35	1.30-1.55	0.20-0.60	0.14-0.19	Moderate	0.0-0.5	0.37	0.37			
1212B:												
Mahkonce--------	0-7	22-35	1.30-1.55	0.20-0.60	0.17-0.22	Moderate	3.0-6.0	0.32	0.32	5	6	48
	7-23	35-60	1.25-1.40	0.06-0.20	0.13-0.19	High-----	0.0-0.5	0.24	0.24			
	23-46	30-45	1.30-1.55	0.20-0.60	0.13-0.19	Moderate	0.0-0.5	0.32	0.32			
	46-60	25-35	1.30-1.55	0.20-0.60	0.13-0.19	Moderate	0.0-0.5	0.32	0.32			
1214:												
Mustinka--------	0-14	28-40	1.10-1.30	0.20-0.60	0.17-0.24	Moderate	5.0-10	0.28	0.28	5	7	38
	14-24	35-60	1.20-1.40	0.06-0.20	0.13-0.19	High-----	1.0-3.0	0.37	0.37			
	24-36	18-35	1.20-1.40	0.20-0.60	0.14-0.19	Moderate	0.5-1.0	0.37	0.37			
	36-80	18-35	1.40-1.60	0.20-0.60	0.14-0.19	Moderate	0.0-0.5	0.37	0.37			

Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Shrink-swell potential	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
								K	Kf	T		
	In	Pct	g/cc	In/hr	In/in		Pct					
1215:												
Pinelake	0-12	8-15	1.30-1.50	2.00-6.00	0.13-0.18	Low	4.0-8.0	0.20	0.20	4	3	86
	12-30	12-18	1.30-1.50	2.00-6.00	0.14-0.19	Low	0.5-2.0	0.20	0.20			
	30-35	1-8	1.50-1.70	6.00-20.00	0.03-0.09	Low	0.0-0.5	0.05	0.15			
	35-80	1-5	1.50-1.70	6.00-20.00	0.02-0.04	Low	0.0-0.5	0.02	0.10			
1216B:												
Egglake	0-4	5-15	1.35-1.60	0.60-6.00	0.13-0.15	Low	2.0-4.0	0.20	0.20	5	3	86
	4-8	3-10	1.50-1.70	0.60-6.00	0.12-0.14	Low	0.5-2.0	0.24	0.24			
	8-22	18-30	1.50-1.70	0.60-2.00	0.16-0.18	Moderate	0.0-0.5	0.32	0.32			
	22-60	10-18	1.60-1.80	0.60-2.00	0.11-0.13	Low	0.0-0.5	0.24	0.24			
Wykeham	0-9	5-18	1.30-1.55	0.60-6.00	0.13-0.18	Low	2.0-6.0	0.17	0.20	5	3	86
	9-13	5-15	1.50-1.70	0.60-2.00	0.10-0.17	Low	1.0-2.0	0.24	0.28			
	13-40	18-30	1.50-1.70	0.60-2.00	0.12-0.18	Moderate	0.5-1.0	0.24	0.28			
	40-60	10-18	1.55-1.75	0.60-2.00	0.11-0.16	Low	0.0-0.5	0.24	0.28			
1217E:												
Waukon	0-8	12-27	1.40-1.60	0.60-2.00	0.20-0.24	Moderate	2.0-6.0	0.24	0.24	5	6	48
	8-36	18-35	1.40-1.60	0.60-2.00	0.15-0.19	Moderate	0.0-0.5	0.32	0.32			
	36-60	18-30	1.45-1.65	0.60-2.00	0.15-0.19	Low	0.0-0.5	0.32	0.32			
Lida	0-6	5-18	1.40-1.60	2.00-6.00	0.13-0.18	Low	2.0-4.0	0.17	0.20	5	3	86
	6-16	3-15	1.40-1.60	2.00-20.00	0.08-0.13	Low	0.0-0.5	0.10	0.17			
	16-36	8-18	1.45-1.65	2.00-6.00	0.08-0.17	Low	0.5-1.0	0.15	0.24			
	36-60	1-5	1.60-1.70	6.00-20.00	0.01-0.07	Low	0.0-0.5	0.05	0.10			
1218B:												
Snellman	0-3	5-18	1.35-1.60	0.60-6.00	0.13-0.18	Low	1.0-3.0	0.20	0.20	5	3	86
	3-10	5-15	1.50-1.70	0.60-2.00	0.09-0.14	Low	0.5-2.0	0.28	0.28			
	10-42	18-30	1.50-1.70	0.60-2.00	0.12-0.18	Moderate	0.0-0.5	0.28	0.28			
	42-55	7-18	1.60-1.80	0.60-2.00	0.11-0.16	Low	0.0-0.5	0.28	0.28			
	55-80	7-18	1.60-1.80	0.60-2.00	0.11-0.16	Low	0.0-0.5	0.28	0.28			
Lida	0-5	5-18	1.40-1.60	2.00-6.00	0.13-0.18	Low	2.0-4.0	0.17	0.20	5	3	86
	5-19	3-15	1.40-1.60	2.00-20.00	0.08-0.13	Low	0.0-0.5	0.10	0.17			
	19-31	8-18	1.45-1.65	2.00-6.00	0.08-0.17	Low	0.5-1.0	0.15	0.24			
	31-35	1-5	1.55-1.70	6.00-20.00	0.02-0.10	Low	0.0-0.5	0.05	0.15			
	35-80	1-5	1.60-1.70	6.00-20.00	0.01-0.07	Low	0.0-0.5	0.05	0.10			
1218C:												
Snellman	0-3	5-18	1.35-1.60	0.60-6.00	0.13-0.18	Low	1.0-3.0	0.20	0.20	5	3	86
	3-10	5-15	1.50-1.70	0.60-2.00	0.09-0.14	Low	0.5-2.0	0.28	0.28			
	10-39	18-30	1.50-1.70	0.60-2.00	0.12-0.18	Moderate	0.0-0.5	0.28	0.28			
	39-80	7-18	1.60-1.80	0.60-2.00	0.11-0.16	Low	0.0-0.5	0.28	0.28			
Lida	0-6	5-18	1.40-1.60	2.00-6.00	0.13-0.18	Low	2.0-4.0	0.17	0.20	5	3	86
	6-13	3-15	1.40-1.60	2.00-20.00	0.08-0.13	Low	0.0-0.5	0.10	0.17			
	13-20	8-18	1.45-1.65	2.00-6.00	0.08-0.17	Low	0.5-1.0	0.15	0.24			
	20-80	1-5	1.60-1.70	6.00-20.00	0.01-0.07	Low	0.0-0.5	0.05	0.10			
1218E:												
Snellman	0-3	5-18	1.35-1.60	0.60-6.00	0.13-0.18	Low	1.0-3.0	0.20	0.20	5	3	86
	3-8	5-15	1.50-1.70	0.60-2.00	0.09-0.14	Low	0.5-2.0	0.28	0.28			
	8-30	18-30	1.50-1.70	0.60-2.00	0.12-0.18	Moderate	0.0-0.5	0.28	0.28			
	30-60	7-18	1.60-1.80	0.60-2.00	0.11-0.16	Low	0.0-0.5	0.28	0.28			
Lida	0-6	5-18	1.40-1.60	2.00-6.00	0.13-0.18	Low	2.0-4.0	0.17	0.20	5	3	86
	6-13	3-15	1.40-1.60	2.00-20.00	0.08-0.13	Low	0.0-0.5	0.10	0.17			
	13-28	8-18	1.45-1.65	2.00-6.00	0.08-0.17	Low	0.5-1.0	0.15	0.24			
	28-42	1-5	1.55-1.70	6.00-20.00	0.02-0.10	Low	0.0-0.5	0.05	0.15			
	42-60	1-5	1.60-1.70	6.00-20.00	0.01-0.07	Low	0.0-0.5	0.05	0.10			

Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Shrink-swell potential	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
								K	Kf	T		
	In	Pct	g/cc	In/hr	In/in		Pct					
1218F:												
Snellman	0-3	5-18	1.35-1.60	0.60-6.00	0.13-0.18	Low	1.0-3.0	0.20	0.20	5	3	86
	3-13	5-15	1.50-1.70	0.60-2.00	0.09-0.14	Low	0.5-2.0	0.28	0.28			
	13-23	18-30	1.50-1.70	0.60-2.00	0.12-0.18	Moderate	0.0-0.5	0.28	0.28			
	23-40	7-18	1.60-1.80	0.60-2.00	0.11-0.16	Low	0.0-0.5	0.28	0.28			
	40-60	7-18	1.60-1.80	0.60-2.00	0.11-0.16	Low	0.0-0.5	0.28	0.28			
Lida	0-4	5-18	1.40-1.60	2.00-6.00	0.13-0.18	Low	2.0-4.0	0.17	0.20	5	3	86
	4-14	3-15	1.40-1.60	2.00-20.00	0.08-0.13	Low	0.0-0.5	0.10	0.17			
	14-24	8-18	1.45-1.65	2.00-6.00	0.08-0.17	Low	0.5-1.0	0.15	0.24			
	24-35	1-5	1.55-1.70	6.00-20.00	0.02-0.10	Low	0.0-0.5	0.05	0.15			
	35-60	1-5	1.60-1.70	6.00-20.00	0.01-0.07	Low	0.0-0.5	0.05	0.10			
1219C:												
Sandberg	0-8	5-15	1.35-1.55	2.00-6.00	0.13-0.15	Low	1.0-4.0	0.17	0.17	3	3	86
	8-25	0-10	1.50-1.65	6.00-20.00	0.03-0.10	Low	0.5-1.0	0.05	0.10			
	25-36	0-5	1.50-1.65	>20.00	0.02-0.06	Low	0.5-1.0	0.05	0.10			
	36-60	0-5	1.50-1.65	>20.00	0.02-0.06	Low	0.0-0.5	0.05	0.10			
Sverdrup	0-12	10-18	1.35-1.50	2.00-6.00	0.13-0.15	Low	2.0-4.0	0.20	0.20	4	3	86
	12-24	6-18	1.40-1.55	2.00-6.00	0.08-0.14	Low	0.5-2.0	0.20	0.20			
	24-60	0-10	1.50-1.65	6.00-20.00	0.02-0.06	Low	0.0-0.5	0.15	0.15			
1221B:												
Sverdrup	0-15	10-18	1.35-1.50	2.00-6.00	0.13-0.15	Low	2.0-4.0	0.20	0.20	4	3	86
	15-28	6-18	1.40-1.55	2.00-6.00	0.08-0.14	Low	0.5-2.0	0.20	0.20			
	28-60	0-10	1.50-1.65	6.00-20.00	0.02-0.06	Low	0.0-0.5	0.15	0.15			
Sandberg	0-8	5-15	1.35-1.55	2.00-6.00	0.13-0.15	Low	1.0-4.0	0.17	0.17	3	3	86
	8-14	0-10	1.50-1.65	6.00-20.00	0.03-0.10	Low	0.5-1.0	0.05	0.10			
	14-24	0-5	1.50-1.65	>20.00	0.02-0.06	Low	0.5-1.0	0.05	0.10			
	24-60	0-5	1.50-1.65	>20.00	0.02-0.06	Low	0.0-0.5	0.05	0.10			
1223D:												
Sandberg	0-7	5-15	1.35-1.55	2.00-6.00	0.13-0.15	Low	1.0-4.0	0.17	0.17	3	3	86
	7-13	0-10	1.50-1.65	6.00-20.00	0.03-0.10	Low	0.5-1.0	0.05	0.10			
	13-60	0-5	1.50-1.65	>20.00	0.02-0.06	Low	0.0-0.5	0.05	0.10			
Arvilla	0-10	6-18	1.40-1.60	2.00-6.00	0.13-0.15	Low	1.0-4.0	0.20	0.20	3	3	86
	10-19	6-18	1.40-1.60	2.00-6.00	0.11-0.14	Low	1.0-2.0	0.20	0.20			
	19-60	2-10	1.40-1.60	6.00-20.00	0.02-0.05	Low	0.0-0.5	0.10	0.20			
1227:												
Quam	0-33	22-27	1.00-1.40	0.60-2.00	0.22-0.24	Low	6.0-15	0.28	0.28	5	6	48
	33-50	22-35	1.25-1.45	0.20-0.60	0.16-0.22	Moderate	4.0-10	0.28	0.28			
	50-60	20-35	1.40-1.65	0.20-0.60	0.14-0.19	Moderate	1.0-3.0	0.37	0.37			
Cathro	0-12	---	0.28-0.45	0.20-6.00	0.45-0.55	---	60-85	---	---	2	8	---
	12-24	---	0.15-0.30	0.20-6.00	0.35-0.45	---	60-85	---	---			
	24-60	10-30	1.50-1.70	0.20-2.00	0.11-0.22	Low	1.0-5.0	---	---			
Urness	0-20	18-27	0.25-0.50	0.20-2.00	0.18-0.24	Moderate	10-50	0.28	0.28	5	8	---
	20-45	18-35	0.30-1.00	0.20-2.00	0.16-0.22	Moderate	10-50	0.28	0.28			
	45-60	18-35	1.00-1.65	0.20-2.00	0.14-0.20	Moderate	10-50	0.28	0.28			
1230:												
Haslie	0-44	---	0.10-0.30	0.60-6.00	0.35-0.48	---	60-90	---	---	1	8	---
	44-60	18-35	0.10-0.50	0.06-0.60	0.18-0.24	Moderate	6.0-20	0.28	0.28			
Nidaros	0-38	---	0.15-0.45	0.20-6.00	0.35-0.45	---	55-85	---	---	2	8	---
	38-54	8-35	1.50-1.80	0.60-2.00	0.13-0.22	Low	5.0-15	0.20	0.24			
	54-60	0-4	1.40-1.65	6.00-20.00	0.03-0.08	Low	0.0-0.5	0.10	0.15			

Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Shrink-swell potential	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
								K	Kf	T		
	In	Pct	g/cc	In/hr	In/in		Pct					
1232B:												
Chapett	0-8	10-20	1.30-1.60	0.60-2.00	0.20-0.22	Low	2.0-4.0	0.24	0.24	5	5	56
	8-21	18-28	1.30-1.65	0.60-2.00	0.15-0.19	Low	0.5-1.0	0.32	0.32			
	21-36	10-18	1.40-1.65	0.60-2.00	0.11-0.19	Low	0.0-0.5	0.28	0.28			
	36-60	10-18	1.65-1.80	0.60-2.00	0.10-0.16	Low	0.0-0.5	0.28	0.28			
1232E:												
Chapett	0-9	10-20	1.30-1.60	0.60-2.00	0.20-0.22	Low	2.0-4.0	0.24	0.24	5	5	56
	9-26	18-28	1.30-1.65	0.60-2.00	0.15-0.19	Low	0.5-1.0	0.32	0.32			
	26-33	10-18	1.40-1.65	0.60-2.00	0.11-0.19	Low	0.0-0.5	0.28	0.28			
	33-60	10-18	1.65-1.80	0.60-2.00	0.10-0.16	Low	0.0-0.5	0.28	0.28			
1234B:												
Formdale	0-11	27-35	1.30-1.50	0.60-2.00	0.17-0.19	Moderate	2.0-5.0	0.24	0.24	5	6	48
	11-18	24-35	1.40-1.60	0.20-0.60	0.17-0.19	Moderate	0.5-2.0	0.37	0.37			
	18-30	18-35	1.50-1.65	0.20-0.60	0.14-0.19	Moderate	0.0-0.5	0.37	0.37			
	30-60	18-35	1.50-1.65	0.20-0.60	0.14-0.19	Moderate	0.0-0.5	0.37	0.37			
Buse	0-8	27-35	1.40-1.50	0.20-0.60	0.17-0.22	Moderate	1.0-3.0	0.28	0.28	5	4L	86
	8-27	18-35	1.55-1.65	0.20-0.60	0.14-0.19	Moderate	0.5-1.0	0.37	0.37			
	27-60	18-35	1.55-1.65	0.20-0.60	0.14-0.19	Moderate	0.0-0.5	0.37	0.37			
1237:												
Lakepark	0-9	20-27	1.30-1.45	0.20-0.60	0.19-0.21	Low	5.0-8.0	0.24	0.24	5	6	48
	9-35	20-35	1.30-1.45	0.20-0.60	0.19-0.21	Low	2.0-5.0	0.24	0.24			
	35-44	22-35	1.40-1.50	0.20-0.60	0.15-0.19	Moderate	0.5-2.0	0.32	0.32			
	44-60	22-35	1.50-1.70	0.20-0.60	0.14-0.19	Moderate	0.0-0.5	0.32	0.32			
1239:												
Quam	0-9	22-27	1.00-1.40	0.60-2.00	0.22-0.24	Low	6.0-15	0.28	0.28	5	6	48
	9-56	22-35	1.25-1.45	0.20-0.60	0.16-0.22	Moderate	4.0-10	0.28	0.28			
	56-80	20-35	1.40-1.65	0.20-0.60	0.14-0.19	Moderate	1.0-3.0	0.37	0.37			
1240:												
Roliss	0-14	28-35	1.10-1.40	0.20-0.60	0.18-0.22	Moderate	3.0-7.0	0.24	0.28	5	4L	86
	14-17	18-35	1.30-1.70	0.20-2.00	0.15-0.19	Moderate	1.0-3.0	0.28	0.28			
	17-27	18-35	1.30-1.70	0.20-2.00	0.15-0.19	Moderate	0.5-1.0	0.28	0.28			
	27-60	18-35	1.30-1.70	0.20-2.00	0.15-0.19	Moderate	0.5-1.0	0.28	0.28			
1247D:												
Corliss	0-7	2-10	1.40-1.60	6.00-20.00	0.10-0.12	Low	1.0-3.0	0.15	0.15	5	2	134
	7-10	0-10	1.50-1.65	6.00-20.00	0.03-0.10	Low	0.0-0.5	0.10	0.15			
	10-60	0-5	1.50-1.65	6.00-20.00	0.02-0.06	Low	0.0-0.5	0.10	0.15			
Dorset	0-8	4-18	1.40-1.55	2.00-6.00	0.13-0.15	Low	3.0-5.0	0.20	0.20	4	3	86
	8-17	10-18	1.45-1.65	2.00-6.00	0.12-0.19	Low	1.0-2.0	0.28	0.28			
	17-22	5-10	1.55-1.65	6.00-20.00	0.06-0.10	Low	0.0-0.5	0.10	0.17			
	22-60	0-5	1.55-1.65	6.00-20.00	0.02-0.04	Low	0.0-0.5	0.10	0.15			
1250C:												
Abbeylake	0-8	2-10	1.40-1.60	6.00-20.00	0.10-0.12	Low	1.0-3.0	0.15	0.15	5	2	134
	8-18	0-10	1.50-1.65	6.00-20.00	0.03-0.11	Low	0.0-0.5	0.10	0.10			
	18-60	0-3	1.50-1.65	6.00-20.00	0.03-0.08	Low	0.0-0.5	0.10	0.10			
Verndale	0-9	7-12	1.50-1.70	2.00-6.00	0.13-0.17	Low	2.0-4.0	0.20	0.20	3	3	86
	9-17	7-18	1.60-1.70	0.60-2.00	0.14-0.18	Low	0.5-1.0	0.24	0.24			
	17-24	2-6	1.45-1.60	6.00-20.00	0.06-0.08	Low	0.0-0.5	0.10	0.10			
	24-60	0-4	1.45-1.60	6.00-20.00	0.02-0.06	Low	0.0-0.5	0.10	0.10			

Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Shrink-swell potential	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
								K	Kf	T		
	In	Pct	g/cc	In/hr	In/in		Pct					
1259:												
Hamerly---------	0-8	27-35	1.10-1.50	0.20-2.00	0.17-0.19	Moderate	4.0-7.0	0.24	0.24	5	4L	86
	8-40	18-35	1.20-1.50	0.20-2.00	0.15-0.19	Moderate	1.0-4.0	0.28	0.28			
	40-60	18-35	1.20-1.60	0.20-2.00	0.14-0.19	Moderate	0.0-1.0	0.37	0.37			
Mustinka--------	0-8	28-40	1.10-1.30	0.20-0.60	0.17-0.24	Moderate	5.0-10	0.28	0.28	5	7	38
	8-25	35-60	1.20-1.40	0.06-0.20	0.13-0.19	High-----	1.0-3.0	0.37	0.37			
	25-36	18-35	1.20-1.40	0.20-0.60	0.14-0.19	Moderate	0.5-1.0	0.37	0.37			
	36-60	18-35	1.40-1.60	0.20-0.60	0.14-0.19	Moderate	0.0-0.5	0.37	0.37			
1275B:												
Kandota---------	0-9	10-20	1.35-1.60	0.60-6.00	0.14-0.17	Low------	2.0-4.0	0.20	0.20	5	3	86
	9-11	5-18	1.35-1.65	0.60-6.00	0.11-0.17	Low------	0.5-1.0	0.24	0.24			
	11-45	18-30	1.50-1.75	0.60-2.00	0.16-0.19	Low------	0.0-0.5	0.32	0.32			
	45-57	12-18	1.40-1.65	0.60-2.00	0.12-0.17	Low------	0.0-0.5	0.28	0.28			
	57-80	7-18	1.50-1.65	0.60-2.00	0.12-0.17	Low------	0.0-0.5	0.28	0.28			
Egglake---------	0-6	8-14	1.40-1.60	0.60-2.00	0.20-0.22	Low------	3.0-5.0	0.24	0.24	5	5	56
	6-12	5-12	1.40-1.65	0.60-6.00	0.12-0.19	Low------	1.0-3.0	0.24	0.24			
	12-17	12-20	1.45-1.65	0.60-2.00	0.12-0.19	Low------	0.0-0.5	0.24	0.24			
	17-52	18-30	1.50-1.65	0.60-2.00	0.15-0.19	Moderate	0.0-0.5	0.28	0.28			
	52-80	10-18	1.60-1.80	0.60-2.00	0.11-0.19	Low------	0.0-0.5	0.28	0.28			
1275C:												
Kandota---------	0-9	10-20	1.35-1.60	0.60-6.00	0.14-0.17	Low------	2.0-4.0	0.20	0.20	5	3	86
	9-13	5-18	1.35-1.65	0.60-6.00	0.11-0.17	Low------	0.5-1.0	0.24	0.24			
	13-38	18-30	1.50-1.75	0.60-2.00	0.16-0.19	Low------	0.0-0.5	0.32	0.32			
	38-55	12-18	1.40-1.65	0.60-2.00	0.12-0.17	Low------	0.0-0.5	0.28	0.28			
	55-80	7-18	1.50-1.65	0.60-2.00	0.12-0.17	Low------	0.0-0.5	0.28	0.28			
Egglake---------	0-9	8-14	1.40-1.60	0.60-2.00	0.20-0.22	Low------	3.0-5.0	0.24	0.24	5	5	56
	9-14	5-12	1.40-1.65	0.60-6.00	0.12-0.19	Low------	1.0-3.0	0.24	0.24			
	14-22	12-20	1.45-1.65	0.60-2.00	0.12-0.19	Low------	0.0-0.5	0.24	0.24			
	22-41	18-30	1.50-1.65	0.60-2.00	0.15-0.19	Moderate	0.0-0.5	0.28	0.28			
	41-80	10-18	1.60-1.80	0.60-2.00	0.11-0.19	Low------	0.0-0.5	0.28	0.28			
1276:												
Knute-----------	0-10	10-18	1.35-1.65	0.60-2.00	0.13-0.18	Low------	2.0-4.0	0.20	0.20	5	3	86
	10-12	18-28	1.30-1.65	0.60-2.00	0.15-0.19	Low------	1.0-2.0	0.32	0.32			
	12-34	10-18	1.40-1.65	0.60-2.00	0.11-0.19	Low------	0.5-1.0	0.28	0.28			
	34-48	10-18	1.45-1.70	0.60-2.00	0.11-0.19	Low------	0.0-0.5	0.28	0.28			
	48-60	10-18	1.65-1.80	0.20-0.60	0.05-0.11	Low------	0.0-0.5	0.28	0.28			
Brandsvold------	0-11	10-20	1.35-1.55	2.00-6.00	0.13-0.18	Low------	3.0-6.0	0.20	0.20	5	3	86
	11-15	10-20	1.50-1.65	2.00-6.00	0.12-0.14	Low------	0.5-2.0	0.20	0.20			
	15-29	18-27	1.45-1.65	0.60-2.00	0.15-0.19	Moderate	0.5-2.0	0.28	0.28			
	29-60	12-20	1.50-1.65	0.60-2.00	0.11-0.19	Low------	0.5-1.0	0.28	0.28			
1277D:												
Corliss---------	0-8	2-10	1.40-1.60	6.00-20.00	0.10-0.12	Low------	1.0-3.0	0.15	0.15	5	2	134
	8-20	0-10	1.50-1.65	6.00-20.00	0.03-0.10	Low------	0.0-0.5	0.10	0.15			
	20-60	0-5	1.50-1.65	6.00-20.00	0.02-0.06	Low------	0.0-0.5	0.10	0.15			
Sverdrup--------	0-9	10-18	1.35-1.50	2.00-6.00	0.13-0.15	Low------	2.0-4.0	0.20	0.20	4	3	86
	9-25	6-18	1.40-1.55	2.00-6.00	0.08-0.14	Low------	0.5-2.0	0.20	0.20			
	25-60	0-10	1.50-1.65	6.00-20.00	0.02-0.06	Low------	0.0-0.5	0.15	0.15			
1289:												
Knute-----------	0-10	10-18	1.35-1.65	0.60-2.00	0.13-0.18	Low------	2.0-4.0	0.20	0.20	5	3	86
	10-13	18-28	1.30-1.65	0.60-2.00	0.15-0.19	Low------	1.0-2.0	0.32	0.32			
	13-41	12-20	1.40-1.65	0.60-2.00	0.11-0.19	Low------	0.5-1.0	0.28	0.28			
	41-53	10-18	1.45-1.70	0.60-2.00	0.11-0.19	Low------	0.0-0.5	0.28	0.28			
	53-60	10-18	1.65-1.80	0.20-0.60	0.05-0.11	Low------	0.0-0.5	0.28	0.28			

Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Shrink-swell potential	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
								K	Kf	T		
	In	Pct	g/cc	In/hr	In/in		Pct					
1290:												
Brandsvold------	0-12	10-20	1.35-1.55	2.00-6.00	0.13-0.18	Low------	3.0-6.0	0.20	0.20	5	3	86
	12-17	10-20	1.50-1.65	2.00-6.00	0.12-0.14	Low------	0.5-2.0	0.20	0.20			
	17-37	18-27	1.45-1.65	0.60-2.00	0.15-0.19	Moderate	0.5-2.0	0.28	0.28			
	37-45	12-20	1.50-1.65	0.60-2.00	0.11-0.19	Low------	0.5-1.0	0.28	0.28			
	45-80	10-18	1.55-1.70	0.20-0.60	0.11-0.19	Low------	0.0-0.5	0.28	0.28			
1291:												
Sedgeville------	0-8	0-23	1.35-1.45	0.60-2.00	0.17-0.24	Low------	4.0-12	0.28	0.28	4	8	---
	8-34	8-17	1.40-1.50	0.60-2.00	0.10-0.22	Low------	1.0-12	0.32	0.43			
	34-60	2-5	1.55-1.70	6.00-20.00	0.04-0.16	Low------	1.0-12	0.10	0.15			
1293:												
Sedgeville------	0-21	8-15	1.35-1.50	0.60-6.00	0.11-0.18	Low------	3.0-12	0.20	0.20	4	8	---
	21-40	8-17	1.40-1.50	0.60-2.00	0.10-0.22	Low------	1.0-12	0.32	0.43			
	40-60	2-5	1.55-1.70	6.00-20.00	0.04-0.16	Low------	1.0-12	0.10	0.15			
1304A:												
Glyndon---------	0-16	15-20	1.20-1.40	0.60-2.00	0.20-0.23	Low------	3.0-7.0	0.28	0.28	5	3	86
	16-29	10-18	1.30-1.50	0.60-6.00	0.17-0.20	Low------	1.0-2.0	0.43	0.43			
	29-60	5-18	1.35-1.65	2.00-6.00	0.15-0.19	Low------	0.0-0.5	0.43	0.43			
1307:												
Rushlake--------	0-5	1-5	1.50-1.70	6.00-20.00	0.04-0.07	Low------	0.5-4.0	0.15	0.15	5	1	180
	5-60	1-10	1.50-1.70	6.00-20.00	0.02-0.10	Low------	0.0-0.5	0.05	0.10			
1317:												
Vallers---------	0-14	28-35	1.20-1.35	0.20-0.60	0.18-0.22	Moderate	5.0-8.0	0.28	0.28	5	4L	86
	14-24	18-35	1.40-1.55	0.20-0.60	0.15-0.19	Moderate	1.0-3.0	0.28	0.28			
	24-60	18-35	1.50-1.70	0.20-0.60	0.17-0.19	Low------	0.0-0.5	0.37	0.37			
1319B:												
Rockwood--------	0-8	5-15	1.55-1.75	0.60-2.00	0.13-0.18	Low------	2.0-4.0	0.24	0.24	4	3	86
	8-18	5-10	1.60-1.75	0.60-2.00	0.12-0.15	Low------	---	0.28	0.28			
	18-26	8-18	1.60-1.75	0.60-2.00	0.12-0.15	Low------	---	0.28	0.28			
	26-42	8-18	1.65-1.80	0.20-0.60	0.12-0.15	Low------	---	0.28	0.28			
	42-60	7-15	1.80-2.00	0.00-0.06	0.00-0.04	Low------	---	0.24	0.24			
1319C:												
Rockwood--------	0-9	5-15	1.55-1.75	0.60-2.00	0.13-0.18	Low------	2.0-4.0	0.24	0.24	4	3	86
	9-16	5-10	1.60-1.75	0.60-2.00	0.12-0.15	Low------	---	0.28	0.28			
	16-27	8-18	1.60-1.75	0.60-2.00	0.12-0.15	Low------	---	0.28	0.28			
	27-41	8-18	1.65-1.80	0.20-0.60	0.12-0.15	Low------	---	0.28	0.28			
	41-60	7-15	1.80-2.00	0.00-0.06	0.00-0.04	Low------	---	0.24	0.24			
1319D:												
Rockwood--------	0-5	5-15	1.55-1.75	0.60-2.00	0.13-0.18	Low------	2.0-4.0	0.24	0.24	4	3	86
	5-9	5-10	1.60-1.75	0.60-2.00	0.12-0.15	Low------	---	0.28	0.28			
	9-38	8-18	1.60-1.75	0.60-2.00	0.12-0.15	Low------	---	0.28	0.28			
	38-45	8-18	1.65-1.80	0.20-0.60	0.12-0.15	Low------	---	0.28	0.28			
	45-60	7-15	1.80-2.00	0.00-0.06	0.00-0.04	Low------	---	0.24	0.24			
1320B:												
Blowers---------	0-7	5-15	1.55-1.80	0.60-2.00	0.13-0.18	Low------	2.0-6.0	0.24	0.24	4	3	86
	7-19	5-10	1.60-1.80	0.60-2.00	0.12-0.15	Low------	1.0-2.0	0.28	0.28			
	19-36	8-18	1.60-1.75	0.60-2.00	0.12-0.15	Low------	0.5-1.0	0.24	0.24			
	36-43	8-18	1.65-1.80	0.20-0.60	0.12-0.15	Low------	0.0-0.5	0.24	0.24			
	43-60	7-15	1.80-2.00	0.00-0.06	0.00-0.04	Low------	0.0-0.5	0.24	0.24			

Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Shrink-swell potential	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
								K	Kf	T		
	In	Pct	g/cc	In/hr	In/in		Pct					
1321:												
Paddock	0-8	8-15	1.45-1.75	0.60-2.00	0.13-0.18	Low	2.0-6.0	0.24	0.24	4	3	86
	8-15	3-10	1.50-1.75	0.60-2.00	0.12-0.16	Low	0.5-2.0	0.24	0.24			
	15-40	8-18	1.60-1.80	0.20-0.60	0.12-0.16	Low	0.0-0.5	0.24	0.24			
	40-60	6-15	1.80-2.00	0.00-0.06	0.00-0.04	Low	0.0-0.5	0.24	0.24			
Becida	0-8	10-20	1.40-1.60	0.60-2.00	0.20-0.22	Low	3.0-7.0	0.32	0.32	4	5	56
	8-13	3-10	1.50-1.75	0.60-2.00	0.12-0.16	Low	1.0-3.0	0.24	0.28			
	13-27	8-18	1.60-1.80	0.60-2.00	0.12-0.16	Low	0.5-1.0	0.24	0.28			
	27-58	8-18	1.70-1.90	0.06-0.20	0.02-0.06	Low	0.0-0.5	0.24	0.28			
	58-80	6-15	1.80-2.00	0.01-0.06	0.02-0.06	Low	0.0-0.5	0.24	0.28			
1322:												
Wolverton	0-16	10-20	1.20-1.40	2.00-6.00	0.16-0.20	Low	2.0-4.0	0.28	0.28	5	3	86
	16-34	5-15	1.30-1.50	2.00-20.00	0.06-0.09	Low	0.5-1.0	0.20	0.20			
	34-45	2-10	1.30-1.60	2.00-20.00	0.05-0.07	Low	0.0-0.5	0.20	0.20			
	45-80	18-35	1.40-1.60	0.20-0.60	0.14-0.19	Moderate	0.0-0.5	0.28	0.32			
1324B:												
Heimdal	0-8	10-20	1.30-1.60	0.60-2.00	0.20-0.22	Low	3.0-6.0	0.24	0.24	5	5	56
	8-18	10-18	1.35-1.65	0.60-2.00	0.12-0.19	Low	0.5-1.0	0.32	0.32			
	18-25	10-18	1.45-1.65	0.60-2.00	0.11-0.19	Low	0.0-0.5	0.32	0.32			
	25-60	7-18	1.65-1.80	0.60-2.00	0.11-0.16	Low	0.0-0.5	0.32	0.32			
Sisseton	0-8	15-20	1.20-1.30	0.60-2.00	0.16-0.18	Low	1.0-3.0	0.32	0.32	5	4L	86
	8-22	10-18	1.20-1.35	0.60-2.00	0.16-0.20	Low	0.0-1.0	0.32	0.32			
	22-60	10-18	1.30-1.50	0.60-2.00	0.14-0.19	Low	0.0-0.5	0.37	0.37			
1338:												
Oakcreek	0-14	8-15	1.40-1.55	0.60-2.00	0.20-0.22	Low	3.0-6.0	0.24	0.24	4	5	56
	14-33	10-18	1.50-1.65	0.60-6.00	0.12-0.17	Low	0.5-1.0	0.37	0.37			
	33-47	2-8	1.50-1.65	6.00-20.00	0.06-0.11	Low	0.0-0.5	0.10	0.17			
	47-80	2-4	1.60-1.75	6.00-20.00	0.02-0.07	Low	0.0-0.5	0.05	0.15			
1339:												
Borup	0-10	15-27	1.20-1.40	2.00-6.00	0.20-0.23	Low	4.0-12	0.28	0.28	5	4L	86
	10-16	10-18	1.30-1.50	2.00-6.00	0.17-0.20	Low	0.5-1.0	0.28	0.28			
	16-60	5-18	1.35-1.65	2.00-20.00	0.15-0.19	Low	0.0-0.5	0.28	0.28			
1340:												
Bluffcreek	0-8	5-14	1.40-1.60	2.00-6.00	0.13-0.18	Low	2.0-5.0	0.20	0.20	5	3	86
	8-31	8-18	1.45-1.65	2.00-6.00	0.10-0.14	Low	0.0-0.5	0.15	0.20			
	31-60	1-5	1.60-1.70	6.00-20.00	0.02-0.07	Low	0.0-0.5	0.10	0.15			
Epoufette	0-7	5-15	1.35-1.50	2.00-6.00	0.09-0.14	Low	2.0-6.0	0.20	---	4	3	86
	7-10	5-15	1.40-1.55	6.00-20.00	0.05-0.07	Low	1.0-3.0	0.17	0.17			
	10-22	8-18	1.40-1.60	2.00-6.00	0.08-0.14	Low	0.0-0.5	0.17	0.17			
	22-60	0-8	1.40-1.65	>20.00	0.01-0.03	Low	0.0-0.5	0.10	0.15			
1341:												
Clitherall	0-11	8-15	1.45-1.60	2.00-6.00	0.13-0.18	Low	2.0-6.0	0.20	0.20	4	3	86
	11-16	8-18	1.45-1.65	2.00-6.00	0.12-0.19	Low	0.5-2.0	0.24	0.24			
	16-30	4-10	1.55-1.65	2.00-20.00	0.06-0.10	Low	0.0-0.5	0.15	0.17			
	30-45	1-5	1.55-1.65	6.00-20.00	0.02-0.07	Low	0.0-0.5	0.10	0.15			
	45-80	10-18	1.65-1.80	0.60-2.00	0.11-0.16	Low	0.0-0.5	0.24	0.24			
Wykeham	0-8	5-18	1.30-1.55	0.60-6.00	0.13-0.18	Low	2.0-6.0	0.17	0.20	5	3	86
	8-17	5-15	1.50-1.70	0.60-2.00	0.10-0.17	Low	1.0-2.0	0.24	0.28			
	17-32	18-30	1.50-1.70	0.60-2.00	0.12-0.18	Moderate	0.5-1.0	0.24	0.28			
	32-60	10-18	1.55-1.75	0.60-2.00	0.11-0.16	Low	0.0-0.5	0.24	0.28			

Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Shrink-swell potential	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
								K	Kf	T		
	In	Pct	g/cc	In/hr	In/in		Pct					
1342:												
Pinelake	0-10	8-18	1.35-1.55	2.00-6.00	0.13-0.18	Low	3.0-7.0	0.20	0.20	4	3	86
	10-29	12-18	1.30-1.55	0.60-2.00	0.14-0.19	Low	0.5-2.0	0.28	0.28			
	29-70	1-5	1.50-1.70	6.00-20.00	0.02-0.08	Low	0.0-0.5	0.10	0.17			
	70-80	12-27	1.50-1.70	0.60-2.00	0.11-0.18	Moderate	0.0-0.5	0.28	0.28			
Brandsvold	0-10	10-20	1.35-1.55	2.00-6.00	0.13-0.18	Low	3.0-6.0	0.20	0.20	5	3	86
	10-12	10-20	1.50-1.65	2.00-6.00	0.12-0.14	Low	0.5-2.0	0.20	0.20			
	12-41	18-27	1.45-1.65	0.60-2.00	0.15-0.19	Moderate	0.5-2.0	0.28	0.28			
	41-80	10-18	1.55-1.70	0.20-0.60	0.11-0.19	Low	0.0-0.5	0.28	0.28			
1343C:												
Lida	0-8	5-18	1.40-1.60	2.00-6.00	0.13-0.18	Low	2.0-4.0	0.17	0.20	5	3	86
	8-13	3-15	1.40-1.60	2.00-20.00	0.08-0.13	Low	0.0-0.5	0.10	0.17			
	13-22	8-18	1.45-1.65	2.00-6.00	0.08-0.17	Low	0.5-1.0	0.15	0.24			
	22-38	1-5	1.55-1.70	6.00-20.00	0.02-0.10	Low	0.0-0.5	0.05	0.15			
	38-80	1-5	1.60-1.70	6.00-20.00	0.01-0.07	Low	0.0-0.5	0.05	0.10			
Almora	0-9	12-20	1.35-1.55	2.00-6.00	0.13-0.18	Low	3.0-5.0	0.20	0.20	4	3	86
	9-12	12-20	1.30-1.55	0.60-2.00	0.12-0.19	Low	1.0-2.0	0.28	0.28			
	12-25	18-30	1.30-1.55	0.60-2.00	0.14-0.19	Moderate	0.5-1.0	0.32	0.32			
	25-28	3-12	1.55-1.65	6.00-20.00	0.02-0.11	Low	0.0-0.5	0.10	0.15			
	28-80	1-4	1.55-1.65	6.00-20.00	0.02-0.07	Low	0.0-0.5	0.10	0.15			
Lizzie	0-8	8-18	1.30-1.45	0.60-6.00	0.16-0.22	Low	2.0-5.0	0.24	0.24	5	3	86
	8-18	18-35	1.20-1.40	0.60-2.00	0.15-0.22	Moderate	0.0-0.5	0.37	0.37			
	18-42	8-20	1.20-1.40	0.60-2.00	0.15-0.22	Low	0.0-0.5	0.32	0.32			
	42-80	3-16	1.30-1.65	0.60-6.00	0.08-0.22	Low	0.0-0.5	0.32	0.32			
1344B:												
Lida	0-7	5-18	1.40-1.60	2.00-6.00	0.13-0.18	Low	2.0-4.0	0.17	0.20	5	3	86
	7-23	8-18	1.45-1.65	2.00-6.00	0.08-0.17	Low	0.5-1.0	0.15	0.24			
	23-30	1-5	1.55-1.70	6.00-20.00	0.02-0.10	Low	0.0-0.5	0.05	0.15			
	30-80	1-5	1.60-1.70	6.00-20.00	0.01-0.07	Low	0.0-0.5	0.05	0.10			
Almora	0-10	12-20	1.35-1.55	2.00-6.00	0.13-0.18	Low	3.0-5.0	0.20	0.20	4	3	86
	10-15	12-20	1.30-1.55	0.60-2.00	0.12-0.19	Low	1.0-2.0	0.28	0.28			
	15-39	18-30	1.30-1.55	0.60-2.00	0.14-0.19	Moderate	0.5-1.0	0.32	0.32			
	39-80	1-4	1.55-1.65	6.00-20.00	0.02-0.07	Low	0.0-0.5	0.10	0.15			
Dent	0-15	8-18	1.30-1.45	0.60-6.00	0.16-0.22	Low	2.0-6.0	0.24	0.24	5	3	86
	15-38	18-35	1.20-1.40	0.60-2.00	0.17-0.22	Moderate	0.5-1.0	0.43	0.43			
	38-62	8-27	1.20-1.40	0.60-2.00	0.15-0.22	Low	0.0-0.5	0.43	0.43			
	62-80	5-20	1.30-1.65	0.60-2.00	0.12-0.22	Low	0.0-0.5	0.43	0.43			
1345:												
Bluffcreek	0-8	5-14	1.40-1.60	2.00-6.00	0.13-0.18	Low	2.0-5.0	0.20	0.20	5	3	86
	8-19	3-10	1.45-1.65	6.00-20.00	0.08-0.10	Low	0.0-0.5	0.15	0.15			
	19-47	8-18	1.45-1.65	2.00-6.00	0.10-0.14	Low	0.0-0.5	0.15	0.20			
	47-60	1-5	1.60-1.70	6.00-20.00	0.02-0.07	Low	0.0-0.5	0.10	0.15			
Rosy	0-9	3-12	1.40-1.55	0.60-2.00	0.14-0.19	Low	0.5-2.0	0.24	0.24	5	3	86
	9-48	8-18	1.50-1.65	0.60-2.00	0.14-0.19	Low	0.0-0.5	0.28	0.28			
	48-60	6-18	1.55-1.70	0.60-2.00	0.11-0.17	Low	0.0-0.5	0.28	0.28			
1346:												
Nidaros	0-25	---	0.15-0.45	0.20-6.00	0.35-0.45	Low	55-90	---	---	2	2	134
	25-42	8-35	1.50-1.80	0.60-2.00	0.13-0.22	Low	5.0-25	0.20	0.20			
	42-60	0-4	1.45-1.70	6.00-20.00	0.03-0.08	Low	0.0-0.5	0.10	0.15			

Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Shrink-swell potential	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
								K	Kf	T		
	In	Pct	g/cc	In/hr	In/in		Pct					
1347B:												
Kandota	0-8	10-20	1.35-1.60	0.60-2.00	0.20-0.22	Low	2.0-4.0	0.24	0.24	5	5	56
	8-11	5-18	1.35-1.65	0.60-6.00	0.11-0.17	Low	0.5-1.0	0.24	0.24			
	11-26	18-30	1.50-1.75	0.60-2.00	0.16-0.19	Low	0.0-0.5	0.32	0.32			
	26-46	12-18	1.40-1.65	0.60-2.00	0.12-0.17	Low	0.0-0.5	0.28	0.28			
	46-80	7-18	1.50-1.65	0.60-2.00	0.12-0.17	Low	0.0-0.5	0.28	0.28			
1348:												
Knute	0-11	12-20	1.30-1.60	0.60-2.00	0.20-0.22	Low	2.0-4.0	0.24	0.24	5	5	56
	11-16	18-28	1.30-1.65	0.60-2.00	0.15-0.19	Low	1.0-2.0	0.32	0.32			
	16-45	10-18	1.40-1.65	0.60-2.00	0.11-0.19	Low	0.5-1.0	0.28	0.28			
	45-65	10-18	1.45-1.70	0.60-2.00	0.11-0.19	Low	0.0-0.5	0.28	0.28			
	65-80	10-18	1.65-1.80	0.20-0.60	0.05-0.11	Low	0.0-0.5	0.28	0.28			
1349:												
Clotho	0-14	10-25	1.50-1.60	0.60-2.00	0.20-0.22	Moderate	4.0-8.0	0.24	0.24	5	4L	86
	14-28	8-18	1.60-1.70	0.20-0.60	0.12-0.17	Low	0.5-2.0	0.28	0.28			
	28-60	8-15	1.65-1.75	0.60-2.00	0.11-0.14	Low	0.0-0.5	0.28	0.28			
1350:												
Brandsvold	0-13	10-20	1.30-1.50	0.60-2.00	0.20-0.22	Low	3.0-6.0	0.24	0.24	5	5	56
	13-61	18-27	1.45-1.65	0.60-2.00	0.15-0.19	Moderate	0.5-2.0	0.28	0.28			
	61-80	10-18	1.55-1.70	0.20-0.60	0.11-0.19	Low	0.0-0.5	0.28	0.28			
1351:												
Bluffton	0-10	14-25	1.35-1.50	0.60-2.00	0.20-0.24	Low	4.0-12	0.24	0.24	5	5	56
	10-53	18-30	1.45-1.55	0.60-2.00	0.15-0.17	Low	0.5-2.0	0.32	0.32			
	53-80	16-24	1.50-1.65	0.60-2.00	0.15-0.19	Low	0.0-0.5	0.32	0.32			
1365:												
Hillview	0-7	5-15	1.25-1.40	2.00-6.00	0.13-0.18	Low	2.0-4.0	0.20	0.20	5	3	86
	7-15	3-12	1.35-1.55	2.00-6.00	0.10-0.14	Low	0.5-1.0	0.17	0.17			
	15-29	8-18	1.35-1.55	2.00-6.00	0.12-0.19	Low	0.5-1.0	0.24	0.24			
	29-60	3-12	1.35-1.65	2.00-6.00	0.08-0.17	Low	0.0-0.5	0.28	0.28			
1396:												
Sedgeville	0-7	0-23	1.35-1.45	0.60-2.00	0.17-0.24	Low	4.0-12	0.28	0.28	4	8	---
	7-24	8-17	1.40-1.50	0.60-2.00	0.10-0.22	Low	1.0-12	0.32	0.43			
	24-60	2-5	1.55-1.70	6.00-20.00	0.04-0.16	Low	1.0-12	0.10	0.15			
Nidaros	0-21	---	0.15-0.45	0.20-6.00	0.35-0.45	---	55-85	---	---	2	2	134
	21-27	8-35	1.50-1.80	0.60-2.00	0.13-0.22	Low	5.0-15	0.24	0.24			
	27-80	0-4	1.40-1.65	6.00-20.00	0.03-0.08	Low	0.0-0.5	0.10	0.15			
Aquolls	0-10	10-20	1.35-1.50	0.60-2.00	0.20-0.22	Low	3.0-6.0	0.28	0.28	5	3	86
	10-24	12-27	1.45-1.65	0.60-2.00	0.15-0.19	Moderate	0.5-1.0	0.28	0.28			
	24-60	2-18	1.50-1.70	0.60-6.00	0.10-0.18	Low	0.0-0.5	0.20	0.24			
1397:												
Bemidji	0-8	2-10	1.45-1.65	6.00-20.00	0.10-0.12	Low	1.0-3.0	0.17	0.17	5	2	134
	8-36	2-10	1.45-1.65	6.00-20.00	0.06-0.11	Low	0.5-1.0	0.15	0.15			
	36-45	12-27	1.50-1.80	0.60-2.00	0.12-0.18	Low	0.0-0.5	0.32	0.32			
	45-60	7-18	1.60-1.80	0.60-2.00	0.11-0.16	Low	0.0-0.5	0.24	0.24			
1825B:												
Seelyeville	0-60	---	0.10-0.25	0.20-6.00	0.35-0.45	---	25-99	0.10	0.10	3	8	---
1874:												
Radium	0-11	1-8	1.55-1.75	6.00-20.00	0.06-0.12	Low	1.0-3.0	0.17	0.17	5	2	134
	11-18	1-8	1.55-1.75	6.00-20.00	0.03-0.08	Low	0.0-0.5	0.10	0.10			
	18-24	1-8	1.55-1.75	20.00-40.00	0.02-0.05	Low	0.0-0.5	0.05	0.17			
	24-60	1-5	1.55-1.75	6.00-20.00	0.03-0.09	Low	0.0-0.5	0.10	0.17			

Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Shrink-swell potential	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
								K	Kf	T		
	In	Pct	g/cc	In/hr	In/in		Pct					
1943:												
Roscommon-------	0-6	2-12	0.90-1.60	6.00-20.00	0.07-0.20	Low------	4.0-8.0	0.17	0.17	5	2	134
	6-60	0-10	1.45-1.75	6.00-20.00	0.05-0.07	Low------	---	0.17	0.17			
1975:												
Oylen-----------	0-13	7-12	1.50-1.70	2.00-6.00	0.12-0.16	Low------	2.0-4.0	0.20	0.20	3	3	86
	13-22	7-18	1.60-1.70	0.60-2.00	0.12-0.18	Low------	0.5-2.0	0.24	0.24			
	22-26	2-6	1.45-1.60	6.00-20.00	0.03-0.08	Low------	0.0-0.5	0.10	0.10			
	26-60	0-4	1.45-1.60	6.00-20.00	0.03-0.07	Low------	0.0-0.5	0.10	0.10			

Chemical Properties of the Soils

(Absence of an entry indicates that data were not estimated)

Map symbol and soil name	Depth	Clay	Cation-exchange capacity	Soil reaction	Calcium carbonate	Gypsum	Salinity	Sodium adsorption ratio
	In	Pct	meq/100g	pH	Pct	Pct	mmhos/cm	
7A:								
Hubbard	0-20	4-10	6.0-16.0	5.1-7.3	---	---	---	---
	20-45	1-5	1.0-4.0	5.1-7.3	---	---	---	---
	45-60	0-5	0.0-4.0	5.6-7.8	0-15	---	---	---
7B:								
Hubbard	0-12	4-10	6.0-16.0	5.1-7.3	---	---	---	---
	12-42	1-5	1.0-4.0	5.1-7.3	---	---	---	---
	42-60	0-5	0.0-4.0	5.6-7.8	0-15	---	---	---
7C:								
Hubbard	0-9	4-10	6.0-16.0	5.1-7.3	---	---	---	---
	9-34	1-5	1.0-4.0	5.1-7.3	---	---	---	---
	34-60	0-5	0.0-4.0	5.6-7.8	0-15	---	---	---
26:								
Aazdahl	0-13	27-35	20.0-30.0	6.6-7.3	---	---	---	---
	13-23	27-35	14.0-24.0	6.6-7.8	---	---	---	---
	23-36	24-35	12.0-18.0	7.4-8.4	15-30	---	---	---
	36-60	24-35	12.0-18.0	7.4-8.4	10-20	---	---	---
34:								
Parnell	0-18	27-40	25.0-40.0	6.1-7.8	---	---	0-2	---
	18-50	35-60	19.0-29.0	6.1-7.8	0-3	0-2	0-2	0-1
	50-60	35-45	16.0-24.0	6.6-8.4	0-10	0-2	0-2	0-1
38B:								
Waukon	0-8	12-27	9.0-28.0	6.1-7.3	---	---	---	---
	8-32	18-35	7.0-21.0	6.1-8.4	0-30	---	---	---
	32-60	18-30	7.0-18.0	7.4-8.4	5-30	---	---	---
38C2:								
Waukon	0-8	12-27	9.0-28.0	6.1-7.3	---	---	---	---
	8-27	18-35	7.0-21.0	6.1-8.4	0-30	---	---	---
	27-60	18-30	7.0-18.0	7.4-8.4	5-30	---	---	---
38D2:								
Waukon	0-7	12-27	9.0-28.0	6.1-7.3	---	---	---	---
	7-22	18-35	7.0-21.0	6.1-8.4	0-30	---	---	---
	22-60	18-30	7.0-18.0	7.4-8.4	5-30	---	---	---
38E:								
Waukon	0-9	12-27	9.0-28.0	6.1-7.3	---	---	---	---
	9-26	18-35	7.0-21.0	6.1-8.4	0-30	---	---	---
	26-60	18-30	7.0-18.0	7.4-8.4	5-30	---	---	---
46:								
Borup	0-13	15-27	15.0-30.0	7.4-8.4	10-25	---	0-4	---
	13-32	10-18	6.0-15.0	7.4-8.4	15-40	---	0-4	---
	32-60	5-18	3.0-10.0	7.4-8.4	10-30	---	0-4	---
53B:								
Kandota	0-8	10-20	8.0-20.0	5.6-7.3	---	---	---	---
	8-11	5-18	3.0-13.0	5.1-6.5	---	---	---	---
	11-32	18-30	7.0-19.0	5.6-7.3	---	---	---	---
	32-68	12-18	5.0-12.0	7.4-8.4	15-25	---	---	---
	68-80	7-18	3.0-10.0	7.4-8.4	5-15	---	---	---

Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Cation-exchange capacity	Soil reaction	Calcium carbonate	Gypsum	Salinity	Sodium adsorption ratio
	In	Pct	meq/100g	pH	Pct	Pct	mmhos/cm	
53C:								
Kandota	0-8	10-20	8.0-20.0	5.6-7.3	---	---	---	---
	8-24	18-30	7.0-19.0	5.6-7.3	---	---	---	---
	24-60	7-18	3.0-10.0	7.4-8.4	5-15	---	---	---
53D:								
Kandota	0-7	10-20	8.0-20.0	5.6-7.3	---	---	---	---
	7-9	5-18	3.0-13.0	5.1-6.5	---	---	---	---
	9-28	18-30	7.0-19.0	5.6-7.3	---	---	---	---
	28-60	7-18	3.0-10.0	7.4-8.4	5-15	---	---	---
58:								
Kittson	0-7	10-27	12.0-26.0	6.6-7.8	---	---	---	---
	7-18	18-30	10.0-20.0	6.6-7.8	0-5	---	---	---
	18-32	18-30	10.0-16.0	7.4-8.4	15-30	---	---	---
	32-60	18-30	10.0-16.0	7.4-8.4	10-20	---	---	---
59:								
Grimstad	0-10	10-18	10.0-18.0	7.4-8.4	5-15	---	---	---
	10-27	2-15	2.0-12.0	7.4-9.0	5-20	0-3	---	---
	27-60	10-30	4.0-16.0	7.4-9.0	15-35	0-3		---
61:								
Arveson	0-10	20-27	19.0-23.0	7.4-8.4	5-20	---	---	---
	10-30	10-27	7.0-11.0	7.4-8.4	15-30	---	---	---
	30-60	5-20	5.0-8.0	7.4-8.4	10-20	---	---	---
63:								
Rockwell	0-10	20-30	15.0-30.0	7.4-8.4	10-20	---	---	---
	10-27	5-30	5.0-15.0	7.9-8.4	15-30	---	---	---
	27-36	3-10	2.0-6.0	7.4-7.8	10-20	---	---	---
	36-60	15-30	5.0-15.0	7.4-7.8	10-20	---	---	---
65:								
Foxhome	0-13	10-20	10.0-24.0	6.6-7.8	---	---	---	---
	13-16	10-25	6.0-18.0	6.6-7.8	0-10	---	---	---
	16-35	5-15	2.0-10.0	7.4-8.4	5-15	---	---	---
	35-60	12-35	6.0-18.0	7.4-8.4	15-30	---	---	---
66:								
Flaming	0-16	2-10	4.0-13.0	5.6-7.3	---	---	---	---
	16-60	2-10	1.0-6.0	5.6-8.4	0-15	---	---	---
68:								
Arveson	0-16	20-27	22.0-34.0	7.4-8.4	5-20	---	---	---
	16-23	10-27	6.0-16.0	7.4-8.4	15-30	---	---	---
	23-60	5-20	2.0-11.0	7.4-8.4	10-20	---	---	---
107:								
Winger	0-16	18-27	17.0-26.0	7.4-8.4	5-20	---	---	---
	16-29	18-35	10.0-22.0	7.4-8.4	15-35	---	---	---
	29-60	18-32	9.0-17.0	7.4-8.4	15-25	---	---	---
108:								
McIntosh	0-12	18-27	19.0-36.0	7.4-8.4	5-30	---	---	---
	12-25	18-35	15.0-38.0	7.4-8.4	20-35	0-1	---	---
	25-60	18-35	9.0-27.0	7.4-8.4	5-30	0-1	---	---
121:								
Wykeham	0-8	5-18	6.0-23.0	5.1-6.5	---	---	---	---
	8-14	5-15	4.0-13.0	5.1-6.5	---	---	---	---
	14-28	18-30	8.0-20.0	5.6-7.3	---	---	---	---
	28-60	10-18	4.0-12.0	7.4-8.4	10-25	---	---	---

Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Cation-exchange capacity	Soil reaction	Calcium carbonate	Gypsum	Salinity	Sodium adsorption ratio
	In	Pct	meq/100g	pH	Pct	Pct	mmhos/cm	
127A:								
Sverdrup	0-7	10-18	9.0-17.0	6.1-7.3	---	---	---	---
	7-17	6-18	4.0-13.0	6.1-7.8	---	---	---	---
	17-60	0-10	0.0-6.0	7.4-8.4	---	---	---	---
127B:								
Sverdrup	0-12	10-18	9.0-17.0	6.1-7.3	---	---	---	---
	12-24	6-18	4.0-13.0	6.1-7.8	---	---	---	---
	24-60	0-10	0.0-6.0	7.4-8.4	---	---	---	---
127C:								
Sverdrup	0-8	10-18	9.0-17.0	6.1-7.3	---	---	---	---
	8-15	6-18	4.0-13.0	6.1-7.8	---	---	---	---
	15-60	0-10	0.0-6.0	7.4-8.4	---	---	---	---
141B:								
Egeland	0-15	10-18	15.0-20.0	5.6-7.3	---	---	0-2	---
	15-42	10-18	15.0-20.0	6.1-7.8	---	---	0-2	---
	42-60	5-10	5.0-15.0	6.6-8.4	5-20	---	0-2	---
141C:								
Egeland	0-11	10-18	15.0-20.0	5.6-7.3	---	---	0-2	---
	11-35	10-18	15.0-20.0	6.1-7.8	---	---	0-2	---
	35-60	5-10	5.0-15.0	6.6-8.4	5-20	---	0-2	---
141D:								
Egeland	0-9	10-18	15.0-20.0	5.6-7.3	---	---	0-2	---
	9-30	10-18	15.0-20.0	6.1-7.8	---	---	0-2	---
	30-60	5-10	5.0-15.0	6.6-8.4	5-20	---	0-2	---
168B:								
Forman	0-9	27-30	19.0-34.0	6.6-7.8	---	---	0-2	---
	9-24	30-35	13.0-23.0	6.6-7.8	---	---	0-2	---
	24-60	18-35	7.0-22.0	7.4-8.4	15-30	---	0-4	---
180:								
Gonvick	0-15	10-27	8.0-24.0	6.1-7.3	---	---	---	---
	15-35	22-35	12.0-24.0	6.6-7.3	0-5	---	---	---
	35-60	18-35	8.0-18.0	7.4-8.4	10-25	---	---	---
184:								
Hamerly	0-10	18-27	15.0-30.0	6.6-8.4	0-15	---	---	---
	10-38	18-30	8.0-20.0	7.4-8.4	15-30	---	---	---
	38-60	18-30	7.0-19.0	7.4-8.4	10-25	---	---	---
187:								
Haug	0-14	---	100-180	6.6-7.8	0-5	---	---	---
	14-20	10-18	14.0-26.0	6.6-8.4	5-30	---	---	---
	20-60	10-18	10.0-16.0	7.4-8.4	5-30	---	---	---
191:								
Epoufette	0-7	5-15	10.0-20.0	6.1-7.3	---	---	---	---
	7-33	8-18	4.0-10.0	6.6-7.8	0-10	---	---	---
	33-60	0-8	1.0-5.0	7.4-8.4	5-10	---	---	---
202:								
Meehan	0-8	4-10	2.0-15.0	3.5-7.3	---	---	---	---
	8-24	4-9	1.0-8.0	3.5-6.5	---	---	---	---
	24-60	1-4	0.0-4.0	3.5-7.3	---	---	---	---

Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Cation-exchange capacity	Soil reaction	Calcium carbonate	Gypsum	Salinity	Sodium adsorption ratio
	In	Pct	meq/100g	pH	Pct	Pct	mmhos/cm	
258A:								
Sandberg	0-11	2-10	2.0-12.0	5.6-7.8	0-5	---	---	---
	11-33	0-10	1.0-6.0	6.1-7.8	0-5	---	---	---
	33-60	0-5	1.0-4.0	7.4-8.4	5-10	---	---	---
258B:								
Sandberg	0-12	2-10	2.0-12.0	5.6-7.8	0-5	---	---	---
	12-19	0-10	1.0-6.0	6.1-7.8	0-5	---	---	---
	19-29	0-5	1.0-6.0	7.4-8.4	10-25	---	---	---
	29-80	0-5	1.0-4.0	7.4-8.4	5-10	---	---	---
258C:								
Sandberg	0-10	2-10	2.0-12.0	5.6-7.8	0-5	---	---	---
	10-17	0-10	1.0-6.0	6.1-7.8	0-5	---	---	---
	17-44	0-5	1.0-6.0	7.4-8.4	10-25	---	---	---
	44-60	0-5	1.0-4.0	7.4-8.4	5-10	---	---	---
260:								
Duelm	0-16	2-10	5.0-18.0	5.6-7.3	---	---	---	---
	16-56	1-8	0.0-4.0	5.1-7.3	---	---	---	---
	56-60	0-6	0.0-5.0	5.6-7.8	0-5	---	---	---
267B:								
Snellman	0-9	5-18	4.0-16.0	5.1-6.5	---	---	---	---
	9-15	5-15	3.0-14.0	5.1-6.5	---	---	---	---
	15-31	18-30	8.0-16.0	5.6-7.3	---	---	---	---
	31-60	7-18	3.0-10.0	7.4-8.4	5-15	---	---	---
267C:								
Snellman	0-7	5-18	4.0-16.0	5.1-6.5	---	---	---	---
	7-15	5-15	3.0-14.0	5.1-6.5	---	---	---	---
	15-31	18-30	8.0-16.0	5.6-7.3	---	---	---	---
	31-45	7-18	3.0-10.0	7.4-8.4	15-25	---	---	---
	45-60	7-18	3.0-10.0	7.4-8.4	5-15	---	---	---
267E:								
Snellman	0-3	5-18	4.0-16.0	5.1-6.5	---	---	---	---
	3-14	5-15	3.0-14.0	5.1-6.5	---	---	---	---
	14-26	18-30	8.0-16.0	5.6-7.3	---	---	---	---
	26-39	7-18	3.0-10.0	7.4-8.4	15-25	---	---	---
	39-60	7-18	3.0-10.0	7.4-8.4	5-15	---	---	---
267F:								
Snellman	0-3	5-18	4.0-16.0	5.1-6.5	---	---	---	---
	3-16	5-15	3.0-14.0	5.1-6.5	---	---	---	---
	16-32	18-30	8.0-16.0	5.6-7.3	---	---	---	---
	32-40	7-18	3.0-10.0	7.4-8.4	15-25	---	---	---
	40-60	7-18	3.0-10.0	7.4-8.4	5-15	---	---	---
290:								
Rothsay	0-14	10-18	10.0-20.0	6.6-7.3	---	---	---	---
	14-22	10-18	6.0-12.0	6.6-7.8	---	---	---	---
	22-31	5-18	5.0-10.0	7.4-8.4	15-30	---	---	---
	31-60	5-18	5.0-10.0	7.4-8.4	10-20	---	---	---
293B:								
Swenoda	0-15	10-20	10.0-23.0	6.1-7.3	---	---	0-2	---
	15-29	10-18	8.0-14.0	6.6-7.8	0-3	---	0-2	---
	29-60	20-35	11.0-19.0	7.4-8.4	10-30	---	0-4	---
335:								
Urness	0-9	18-27	40.0-50.0	7.4-8.4	5-25	---	---	---
	9-60	18-35	40.0-50.0	7.4-8.4	5-25	---	---	---

Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Cation-exchange capacity	Soil reaction	Calcium carbonate	Gypsum	Salinity	Sodium adsorption ratio
	In	Pct	meq/100g	pH	Pct	Pct	mmhos/cm	
339:								
Fordville-------	0-10	18-25	21.0-27.0	6.1-7.3	0-1	---	0-2	---
	10-29	18-30	21.0-27.0	6.1-7.8	0-5	---	0-2	---
	29-37	15-30	15.0-25.0	6.1-8.4	2-25	---	0-2	---
	37-60	0-5	1.0-10.0	7.4-8.4	2-20	---	0-2	---
341A:								
Arvilla---------	0-13	6-18	5.0-20.0	6.1-8.4	---	---	---	---
	13-20	6-18	5.0-15.0	6.6-8.4	---	---	---	---
	20-60	2-10	1.0-5.0	7.4-8.4	1-5	---	---	---
341B:								
Arvilla---------	0-9	6-18	5.0-20.0	6.1-8.4	---	---	---	---
	9-19	6-18	5.0-15.0	6.6-8.4	---	---	---	---
	19-60	2-10	1.0-5.0	7.4-8.4	1-5	---	---	---
371:								
Clontarf--------	0-13	10-18	9.0-17.0	6.1-7.3	---	---	---	---
	13-24	10-18	6.0-11.0	6.1-7.8	0-15	---	---	---
	24-60	5-10	3.0-6.0	6.6-7.8	0-15	---	---	---
375:								
Forada----------	0-18	10-22	14.0-30.0	6.1-7.8	0-15	---	---	---
	18-36	8-18	4.0-12.0	6.1-7.8	0-15	---	---	---
	36-60	0-5	0.0-5.0	6.6-8.4	0-10	---	---	---
402C:								
Sioux-----------	0-10	3-10	---	6.6-8.4	---	---	0-2	---
	10-60	0-10	---	7.4-8.4	---	---	0-2	---
402E:								
Sioux-----------	0-10	3-10	---	6.6-8.4	---	---	0-2	---
	10-60	0-10	---	7.4-8.4	---	---	0-2	---
406A:								
Dorset----------	0-11	4-18	10.0-23.0	5.6-7.3	---	---	---	---
	11-20	10-18	7.0-17.0	5.6-7.3	---	---	---	---
	20-60	0-5	0.0-5.0	7.4-8.4	5-15	---	---	---
406B:								
Dorset----------	0-11	4-18	10.0-23.0	5.6-7.3	---	---	---	---
	11-20	10-18	7.0-17.0	5.6-7.3	---	---	---	---
	20-38	5-10	3.0-8.0	7.4-8.4	10-25	---	---	---
	38-60	0-5	0.0-5.0	7.4-8.4	5-15	---	---	---
418:								
Lamoure---------	0-32	27-34	25.0-32.0	7.4-8.4	0-10	---	0-4	1-2
	32-40	20-34	24.0-31.0	7.4-8.4	9-20	---	0-4	1-3
	40-48	20-34	20.0-29.0	7.4-8.4	9-20	0-1	0-4	1-3
	48-60	20-34	16.0-23.0	7.4-8.4	4-20	0-2	0-4	1-3
422B:								
Bygland---------	0-10	27-40	20.0-40.0	6.1-7.3	---	---	---	---
	10-41	35-60	15.0-30.0	6.1-7.8	0-5	---	---	---
	41-46	18-40	10.0-25.0	7.4-8.4	10-20	0-2	---	---
	46-60	18-40	10.0-20.0	7.4-8.4	5-15	0-3	---	---
422C:								
Bygland---------	0-8	27-40	20.0-40.0	6.1-7.3	---	---	---	---
	8-16	35-60	15.0-30.0	6.1-7.8	0-5	---	---	---
	16-22	18-40	10.0-25.0	7.4-8.4	10-20	0-2	---	---
	22-60	18-40	10.0-20.0	7.4-8.4	5-15	0-3	---	---

Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Cation-exchange capacity	Soil reaction	Calcium carbonate	Gypsum	Salinity	Sodium adsorption ratio
	In	Pct	meq/100g	pH	Pct	Pct	mmhos/cm	
426:								
Foldahl	0-14	4-9	4.0-14.0	6.1-7.8	---	---	---	---
	14-26	2-10	2.0-8.0	6.6-7.8	0-10	---	---	---
	26-40	18-35	6.0-18.0	7.4-8.4	15-30	---	---	---
	40-60	18-35	6.0-18.0	7.4-8.4	10-20	---	---	---
441A:								
Almora	0-11	12-20	12.0-20.0	5.6-7.3	---	---	---	---
	11-15	12-20	8.0-14.0	5.6-7.3	---	---	---	---
	15-38	18-30	10.0-17.0	5.6-7.3	---	---	---	---
	38-46	3-12	2.0-7.0	5.6-7.8	0-5	---	---	---
	46-60	1-4	1.0-3.0	7.4-8.4	5-30	---	---	---
441B:								
Almora	0-9	12-20	12.0-20.0	5.6-7.3	---	---	---	---
	9-13	12-20	8.0-14.0	5.6-7.3	---	---	---	---
	13-27	18-30	10.0-17.0	5.6-7.3	---	---	---	---
	27-60	1-4	1.0-3.0	7.4-8.4	5-30	---	---	---
441C:								
Almora	0-10	12-20	12.0-20.0	5.6-7.3	---	---	---	---
	10-13	12-20	8.0-14.0	5.6-7.3	---	---	---	---
	13-33	18-30	10.0-17.0	5.6-7.3	---	---	---	---
	33-60	1-4	1.0-3.0	7.4-8.4	5-30	---	---	---
481:								
Kratka	0-9	5-15	6.0-20.0	5.6-7.8	0-15	---	---	---
	9-25	2-10	1.0-8.0	5.6-7.8	0-15	---	---	---
	25-60	10-35	4.0-21.0	6.1-8.4	0-30	---	---	---
494:								
Darnen	0-36	18-27	17.0-32.0	6.6-7.8	---	---	---	---
	36-43	18-30	11.0-21.0	6.1-7.8	---	---	---	---
	43-60	18-30	9.0-16.0	7.4-8.4	0-10	---	---	---
497:								
Hantho	0-9	10-27	14.0-34.0	6.6-7.8	---	---	---	---
	9-22	10-18	10.0-22.0	6.6-7.8	---	---	---	---
	22-31	10-18	6.0-16.0	7.4-8.4	5-20	---	---	---
	31-60	10-35	6.0-29.0	7.4-8.4	5-20	---	---	---
508:								
Wyndmere	0-12	5-15	10.0-25.0	6.6-8.4	10-20	0-1	---	0-1
	12-38	3-15	3.0-20.0	7.4-8.4	15-35	0-1	0-2	0-1
	38-60	3-15	2.0-10.0	7.4-8.4	5-20	0-1	0-2	0-3
540:								
Seelyeville	0-8	---	140-200	4.5-7.3	---	---	---	---
	8-80	---	140-200	4.5-7.3	---	---	---	---
541:								
Rifle	0-21	---	150-180	4.5-7.3	---	---	---	---
	21-80	---	50-150	4.5-7.3	---	---	---	---
544:								
Cathro	0-16	---	120-170	4.5-7.8	---	---	---	---
	16-38	---	120-170	4.5-7.8	---	---	---	---
	38-60	10-30	2.0-25.0	6.6-8.4	5-25	---	---	---

Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Cation-exchange capacity	Soil reaction	Calcium carbonate	Gypsum	Salinity	Sodium adsorption ratio
	In	Pct	meq/100g	pH	Pct	Pct	mmhos/cm	
567A:								
Verndale	0-9	7-12	7.0-15.0	5.6-7.3	---	---	---	---
	9-21	7-18	3.0-12.0	5.6-7.3	---	---	---	---
	21-38	2-6	2.0-4.0	5.6-7.3	---	---	---	---
	38-60	0-4	0.0-3.0	6.1-8.4	0-30	---	---	---
567B:								
Verndale	0-10	7-12	7.0-15.0	5.6-7.3	---	---	---	---
	10-18	7-18	3.0-12.0	5.6-7.3	---	---	---	---
	18-29	2-6	2.0-4.0	5.6-7.3	---	---	---	---
	29-60	0-4	0.0-3.0	6.1-8.4	0-30	---	---	---
609B:								
Dickey	0-13	2-14	---	6.1-7.8	---	---	0-2	---
	13-28	2-14	---	6.1-7.8	---	---	0-2	---
	28-60	18-39	---	7.4-8.4	---	---	0-2	---
624:								
Rosy	0-9	3-12	1.0-15.0	5.1-7.3	---	---	---	---
	9-26	8-18	4.0-10.0	5.1-7.3	---	---	---	---
	26-60	6-18	3.0-10.0	5.6-8.4	0-30	---	---	---
646C:								
Peever	0-9	27-35	25.0-30.0	6.1-7.3	---	---	0-2	---
	9-18	35-50	25.0-30.0	6.6-7.8	15-20	0-5	0-2	0-5
	18-37	30-45	20.0-25.0	7.4-8.4	10-15	0-10	0-4	0-10
	37-60	30-45	15.0-25.0	7.4-8.4	10-15	0-10	0-8	0-10
646D:								
Peever	0-8	27-35	25.0-30.0	6.1-7.3	---	---	0-2	---
	8-21	35-50	25.0-30.0	6.6-7.8	15-20	0-5	0-2	0-5
	21-60	30-45	15.0-25.0	7.4-8.4	10-15	0-10	0-8	0-10
670:								
Knute	0-9	10-18	8.0-18.0	6.1-7.3	---	---	---	---
	9-22	18-28	8.0-19.0	6.1-7.8	---	---	---	---
	22-29	10-18	4.0-12.0	7.4-8.4	20-30	---	---	---
	29-60	10-18	4.0-12.0	7.4-8.4	15-25	---	---	---
680:								
Parnell	0-27	22-27	22.0-35.0	6.1-7.8	---	---	0-2	---
	27-49	35-60	19.0-29.0	6.1-7.8	0-3	0-2	0-2	0-1
	49-60	22-40	16.0-24.0	6.6-8.4	0-10	0-2	0-2	0-1
698:								
Doran	0-9	27-35	20.0-35.0	6.6-7.3	---	---	---	---
	9-19	35-50	17.0-25.0	6.6-7.8	---	---	---	---
	19-32	20-40	12.0-20.0	7.4-8.4	3-25	---	---	---
	32-60	20-40	12.0-18.0	7.4-8.4	3-25	---	---	---
701:								
Runeberg	0-10	10-25	12.0-40.0	6.1-7.3	---	---	---	---
	10-36	10-18	4.0-14.0	6.1-7.3	---	---	---	---
	36-60	6-15	2.0-9.0	7.4-8.4	---	---	---	---
705B:								
Nitche	0-16	8-18	---	5.6-7.3	---	---	---	---
	16-24	8-18	---	5.6-7.3	---	---	---	---
	24-33	5-10	---	5.6-7.3	---	---	---	---
	33-55	1-5	---	7.4-8.4	5-20	---	---	---
	55-80	10-18	---	7.4-8.4	5-20	---	---	---

Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Cation-exchange capacity	Soil reaction	Calcium carbonate	Gypsum	Salinity	Sodium adsorption ratio
	In	Pct	meq/100g	pH	Pct	Pct	mmhos/cm	
705B:								
Kandota	0-7	10-20	8.0-20.0	5.6-7.3	---	---	---	---
	7-11	5-18	3.0-13.0	5.1-6.5	---	---	---	---
	11-28	18-30	7.0-19.0	5.6-7.3	---	---	---	---
	28-48	12-18	5.0-12.0	7.4-8.4	15-25	---	---	---
	48-80	7-18	3.0-10.0	7.4-8.4	5-15	---	---	---
Lida	0-9	5-18	6.0-19.0	5.6-7.3	---	---	---	---
	9-19	3-15	1.0-10.0	5.6-7.3	---	---	---	---
	19-28	8-18	4.0-13.0	5.6-7.3	---	---	---	---
	28-60	1-5	1.0-4.0	7.4-8.4	3-15	---	---	---
705C:								
Nitche	0-15	8-18	---	5.6-7.3	---	---	---	---
	15-23	8-18	---	5.6-7.3	---	---	---	---
	23-41	5-10	---	5.6-7.3	---	---	---	---
	41-60	10-18	---	7.4-8.4	5-20	---	---	---
Kandota	0-7	10-20	8.0-20.0	5.6-7.3	---	---	---	---
	7-13	5-18	3.0-13.0	5.1-6.5	---	---	---	---
	13-33	18-30	7.0-19.0	5.6-7.3	---	---	---	---
	33-47	12-18	5.0-12.0	7.4-8.4	15-25	---	---	---
	47-60	7-18	3.0-10.0	7.4-8.4	5-15	---	---	---
Lida	0-6	5-18	6.0-19.0	5.6-7.3	---	---	---	---
	6-17	3-15	1.0-10.0	5.6-7.3	---	---	---	---
	17-28	8-18	4.0-13.0	5.6-7.3	---	---	---	---
	28-60	1-5	1.0-4.0	7.4-8.4	3-15	---	---	---
707B:								
Lizzie	0-9	18-22	9.0-23.0	6.1-7.3	---	---	---	---
	9-26	18-35	8.0-22.0	6.1-7.3	---	---	---	---
	26-32	8-20	6.0-13.0	7.4-8.4	12-35	---	---	---
	32-60	3-16	2.0-10.0	7.4-8.4	12-35	---	---	---
707C2:								
Lizzie	0-10	18-22	9.0-23.0	6.1-7.3	---	---	---	---
	10-35	18-35	8.0-22.0	6.1-7.3	---	---	---	---
	35-40	8-20	6.0-13.0	7.4-8.4	12-35	---	---	---
	40-80	3-16	2.0-10.0	7.4-8.4	12-35	---	---	---
707D2:								
Lizzie	0-8	18-22	9.0-23.0	6.1-7.3	---	---	---	---
	8-21	18-35	8.0-22.0	6.1-7.3	---	---	---	---
	21-35	8-20	6.0-13.0	7.4-8.4	12-35	---	---	---
	35-60	3-16	2.0-10.0	7.4-8.4	12-35	---	---	---
710:								
Friberg	0-19	10-24	15.0-26.0	5.6-7.8	---	---	---	---
	19-47	22-35	12.0-22.0	5.6-7.3	0-5	---	---	---
	47-60	10-22	5.0-10.0	7.4-8.4	5-30	---	---	---
Weetown	0-9	10-20	12.0-36.0	6.1-7.3	---	---	---	---
	9-31	10-22	8.0-29.0	6.1-7.3	---	---	---	---
	31-51	18-28	8.0-19.0	5.6-7.3	---	---	---	---
	51-60	10-18	4.0-12.0	7.4-8.4	5-30	---	---	---
711B:								
Arvilla	0-13	6-18	5.0-20.0	6.1-8.4	---	---	---	---
	13-19	6-18	5.0-15.0	6.6-8.4	---	---	---	---
	19-60	2-10	1.0-5.0	7.4-8.4	1-5	---	---	---

Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Cation-exchange capacity	Soil reaction	Calcium carbonate	Gypsum	Salinity	Sodium adsorption ratio
	In	Pct	meq/100g	pH	Pct	Pct	mmhos/cm	
711B:								
Sandberg	0-12	5-15	4.0-16.0	5.6-7.8	0-5	---	---	---
	12-20	0-10	1.0-6.0	6.1-7.8	0-5	---	---	---
	20-32	0-5	1.0-6.0	7.4-8.4	10-25	---	---	---
	32-60	0-5	1.0-4.0	7.4-8.4	5-10	---	---	---
711C:								
Arvilla	0-8	6-18	5.0-20.0	6.1-8.4	---	---	---	---
	8-15	6-18	5.0-15.0	6.6-8.4	---	---	---	---
	15-60	2-10	1.0-5.0	7.4-8.4	1-5	---	---	---
Sandberg	0-7	5-15	4.0-16.0	5.6-7.8	0-5	---	---	---
	7-14	0-10	1.0-6.0	6.1-7.8	0-5	---	---	---
	14-60	0-5	1.0-4.0	7.4-8.4	5-10	---	---	---
715:								
Bluffcreek	0-8	5-14	6.0-18.0	5.6-7.3	---	---	---	---
	8-26	3-10	1.0-7.0	5.6-7.3	---	---	---	---
	26-42	8-18	3.0-12.0	5.6-7.3	---	---	---	---
	42-80	1-5	0.0-4.0	6.1-8.4	0-30	---	---	---
Clearriver	0-9	5-15	4.0-13.0	5.1-6.5	---	---	---	---
	9-48	3-10	1.0-6.0	5.1-7.3	---	---	---	---
	48-60	1-5	1.0-3.0	6.6-7.8	1-10	---	---	---
716B:								
Leaflake	0-8	2-10	2.0-13.0	5.6-7.3	---	---	---	---
	8-26	2-10	1.0-6.0	5.6-7.3	---	---	---	---
	26-51	15-28	7.0-14.0	5.1-7.3	---	---	---	---
	51-60	10-18	5.0-10.0	6.6-8.4	0-20	---	---	---
Eagleview	0-9	2-10	10.0-15.0	5.6-7.3	---	---	---	---
	9-36	2-10	10.0-15.0	5.6-7.3	---	---	---	---
	36-54	2-10	5.0-10.0	6.1-7.3	---	---	---	---
	54-60	2-10	0.0-5.0	6.1-8.4	0-10	---	---	---
716C:								
Leaflake	0-3	2-10	2.0-13.0	5.6-7.3	---	---	---	---
	3-34	2-10	1.0-6.0	5.6-7.3	---	---	---	---
	34-71	15-28	7.0-14.0	5.1-7.3	---	---	---	---
	71-80	10-18	5.0-10.0	6.6-8.4	0-20	---	---	---
Eagleview	0-3	2-10	10.0-15.0	5.6-7.3	---	---	---	---
	3-46	2-10	10.0-15.0	5.6-7.3	---	---	---	---
	46-78	2-10	5.0-10.0	6.1-7.3	---	---	---	---
	78-80	2-10	0.0-5.0	6.1-8.4	0-10	---	---	---
716D:								
Leaflake	0-6	2-10	2.0-13.0	5.6-7.3	---	---	---	---
	6-23	2-10	1.0-6.0	5.6-7.3	---	---	---	---
	23-39	15-28	7.0-14.0	5.1-7.3	---	---	---	---
	39-60	10-18	5.0-10.0	6.6-8.4	0-20	---	---	---
Eagleview	0-3	2-10	10.0-15.0	5.6-7.3	---	---	---	---
	3-42	2-10	10.0-15.0	5.6-7.3	---	---	---	---
	42-60	2-10	5.0-10.0	6.1-7.3	---	---	---	---
718E:								
Naytahwaush	0-5	10-20	15.0-28.0	5.6-7.3	---	---	---	---
	5-10	8-15	6.0-18.0	5.6-7.3	---	---	---	---
	10-31	35-60	15.0-26.0	5.6-7.3	0-5	---	---	---
	31-60	22-35	9.0-22.0	7.4-8.4	15-25	---	---	---

Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Cation-exchange capacity	Soil reaction	Calcium carbonate	Gypsum	Salinity	Sodium adsorption ratio
	In	Pct	meq/100g	pH	Pct	Pct	mmhos/cm	
721B:								
Corliss	0-8	2-10	3.0-12.0	6.1-7.8	0-15	---	---	---
	8-19	0-10	1.0-6.0	6.1-7.8	0-15	---	---	---
	19-60	0-5	0.0-3.0	7.4-8.4	5-30	---	---	---
721C:								
Corliss	0-7	2-10	3.0-12.0	6.1-7.8	0-15	---	---	---
	7-28	0-10	1.0-6.0	6.1-7.8	0-15	---	---	---
	28-80	0-5	0.0-3.0	7.4-8.4	5-30	---	---	---
721D:								
Corliss	0-6	2-10	3.0-12.0	6.1-7.8	0-15	---	---	---
	6-20	0-10	1.0-6.0	6.1-7.8	0-15	---	---	---
	20-60	0-5	0.0-3.0	7.4-8.4	5-30	---	---	---
721E:								
Corliss	0-2	2-10	3.0-12.0	6.1-7.8	0-15	---	---	---
	2-22	0-10	1.0-6.0	6.1-7.8	0-15	---	---	---
	22-60	0-5	0.0-3.0	7.4-8.4	5-30	---	---	---
726:								
Kratka	0-8	5-15	6.0-20.0	6.1-7.3	---	---	---	---
	8-33	2-10	1.0-8.0	6.1-7.3	---	---	---	---
	33-60	10-35	4.0-21.0	6.1-7.3	---	---	---	---
746:								
Haslie	0-21	---	140-180	5.6-7.8	---	---	---	---
	21-24	---	140-190	5.6-7.8	---	---	---	---
	24-60	18-35	10.0-45.0	7.4-8.4	20-80	---	---	---
760C2:								
Chapett	0-7	10-20	8.0-20.0	6.1-7.3	---	---	---	---
	7-19	18-28	8.0-19.0	6.1-7.3	---	---	---	---
	19-27	10-18	4.0-12.0	7.4-8.4	15-30	---	---	---
	27-60	10-18	4.0-12.0	7.4-8.4	10-12	---	---	---
Sisseton	0-7	15-20	25.0-35.0	7.4-8.4	0-5	---	0-2	---
	7-22	10-18	20.0-30.0	7.4-8.4	15-35	---	0-2	0-1
	22-60	10-18	20.0-30.0	7.4-8.4	7-30	0-5	0-2	0-1
760D2:								
Chapett	0-7	10-20	8.0-20.0	6.1-7.3	---	---	---	---
	7-15	18-28	8.0-19.0	6.1-7.3	---	---	---	---
	15-23	10-18	4.0-12.0	7.4-8.4	15-30	---	---	---
	23-60	10-18	4.0-12.0	7.4-8.4	10-12	---	---	---
Sisseton	0-8	15-20	25.0-35.0	7.4-8.4	0-5	---	0-2	---
	8-16	10-18	20.0-30.0	7.4-8.4	15-35	---	0-2	0-1
	16-60	10-18	20.0-30.0	7.4-8.4	7-30	0-5	0-2	0-1
769B:								
Mehurin	0-13	27-35	25.0-30.0	6.1-7.3	---	---	0-2	---
	13-26	35-60	25.0-30.0	6.1-7.8	0-10	---	0-2	---
	26-34	20-35	20.0-25.0	7.4-8.4	10-25	0-10	0-2	---
	34-60	20-30	15.0-25.0	7.4-8.4	5-20	0-10	0-2	---
776B:								
Snellman	0-3	5-18	4.0-16.0	5.1-6.5	---	---	---	---
	3-12	5-15	3.0-14.0	5.1-6.5	---	---	---	---
	12-32	18-30	8.0-16.0	5.6-7.3	---	---	---	---
	32-60	7-18	3.0-10.0	7.4-8.4	15-25	---	---	---

Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Cation-exchange capacity	Soil reaction	Calcium carbonate	Gypsum	Salinity	Sodium adsorption ratio
	In	Pct	meq/100g	pH	Pct	Pct	mmhos/cm	
776B:								
Sugarbush-------	0-3	5-15	4.0-12.0	5.6-7.3	---	---	---	---
	3-17	2-10	2.0-8.0	5.6-7.3	---	---	---	---
	17-28	10-18	5.0-10.0	5.6-7.3	---	---	---	---
	28-60	1-5	1.0-5.0	5.6-8.4	0-15	---	---	---
776C:								
Snellman--------	0-2	5-18	4.0-16.0	5.1-6.5	---	---	---	---
	2-16	5-15	3.0-14.0	5.1-6.5	---	---	---	---
	16-32	18-30	8.0-16.0	5.6-7.3	---	---	---	---
	32-60	7-18	3.0-10.0	7.4-8.4	15-25	---	---	---
Sugarbush-------	0-2	5-15	4.0-12.0	5.6-7.3	---	---	---	---
	2-14	2-10	2.0-8.0	5.6-7.3	---	---	---	---
	14-21	10-18	5.0-10.0	5.6-7.3	---	---	---	---
	21-60	1-5	1.0-5.0	5.6-8.4	0-15	---	---	---
776E:								
Snellman--------	0-3	5-18	4.0-16.0	5.1-6.5	---	---	---	---
	3-14	5-15	3.0-14.0	5.1-6.5	---	---	---	---
	14-26	18-30	8.0-16.0	5.6-7.3	---	---	---	---
	26-60	7-18	3.0-10.0	7.4-8.4	15-25	---	---	---
Sugarbush-------	0-2	5-15	4.0-12.0	5.6-7.3	---	---	---	---
	2-10	2-10	2.0-8.0	5.6-7.3	---	---	---	---
	10-19	10-18	5.0-10.0	5.6-7.3	---	---	---	---
	19-60	1-5	1.0-5.0	5.6-8.4	0-15	---	---	---
777C2:								
Sisseton--------	0-9	15-20	25.0-35.0	7.4-8.4	0-5	---	0-2	---
	9-19	10-18	20.0-30.0	7.4-8.4	15-35	---	0-2	0-1
	19-60	10-18	20.0-30.0	7.4-8.4	7-30	0-5	0-2	0-1
Heimdal---------	0-7	10-20	10.0-24.0	6.1-7.3	---	---	---	---
	7-17	10-18	5.0-12.0	6.1-7.8	0-10	---	---	---
	17-34	10-18	5.0-12.0	7.4-8.4	20-30	---	---	---
	34-60	7-18	4.0-10.0	7.4-8.4	15-25	---	---	---
777D2:								
Sisseton--------	0-8	15-20	25.0-35.0	7.4-8.4	0-5	---	0-2	---
	8-16	10-18	20.0-30.0	7.4-8.4	15-35	---	0-2	0-1
	16-60	10-18	20.0-30.0	7.4-8.4	7-30	0-5	0-2	0-1
Heimdal---------	0-8	10-20	10.0-24.0	6.1-7.3	---	---	---	---
	8-12	10-18	5.0-12.0	6.1-7.8	0-10	---	---	---
	12-25	10-18	5.0-12.0	7.4-8.4	20-30	---	---	---
	25-60	7-18	4.0-10.0	7.4-8.4	15-25	---	---	---
777E:								
Sisseton--------	0-3	15-20	25.0-35.0	7.4-8.4	0-5	---	0-2	---
	3-12	10-18	20.0-30.0	7.4-8.4	15-35	---	0-2	0-1
	12-60	10-18	20.0-30.0	7.4-8.4	7-30	0-5	0-2	0-1
Heimdal---------	0-8	10-20	10.0-24.0	6.1-7.3	---	---	---	---
	8-12	10-18	5.0-12.0	6.1-7.8	0-10	---	---	---
	12-19	10-18	5.0-12.0	7.4-8.4	20-30	---	---	---
	19-60	7-18	4.0-10.0	7.4-8.4	15-25	---	---	---

Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Cation-exchange capacity	Soil reaction	Calcium carbonate	Gypsum	Salinity	Sodium adsorption ratio
	In	Pct	meq/100g	pH	Pct	Pct	mmhos/cm	
778B:								
Dorset	0-10	4-18	10.0-23.0	5.6-7.3	---	---	---	---
	10-20	10-18	7.0-17.0	5.6-7.3	---	---	---	---
	20-38	5-10	3.0-8.0	7.4-8.4	10-25	---	---	---
	38-60	0-5	0.0-5.0	7.4-8.4	5-15	---	---	---
Corliss	0-7	2-10	3.0-12.0	6.1-7.8	0-15	---	---	---
	7-16	0-10	1.0-6.0	6.1-7.8	0-15	---	---	---
	16-60	0-5	0.0-3.0	7.4-8.4	5-30	---	---	---
778C:								
Dorset	0-9	4-18	10.0-23.0	5.6-7.3	---	---	---	---
	9-16	10-18	7.0-17.0	5.6-7.3	---	---	---	---
	16-43	5-10	3.0-8.0	7.4-8.4	10-25	---	---	---
	43-60	0-5	0.0-5.0	7.4-8.4	5-15	---	---	---
Corliss	0-7	2-10	3.0-12.0	6.1-7.8	0-15	---	---	---
	7-11	0-10	1.0-6.0	6.1-7.8	0-15	---	---	---
	11-60	0-5	0.0-3.0	7.4-8.4	5-30	---	---	---
779B:								
Peever	0-11	27-35	25.0-30.0	6.1-7.3	---	---	0-2	---
	11-29	35-50	25.0-30.0	6.6-7.8	15-20	0-5	0-2	0-5
	29-60	30-45	15.0-25.0	7.4-8.4	10-15	0-10	0-8	0-10
Mehurin	0-13	27-35	25.0-30.0	6.1-7.3	---	---	0-2	---
	13-35	35-60	25.0-30.0	6.1-7.8	0-10	---	0-2	---
	35-48	20-35	20.0-25.0	7.4-8.4	10-25	0-10	0-2	---
	48-60	20-30	15.0-25.0	7.4-8.4	5-20	0-10	0-2	---
902B:								
Barnes	0-9	18-27	11.0-26.0	6.1-7.8	---	---	0-2	---
	9-17	18-27	8.0-18.0	6.1-7.8	0-5	---	0-2	---
	17-60	18-27	7.0-17.0	7.4-8.4	10-30	---	0-4	---
Buse	0-8	18-27	13.0-18.0	7.4-8.4	1-25	---	---	---
	8-40	18-27	10.0-15.0	7.4-8.4	15-40	---	---	---
	40-60	18-27	10.0-15.0	7.4-8.4	10-20	---	---	---
903C2:								
Barnes	0-10	18-27	11.0-26.0	6.1-7.8	---	---	0-2	---
	10-16	18-27	8.0-18.0	6.1-7.8	0-5	---	0-2	---
	16-60	18-27	7.0-17.0	7.4-8.4	10-30	---	0-4	---
Langhei	0-7	18-27	10.0-30.0	6.6-8.4	0-30	---	---	---
	7-30	18-32	10.0-25.0	7.9-8.4	20-35	---	---	---
	30-60	18-32	10.0-25.0	7.4-8.4	15-30	---	---	---
915C2:								
Forman	0-8	27-30	19.0-34.0	6.6-7.8	---	---	0-2	---
	8-23	30-35	13.0-23.0	6.6-7.8	---	---	0-2	---
	23-60	18-35	7.0-22.0	7.4-8.4	15-30	---	0-4	---
Buse	0-7	18-27	13.0-18.0	7.4-8.4	1-25	---	---	---
	7-30	18-27	10.0-15.0	7.4-8.4	15-40	---	---	---
	30-60	18-27	10.0-15.0	7.4-8.4	10-20	---	---	---
915D2:								
Forman	0-9	27-30	19.0-34.0	6.6-7.8	---	---	0-2	---
	9-23	30-35	13.0-23.0	6.6-7.8	---	---	0-2	---
	23-60	18-35	7.0-22.0	7.4-8.4	15-30	---	0-4	---

Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Cation-exchange capacity	Soil reaction	Calcium carbonate	Gypsum	Salinity	Sodium adsorption ratio
	In	Pct	meq/100g	pH	Pct	Pct	mmhos/cm	
915D2:								
Buse	0-9	18-27	13.0-18.0	7.4-8.4	1-25	---	---	---
	9-16	18-27	10.0-15.0	7.4-8.4	15-40	---	---	---
	16-60	18-27	10.0-15.0	7.4-8.4	10-20	---	---	---
931C2:								
Formdale	0-8	27-35	17.0-28.0	6.1-7.3	---	---	---	---
	8-18	24-35	13.0-22.0	6.6-7.8	---	---	---	---
	18-39	18-35	9.0-18.0	7.4-8.4	20-30	---	---	---
	39-60	18-35	9.0-18.0	7.4-8.4	12-20	---	---	---
Langhei	0-7	28-35	10.0-30.0	6.6-8.4	0-30	---	---	---
	7-16	28-35	10.0-25.0	7.4-8.4	20-35	---	---	---
	16-60	28-35	10.0-25.0	7.4-8.4	15-30	---	---	---
931D2:								
Formdale	0-8	27-35	17.0-28.0	6.1-7.3	---	---	---	---
	8-12	24-35	13.0-22.0	6.6-7.8	---	---	---	---
	12-26	18-35	9.0-18.0	7.4-8.4	20-30	---	---	---
	26-60	18-35	9.0-18.0	7.4-8.4	12-20	---	---	---
Langhei	0-5	28-35	10.0-30.0	6.6-8.4	0-30	---	---	---
	5-21	28-35	10.0-25.0	7.4-8.4	20-35	---	---	---
	21-60	28-35	10.0-25.0	7.4-8.4	15-30	---	---	---
942D2:								
Langhei	0-7	18-27	10.0-30.0	6.6-8.4	0-30	---	---	---
	7-13	18-32	10.0-25.0	7.9-8.4	20-35	---	---	---
	13-60	18-32	10.0-25.0	7.4-8.4	15-30	---	---	---
Barnes	0-7	18-27	11.0-26.0	6.1-7.8	---	---	0-2	---
	7-14	18-27	8.0-18.0	6.1-7.8	0-5	---	0-2	---
	14-60	18-27	7.0-17.0	7.4-8.4	10-30	---	0-4	---
957B2:								
Rothsay	0-15	10-18	10.0-20.0	6.6-7.3	---	---	---	---
	15-27	10-18	6.0-12.0	6.6-7.8	---	---	---	---
	27-33	5-18	5.0-10.0	7.4-8.4	15-30	---	---	---
	33-60	5-18	5.0-10.0	7.4-8.4	10-20	---	---	---
Zell	0-9	10-18	15.0-25.0	6.6-8.4	0-5	---	0-2	---
	9-18	10-18	10.0-20.0	7.4-8.4	15-30	---	0-2	---
	18-60	5-18	10.0-20.0	7.4-9.0	10-25	0-1	0-2	0-3
969C2:								
Zell	0-8	10-18	15.0-25.0	6.6-8.4	0-5	---	0-2	---
	8-31	10-18	10.0-20.0	7.4-8.4	15-30	---	0-2	---
	31-60	5-18	10.0-20.0	7.4-9.0	10-25	0-1	0-2	0-3
Rothsay	0-9	10-18	10.0-20.0	6.6-7.3	---	---	---	---
	9-17	10-18	6.0-12.0	6.6-7.8	---	---	---	---
	17-28	5-18	5.0-10.0	7.4-8.4	15-30	---	---	---
	28-60	5-18	5.0-10.0	7.4-8.4	10-20	---	---	---
969D2:								
Zell	0-8	10-18	15.0-25.0	6.6-8.4	0-5	---	0-2	---
	8-13	10-18	10.0-20.0	7.4-8.4	15-30	---	0-2	---
	13-60	5-18	10.0-20.0	7.4-9.0	10-25	0-1	0-2	0-3
Rothsay	0-6	10-18	10.0-20.0	6.6-7.3	---	---	---	---
	6-12	10-18	6.0-12.0	6.6-7.8	---	---	---	---
	12-32	5-18	5.0-10.0	7.4-8.4	15-30	---	---	---
	32-60	5-18	5.0-10.0	7.4-8.4	10-20	---	---	---

Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Cation-exchange capacity	Soil reaction	Calcium carbonate	Gypsum	Salinity	Sodium adsorption ratio
	In	Pct	meq/100g	pH	Pct	Pct	mmhos/cm	
1015:								
Udipsamments----	0-14	1-15	1.0-5.0	6.6-7.3	---	---	---	---
	14-60	1-10	1.0-3.0	6.6-7.3	---	---	---	---
	60-80	1-10	1.0-3.0	7.4-8.4	0-5	---	---	---
1016:								
Udorthents------	0-60	---	---	---	---	---	---	---
	60-80	---	---	---	---	---	---	---
1027:								
Udorthents.								
1030:								
Pits.								
Udipsamments----	0-14	1-15	1.0-5.0	6.6-7.3	---	---	---	---
	14-60	1-10	1.0-3.0	6.6-7.3	---	---	---	---
	60-80	1-10	1.0-3.0	7.4-8.4	0-5	---	---	---
1077:								
Forada----------	0-16	10-22	14.0-45.0	6.6-7.8	0-15	---	---	---
	16-27	8-18	4.0-12.0	6.6-7.8	0-15	---	---	---
	27-60	0-5	0.0-5.0	7.4-8.4	5-30	---	---	---
Leafriver-------	0-12	---	100-180	4.5-7.3	---	---	---	---
	12-20	3-18	10.0-50.0	4.5-7.3	---	---	---	---
	20-60	0-10	1.0-15.0	4.5-7.3	---	---	---	---
1102B:								
Chapett---------	0-10	10-20	8.0-20.0	6.1-7.3	---	---	---	---
	10-25	18-28	8.0-19.0	6.1-7.3	---	---	---	---
	25-37	10-18	4.0-12.0	7.4-8.4	15-30	---	---	---
	37-60	10-18	4.0-12.0	7.4-8.4	10-12	---	---	---
Dorset----------	0-12	4-18	10.0-23.0	5.6-7.3	---	---	---	---
	12-15	10-18	7.0-17.0	5.6-7.3	---	---	---	---
	15-32	5-10	3.0-8.0	7.4-8.4	10-25	---	---	---
	32-60	0-5	0.0-5.0	7.4-8.4	5-15	---	---	---
1102C:								
Chapett---------	0-9	10-20	8.0-20.0	6.1-7.3	---	---	---	---
	9-20	18-28	8.0-19.0	6.1-7.3	---	---	---	---
	20-34	10-18	4.0-12.0	7.4-8.4	15-30	---	---	---
	34-60	10-18	4.0-12.0	7.4-8.4	10-12	---	---	---
Dorset----------	0-10	4-18	10.0-23.0	5.6-7.3	---	---	---	---
	10-18	10-18	7.0-17.0	5.6-7.3	---	---	---	---
	18-29	5-10	3.0-8.0	7.4-8.4	10-25	---	---	---
	29-60	0-5	0.0-5.0	7.4-8.4	5-15	---	---	---
1103:								
Clitherall------	0-10	8-15	8.0-20.0	5.6-7.3	---	---	---	---
	10-16	8-18	5.0-17.0	5.6-7.3	---	---	---	---
	16-38	1-5	1.0-4.0	6.1-7.8	0-12	---	---	---
	38-80	10-18	5.0-10.0	7.4-8.4	5-20	---	---	---
1104B:								
Waukon----------	0-9	12-27	9.0-28.0	6.1-7.3	---	---	---	---
	9-34	18-35	7.0-21.0	6.1-8.4	0-30	---	---	---
	34-60	18-30	7.0-18.0	7.4-8.4	5-30	---	---	---

Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Cation-exchange capacity	Soil reaction	Calcium carbonate	Gypsum	Salinity	Sodium adsorption ratio
	In	Pct	meq/100g	pH	Pct	Pct	mmhos/cm	
1104B:								
Dorset	0-9	4-18	10.0-23.0	5.6-7.3	---	---	---	---
	9-23	10-18	7.0-17.0	5.6-7.3	---	---	---	---
	23-33	5-10	3.0-8.0	7.4-8.4	10-25	---	---	---
	33-60	0-5	0.0-5.0	7.4-8.4	5-15	---	---	---
1104C:								
Waukon	0-9	12-27	9.0-28.0	6.1-7.3	---	---	---	---
	9-28	18-35	7.0-21.0	6.1-8.4	0-30	---	---	---
	28-60	18-30	7.0-18.0	7.4-8.4	5-30	---	---	---
Dorset	0-10	4-18	10.0-23.0	5.6-7.3	---	---	---	---
	10-14	10-18	7.0-17.0	5.6-7.3	---	---	---	---
	14-20	5-10	3.0-8.0	7.4-8.4	10-25	---	---	---
	20-60	0-5	0.0-5.0	7.4-8.4	5-15	---	---	---
1104D:								
Waukon	0-9	12-27	9.0-28.0	6.1-7.3	---	---	---	---
	9-21	18-35	7.0-21.0	6.1-8.4	0-30	---	---	---
	21-60	18-30	7.0-18.0	7.4-8.4	5-30	---	---	---
Dorset	0-8	4-18	10.0-23.0	5.6-7.3	---	---	---	---
	8-18	10-18	7.0-17.0	5.6-7.3	---	---	---	---
	18-60	0-5	0.0-5.0	7.4-8.4	5-15	---	---	---
1105B:								
Dent	0-12	8-22	8.0-23.0	6.1-7.3	---	---	---	---
	12-26	18-35	10.0-20.0	5.1-7.3	---	---	---	---
	26-54	8-27	4.0-15.0	7.4-7.8	10-20	---	---	---
	54-80	5-20	3.0-11.0	7.4-8.4	5-15	---	---	---
1110:								
Isan	0-16	5-14	10.0-25.0	5.6-7.3	---	---	---	---
	16-26	2-8	2.0-10.0	5.1-6.5	---	---	---	---
	26-60	1-5	1.0-5.0	5.6-7.3	---	---	---	---
1111:								
Nidaros	0-32	---	110-170	4.5-7.8	---	---	---	---
	32-38	8-35	13.0-51.0	5.6-8.4	---	---	---	---
	38-60	0-4	1.0-3.0	5.6-8.4	0-5	---	---	---
1112D:								
Chapett	0-8	10-20	8.0-20.0	6.1-7.3	---	---	---	---
	8-18	18-28	8.0-19.0	6.1-7.3	---	---	---	---
	18-30	10-18	4.0-12.0	7.4-8.4	15-30	---	---	---
	30-60	10-18	4.0-12.0	7.4-8.4	10-12	---	---	---
Corliss	0-6	2-10	3.0-12.0	6.1-7.8	0-15	---	---	---
	6-18	0-10	1.0-6.0	6.1-7.8	0-15	---	---	---
	18-60	0-5	0.0-3.0	7.4-8.4	5-30	---	---	---
1112E:								
Chapett	0-7	10-20	8.0-20.0	6.1-7.3	---	---	---	---
	7-20	18-28	8.0-19.0	6.1-7.3	---	---	---	---
	20-37	10-18	4.0-12.0	7.4-8.4	15-30	---	---	---
	37-60	10-18	4.0-12.0	7.4-8.4	10-12	---	---	---
Corliss	0-7	2-10	3.0-12.0	6.1-7.8	0-15	---	---	---
	7-10	0-10	1.0-6.0	6.1-7.8	0-15	---	---	---
	10-60	0-5	0.0-3.0	7.4-8.4	5-30	---	---	---

Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Cation-exchange capacity	Soil reaction	Calcium carbonate	Gypsum	Salinity	Sodium adsorption ratio
	In	Pct	meq/100g	pH	Pct	Pct	mmhos/cm	
1113:								
Haslie----------	0-44	---	140-180	5.6-7.8	---	---	---	---
	44-60	18-35	10.0-45.0	7.4-8.4	60-80	---	---	---
Seelyeville-----	0-30	---	140-200	4.5-7.3	---	---	---	---
	30-60	---	140-200	4.5-7.3	---	---	---	---
Cathro----------	0-30	---	150-230	4.5-7.8	---	---	---	---
	30-60	10-30	2.0-20.0	5.6-8.4	5-25	---	---	---
1114:								
Hangaard--------	0-8	5-15	10.0-20.0	6.6-7.8	---	---	---	---
	8-60	2-10	2.0-6.0	7.4-8.4	5-15	---	---	---
1120:								
Rushlake--------	0-5	3-10	2.0-12.0	6.1-7.8	0-15	---	---	---
	5-60	1-10	1.0-6.0	7.4-8.4	5-30	---	---	---
Hangaard--------	0-4	5-15	10.0-20.0	6.6-7.8	---	---	---	---
	4-60	2-10	2.0-6.0	7.4-8.4	5-15	---	---	---
1129:								
Lindaas---------	0-15	27-35	24.0-42.0	6.6-7.3	---	---	---	---
	15-25	35-60	25.0-54.0	6.6-7.3	---	---	---	---
	25-60	25-40	16.0-34.0	7.4-8.4	20-30	---	---	---
1131B:								
Verndale--------	0-9	7-12	7.0-15.0	5.6-7.3	---	---	---	---
	9-19	7-18	3.0-12.0	5.6-7.3	---	---	---	---
	19-49	2-6	2.0-4.0	5.6-7.3	---	---	---	---
	49-60	0-4	0.0-3.0	6.1-8.4	0-30	---	---	---
Abbeylake-------	0-8	2-10	3.0-15.0	6.1-7.3	0-15	---	---	---
	8-19	0-10	1.0-8.0	6.1-7.3	0-15	---	---	---
	19-60	0-3	1.0-5.0	7.4-8.4	5-30	---	---	---
1136:								
Nidaros---------	0-27	---	110-170	4.5-7.8	---	---	---	---
	27-38	8-35	13.0-51.0	5.6-8.4	---	---	---	---
	38-60	0-4	1.0-3.0	5.6-8.4	0-5	---	---	---
1149:								
Hamerly---------	0-16	27-35	20.0-35.0	6.6-8.4	1-15	---	0-2	---
	16-25	18-35	10.0-30.0	7.4-8.4	15-35	0-3	0-4	0-2
	25-60	18-35	10.0-25.0	7.4-8.4	10-30	0-3	0-4	0-2
1195A:								
Sybil-----------	0-6	3-10	3.0-10.0	5.6-7.3	---	---	---	---
	6-14	3-15	1.0-10.0	5.6-7.3	---	---	---	---
	14-19	8-18	4.0-13.0	5.6-7.3	---	---	---	---
	19-34	3-10	1.0-7.0	5.6-7.3	---	---	---	---
	34-80	2-5	1.0-4.0	6.1-8.4	0-3	---	---	---
Eagleview-------	0-8	2-10	10.0-15.0	5.6-7.3	---	---	---	---
	8-32	2-10	10.0-15.0	5.6-7.3	---	---	---	---
	32-60	2-10	5.0-10.0	6.1-7.3	---	---	---	---
	60-80	2-10	0.0-5.0	6.1-8.4	0-10	---	---	---

Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Cation-exchange capacity	Soil reaction	Calcium carbonate	Gypsum	Salinity	Sodium adsorption ratio
	In	Pct	meq/100g	pH	Pct	Pct	mmhos/cm	
1195B:								
Sybil	0-5	3-10	3.0-10.0	5.6-7.3	---	---	---	---
	5-10	3-15	1.0-10.0	5.6-7.3	---	---	---	---
	10-15	8-18	4.0-13.0	5.6-7.3	---	---	---	---
	15-32	3-10	1.0-7.0	5.6-7.3	---	---	---	---
	32-80	2-5	1.0-4.0	6.1-8.4	0-3	---	---	---
Eagleview	0-4	2-10	10.0-15.0	5.6-7.3	---	---	---	---
	4-36	2-10	10.0-15.0	5.6-7.3	---	---	---	---
	36-60	2-10	5.0-10.0	6.1-7.3	---	---	---	---
1195C:								
Sybil	0-8	3-10	3.0-10.0	5.6-7.3	---	---	---	---
	8-17	3-15	1.0-10.0	5.6-7.3	---	---	---	---
	17-26	8-18	4.0-13.0	5.6-7.3	---	---	---	---
	26-37	3-10	1.0-7.0	5.6-7.3	---	---	---	---
	37-80	2-5	1.0-4.0	6.1-8.4	0-3	---	---	---
Eagleview	0-3	2-10	10.0-15.0	5.6-7.3	---	---	---	---
	3-37	2-10	10.0-15.0	5.6-7.3	---	---	---	---
	37-60	2-10	5.0-10.0	6.1-7.3	---	---	---	---
	60-80	2-10	0.0-5.0	6.1-8.4	0-10	---	---	---
1195E:								
Sybil	0-4	5-18	6.0-19.0	5.6-7.3	---	---	---	---
	4-15	3-15	1.0-10.0	5.6-7.3	---	---	---	---
	15-25	8-18	4.0-13.0	5.6-7.3	---	---	---	---
	25-78	3-10	1.0-7.0	5.6-7.3	---	---	---	---
	78-80	2-5	1.0-4.0	6.1-8.4	0-3	---	---	---
Eagleview	0-7	2-10	10.0-15.0	5.6-7.3	---	---	---	---
	7-17	2-10	10.0-15.0	5.6-7.3	---	---	---	---
	17-55	2-10	5.0-10.0	6.1-7.3	---	---	---	---
	55-80	2-10	0.0-5.0	6.1-8.4	0-10	---	---	---
1196B:								
Lida	0-9	5-18	6.0-19.0	5.6-7.3	---	---	---	---
	9-13	3-15	1.0-10.0	5.6-7.3	---	---	---	---
	13-25	8-18	4.0-13.0	5.6-7.3	---	---	---	---
	25-45	1-5	1.0-4.0	5.6-7.3	---	---	---	---
	45-60	1-5	1.0-4.0	7.4-8.4	3-15	---	---	---
Two Inlets	0-7	5-10	3.0-10.0	5.6-7.3	---	---	---	---
	7-14	2-10	1.0-6.0	5.6-7.3	---	---	---	---
	14-29	5-15	2.0-9.0	6.1-7.3	---	---	---	---
	29-60	0-3	0.0-2.0	7.4-8.4	5-30	---	---	---
1196C:								
Lida	0-8	5-18	6.0-19.0	5.6-7.3	---	---	---	---
	8-17	3-15	1.0-10.0	5.6-7.3	---	---	---	---
	17-25	8-18	4.0-13.0	5.6-7.3	---	---	---	---
	25-41	1-5	1.0-4.0	5.6-7.3	---	---	---	---
	41-80	1-5	1.0-4.0	7.4-8.4	3-15	---	---	---
Two Inlets	0-4	5-10	3.0-10.0	5.6-7.3	---	---	---	---
	4-9	2-10	1.0-6.0	5.6-7.3	---	---	---	---
	9-38	5-15	2.0-9.0	6.1-7.3	---	---	---	---
	38-60	0-3	0.0-2.0	7.4-8.4	5-30	---	---	---

Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Cation-exchange capacity	Soil reaction	Calcium carbonate	Gypsum	Salinity	Sodium adsorption ratio
	In	Pct	meq/100g	pH	Pct	Pct	mmhos/cm	
1196E:								
Lida	0-3	5-18	6.0-19.0	5.6-7.3	---	---	---	---
	3-14	3-15	1.0-10.0	5.6-7.3	---	---	---	---
	14-20	8-18	4.0-13.0	5.6-7.3	---	---	---	---
	20-27	1-5	1.0-4.0	5.6-7.3	---	---	---	---
	27-60	1-5	1.0-4.0	7.4-8.4	3-15	---	---	---
Two Inlets	0-3	5-10	3.0-10.0	5.6-7.3	---	---	---	---
	3-7	2-10	1.0-6.0	5.6-7.3	---	---	---	---
	7-21	5-15	2.0-9.0	6.1-7.3	---	---	---	---
	21-60	0-3	0.0-2.0	7.4-8.4	5-30	---	---	---
1196F:								
Lida	0-4	5-18	6.0-19.0	5.6-7.3	---	---	---	---
	4-17	3-15	1.0-10.0	5.6-7.3	---	---	---	---
	17-25	8-18	4.0-13.0	5.6-7.3	---	---	---	---
	25-28	1-5	1.0-4.0	5.6-7.3	---	---	---	---
	28-60	1-5	1.0-4.0	7.4-8.4	3-15	---	---	---
Two Inlets	0-3	5-10	3.0-10.0	5.6-7.3	---	---	---	---
	3-7	2-10	1.0-6.0	5.6-7.3	---	---	---	---
	7-14	5-15	2.0-9.0	6.1-7.3	---	---	---	---
	14-60	0-3	0.0-2.0	7.4-8.4	5-30	---	---	---
1200:								
Egglake	0-4	8-15	7.0-17.0	5.6-7.3	---	---	---	---
	4-9	3-10	2.0-10.0	5.6-7.3	---	---	---	---
	9-25	18-30	7.0-18.0	5.6-7.3	---	---	---	---
	25-60	10-18	4.0-11.0	7.4-8.4	10-20	---	---	---
1208B:								
Naytahwaush	0-7	27-35	15.0-33.0	5.6-7.3	---	---	---	---
	7-25	35-60	15.0-26.0	5.6-7.3	0-5	---	---	---
	25-60	22-35	9.0-22.0	7.4-8.4	15-25	---	---	---
Mahkonce	0-7	22-35	15.0-30.0	5.6-7.3	---	---	---	---
	7-37	35-60	25.0-30.0	6.1-7.3	---	---	---	---
	37-55	30-45	10.0-20.0	6.1-7.8	5-15	---	---	---
	55-60	25-35	10.0-20.0	7.4-8.4	15-30	---	---	---
1209C:								
Naytahwaush	0-7	27-35	15.0-33.0	5.6-7.3	---	---	---	---
	7-24	35-60	15.0-26.0	5.6-7.3	0-5	---	---	---
	24-60	22-35	9.0-22.0	7.4-8.4	15-25	---	---	---
1212B:								
Mahkonce	0-7	22-35	15.0-30.0	5.6-7.3	---	---	---	---
	7-23	35-60	25.0-30.0	6.1-7.3	---	---	---	---
	23-46	30-45	10.0-20.0	6.1-7.8	5-15	---	---	---
	46-60	25-35	10.0-20.0	7.4-8.4	15-30	---	---	---
1214:								
Mustinka	0-14	28-40	28.0-40.0	6.6-7.3	---	---	---	---
	14-24	35-60	20.0-35.0	6.6-7.3	---	---	---	---
	24-36	18-35	10.0-18.0	7.4-8.4	10-30	---	---	---
	36-80	18-35	10.0-18.0	7.4-8.4	10-30	---	---	---
1215:								
Pinelake	0-12	8-15	12.0-24.0	6.1-7.3	---	---	---	---
	12-30	12-18	7.0-13.0	6.1-7.3	---	---	---	---
	30-35	1-8	1.0-5.0	6.1-8.4	---	---	---	---
	35-80	1-5	1.0-4.0	7.4-8.4	3-10	---	---	---

Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Cation-exchange capacity	Soil reaction	Calcium carbonate	Gypsum	Salinity	Sodium adsorption ratio
	In	Pct	meq/100g	pH	Pct	Pct	mmhos/cm	
1216B:								
Egglake---------	0-4	5-15	6.0-17.0	5.6-7.3	---	---	---	---
	4-8	3-10	2.0-10.0	5.6-7.3	---	---	---	---
	8-22	18-30	7.0-18.0	5.6-7.3	---	---	---	---
	22-60	10-18	4.0-11.0	7.4-8.4	10-20	---	---	---
Wykeham---------	0-9	5-18	6.0-23.0	5.1-6.5	---	---	---	---
	9-13	5-15	4.0-13.0	5.1-6.5	---	---	---	---
	13-40	18-30	8.0-20.0	5.6-7.3	---	---	---	---
	40-60	10-18	4.0-12.0	7.4-8.4	10-25	---	---	---
1217E:								
Waukon----------	0-8	12-27	9.0-28.0	6.1-7.3	---	---	---	---
	8-36	18-35	7.0-21.0	6.1-8.4	0-30	---	---	---
	36-60	18-30	7.0-18.0	7.4-8.4	5-30	---	---	---
Lida----------	0-6	5-18	6.0-19.0	5.6-7.3	---	---	---	---
	6-16	3-15	1.0-10.0	5.6-7.3	---	---	---	---
	16-36	8-18	4.0-13.0	5.6-7.3	---	---	---	---
	36-60	1-5	1.0-4.0	7.4-8.4	3-15	---	---	---
1218B:								
Snellman--------	0-3	5-18	4.0-16.0	5.1-6.5	---	---	---	---
	3-10	5-15	3.0-14.0	5.1-6.5	---	---	---	---
	10-42	18-30	8.0-16.0	5.6-7.3	---	---	---	---
	42-55	7-18	3.0-10.0	7.4-8.4	15-25	---	---	---
	55-80	7-18	3.0-10.0	7.4-8.4	5-15	---	---	---
Lida----------	0-5	5-18	6.0-19.0	5.6-7.3	---	---	---	---
	5-19	3-15	1.0-10.0	5.6-7.3	---	---	---	---
	19-31	8-18	4.0-13.0	5.6-7.3	---	---	---	---
	31-35	1-5	1.0-4.0	5.6-7.3	---	---	---	---
	35-80	1-5	1.0-4.0	7.4-8.4	3-15	---	---	---
1218C:								
Snellman--------	0-3	5-18	4.0-16.0	5.1-6.5	---	---	---	---
	3-10	5-15	3.0-14.0	5.1-6.5	---	---	---	---
	10-39	18-30	8.0-16.0	5.6-7.3	---	---	---	---
	39-80	7-18	3.0-10.0	7.4-8.4	5-15	---	---	---
Lida----------	0-6	5-18	6.0-19.0	5.6-7.3	---	---	---	---
	6-13	3-15	1.0-10.0	5.6-7.3	---	---	---	---
	13-20	8-18	4.0-13.0	5.6-7.3	---	---	---	---
	20-80	1-5	1.0-4.0	7.4-8.4	3-15	---	---	---
1218E:								
Snellman--------	0-3	5-18	4.0-16.0	5.1-6.5	---	---	---	---
	3-8	5-15	3.0-14.0	5.1-6.5	---	---	---	---
	8-30	18-30	8.0-16.0	5.6-7.3	---	---	---	---
	30-60	7-18	3.0-10.0	7.4-8.4	5-15	---	---	---
Lida----------	0-6	5-18	6.0-19.0	5.6-7.3	---	---	---	---
	6-13	3-15	1.0-10.0	5.6-7.3	---	---	---	---
	13-28	8-18	4.0-13.0	5.6-7.3	---	---	---	---
	28-42	1-5	1.0-4.0	5.6-7.3	---	---	---	---
	42-60	1-5	1.0-4.0	7.4-8.4	3-15	---	---	---
1218F:								
Snellman--------	0-3	5-18	4.0-16.0	5.1-6.5	---	---	---	---
	3-13	5-15	3.0-14.0	5.1-6.5	---	---	---	---
	13-23	18-30	8.0-16.0	5.6-7.3	---	---	---	---
	23-40	7-18	3.0-10.0	7.4-8.4	15-25	---	---	---
	40-60	7-18	3.0-10.0	7.4-8.4	5-15	---	---	---

Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Cation-exchange capacity	Soil reaction	Calcium carbonate	Gypsum	Salinity	Sodium adsorption ratio
	In	Pct	meq/100g	pH	Pct	Pct	mmhos/cm	
1218F:								
Lida----------	0-4	5-18	6.0-19.0	5.6-7.3	---	---	---	---
	4-14	3-15	1.0-10.0	5.6-7.3	---	---	---	---
	14-24	8-18	4.0-13.0	5.6-7.3	---	---	---	---
	24-35	1-5	1.0-4.0	5.6-7.3	---	---	---	---
	35-60	1-5	1.0-4.0	7.4-8.4	3-15	---	---	---
1219C:								
Sandberg--------	0-8	5-15	4.0-16.0	5.6-7.8	0-5	---	---	---
	8-25	0-10	1.0-6.0	6.1-7.8	0-5	---	---	---
	25-36	0-5	1.0-6.0	7.4-8.4	10-25	---	---	---
	36-60	0-5	1.0-4.0	7.4-8.4	5-10	---	---	---
Sverdrup--------	0-12	10-18	9.0-17.0	6.1-7.3	---	---	---	---
	12-24	6-18	4.0-13.0	6.1-7.8	---	---	---	---
	24-60	0-10	0.0-6.0	7.4-8.4	---	---	---	---
1221B:								
Sverdrup--------	0-15	10-18	9.0-17.0	6.1-7.3	---	---	---	---
	15-28	6-18	4.0-13.0	6.1-7.8	---	---	---	---
	28-60	0-10	0.0-6.0	7.4-8.4	---	---	---	---
Sandberg--------	0-8	5-15	4.0-16.0	5.6-7.8	0-5	---	---	---
	8-14	0-10	1.0-6.0	6.1-7.8	0-5	---	---	---
	14-24	0-5	1.0-6.0	7.4-8.4	10-25	---	---	---
	24-60	0-5	1.0-4.0	7.4-8.4	5-10	---	---	---
1223D:								
Sandberg--------	0-7	5-15	4.0-16.0	5.6-7.8	0-5	---	---	---
	7-13	0-10	1.0-6.0	6.1-7.8	0-5	---	---	---
	13-60	0-5	1.0-4.0	7.4-8.4	5-10	---	---	---
Arvilla---------	0-10	6-18	5.0-20.0	6.1-8.4	---	---	---	---
	10-19	6-18	5.0-15.0	6.6-8.4	---	---	---	---
	19-60	2-10	1.0-5.0	7.4-8.4	1-5	---	---	---
1227:								
Quam----------	0-33	22-27	20.0-40.0	6.6-7.8	---	---	---	---
	33-50	22-35	20.0-40.0	6.6-7.8	0-15	---	---	---
	50-60	20-35	12.0-25.0	7.4-8.4	5-20	---	---	---
Cathro----------	0-12	---	150-230	4.5-7.8	---	---	---	---
	12-24	---	150-230	4.5-7.8	---	---	---	---
	24-60	10-30	2.0-20.0	5.6-8.4	5-25	---	---	---
Urness----------	0-20	18-27	40.0-50.0	7.4-8.4	5-30	---	---	---
	20-45	18-35	40.0-50.0	7.4-8.4	5-30	---	---	---
	45-60	18-35	40.0-50.0	7.4-8.4	5-30	---	---	---
1230:								
Haslie----------	0-44	---	140-180	5.6-7.8	---	---	---	---
	44-60	18-35	10.0-45.0	7.4-8.4	60-80	---	---	---
Nidaros---------	0-38	---	110-170	4.5-7.8	---	---	---	---
	38-54	8-35	13.0-51.0	5.6-8.4	---	---	---	---
	54-60	0-4	1.0-3.0	5.6-8.4	0-5	---	---	---
1232B:								
Chapett---------	0-8	10-20	8.0-20.0	6.1-7.3	---	---	---	---
	8-21	18-28	8.0-19.0	6.1-7.3	---	---	---	---
	21-36	10-18	4.0-12.0	7.4-8.4	15-30	---	---	---
	36-60	10-18	4.0-12.0	7.4-8.4	10-12	---	---	---

Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Cation-exchange capacity	Soil reaction	Calcium carbonate	Gypsum	Salinity	Sodium adsorption ratio
	In	Pct	meq/100g	pH	Pct	Pct	mmhos/cm	
1232E:								
Chapett---	0-9	10-20	8.0-20.0	6.1-7.3	---	---	---	---
	9-26	18-28	8.0-19.0	6.1-7.3	---	---	---	---
	26-33	10-18	4.0-12.0	7.4-8.4	15-30	---	---	---
	33-60	10-18	4.0-12.0	7.4-8.4	10-12	---	---	---
1234B:								
Formdale---	0-11	27-35	17.0-28.0	6.1-7.3	---	---	---	---
	11-18	24-35	13.0-22.0	6.6-7.8	---	---	---	---
	18-30	18-35	9.0-18.0	7.4-8.4	20-30	---	---	---
	30-60	18-35	9.0-18.0	7.4-8.4	12-20	---	---	---
Buse---	0-8	27-35	15.0-24.0	6.6-8.4	1-25	---	---	---
	8-27	18-35	10.0-20.0	7.4-8.4	15-40	---	---	---
	27-60	18-35	9.0-18.0	7.4-8.4	10-20	---	---	---
1237:								
Lakepark---	0-9	20-27	20.0-30.0	6.1-7.8	---	---	---	---
	9-35	20-35	14.0-28.0	6.1-7.8	---	---	---	---
	35-44	22-35	12.0-22.0	6.6-7.8	---	---	---	---
	44-60	22-35	11.0-19.0	7.4-8.4	5-20	---	---	---
1239:								
Quam---	0-9	22-27	20.0-40.0	6.6-7.8	---	---	---	---
	9-56	22-35	20.0-40.0	6.6-7.8	0-15	---	---	---
	56-80	20-35	12.0-25.0	7.4-8.4	5-20	---	---	---
1240:								
Roliss---	0-14	28-35	20.0-32.0	6.6-8.4	5-20	---	---	---
	14-17	18-35	10.0-18.0	7.4-8.4	5-20	0-3	---	---
	17-27	18-35	8.0-16.0	7.4-8.4	20-35	0-3	---	---
	27-60	18-35	8.0-16.0	7.4-8.4	12-25	0-3	---	---
1247D:								
Corliss---	0-7	2-10	3.0-12.0	6.1-7.8	0-15	---	---	---
	7-10	0-10	1.0-6.0	6.1-7.8	0-15	---	---	---
	10-60	0-5	0.0-3.0	7.4-8.4	5-30	---	---	---
Dorset---	0-8	4-18	10.0-23.0	5.6-7.3	---	---	---	---
	8-17	10-18	7.0-17.0	5.6-7.3	---	---	---	---
	17-22	5-10	3.0-8.0	7.4-8.4	10-25	---	---	---
	22-60	0-5	0.0-5.0	7.4-8.4	5-15	---	---	---
1250C:								
Abbeylake---	0-8	2-10	3.0-15.0	6.1-7.3	0-15	---	---	---
	8-18	0-10	1.0-8.0	6.1-7.3	0-15	---	---	---
	18-60	0-3	1.0-5.0	7.4-8.4	5-30	---	---	---
Verndale---	0-9	7-12	7.0-15.0	5.6-7.3	---	---	---	---
	9-17	7-18	3.0-12.0	5.6-7.3	---	---	---	---
	17-24	2-6	2.0-4.0	5.6-7.3	---	---	---	---
	24-60	0-4	0.0-3.0	6.1-8.4	0-30	---	---	---
1259:								
Hamerly---	0-8	27-35	20.0-35.0	6.6-8.4	1-15	---	0-2	---
	8-40	18-35	10.0-30.0	7.4-8.4	15-35	0-3	0-4	0-2
	40-60	18-35	10.0-25.0	7.4-8.4	10-30	0-3	0-4	0-2
Mustinka---	0-8	28-40	28.0-40.0	6.6-7.3	---	---	---	---
	8-25	35-60	20.0-35.0	6.6-7.3	---	---	---	---
	25-36	18-35	10.0-18.0	7.4-8.4	10-30	---	---	---
	36-60	18-35	10.0-18.0	7.4-8.4	10-30	---	---	---

Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Cation-exchange capacity	Soil reaction	Calcium carbonate	Gypsum	Salinity	Sodium adsorption ratio
	In	Pct	meq/100g	pH	Pct	Pct	mmhos/cm	
1275B:								
Kandota	0-9	10-20	8.0-20.0	5.6-7.3	---	---	---	---
	9-11	5-18	3.0-13.0	5.1-6.5	---	---	---	---
	11-45	18-30	7.0-19.0	5.6-7.3	---	---	---	---
	45-57	12-18	5.0-12.0	7.4-8.4	15-25	---	---	---
	57-80	7-18	3.0-10.0	7.4-8.4	5-15	---	---	---
Egglake	0-6	8-14	7.0-17.0	6.1-7.3	---	---	---	---
	6-12	5-12	2.0-10.0	5.6-7.3	---	---	---	---
	12-17	12-20	7.0-18.0	5.6-6.5	---	---	---	---
	17-52	18-30	7.0-18.0	5.6-6.5	---	---	---	---
	52-80	10-18	4.0-11.0	6.6-7.8	0-20	---	---	---
1275C:								
Kandota	0-9	10-20	8.0-20.0	5.6-7.3	---	---	---	---
	9-13	5-18	3.0-13.0	5.1-6.5	---	---	---	---
	13-38	18-30	7.0-19.0	5.6-7.3	---	---	---	---
	38-55	12-18	5.0-12.0	7.4-8.4	15-25	---	---	---
	55-80	7-18	3.0-10.0	7.4-8.4	5-15	---	---	---
Egglake	0-9	8-14	7.0-17.0	6.1-7.3	---	---	---	---
	9-14	5-12	2.0-10.0	5.6-7.3	---	---	---	---
	14-22	12-20	7.0-18.0	5.6-6.5	---	---	---	---
	22-41	18-30	7.0-18.0	5.6-6.5	---	---	---	---
	41-80	10-18	4.0-11.0	6.6-7.8	0-20	---	---	---
1276:								
Knute	0-10	10-18	8.0-18.0	6.1-7.3	---	---	---	---
	10-12	18-28	8.0-19.0	6.1-7.8	---	---	---	---
	12-34	10-18	4.0-12.0	7.4-8.4	20-30	---	---	---
	34-48	10-18	4.0-12.0	7.4-8.4	15-25	---	---	---
	48-60	10-18	3.0-10.0	7.4-8.4	5-15	---	---	---
Brandsvold	0-11	10-20	7.0-15.0	6.1-7.3	---	---	---	---
	11-15	10-20	9.0-13.0	5.6-7.3	---	---	---	---
	15-29	18-27	9.0-13.0	5.6-6.5	---	---	---	---
	29-60	12-20	5.0-10.0	6.1-7.3	---	---	---	---
1277D:								
Corliss	0-8	2-10	3.0-12.0	6.1-7.8	0-15	---	---	---
	8-20	0-10	1.0-6.0	6.1-7.8	0-15	---	---	---
	20-60	0-5	0.0-3.0	7.4-8.4	5-30	---	---	---
Sverdrup	0-9	10-18	9.0-17.0	6.1-7.3	---	---	---	---
	9-25	6-18	4.0-13.0	6.1-7.8	---	---	---	---
	25-60	0-10	0.0-6.0	7.4-8.4	---	---	---	---
1289:								
Knute	0-10	10-18	8.0-18.0	6.1-7.3	---	---	---	---
	10-13	18-28	8.0-19.0	5.1-6.5	---	---	---	---
	13-41	12-20	4.0-12.0	5.6-6.5	---	---	---	---
	41-53	10-18	4.0-12.0	7.4-8.4	15-25	---	---	---
	53-60	10-18	3.0-10.0	7.4-8.4	5-15	---	---	---
1290:								
Brandsvold	0-12	10-20	7.0-15.0	6.1-7.3	---	---	---	---
	12-17	10-20	9.0-13.0	5.6-7.3	---	---	---	---
	17-37	18-27	9.0-13.0	5.6-6.5	---	---	---	---
	37-45	12-20	5.0-10.0	6.1-7.3	---	---	---	---
	45-80	10-18	5.0-10.0	7.4-8.4	15-25	---	---	---

Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Cation-exchange capacity	Soil reaction	Calcium carbonate	Gypsum	Salinity	Sodium adsorption ratio
	In	Pct	meq/100g	pH	Pct	Pct	mmhos/cm	
1291:								
Sedgeville------	0-8	0-23	10.0-45.0	6.1-8.4	0-20	---	---	---
	8-34	8-17	5.0-20.0	6.1-8.4	0-20	---	---	---
	34-60	2-5	2.0-5.0	6.6-8.4	0-20	---	---	---
1293:								
Sedgeville------	0-21	8-15	10.0-35.0	5.6-7.8	0-20	---	---	---
	21-40	8-17	5.0-20.0	5.6-7.8	0-20	---	---	---
	40-60	2-5	2.0-5.0	7.9-8.4	5-20	---	---	---
1304A:								
Glyndon---------	0-16	15-20	12.0-24.0	7.4-9.0	5-25	---	0-4	---
	16-29	10-18	6.0-14.0	7.4-9.0	20-40	---	0-4	---
	29-60	5-18	2.0-10.0	7.4-9.0	10-35	---	0-4	---
1307:								
Rushlake--------	0-5	1-5	2.0-9.0	6.1-7.8	0-15	---	---	---
	5-60	1-10	1.0-6.0	7.4-8.4	5-30	---	---	---
1317:								
Vallers---------	0-14	28-35	15.0-28.0	7.4-8.4	5-25	---	0-4	---
	14-24	18-35	10.0-18.0	7.4-8.4	20-35	0-2	0-4	---
	24-60	18-35	8.0-16.0	7.4-8.4	12-25	0-2	0-4	---
1319B:								
Rockwood--------	0-8	5-15	---	5.1-6.5	---	---	---	---
	8-18	5-10	---	5.1-6.5	---	---	---	---
	18-26	8-18	---	5.6-7.3	---	---	---	---
	26-42	8-18	---	5.6-7.3	---	---	---	---
	42-60	7-15	---	6.1-8.4	---	---	---	---
1319C:								
Rockwood--------	0-9	5-15	---	5.1-6.5	---	---	---	---
	9-16	5-10	---	5.1-6.5	---	---	---	---
	16-27	8-18	---	5.6-7.3	---	---	---	---
	27-41	8-18	---	5.6-7.3	---	---	---	---
	41-60	7-15	---	6.1-8.4	---	---	---	---
1319D:								
Rockwood--------	0-5	5-15	---	5.1-6.5	---	---	---	---
	5-9	5-10	---	5.1-6.5	---	---	---	---
	9-38	8-18	---	5.6-7.3	---	---	---	---
	38-45	8-18	---	5.6-7.3	---	---	---	---
	45-60	7-15	---	6.1-8.4	---	---	---	---
1320B:								
Blowers---------	0-7	5-15	6.0-20.0	5.1-7.3	---	---	---	---
	7-19	5-10	4.0-9.0	5.1-6.5	---	---	---	---
	19-36	8-18	5.0-11.0	5.6-7.3	---	---	---	---
	36-43	8-18	4.0-10.0	5.6-7.3	0-15	---	---	---
	43-60	7-15	4.0-9.0	6.6-8.4	0-15	---	---	---
1321:								
Paddock---------	0-8	8-15	8.0-20.0	5.6-7.3	---	---	---	---
	8-15	3-10	3.0-9.0	5.6-6.5	---	---	---	---
	15-40	8-18	4.0-10.0	6.6-7.3	---	---	---	---
	40-60	6-15	3.0-9.0	6.6-8.4	---	---	---	---
Becida----------	0-8	10-20	11.0-24.0	5.6-7.3	---	---	---	---
	8-13	3-10	3.0-11.0	5.6-6.5	---	---	---	---
	13-27	8-18	9.0-11.0	5.1-6.5	---	---	---	---
	27-58	8-18	3.0-9.0	5.1-6.5	---	---	---	---
	58-80	6-15	3.0-9.0	6.6-8.4	---	---	---	---

Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Cation-exchange capacity	Soil reaction	Calcium carbonate	Gypsum	Salinity	Sodium adsorption ratio
	In	Pct	meq/100g	pH	Pct	Pct	mmhos/cm	
1322:								
Wolverton-------	0-16	10-20	20.0-40.0	7.4-8.4	15-25	---	---	---
	16-34	5-15	20.0-40.0	7.4-8.4	15-25	---	---	---
	34-45	2-10	15.0-30.0	7.4-8.4	10-20	---	---	---
	45-80	18-35	10.0-20.0	7.4-8.4	10-20	---	---	---
1324B:								
Heimdal---------	0-8	10-20	10.0-24.0	6.1-7.3	---	---	---	---
	8-18	10-18	5.0-12.0	6.1-7.8	0-10	---	---	---
	18-25	10-18	5.0-12.0	7.4-8.4	20-30	---	---	---
	25-60	7-18	4.0-10.0	7.4-8.4	15-25	---	---	---
Sisseton--------	0-8	15-20	25.0-35.0	7.4-8.4	0-5	---	0-2	---
	8-22	10-18	20.0-30.0	7.4-8.4	15-35	---	0-2	0-1
	22-60	10-18	20.0-30.0	7.4-8.4	7-30	0-5	0-2	0-1
1338:								
Oakcreek--------	0-14	8-15	10.0-20.0	6.1-7.3	---	---	---	---
	14-33	10-18	6.0-11.0	5.6-7.3	---	---	---	---
	33-47	2-8	1.0-5.0	5.6-7.8	5-20	---	---	---
	47-80	2-4	1.0-3.0	7.4-8.4	5-15	---	---	---
1339:								
Borup-----------	0-10	15-27	18.0-43.0	7.4-8.4	5-20	---	0-4	---
	10-16	10-18	8.0-15.0	7.4-8.4	15-40	0-5	0-4	---
	16-60	5-18	4.0-14.0	7.4-8.4	10-20	0-5	2-8	---
1340:								
Bluffcreek------	0-8	5-14	6.0-18.0	5.6-7.3	---	---	---	---
	8-31	8-18	3.0-12.0	5.6-7.3	---	---	---	---
	31-60	1-5	0.0-4.0	6.1-8.4	0-30	---	---	---
Epoufette-------	0-7	5-15	10.0-20.0	6.1-7.3	---	---	---	---
	7-10	5-15	4.0-14.0	6.1-7.3	0-5	---	---	---
	10-22	8-18	4.0-10.0	6.6-7.8	0-10	---	---	---
	22-60	0-8	1.0-5.0	7.4-8.4	5-10	---	---	---
1341:								
Clitherall------	0-11	8-15	8.0-20.0	5.6-7.3	---	---	---	---
	11-16	8-18	5.0-17.0	5.6-7.3	---	---	---	---
	16-30	4-10	2.0-6.0	5.6-7.3	---	---	---	---
	30-45	1-5	1.0-4.0	6.1-7.8	0-12	---	---	---
	45-80	10-18	5.0-10.0	7.4-8.4	5-20	---	---	---
Wykeham---------	0-8	5-18	6.0-23.0	5.1-6.5	---	---	---	---
	8-17	5-15	4.0-13.0	5.1-6.5	---	---	---	---
	17-32	18-30	8.0-20.0	5.6-7.3	---	---	---	---
	32-60	10-18	4.0-12.0	7.4-8.4	10-25	---	---	---
1342:								
Pinelake--------	0-10	8-18	10.0-23.0	6.1-7.3	---	---	---	---
	10-29	12-18	12.0-18.0	6.1-7.3	---	---	---	---
	29-70	1-5	1.0-5.0	7.4-8.4	2-20	---	---	---
	70-80	12-27	12.0-27.0	7.4-8.4	5-15	---	---	---
Brandsvold------	0-10	10-20	7.0-15.0	6.1-7.3	---	---	---	---
	10-12	10-20	9.0-13.0	5.6-7.3	---	---	---	---
	12-41	18-27	9.0-13.0	5.6-6.5	---	---	---	---
	41-80	10-18	5.0-10.0	7.4-8.4	15-25	---	---	---

Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Cation-exchange capacity	Soil reaction	Calcium carbonate	Gypsum	Salinity	Sodium adsorption ratio
	In	Pct	meq/100g	pH	Pct	Pct	mmhos/cm	
1343C:								
Lida	0-8	5-18	6.0-19.0	5.6-7.3	---	---	---	---
	8-13	3-15	1.0-10.0	5.6-7.3	---	---	---	---
	13-22	8-18	4.0-13.0	5.6-7.3	---	---	---	---
	22-38	1-5	1.0-4.0	5.6-7.3	---	---	---	---
	38-80	1-5	1.0-4.0	7.4-8.4	3-15	---	---	---
Almora	0-9	12-20	12.0-20.0	5.6-7.3	---	---	---	---
	9-12	12-20	8.0-14.0	5.6-7.3	---	---	---	---
	12-25	18-30	10.0-17.0	5.6-7.3	---	---	---	---
	25-28	3-12	2.0-7.0	5.6-7.8	0-5	---	---	---
	28-80	1-4	1.0-3.0	7.4-8.4	5-30	---	---	---
Lizzie	0-8	8-18	9.0-20.0	6.1-7.3	---	---	---	---
	8-18	18-35	8.0-22.0	6.1-7.3	---	---	---	---
	18-42	8-20	6.0-13.0	7.4-8.4	12-35	---	---	---
	42-80	3-16	2.0-10.0	7.4-8.4	12-35	---	---	---
1344B:								
Lida	0-7	5-18	6.0-19.0	5.6-7.3	---	---	---	---
	7-23	8-18	4.0-13.0	5.6-7.3	---	---	---	---
	23-30	1-5	1.0-4.0	5.6-7.3	---	---	---	---
	30-80	1-5	1.0-4.0	7.4-8.4	3-15	---	---	---
Almora	0-10	12-20	12.0-20.0	5.6-7.3	---	---	---	---
	10-15	12-20	8.0-14.0	5.6-7.3	---	---	---	---
	15-39	18-30	10.0-17.0	5.6-7.3	---	---	---	---
	39-80	1-4	1.0-3.0	7.4-8.4	5-30	---	---	---
Dent	0-15	8-18	8.0-21.0	6.1-7.3	---	---	---	---
	15-38	18-35	10.0-20.0	5.1-7.3	---	---	---	---
	38-62	8-27	4.0-15.0	7.4-7.8	10-20	---	---	---
	62-80	5-20	3.0-11.0	7.4-8.4	5-15	---	---	---
1345:								
Bluffcreek	0-8	5-14	6.0-18.0	5.6-7.3	---	---	---	---
	8-19	3-10	1.0-7.0	5.6-7.3	---	---	---	---
	19-47	8-18	3.0-12.0	5.6-7.3	---	---	---	---
	47-60	1-5	0.0-4.0	6.1-8.4	0-30	---	---	---
Rosy	0-9	3-12	1.0-15.0	5.1-7.3	---	---	---	---
	9-48	8-18	4.0-10.0	5.1-7.3	---	---	---	---
	48-60	6-18	3.0-10.0	5.6-8.4	0-30	---	---	---
1346:								
Nidaros	0-25	---	140-180	7.4-9.0	10-40	---	---	---
	25-42	8-35	14.0-68.0	6.6-8.4	5-20	---	---	---
	42-60	0-4	0.0-3.0	6.6-8.4	0-5	---	---	---
1347B:								
Kandota	0-8	10-20	8.0-20.0	5.6-7.3	---	---	---	---
	8-11	5-18	3.0-13.0	5.1-6.5	---	---	---	---
	11-26	18-30	7.0-19.0	5.6-7.3	---	---	---	---
	26-46	12-18	5.0-12.0	7.4-8.4	15-25	---	---	---
	46-80	7-18	3.0-10.0	7.4-8.4	5-15	---	---	---
1348:								
Knute	0-11	12-20	9.0-20.0	6.1-7.3	---	---	---	---
	11-16	18-28	8.0-19.0	6.1-7.8	---	---	---	---
	16-45	10-18	4.0-12.0	7.4-8.4	20-30	---	---	---
	45-65	10-18	4.0-12.0	7.4-8.4	15-25	---	---	---
	65-80	10-18	3.0-10.0	7.4-8.4	5-15	---	---	---

Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Cation-exchange capacity	Soil reaction	Calcium carbonate	Gypsum	Salinity	Sodium adsorption ratio
	In	Pct	meq/100g	pH	Pct	Pct	mmhos/cm	
1349:								
Clotho----------	0-14	10-25	15.0-28.0	7.4-8.4	2-10	---	---	---
	14-28	8-18	5.0-14.0	7.4-8.4	5-20	---	---	---
	28-60	8-15	4.0-7.0	7.4-8.4	5-10	---	---	---
1350:								
Brandsvold------	0-13	10-20	7.0-15.0	6.1-7.3	---	---	---	---
	13-61	18-27	9.0-13.0	5.6-6.5	---	---	---	---
	61-80	10-18	5.0-10.0	7.4-8.4	15-25	---	---	---
1351:								
Bluffton--------	0-10	14-25	12.0-30.0	5.6-7.3	---	---	---	---
	10-53	18-30	7.0-25.0	5.6-7.3	---	---	---	---
	53-80	16-24	7.0-20.0	6.6-8.4	0-15	---	---	---
1365:								
Hillview--------	0-7	5-15	6.0-15.0	5.1-7.3	---	---	---	---
	7-15	3-12	3.0-8.0	5.1-6.5	---	---	---	---
	15-29	8-18	5.0-11.0	5.1-7.3	---	---	---	---
	29-60	3-12	2.0-7.0	5.1-8.4	0-12	---	---	---
1396:								
Sedgeville------	0-7	0-23	10.0-45.0	6.1-8.4	0-20	---	---	---
	7-24	8-17	5.0-20.0	6.1-8.4	0-20	---	---	---
	24-60	2-5	2.0-5.0	6.6-8.4	0-20	---	---	---
Nidaros---------	0-21	---	110-170	4.5-7.8	---	---	---	---
	21-27	8-35	13.0-51.0	5.6-8.4	---	---	---	---
	27-80	0-4	1.0-3.0	5.6-8.4	0-5	---	---	---
Aquolls---------	0-10	10-20	11.0-22.0	6.1-8.4	0-10	---	---	---
	10-24	12-27	7.0-16.0	6.1-8.4	0-10	---	---	---
	24-60	2-18	1.0-10.0	6.1-8.4	0-10	---	---	---
1397:								
Bemidji---------	0-8	2-10	3.0-11.0	5.6-6.5	---	---	---	---
	8-36	2-10	2.0-7.0	5.6-6.5	---	---	---	---
	36-45	12-27	6.0-15.0	6.1-7.3	---	---	---	---
	45-60	7-18	4.0-10.0	7.4-8.4	0-5	---	---	---
1825B:								
Seelyeville-----	0-60	---	140-200	6.1-7.8	0-15	---	---	---
1874:								
Radium----------	0-11	1-8	3.0-12.0	6.1-7.8	0-5	---	---	---
	11-18	1-8	2.0-8.0	6.6-8.4	2-10	---	---	---
	18-24	1-8	1.0-5.0	7.4-8.4	5-15	---	---	---
	24-60	1-5	1.0-5.0	7.4-8.4	5-15	---	---	---
1943:								
Roscommon-------	0-6	2-12	9.0-23.0	5.6-7.8	---	---	---	---
	6-60	0-10	1.0-4.0	5.6-8.4	0-10	---	---	---
1975:								
Oylen-----------	0-13	7-12	8.0-14.0	6.1-7.3	---	---	---	---
	13-22	7-18	5.0-13.0	6.1-7.3	---	---	---	---
	22-26	2-6	1.0-3.0	6.1-7.3	---	---	---	---
	26-60	0-4	0.0-2.0	6.6-8.4	0-15	---	---	---

Water Features

(See text for definitions of terms used in this table. Absence of an entry indicates that the feature is not a concern or that data were not estimated)

Map symbol and soil name	Hydrologic group	Flooding			High water table and ponding				
		Frequency	Duration	Months	Water table depth	Kind of water table	Months	Ponding duration	Maximum ponding depth
					Ft				Ft
7A, 7B, 7C:									
Hubbard	A	None	---	---	>6.0	---	---	---	---
26:									
Aazdahl	B	None	---	---	2.5-3.5	Apparent	Oct-Jun	---	---
34:									
Parnell	C/D	None	---	---	0.0-0.5	Apparent	Jan-Dec	Very long	1.0
38B, 38C2, 38D2, 38E:									
Waukon	B	None	---	---	>6.0	---	---	---	---
46:									
Borup	B/D	None	---	---	0.5-1.5	Apparent	Apr-Jul	---	---
53B, 53C, 53D:									
Kandota	B	None	---	---	>6.0	---	---	---	---
58:									
Kittson	C	None	---	---	2.5-3.5	Apparent	Nov-Jun	---	---
59:									
Grimstad	B	None	---	---	2.5-3.5	Apparent	Apr-Jul	---	---
61:									
Arveson	B/D	None	---	---	0.5-1.5	Apparent	Apr-Jul	---	---
63:									
Rockwell	B/D	None	---	---	0.5-1.5	Apparent	Apr-Jul	---	---
65:									
Foxhome	B	None	---	---	2.5-3.5	Apparent	Oct-Jun	---	---
66:									
Flaming	A	None	---	---	2.5-3.5	Apparent	Nov-Jun	---	---
68:									
Arveson	B/D	None	---	---	0.0-0.5	Apparent	Jan-Dec	Very long	1.0
107:									
Winger	B/D	None	---	---	0.5-1.5	Apparent	Nov-Jun	---	---
108:									
McIntosh	B	None	---	---	2.5-3.5	Apparent	Apr-Nov	---	---
121:									
Wykeham	B	None	---	---	2.5-3.5	Apparent	Apr-Jun	---	---
127A, 127B, 127C:									
Sverdrup	B	None	---	---	>6.0	---	---	---	---
141B, 141C, 141D:									
Egeland	B	None	---	---	>6.0	---	---	---	---
168B:									
Forman	B	None	---	---	>6.0	---	---	---	---

Water Features--Continued

Map symbol and soil name	Hydrologic group	Flooding			High water table and ponding				Maximum ponding depth
		Frequency	Duration	Months	Water table depth	Kind of water table	Months	Ponding duration	
					Ft				Ft
180:									
Gonvick	B	None	---	---	2.5-3.5	Apparent	Nov-Jun	---	---
184:									
Hamerly	C	None	---	---	2.0-4.0	Apparent	Apr-Jun	---	---
187:									
Haug	B/D	None	---	---	0.0-0.5	Apparent	Jan-Dec	Very long	1.0
191:									
Epoufette	B/D	None	---	---	0.5-2.0	Apparent	Nov-Jun	---	---
202:									
Meehan	B	None	---	---	1.0-2.5	Apparent	Oct-Jun	---	---
258A, 258B, 258C:									
Sandberg	A	None	---	---	>6.0	---	---	---	---
260:									
Duelm	A	None	---	---	2.5-3.5	Apparent	Mar-Jun	---	---
267B, 267C, 267E, 267F:									
Snellman	B	None	---	---	>6.0	---	---	---	---
290:									
Rothsay	B	None	---	---	>6.0	---	---	---	---
293B:									
Swenoda	B	None	---	---	2.5-4.0	Perched	Mar-Jun	---	---
335:									
Urness	B/D	None	---	---	0.0-0.5	Apparent	Jan-Dec	Very long	1.0
339:									
Fordville	B	None	---	---	>6.0	---	---	---	---
341A, 341B:									
Arvilla	B	None	---	---	>6.0	---	---	---	---
371:									
Clontarf	B	None	---	---	2.5-3.5	Apparent	Nov-Jun	---	---
375:									
Forada	B/D	None	---	---	0.5-1.5	Apparent	Oct-Jun	---	---
402C, 402E:									
Sioux	A	None	---	---	>6.0	---	---	---	---
406A, 406B:									
Dorset	B	None	---	---	>6.0	---	---	---	---
418:									
Lamoure	C	Occasional	Brief	Mar-Oct	0.0-1.5	Apparent	Oct-Jun	---	---
422B, 422C:									
Bygland	C	None	---	---	2.5-4.0	Apparent	Apr-Jun	---	---
426:									
Foldahl	B	None	---	---	2.5-3.5	Apparent	Nov-Jun	---	---

Water Features--Continued

Map symbol and soil name	Hydrologic group	Flooding			High water table and ponding				
		Frequency	Duration	Months	Water table depth	Kind of water table	Months	Ponding duration	Maximum ponding depth
					Ft				Ft
441A, 441B, 441C:									
Almora	B	None	---	---	>6.0	---	---	---	---
481:									
Kratka	B/D	None	---	---	0.5-1.5	Apparent	Apr-Jul	---	---
494:									
Darnen	B	None	---	---	3.5-6.0	Apparent	Nov-Jun	---	---
497:									
Hantho	B	None	---	---	2.5-3.5	Apparent	Mar-Jun	---	---
508:									
Wyndmere	C	None	---	---	1.5-3.5	Apparent	Apr-Jun	---	---
540:									
Seelyeville	A/D	None	---	---	0.0-0.5	Apparent	Oct-Jun	Very long	1.0
541:									
Rifle	A/D	None	---	---	0.0-1.0	Apparent	Nov-Jun	Very long	1.0
544:									
Cathro	A/D	None	---	---	0.0-1.0	Apparent	Oct-Jun	Very long	1.0
567A, 567B:									
Verndale	B	None	---	---	>6.0	---	---	---	---
609B:									
Dickey	B	None	---	---	>6.0	---	---	---	---
624:									
Rosy	B	None	---	---	2.5-3.5	Apparent	Apr-Jun	---	---
646C, 646D:									
Peever	C	None	---	---	>6.0	---	---	---	---
670:									
Knute	B	None	---	---	2.5-3.5	Apparent	Mar-Jun	---	---
680:									
Parnell	C/D	None	---	---	0.5-1.5	Apparent	Nov-Jun	---	---
698:									
Doran	C	None	---	---	3.0-5.0	Apparent	Apr-Jun	---	---
701:									
Runeberg	C/D	None	---	---	0.0-0.5	Apparent	Jan-Dec	Very long	1.0
705B, 705C:									
Nitche	B	None	---	---	>6.0	---	---	---	---
Kandota	B	None	---	---	>6.0	---	---	---	---
Lida	B	None	---	---	>6.0	---	---	---	---
707B, 707C2, 707D2:									
Lizzie	B	None	---	---	>6.0	---	---	---	---

Water Features--Continued

Map symbol and soil name	Hydrologic group	Flooding			High water table and ponding				Maximum ponding depth
		Frequency	Duration	Months	Water table depth	Kind of water table	Months	Ponding duration	
					Ft				Ft
710:									
Friberg	B/D	None	---	---	0.5-1.5	Apparent	Nov-Jul	---	---
Weetown	B	None	---	---	3.5-6.0	Apparent	Oct-Jul	---	---
711B, 711C:									
Arvilla	B	None	---	---	>6.0	---	---	---	---
Sandberg	A	None	---	---	>6.0	---	---	---	---
715:									
Bluffcreek	B	None	---	---	2.5-4.0	Apparent	Oct-Jun	---	---
Clearriver	B	None	---	---	2.5-3.5	Apparent	Apr-Jun	---	---
716B, 716C, 716D:									
Leaflake	B	None	---	---	>6.0	---	---	---	---
Eagleview	A	None	---	---	>6.0	---	---	---	---
718E:									
Naytahwaush	B	None	---	---	>6.0	---	---	---	---
721B, 721C, 721D, 721E:									
Corliss	A	None	---	---	>6.0	---	---	---	---
726:									
Kratka	B/D	None	---	---	0.0-0.5	Apparent	Apr-Jul	Very long	1.0
746:									
Haslie	A/D	None	---	---	0.0-0.5	Apparent	Nov-Jul	Very long	1.0
760C2, 760D2:									
Chapett	B	None	---	---	>6.0	---	---	---	---
Sisseton	B	None	---	---	>6.0	---	---	---	---
769B:									
Mehurin	C	None	---	---	2.5-3.5	Apparent	Apr-Jun	---	---
776B, 776C, 776E:									
Snellman	B	None	---	---	>6.0	---	---	---	---
Sugarbush	B	None	---	---	>6.0	---	---	---	---
777C2, 777D2, 777E:									
Sisseton	B	None	---	---	>6.0	---	---	---	---
Heimdal	B	None	---	---	>6.0	---	---	---	---
778B, 778C:									
Dorset	B	None	---	---	>6.0	---	---	---	---
Corliss	A	None	---	---	>6.0	---	---	---	---
779B:									
Peever	C	None	---	---	>6.0	---	---	---	---
Mehurin	C	None	---	---	2.5-3.5	Apparent	Apr-Jun	---	---

Water Features--Continued

Map symbol and soil name	Hydrologic group	Flooding			High water table and ponding				Maximum ponding depth
		Frequency	Duration	Months	Water table depth	Kind of water table	Months	Ponding duration	
					Ft				Ft
902B:									
Barnes	B	None	---	---	>6.0	---	---	---	---
Buse	B	None	---	---	>6.0	---	---	---	---
903C2:									
Barnes	B	None	---	---	>6.0	---	---	---	---
Langhei	B	None	---	---	>6.0	---	---	---	---
915C2, 915D2:									
Forman	B	None	---	---	>6.0	---	---	---	---
Buse	B	None	---	---	>6.0	---	---	---	---
931C2, 931D2:									
Formdale	B	None	---	---	>6.0	---	---	---	---
Langhei	B	None	---	---	>6.0	---	---	---	---
942D2:									
Langhei	B	None	---	---	>6.0	---	---	---	---
Barnes	B	None	---	---	>6.0	---	---	---	---
957B2:									
Rothsay	B	None	---	---	>6.0	---	---	---	---
Zell	B	None	---	---	>6.0	---	---	---	---
969C2, 969D2:									
Zell	B	None	---	---	>6.0	---	---	---	---
Rothsay	B	None	---	---	>6.0	---	---	---	---
1015:									
Udipsamments	A	None	---	---	>6.0	---	---	---	---
1016:									
Udorthents	B	None	---	---	>6.0	---	---	---	---
1027:									
Udorthents.									
1030:									
Pits.									
Udipsamments	A	None	---	---	>6.0	---	---	---	---
1077:									
Forada	B/D	None	---	---	0.0-0.5	Apparent	Jan-Dec	Very long	1.0
Leafriver	A/D	None	---	---	0.0-0.5	Apparent	Nov-Jul	Very long	1.0
1102B, 1102C:									
Chapett	B	None	---	---	>6.0	---	---	---	---
Dorset	B	None	---	---	>6.0	---	---	---	---
1103:									
Clitherall	B	None	---	---	2.5-4.0	Apparent	Oct-Mar	---	---

Water Features--Continued

Map symbol and soil name	Hydrologic group	Flooding			High water table and ponding				Maximum ponding depth
		Frequency	Duration	Months	Water table depth	Kind of water table	Months	Ponding duration	
					Ft				Ft
1104B, 1104C, 1104D:									
Waukon	B	None	---	---	>6.0	---	---	---	---
Dorset	B	None	---	---	>6.0	---	---	---	---
1105B:									
Dent	B	None	---	---	2.5-4.0	Apparent	Mar-Jul	---	---
1110:									
Isan	A/D	None	---	---	0.5-1.5	Apparent	Oct-Jun	---	---
1111:									
Nidaros	A/D	Frequent	Long	Mar-Nov	0.0-0.5	Apparent	Oct-Jun	Very long	1.0
1112D, 1112E:									
Chapett	B	None	---	---	>6.0	---	---	---	---
Corliss	A	None	---	---	>6.0	---	---	---	---
1113:									
Haslie	D	None	---	---	0.0-0.0	Apparent	Jan-Dec	Very long	3.0
Seelyeville	D	None	---	---	0.0-0.0	Apparent	Jan-Dec	Very long	3.0
Cathro	D	None	---	---	0.0-0.5	Apparent	Jan-Dec	Very long	4.0
1114:									
Hangaard	A/D	None	---	---	0.5-1.5	Apparent	Apr-Jul	---	---
1120:									
Rushlake	A	None	---	---	2.5-3.5	Apparent	Jan-Dec	---	---
Hangaard	A/D	None	---	---	0.5-1.5	Apparent	Apr-Jul	---	---
1129:									
Lindaas	C/D	None	---	---	0.5-1.5	Apparent	Oct-Jul	---	---
1131B:									
Verndale	B	None	---	---	>6.0	---	---	---	---
Abbeylake	A	None	---	---	>6.0	---	---	---	---
1136:									
Nidaros	A/D	None	---	---	0.0-0.5	Apparent	Oct-Jun	Very long	1.0
1149:									
Hamerly	C	None	---	---	1.5-3.5	Apparent	Apr-Jun	---	---
1195A, 1195B, 1195C, 1195E:									
Sybil	B	None	---	---	>6.0	---	---	---	---
Eagleview	A	None	---	---	>6.0	---	---	---	---
1196B, 1196C, 1196E, 1196F:									
Lida	B	None	---	---	>6.0	---	---	---	---
Two Inlets	A	None	---	---	>6.0	---	---	---	---

Water Features--Continued

Map symbol and soil name	Hydrologic group	Flooding			High water table and ponding				
		Frequency	Duration	Months	Water table depth	Kind of water table	Months	Ponding duration	Maximum ponding depth
					Ft				Ft
1200:									
Egglake	B	None	---	---	0.5-1.5	Apparent	Oct-Jul	---	---
1208B:									
Naytahwaush	B	None	---	---	>6.0	---	---	---	---
Mahkonce	C	None	---	---	2.5-3.5	Apparent	Mar-May	---	---
1209C:									
Naytahwaush	B	None	---	---	>6.0	---	---	---	---
1212B:									
Mahkonce	C	None	---	---	2.5-3.5	Apparent	Mar-May	---	---
1214:									
Mustinka	C/D	None	---	---	0.0-1.0	Apparent	Nov-Jun	---	---
1215:									
Pinelake	B/D	None	---	---	0.5-1.5	Apparent	Nov-Jun	---	---
1216B:									
Egglake	B	None	---	---	0.5-1.5	Apparent	Oct-Jul	---	---
Wykeham	B	None	---	---	2.5-3.5	Apparent	Apr-Jun	---	---
1217E:									
Waukon	B	None	---	---	>6.0	---	---	---	---
Lida	B	None	---	---	>6.0	---	---	---	---
1218B, 1218C, 1218E, 1218F:									
Snellman	B	None	---	---	>6.0	---	---	---	---
Lida	B	None	---	---	>6.0	---	---	---	---
1219C:									
Sandberg	A	None	---	---	>6.0	---	---	---	---
Sverdrup	B	None	---	---	>6.0	---	---	---	---
1221B:									
Sverdrup	B	None	---	---	>6.0	---	---	---	---
Sandberg	A	None	---	---	>6.0	---	---	---	---
1223D:									
Sandberg	A	None	---	---	>6.0	---	---	---	---
Arvilla	B	None	---	---	>6.0	---	---	---	---
1227:									
Quam	B/D	None	---	---	0.0-0.5	Apparent	Jan-Dec	Very long	1.0
Cathro	D	None	---	---	0.0-0.5	Apparent	Jan-Dec	Very long	4.0
Urness	B/D	None	---	---	0.0-0.0	Apparent	Jan-Dec	Very long	3.0
1230:									
Haslie	D	None	---	---	0.0-0.0	Apparent	Jan-Dec	Very long	3.0
Nidaros	D	None	---	---	0.0-0.0	Apparent	Jan-Dec	Very long	3.0

Water Features--Continued

Map symbol and soil name	Hydrologic group	Flooding			High water table and ponding				Maximum ponding depth
		Frequency	Duration	Months	Water table depth	Kind of water table	Months	Ponding duration	
					Ft				Ft
1232B, 1232E:									
Chapett	B	None	---	---	>6.0	---	---	---	---
1234B:									
Formdale	B	None	---	---	>6.0	---	---	---	---
Buse	B	None	---	---	>6.0	---	---	---	---
1237:									
Lakepark	B/D	None	---	---	0.5-1.5	Apparent	Nov-Jun	---	---
1239:									
Quam	B/D	None	---	---	0.0-0.5	Apparent	Jan-Dec	Very long	1.0
1240:									
Roliss	B/D	None	---	---	0.5-1.5	Apparent	Apr-Jul	---	---
1247D:									
Corliss	A	None	---	---	>6.0	---	---	---	---
Dorset	B	None	---	---	>6.0	---	---	---	---
1250C:									
Abbeylake	A	None	---	---	>6.0	---	---	---	---
Verndale	B	None	---	---	>6.0	---	---	---	---
1259:									
Hamerly	C	None	---	---	1.5-3.5	Apparent	Apr-Jun	---	---
Mustinka	C/D	None	---	---	0.0-1.0	Apparent	Nov-Jun	---	---
1275B, 1275C:									
Kandota	B	None	---	---	>6.0	---	---	---	---
Egglake	C/D	None	---	---	0.0-0.5	Apparent	Mar-Dec	Very long	1.0
1276:									
Knute	B	None	---	---	2.5-3.5	Apparent	Mar-Jun	---	---
Brandsvold	C/D	None	---	---	0.5-1.5	Apparent	Mar-Jun	---	---
1277D:									
Corliss	A	None	---	---	>6.0	---	---	---	---
Sverdrup	B	None	---	---	>6.0	---	---	---	---
1289:									
Knute	B	None	---	---	2.5-3.5	Apparent	Mar-Jun	---	---
1290:									
Brandsvold	C/D	None	---	---	0.5-1.5	Apparent	Mar-Jun	---	---
1291:									
Sedgeville	D	Frequent	Long	Mar-Jun	0.0-0.5	Apparent	Jan-Dec	Very long	1.0
1293:									
Sedgeville	D	Rare	---	---	0.5-1.5	Apparent	Nov-Jun	---	---
1304A:									
Glyndon	B	None	---	---	1.5-2.5	Apparent	Apr-Jun	---	---

Water Features--Continued

Map symbol and soil name	Hydrologic group	Flooding			High water table and ponding				Maximum ponding depth
		Frequency	Duration	Months	Water table depth	Kind of water table	Months	Ponding duration	
					Ft				Ft
1307:									
Rushlake	A	None	---	---	2.5-3.5	Apparent	Jan-Dec	---	---
1317:									
Vallers	C	None	---	---	0.5-1.5	Apparent	Apr-Jun	---	---
1319B, 1319C, 1319D:									
Rockwood	C	None	---	---	>6.0	---	---	---	---
1320B:									
Blowers	B	None	---	---	2.0-3.5	Perched	Oct-Jun	---	---
1321:									
Paddock	C/D	None	---	---	1.0-2.0	Perched	Nov-Jun	---	---
Becida	C/D	None	---	---	0.0-1.0	Perched	Oct-Jul	---	---
1322:									
Wolverton	B	None	---	---	2.5-3.5	Apparent	Mar-Jun	---	---
1324B:									
Heimdal	B	None	---	---	>6.0	---	---	---	---
Sisseton	B	None	---	---	>6.0	---	---	---	---
1338:									
Oakcreek	B	None	---	---	2.5-4.0	Apparent	Nov-Jun	---	---
1339:									
Borup	B/D	None	---	---	0.0-0.5	Apparent	Jan-Dec	Very long	1.0
1340:									
Bluffcreek	B	None	---	---	2.5-4.0	Apparent	Oct-Jun	---	---
Epoufette	B/D	None	---	---	0.5-2.0	Apparent	Nov-Jun	---	---
1341:									
Clitherall	B	None	---	---	2.5-4.0	Apparent	Oct-Mar	---	---
Wykeham	B	None	---	---	2.5-3.5	Apparent	Apr-Jun	---	---
1342:									
Pinelake	B/D	None	---	---	0.5-1.5	Apparent	Nov-Jun	---	---
Brandsvold	C/D	None	---	---	0.5-1.5	Apparent	Mar-Jun	---	---
1343C:									
Lida	B	None	---	---	>6.0	---	---	---	---
Almora	B	None	---	---	>6.0	---	---	---	---
Lizzie	B	None	---	---	>6.0	---	---	---	---
1344B:									
Lida	B	None	---	---	>6.0	---	---	---	---
Almora	B	None	---	---	>6.0	---	---	---	---
Dent	B	None	---	---	2.5-4.0	Apparent	Mar-Jul	---	---

Water Features--Continued

Map symbol and soil name	Hydrologic group	Flooding			High water table and ponding				
		Frequency	Duration	Months	Water table depth	Kind of water table	Months	Ponding duration	Maximum ponding depth
					Ft				Ft
1345:									
Bluffcreek	B	None	---	---	2.5-4.0	Apparent	Oct-Jun	---	---
Rosy	B	None	---	---	2.5-3.5	Apparent	Apr-Jun	---	---
1346:									
Nidaros	A/D	None	---	---	0.0-1.0	Apparent	Oct-Jul	Very long	1.0
1347B:									
Kandota	B	None	---	---	>6.0	---	---	---	---
1348:									
Knute	B	None	---	---	2.5-3.5	Apparent	Mar-Jun	---	---
1349:									
Clotho	C/D	None	---	---	0.5-1.5	Apparent	Apr-Jul	---	---
1350:									
Brandsvold	C/D	None	---	---	0.5-1.5	Apparent	Mar-Jun	---	---
1351:									
Bluffton	C/D	None	---	---	0.0-0.5	Apparent	Jan-Dec	Very long	1.0
1365:									
Hillview	B/D	None	---	---	0.5-1.5	Apparent	Nov-Jul	---	---
1396:									
Sedgeville	D	Frequent	Long	Mar-Jun	0.0-0.5	Apparent	Jan-Dec	Very long	1.0
Nidaros	A/D	None	---	---	0.0-0.5	Apparent	Oct-Jun	Very long	1.0
Aquolls	D	None	---	---	0.0-1.5	Apparent	Jan-Dec	Very long	0.5
1397:									
Bemidji	B	None	---	---	2.5-4.0	Apparent	Mar-Jul	---	---
1825B:									
Seelyeville	D	None	---	---	0.0-2.0	Apparent	Jan-Dec	---	---
1874:									
Radium	A	None	---	---	2.5-3.5	Apparent	Apr-Oct	---	---
1943:									
Roscommon	A/D	None	---	---	0.0-1.0	Apparent	Sep-Jun	---	---
1975:									
Oylen	C	None	---	---	2.5-3.5	Apparent	Oct-Jun	---	---

Soil Features

(See text for definitions of terms used in this table. Absence of an entry indicates that the feature is not a concern or that data were not estimated)

Map symbol and soil name	Bedrock		Subsidence		Potential frost action	Risk of corrosion	
	Depth	Hardness	Initial	Total		Uncoated steel	Concrete
	In		In	In			
7A, 7B, 7C:							
Hubbard	>60	---	---	---	Low	Low	Low.
26:							
Aazdahl	>60	---	---	---	High	Moderate	Low.
34:							
Parnell	>60	---	---	---	High	High	Low.
38B, 38C2, 38D2, 38E:							
Waukon	>60	---	---	---	Moderate	Low	Low.
46:							
Borup	>60	---	---	---	High	High	Low.
53B, 53C, 53D:							
Kandota	>60	---	---	---	Moderate	Low	Moderate.
58:							
Kittson	>60	---	---	---	High	High	Low.
59:							
Grimstad	>60	---	---	---	Moderate	Moderate	Low.
61:							
Arveson	>60	---	---	---	High	High	Low.
63:							
Rockwell	>60	---	---	---	High	High	Low.
65:							
Foxhome	>60	---	---	---	High	Moderate	Low.
66:							
Flaming	>60	---	---	---	Moderate	Low	Low.
68:							
Arveson	>60	---	---	---	High	High	Low.
107:							
Winger	>60	---	---	---	High	High	Low.
108:							
McIntosh	>60	---	---	---	High	High	Low.
121:							
Wykeham	>60	---	---	---	Moderate	Moderate	Moderate.
127A, 127B, 127C:							
Sverdrup	>60	---	---	---	Low	Low	Low.
141B, 141C, 141D:							
Egeland	>60	---	---	---	Low	Moderate	Low.
168B:							
Forman	>60	---	---	---	Moderate	High	Low.

Soil Features--Continued

Map symbol and soil name	Bedrock		Subsidence		Potential frost action	Risk of corrosion	
	Depth	Hardness	Initial	Total		Uncoated steel	Concrete
	In		In	In			
180:							
Gonvick	>60	---	---	---	High	Moderate	Low.
184:							
Hamerly	>60	---	---	---	High	High	Low.
187:							
Haug	>60	---	---	---	High	High	Low.
191:							
Epoufette	>60	---	---	---	High	High	Moderate.
202:							
Meehan	>60	---	---	---	Moderate	Low	Moderate.
258A, 258B, 258C:							
Sandberg	>60	---	---	---	Low	Moderate	Low.
260:							
Duelm	>60	---	---	---	Moderate	Low	Moderate.
267B, 267C, 267E, 267F:							
Snellman	>60	---	---	---	Moderate	Low	Moderate.
290:							
Rothsay	>60	---	---	---	High	Low	Low.
293B:							
Swenoda	>60	---	---	---	Moderate	High	Moderate.
335:							
Urness	>60	---	---	---	High	High	Low.
339:							
Fordville	>60	---	---	---	Low	Moderate	Low.
341A, 341B:							
Arvilla	>60	---	---	---	Low	Moderate	Low.
371:							
Clontarf	>60	---	---	---	Moderate	Low	Low.
375:							
Forada	>60	---	---	---	High	High	Low.
402C, 402E:							
Sioux	>60	---	---	---	Low	Low	Low.
406A, 406B:							
Dorset	>60	---	---	---	Low	Low	Moderate.
418:							
Lamoure	>60	---	---	---	High	High	Moderate.
422B, 422C:							
Bygland	>60	---	---	---	High	High	Low.
426:							
Foldahl	>60	---	---	---	High	Moderate	Low.
441A, 441B, 441C:							
Almora	>60	---	---	---	Moderate	Low	Moderate.

Soil Features--Continued

Map symbol and soil name	Bedrock		Subsidence		Potential frost action	Risk of corrosion	
	Depth	Hardness	Initial	Total		Uncoated steel	Concrete
	In		In	In			
481:							
Kratka	>60	---	---	---	Moderate	High	Low.
494:							
Darnen	>60	---	---	---	Moderate	High	Low.
497:							
Hantho	>60	---	---	---	High	Moderate	Low.
508:							
Wyndmere	>60	---	---	---	High	Moderate	Low.
540:							
Seelyeville	>60	---	---	50-55	High	High	Moderate.
541:							
Rifle	>60	---	---	---	High	High	Low.
544:							
Cathro	>60	---	---	19-22	High	High	Low.
567A, 567B:							
Verndale	>60	---	---	---	Low	Low	Low.
609B:							
Dickey	>60	---	---	---	Low	High	Low.
624:							
Rosy	>60	---	---	---	Moderate	Moderate	Moderate.
646C, 646D:							
Peever	>60	---	---	---	Moderate	High	Moderate.
670:							
Knute	>60	---	---	---	Moderate	Moderate	Low.
680:							
Parnell	>60	---	---	---	High	High	Low.
698:							
Doran	>60	---	---	---	High	High	Low.
701:							
Runeberg	>60	---	---	---	High	High	Low.
705B, 705C:							
Nitche	>60	---	---	---	Low	Low	Moderate.
Kandota	>60	---	---	---	Moderate	Low	Moderate.
Lida	>60	---	---	---	Low	Low	Low.
707B, 707C2, 707D2:							
Lizzie	>60	---	---	---	High	Low	Low.
710:							
Friberg	>60	---	---	---	High	High	Low.
Weetown	>60	---	---	---	Moderate	Moderate	Low.

Soil Features--Continued

Map symbol and soil name	Bedrock		Subsidence		Potential frost action	Risk of corrosion	
	Depth	Hardness	Initial	Total		Uncoated steel	Concrete
	In		In	In			
711B, 711C:							
Arvilla	>60	---	---	---	Low	Moderate	Low.
Sandberg	>60	---	---	---	Low	Moderate	Low.
715:							
Bluffcreek	>60	---	---	---	Moderate	Low	Low.
Clearriver	>60	---	---	---	Low	Low	Moderate.
716B, 716C, 716D:							
Leaflake	>60	---	---	---	Low	Low	Low.
Eagleview	>60	---	---	---	Low	Low	Low.
718E:							
Naytahwaush	>60	---	---	---	Moderate	Moderate	Low.
721B, 721C, 721D, 721E:							
Corliss	>60	---	---	---	Low	Low	Low.
726:							
Kratka	>60	---	---	---	Moderate	High	Low.
746:							
Haslie	>60	---	---	---	High	High	Moderate.
760C2, 760D2:							
Chapett	>60	---	---	---	Moderate	Low	Low.
Sisseton	>60	---	---	---	Moderate	High	Low.
769B:							
Mehurin	>60	---	---	---	Moderate	High	Low.
776B, 776C, 776E:							
Snellman	>60	---	---	---	Moderate	Low	Moderate.
Sugarbush	>60	---	---	---	Low	Low	Low.
777C2, 777D2, 777E:							
Sisseton	>60	---	---	---	Moderate	High	Low.
Heimdal	>60	---	---	---	Moderate	High	Low.
778B, 778C:							
Dorset	>60	---	---	---	Low	Low	Moderate.
Corliss	>60	---	---	---	Low	Low	Low.
779B:							
Peever	>60	---	---	---	Moderate	High	Moderate.
Mehurin	>60	---	---	---	Moderate	High	Low.
902B:							
Barnes	>60	---	---	---	Moderate	Moderate	Low.
Buse	>60	---	---	---	Moderate	Low	Low.

Soil Features--Continued

Map symbol and soil name	Bedrock		Subsidence		Potential frost action	Risk of corrosion	
	Depth	Hardness	Initial	Total		Uncoated steel	Concrete
	In		In	In			
903C2:							
Barnes	>60	---	---	---	Moderate	Moderate	Low.
Langhei	>60	---	---	---	Moderate	Low	Low.
915C2, 915D2:							
Forman	>60	---	---	---	Moderate	High	Low.
Buse	>60	---	---	---	Moderate	Low	Low.
931C2, 931D2:							
Formdale	>60	---	---	---	Moderate	Moderate	Low.
Langhei	>60	---	---	---	Moderate	Moderate	Low.
942D2:							
Langhei	>60	---	---	---	Moderate	Low	Low.
Barnes	>60	---	---	---	Moderate	Moderate	Low.
957B2:							
Rothsay	>60	---	---	---	High	Low	Low.
Zell	>60	---	---	---	High	High	Moderate.
969C2, 969D2:							
Zell	>60	---	---	---	High	High	Moderate.
Rothsay	>60	---	---	---	High	Low	Low.
1015:							
Udipsamments	>60	---	---	---	Low	Low	Low.
1016:							
Udorthents	>60	---	---	---	Moderate	High	Moderate.
1027:							
Udorthents.							
1030:							
Pits.							
Udipsamments	>60	---	---	---	Low	Low	Low.
1077:							
Forada	>60	---	---	---	High	Low	Low.
Leafriver	>60	---	---	5-10	High	High	High.
1102B, 1102C:							
Chapett	>60	---	---	---	Moderate	Low	Low.
Dorset	>60	---	---	---	Low	Low	Moderate.
1103:							
Clitherall	>60	---	---	---	Moderate	Moderate	Moderate.
1104B, 1104C, 1104D:							
Waukon	>60	---	---	---	Moderate	Low	Low.
Dorset	>60	---	---	---	Low	Low	Moderate.

Soil Features--Continued

Map symbol and soil name	Bedrock		Subsidence		Potential frost action	Risk of corrosion	
	Depth	Hardness	Initial	Total		Uncoated steel	Concrete
	In		In	In			
1105B:							
Dent	>60	---	---	---	High	Moderate	Low.
1110:							
Isan	>60	---	---	---	Moderate	High	Moderate.
1111:							
Nidaros	>60	---	---	25-30	High	High	Low.
1112D, 1112E:							
Chapett	>60	---	---	---	Moderate	Low	Low.
Corliss	>60	---	---	---	Low	Low	Low.
1113:							
Haslie	>60	---	---	30-45	High	High	Moderate.
Seelyeville	>60	---	---	---	High	High	Moderate.
Cathro	>60	---	---	---	High	High	Low.
1114:							
Hangaard	>60	---	---	---	Moderate	High	Low.
1120:							
Rushlake	>60	---	---	---	Moderate	Moderate	Low.
Hangaard	>60	---	---	---	Moderate	High	Low.
1129:							
Lindaas	>60	---	---	---	High	High	Low.
1131B:							
Verndale	>60	---	---	---	Low	Low	Low.
Abbeylake	>60	---	---	---	Low	Low	Low.
1136:							
Nidaros	>60	---	---	25-30	High	High	Low.
1149:							
Hamerly	>60	---	---	---	High	High	Low.
1195A, 1195B, 1195C, 1195E:							
Sybil	>60	---	---	---	Low	Low	Low.
Eagleview	>60	---	---	---	Low	Low	Low.
1196B, 1196C, 1196E, 1196F:							
Lida	>60	---	---	---	Low	Low	Low.
Two Inlets	>60	---	---	---	Low	Low	Low.
1200:							
Egglake	>60	---	---	---	High	High	Low.
1208B:							
Naytahwaush	>60	---	---	---	Moderate	Moderate	Low.
Mahkonce	>60	---	---	---	High	High	Low.

Soil Features--Continued

Map symbol and soil name	Bedrock		Subsidence		Potential frost action	Risk of corrosion	
	Depth	Hardness	Initial	Total		Uncoated steel	Concrete
	In		In	In			
1209C:							
Naytahwaush	>60	---	---	---	Moderate	Moderate	Low.
1212B:							
Mahkonce	>60	---	---	---	High	High	Low.
1214:							
Mustinka	>60	---	---	---	High	High	Low.
1215:							
Pinelake	>60	---	---	---	High	High	Low.
1216B:							
Egglake	>60	---	---	---	High	High	Low.
Wykeham	>60	---	---	---	Moderate	Moderate	Moderate.
1217E:							
Waukon	>60	---	---	---	Moderate	Low	Low.
Lida	>60	---	---	---	Low	Low	Low.
1218B, 1218C, 1218E, 1218F:							
Snellman	>60	---	---	---	Moderate	Low	Moderate.
Lida	>60	---	---	---	Low	Low	Low.
1219C:							
Sandberg	>60	---	---	---	Low	Moderate	Low.
Sverdrup	>60	---	---	---	Low	Low	Low.
1221B:							
Sverdrup	>60	---	---	---	Low	Low	Low.
Sandberg	>60	---	---	---	Low	Moderate	Low.
1223D:							
Sandberg	>60	---	---	---	Low	Moderate	Low.
Arvilla	>60	---	---	---	Low	Moderate	Low.
1227:							
Quam	>60	---	---	---	High	High	Low.
Cathro	>60	---	---	---	High	High	Low.
Urness	>60	---	---	---	High	High	Low.
1230:							
Haslie	>60	---	---	30-45	High	High	Moderate.
Nidaros	>60	---	---	25-30	High	High	Low.
1232B, 1232E:							
Chapett	>60	---	---	---	Moderate	Low	Low.
1234B:							
Formdale	>60	---	---	---	Moderate	Moderate	Low.
Buse	>60	---	---	---	Moderate	Low	Low.

Soil Features--Continued

Map symbol and soil name	Bedrock		Subsidence		Potential frost action	Risk of corrosion	
	Depth	Hardness	Initial	Total		Uncoated steel	Concrete
	In		In	In			
1237:							
Lakepark	>60	---	---	---	High	High	Low.
1239:							
Quam	>60	---	---	---	High	High	Low.
1240:							
Roliss	>60	---	---	---	High	High	Low.
1247D:							
Corliss	>60	---	---	---	Low	Low	Low.
Dorset	>60	---	---	---	Low	Low	Moderate.
1250C:							
Abbeylake	>60	---	---	---	Low	Low	Low.
Verndale	>60	---	---	---	Low	Low	Low.
1259:							
Hamerly	>60	---	---	---	High	High	Low.
Mustinka	>60	---	---	---	High	High	Low.
1275B, 1275C:							
Kandota	>60	---	---	---	Moderate	Low	Moderate.
Egglake	>60	---	---	---	High	High	Low.
1276:							
Knute	>60	---	---	---	Moderate	Moderate	Low.
Brandsvold	>60	---	---	---	High	High	Low.
1277D:							
Corliss	>60	---	---	---	Low	Low	Low.
Sverdrup	>60	---	---	---	Low	Low	Low.
1289:							
Knute	>60	---	---	---	Moderate	Moderate	Low.
1290:							
Brandsvold	>60	---	---	---	High	High	Low.
1291:							
Sedgeville	>60	---	---	---	High	High	Moderate.
1293:							
Sedgeville	>60	---	---	---	High	High	Moderate.
1304A:							
Glyndon	>60	---	---	---	High	High	Low.
1307:							
Rushlake	>60	---	---	---	Moderate	Moderate	Low.
1317:							
Vallers	>80	---	---	---	High	High	Low.
1319B, 1319C, 1319D:							
Rockwood	>60	---	---	---	Moderate	Low	Moderate.

Soil Features--Continued

Map symbol and soil name	Bedrock		Subsidence		Potential frost action	Risk of corrosion	
	Depth	Hardness	Initial	Total		Uncoated steel	Concrete
	In		In	In			
1320B:							
Blowers	>60	---	---	---	High	Moderate	Moderate.
1321:							
Paddock	>60	---	---	---	High	High	Moderate.
Becida	>60	---	---	---	High	High	Moderate.
1322:							
Wolverton	>60	---	---	---	Moderate	Moderate	Low.
1324B:							
Heimdal	>60	---	---	---	Moderate	High	Low.
Sisseton	>60	---	---	---	Moderate	High	Low.
1338:							
Oakcreek	>60	---	---	---	Moderate	Moderate	Moderate.
1339:							
Borup	>60	---	---	---	High	High	Low.
1340:							
Bluffcreek	>60	---	---	---	Moderate	Low	Low.
Epoufette	>60	---	---	---	High	High	Moderate.
1341:							
Clitherall	>60	---	---	---	Moderate	Moderate	Moderate.
Wykeham	>60	---	---	---	Moderate	Moderate	Moderate.
1342:							
Pinelake	>60	---	---	---	High	High	Low.
Brandsvold	>60	---	---	---	High	High	Low.
1343C:							
Lida	>60	---	---	---	Low	Low	Low.
Almora	>60	---	---	---	Moderate	Low	Moderate.
Lizzie	>60	---	---	---	High	Low	Low.
1344B:							
Lida	>60	---	---	---	Low	Low	Low.
Almora	>60	---	---	---	Moderate	Low	Moderate.
Dent	>60	---	---	---	High	Moderate	Low.
1345:							
Bluffcreek	>60	---	---	---	Moderate	Low	Low.
Rosy	>60	---	---	---	Moderate	Moderate	Moderate.
1346:							
Nidaros	>60	---	---	25-30	High	High	Low.
1347B:							
Kandota	>60	---	---	---	Moderate	Low	Moderate.

Soil Features--Continued

Map symbol and soil name	Bedrock		Subsidence		Potential frost action	Risk of corrosion	
	Depth	Hardness	Initial	Total		Uncoated steel	Concrete
	In		In	In			
1348:							
Knute	>60	---	---	---	Moderate	Moderate	Low.
1349:							
Clotho	>60	---	---	---	High	High	Low.
1350:							
Brandsvold	>60	---	---	---	High	High	Low.
1351:							
Bluffton	>60	---	---	---	High	High	Moderate.
1365:							
Hillview	>60	---	---	---	High	High	Moderate.
1396:							
Sedgeville	>60	---	---	---	High	High	Moderate.
Nidaros	>60	---	---	25-30	High	High	Low.
Aquolls	>60	---	---	---	High	High	Low.
1397:							
Bemidji	>60	---	---	---	Moderate	Moderate	Moderate.
1825B:							
Seelyeville	>60	---	4-12	50-55	High	High	Moderate.
1874:							
Radium	>60	---	---	---	Low	Moderate	Low.
1943:							
Roscommon	>60	---	---	---	Moderate	High	Low.
1975:							
Oylen	>60	---	---	---	Moderate	Moderate	Low.

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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.

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

Alpha,alpha-dipyridyl. A dye that when dissolved in 1N ammonium acetate is used to detect the presence of reduced iron (Fe II) in the soil. A positive reaction indicates a type of redoximorphic feature.

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.

Aquic conditions. Current soil wetness characterized by saturation, reduction, and redoximorphic features.

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.

Argillic horizon. A subsoil horizon characterized by an accumulation of illuvial clay.

Aspect. The direction in which a slope faces.

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:

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

Backslope. The position that forms the steepest and generally linear, middle portion of a hillslope. In profile, backslopes are commonly bounded by a convex shoulder above and a concave footslope below.

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, and K), expressed as a percentage of the total cation-exchange capacity.

Beach deposits. Material, such as sand and gravel, that is generally laid down parallel to an active or relict shoreline of a postglacial or glacial lake.

Bedding planes. Fine strata, less than 5 millimeters thick, in unconsolidated alluvial, eolian, lacustrine, or marine sediment.

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Bedrock-controlled topography. A landscape where the configuration and relief of the landforms are determined or strongly influenced by the underlying bedrock.

Bench terrace. A raised, level or nearly level strip of earth constructed on or nearly on a contour, supported by a barrier of rocks or similar material, and designed to make the soil suitable for tillage and to prevent accelerated erosion.

Bisequum. Two sequences of soil horizons, each of which consists of an illuvial horizon and the overlying eluvial horizons.

Blowout. A shallow depression from which all or most of the soil material has been removed by the wind. A blowout has a flat or irregular floor formed by a

resistant layer or by an accumulation of pebbles or cobbles. In some blowouts the water table is exposed.

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

Brush management. Use of mechanical, chemical, or biological methods to make conditions favorable for reseeding or to reduce or eliminate competition from woody vegetation and thus allow understory grasses and forbs to recover. Brush management increases forage production and thus reduces the hazard of erosion. It can improve the habitat for some species of wildlife.

Calcareous soil. A soil containing enough calcium carbonate (commonly combined with magnesium carbonate) to effervesce visibly when treated with cold, dilute hydrochloric acid.

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.

Catena. A sequence, or "chain," of soils on a landscape that formed in similar kinds of parent material but have different characteristics as a result of differences in relief and drainage.

Cation. An ion carrying a positive charge of electricity. The common soil cations are calcium, potassium, magnesium, sodium, and hydrogen.

Cation-exchange capacity. The total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. The term, as applied to soils, is synonymous with base-exchange capacity but is more precise in meaning.

Catsteps. Very small, irregular terraces on steep hillsides, especially in pasture, formed by the trampling of cattle or the slippage of saturated soil.

Channery soil material. Soil material that has, by volume, 15 to 35 percent thin, flat fragments of sandstone, shale, slate, limestone, or schist as much as 6 inches (15 centimeters) along the longest axis. A single piece is called a channer.

Chemical treatment. Control of unwanted vegetation through the use of chemicals.

Chiseling. Tillage with an implement having one or more soil-penetrating points that shatter or loosen hard, compacted layers to a depth below normal plow depth.

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 depletions. Low-chroma zones having a low content of iron, manganese, and clay because of the chemical reduction of iron and manganese and the removal of iron, manganese, and clay. A type of redoximorphic depletion.

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.

Clay spot (spot symbol). This symbol is used on the detailed soil maps to show areas of map unit 1077 in which the texture of the surface layer is clay or silty clay.

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

Coarse textured soil. Sand or loamy sand.

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 has 15 to 35 percent, by volume, rounded or partially rounded rock fragments 3 to 10 inches (7.6 to 25 centimeters) in diameter. Very cobbly soil material has 35 to 60 percent of these rock fragments, and extremely cobbly soil material has more than 60 percent.

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

Complex slope. Irregular or variable slope. Planning or establishing terraces, diversions, and other water-control structures 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. Cemented bodies with crude internal symmetry organized around a point, a line, or a plane. They typically take the form of concentric layers visible to the naked eye. Calcium carbonate, iron oxide, and manganese oxide are common compounds making up concretions. If formed in place, concretions of iron oxide or manganese oxide are generally considered a type of redoximorphic concentration.

Conservation cropping system. Growing crops in combination with needed cultural and

management practices. In a good conservation cropping system, the soil-improving crops and practices more than offset the effects of the soil-depleting crops and practices. Cropping systems are needed on all tilled soils. Soil-improving practices in a conservation cropping system include the use of rotations that contain grasses and legumes and the return of crop residue to the soil. Other practices include the use of green manure crops of grasses and legumes, proper tillage, adequate fertilization, and weed and pest control.

Conservation tillage. A tillage system that does not invert the soil and that leaves a protective amount of crop residue on the surface throughout the year.

Consistence, soil. Refers to the degree of cohesion and adhesion of soil material and its resistance to deformation when ruptured. Consistence includes resistance of soil material to rupture and to penetration; plasticity, toughness, and stickiness of puddled soil material; and the manner in which the soil material behaves when subject to compression. Terms describing consistence are defined in the "Soil Survey Manual."

Contour stripcropping. Growing crops in strips that follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

Coprogenous earth (sedimentary peat). Fecal material deposited in water by aquatic organisms.

Corrosion. Soil-induced electrochemical or chemical action that dissolves or weakens concrete or uncoated steel.

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.

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

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.

Cross-slope farming. Deliberately conducting farming operations on sloping farmland in such a way that tillage is across the general slope.

Crown. The upper part of a tree or shrub, including the living branches and their foliage.

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

Deferred grazing. Postponing grazing or resting grazing land for a prescribed period.

Delta. A body of alluvium having a surface that 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.

Dense layer (in tables). A very firm, massive layer that has a bulk density of more than 1.8 grams per cubic centimeter. Such a layer affects the ease of digging and can affect filling and compacting.

Depth, soil. Generally, the thickness of the soil over bedrock. Very deep soils are more than 60 inches deep over bedrock; deep soils, 40 to 60 inches; moderately deep, 20 to 40 inches; shallow, 10 to 20 inches; and very shallow, less than 10 inches.

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

Disturbed/made land (spot symbol). This symbol is used on the detailed soil maps to show areas where the natural soil has been significantly altered as a result of cutting, filling, grading, or shaping by machinery. The natural soil profile has been largely destroyed. These areas are 1/4 acre to 3 acres in size.

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 wet periods under conditions similar to those under which the soil formed. Alterations of the water regime by human activities, either through drainage or irrigation, are not a consideration unless they have significantly changed the morphology of the soil. Seven classes of natural soil drainage are recognized—*excessively drained, somewhat excessively drained, well drained, moderately well drained, somewhat poorly drained, poorly drained,* and *very poorly drained.* These classes are defined in the "Soil Survey Manual."

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

Drumlin. A low, smooth, elongated oval hill, mound, or ridge of compact glacial till. The longer axis is parallel to the path of the glacier and commonly has a blunt nose pointing in the direction from which the ice approached.

Duff. 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.

Endosaturation. A type of saturation of the soil in which all horizons between the upper boundary of saturation and a depth of 2 meters are saturated.

Eolian soil material. Earthy parent material accumulated through wind action; commonly refers to sandy material in dunes or to loess in blankets on the surface.

Ephemeral stream. A stream, or reach of a stream, that flows only in direct response to precipitation. It receives no long-continued supply from melting snow or other source, and its channel is above the water table at all times.

Episaturation. A type of saturation indicating a perched water table in a soil in which saturated layers are underlain by one or more unsaturated layers within 2 meters of the surface.

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

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

Erosion (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of human or animal activities or of a catastrophe in nature, such as a fire, that exposes the surface.

Erosion pavement. A layer of gravel or stones that remains on the surface after fine particles are removed by sheet or rill erosion.

Escarpment (spot symbol). This symbol is used on the detailed soil maps to show areas that are too steep for cultivation. These areas are 1/4 acre to 4 acres in size. They are characterized by steep drops to stream channels or steep, high bank areas around glacial lakes.

Esker. 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.

Fan terrace. A relict alluvial fan, no longer a site of active deposition, incised by younger and lower alluvial surfaces.

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 ovendry 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.*

Fine textured soil. Sandy clay, silty clay, or clay.

Firebreak. An 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 firefighters and equipment. Designated roads also serve as firebreaks.

First bottom. The normal flood plain of a stream, subject to frequent or occasional flooding.

Flaggy soil material. Material that has, by volume, 15 to 35 percent flagstones. Very flaggy soil material has 35 to 60 percent flagstones, and extremely flaggy soil material has more than 60 percent flagstones.

Flagstone. A thin fragment of sandstone, limestone, slate, shale, or (rarely) schist 6 to 15 inches (15 to 38 centimeters) long.

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.

Footslope. The position that forms the inner, gently inclined surface at the base of a hillslope. In profile, footslopes are commonly concave. A footslope is a transition zone between upslope sites of erosion and transport (shoulders and backslopes) and downslope sites of deposition (toeslopes).

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

Forest cover. All trees and other woody plants (underbrush) covering the ground in a forest.

Forest type. A stand of trees similar in composition and development because of given physical and biological factors by which it may be differentiated from other stands.

Fragipan. A loamy, brittle subsurface horizon low in porosity and content of organic matter and low or

moderate in clay but high in silt or very fine sand. A fragipan appears cemented and restricts roots. When dry, it is hard or very hard and has a higher bulk density than the horizon or horizons above. When moist, it tends to rupture suddenly under pressure rather than to deform slowly.

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.

Geomorphology. The science that treats the general configuration of the earth's surface; specifically, the study of the classification, description, nature, origin, and development of landforms and their relationship to underlying structures and of the history of geologic changes as recorded by these surface features. The term is particularly applied to the genetic interpretation of landforms.

Glacial drift. 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. Gravel, sand, and silt, commonly stratified, deposited by glacial meltwater.

Glacial till. Unsorted, nonstratified glacial drift consisting of clay, silt, sand, and boulders transported and deposited by glacial ice.

Glaciofluvial deposits. 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.

Graded stripcropping. Growing crops in strips that grade toward a protected waterway.

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 has 15 to 35 percent, by volume, rounded or angular rock fragments, not prominently flattened, as much as 3 inches (7.6 centimeters) in diameter.

Gravelly spot (spot symbol). This symbol is used on the detailed soil maps to show areas, within a nongravelly map unit, in which the content of rock fragments is 15 percent or more, by volume. These areas are 1/4 acre to 3 acres in size. The symbol is not used in areas of soils that formed in glacial outwash.

Gravel pit (spot symbol). This symbol is used on the detailed soil maps to show areas of open excavations where gravelly deposits are being mined or have been mined. These areas are 1/4 acre to 3 acres in size.

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. Water filling all the unblocked pores of the 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 bedrock. Bedrock that cannot be excavated except by blasting or by the use of special equipment that is not commonly used in construction.

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.

High-residue crops. Such crops as small grain and corn used for grain. If properly managed, residue from these crops can be used to control erosion until the next crop in the rotation is established. These crops return large amounts of organic matter to the soil.

High rise (spot symbol). This symbol is used on the detailed soil maps to show areas of better drained mineral soils within areas of organic soils or within areas of open water. The areas of better drained mineral soils are 1/4 acre to 3 acres in size.

Hill. A natural elevation of the land surface, rising as much as 1,000 feet above surrounding lowlands, commonly of limited summit area and having a well defined outline; hillsides generally have slopes of more than 15 percent. The distinction between a hill and a mountain is arbitrary and is dependent on local usage.

Horizon, soil. A layer of soil, approximately parallel to

the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an uppercase letter represents the major horizons. Numbers or lowercase letters that follow represent subdivisions of the major horizons. An explanation of the subdivisions is given in the "Soil Survey Manual." The major horizons of mineral soil are as follows:

O horizon.—An organic layer of fresh and decaying plant residue.

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

E horizon.—The mineral horizon in which the main feature is loss of silicate clay, iron, aluminum, or some combination of these.

B horizon.—The mineral horizon below an A horizon. The B horizon is in part a layer of transition from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics, such as (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) prismatic or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the overlying soil material. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, an Arabic numeral, commonly a 2, precedes the letter C.

Cr horizon.—Soft, consolidated bedrock beneath the soil.

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

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 potential. The soil properties that influence this potential are those that affect the minimum rate of water infiltration on a bare soil during periods after prolonged wetting when the soil is not frozen. These properties are depth to a seasonal high water table, the infiltration rate and permeability after prolonged wetting, and depth to a very slowly permeable layer. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff.

Ice-walled lake plain. A relict surface marking the floor of an extinct lake basin that was formed on solid ground and surrounded by stagnant ice in a stable or unstable superglacial environment on stagnation moraines. As the ice melted, the lake plain became perched above the adjacent landscape. The lake plain is well sorted, generally fine textured, stratified deposits.

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

Interfluve. An elevated area between two drainageways that sheds water to those drainageways.

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.

Iron concentrations. High-chroma zones having a high content of iron and manganese oxide because of chemical oxidation and accumulation but having a clay content similar to that of the adjacent matrix. A type of redoximorphic concentration.

Iron depletions. Low-chroma zones having a low content of iron and manganese oxide because of chemical reduction and removal, but having a clay content similar to that of the adjacent matrix. A type of redoximorphic depletion.

Irrigation. Application of water to soils to assist in production of crops. Methods of irrigation are:
Basin.—Water is applied rapidly to nearly level plains surrounded by levees or dikes.
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.
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.

Kame. An irregular, short ridge or hill of stratified glacial drift.

Kame moraine. An end moraine that contains numerous kames. A group of kames along the front of a stagnant glacier, commonly comprising the slumped remnants of a formerly continuous outwash plain built up over the foot of rapidly wasting or stagnant ice.

Karst (topography). The relief of an area underlain by limestone that dissolves in differing degrees, thus forming numerous depressions or small basins.

Knoll. A small, low, rounded hill rising above adjacent landforms.

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

Lakebed. The bottom of a lake; a lake basin.

Lake plain. A nearly level surface marking the floor of an extinct lake filled by well sorted, generally fine textured, stratified deposits, commonly containing varves.

Lakeshore. A narrow strip of land in contact with or bordering a lake; especially the beach of a lake.

Lake terrace. A narrow shelf, partly cut and partly built, produced along a lakeshore in front of a scarp line of low cliffs and later exposed when the water level falls.

Large stones (in tables). Rock fragments 3 inches (7.6 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.

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-residue crops. Such crops as corn used for silage, peas, beans, and potatoes. Residue from these crops is not adequate to control erosion until the next crop in the rotation is established. These crops return little organic matter to the soil.

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

Marl. An earthy, unconsolidated deposit consisting chiefly of calcium carbonate mixed with clay in approximately equal amounts.

Marsh (spot symbol). This symbol is used on the detailed soil maps to show areas of very poorly drained soils that support marsh vegetation. Most of these areas are not cropped. They support cattails and have some open water. The areas are 1/4 acre to 3 acres in size.

Masses. Concentrations of substances in the soil matrix that do not have a clearly defined boundary with the surrounding soil material and cannot be removed as a discrete unit. Common compounds making up masses are calcium carbonate, gypsum or other soluble salts, iron oxide, and manganese oxide. Masses consisting of iron oxide or manganese oxide generally are considered a type of redoximorphic concentration.

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, or fine sandy loam.

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

Mollic epipedon. A thick, dark, humus-rich surface horizon (or horizons) that has high base saturation and pedogenic soil structure. It may include the upper part of the subsoil.

Moraine. 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. 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).

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

Mudstone. Sedimentary rock formed by induration of silt and clay in approximately equal amounts.

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

Natric horizon. A special kind of argillic horizon that contains enough exchangeable sodium to have an adverse effect on the physical condition of the subsoil.

Neutral soil. A soil having a pH value of 6.6 to 7.3. (See Reaction, soil.)

Nodules. Cemented bodies lacking visible internal structure. Calcium carbonate, iron oxide, and manganese oxide are common compounds making up nodules. If formed in place, nodules of iron oxide or manganese oxide are considered types of redoximorphic concentrations.

Nose slope. A geomorphic component of hills consisting of the projecting end (laterally convex area) of a hillside. The overland waterflow is predominantly divergent.

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

Organic matter. Plant and animal residue in the soil in various stages of decomposition. The content of organic matter in the surface layer is described as follows:

Very low	less than 0.5 percent
Low	0.5 to 1.0 percent
Moderately low	1.0 to 2.0 percent
Moderate	2.0 to 4.0 percent
High	4.0 to 8.0 percent
Very high	more than 8.0 percent

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.

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

Peat. Unconsolidated material, largely undecomposed organic matter, that has accumulated under excess moisture. (See Fibric soil material.)

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedisediment. A thin layer of alluvial material that mantles an erosion surface and has been transported to its present position from higher lying areas of the erosion surface.

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percolation. The movement of water through the soil.

Percs slowly (in tables). The slow movement of water through the soil adversely affects the specified use.

Permeability. The quality of the soil that enables water or air to move downward through the profile. The rate at which a saturated soil transmits water is accepted as a measure of this quality. In soil physics, the rate is referred to as "saturated hydraulic conductivity," which is defined in the "Soil Survey Manual." In line with conventional usage in the engineering profession and with traditional usage in published soil surveys, this rate of flow continues to be expressed as "permeability." Terms describing permeability, measured in inches per hour, are as follows:

Extremely slow	0.0 to 0.01 inch
Very slow	0.01 to 0.06 inch
Slow	0.06 to 0.2 inch
Moderately slow	0.2 to 0.6 inch
Moderate	0.6 inch to 2.0 inches
Moderately rapid	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
Very rapid	more than 20 inches

Phase, soil. A subdivision of a soil series based on features that affect its use and management, such as slope, stoniness, and flooding.

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

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

Pitted outwash plain. An outwash plain marked by many irregular depressions, such as kettles, shallow pits, and potholes, which formed by melting of incorporated ice masses. Common in Wisconsin and Minnesota.

Pitting (in tables). Pits caused by melting around ice. They form on the soil after plant cover is removed.

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.

Plateau. An extensive upland mass with relatively flat summit area that is considerably elevated (more than 100 meters) above adjacent lowlands and separated from them on one or more sides by escarpments.

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

Ponding. Standing water on soils in closed depressions. Unless the soils are artificially drained, the water can be removed only by percolation or evapotranspiration.

Poor filter (in tables). Because of rapid or very rapid permeability, 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 native plant community. See Climax plant community.

Potential rooting depth (effective rooting depth). Depth to which roots could penetrate if the content of moisture in the soil were adequate. The soil has no properties restricting the penetration of roots to this depth.

Prescribed burning. Deliberately burning an area for specific management purposes, under the appropriate conditions of weather and soil moisture and at the proper time of day.

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:

Ultra acid	less than 3.5
Extremely acid	3.5 to 4.4
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Moderately acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Slightly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Redoximorphic concentrations. Nodules, concretions, soft masses, pore linings, and other features resulting from the accumulation of iron or manganese oxide. An indication of chemical reduction and oxidation resulting from saturation.

Redoximorphic depletions. Low-chroma zones from which iron and manganese oxide or a combination of iron and manganese oxide and clay has been removed. These zones are indications of the

chemical reduction of iron resulting from saturation.

Redoximorphic features. Redoximorphic concentrations, redoximorphic depletions, reduced matrices, a positive reaction to alpha,alpha-dipyridyl, and other features indicating the chemical reduction and oxidation of iron and manganese compounds resulting from saturation.

Reduced matrix. A soil matrix that has low chroma in situ because of chemically reduced iron (Fe II). The chemical reduction results from nearly continuous wetness. The matrix undergoes a change in hue or chroma within 30 minutes after exposure to air as the iron is oxidized (Fe III). A type of redoximorphic feature.

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

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

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.

Rooting depth (in tables). Shallow root zone. The soil is shallow over a layer that greatly restricts roots.

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

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

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

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sandstone. Sedimentary rock containing dominantly sand-sized particles.

Sandy spot (spot symbol). This symbol is used on the detailed soil maps to show areas in which loamy sand or sand is exposed at the surface. These areas are 1/4 acre to 3 acres in size. The symbol is not used in areas of soils that formed in glacial outwash.

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.

Saturation. Wetness characterized by zero or positive pressure of the soil water. Under conditions of saturation, the water will flow from the soil matrix into an unlined auger hole.

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

Second bottom. The first terrace above the normal flood plain (or first bottom) of a river.

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. 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 surface runoff.

Short, steep slope (spot symbol). This symbol is used on the detailed soil maps to show elongated soil areas that have slopes at least two slope classes steeper than those of the surrounding map units. These areas are 1/4 acre to 3 acres in size.

Shoulder. The position that forms the uppermost inclined surface near the top of a hillslope. It is a transition from backslope to summit. The surface is dominantly convex in profile and erosional in origin.

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.

Side slope. A geomorphic component of hills consisting of a laterally planar area of a hillside. The overland waterflow is predominantly parallel.

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

Silica-sesquioxide ratio. The ratio of the number of molecules of silica to the number of molecules of alumina and iron oxide. The more highly weathered soils or their clay fractions in warm-temperate, humid regions, and especially those in the tropics, generally have a low ratio.

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

Siltstone. Sedimentary rock made up of dominantly silt-sized particles.

Similar soils. Soils that share limits of diagnostic criteria, behave and perform in a similar manner, and have similar conservation needs or management requirements for the major land uses in the survey area.

Sinkhole. A depression in the landscape where limestone has been dissolved.

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.

Slickensides. Polished and grooved surfaces produced by one mass sliding past another. In soils, slickensides may occur at the bases of slip surfaces on the steeper slopes; on faces of blocks, prisms, and columns; and in swelling clayey soils, where there is marked change in moisture content.

Slippage (in tables). Soil mass susceptible to movement downslope when loaded, excavated, or wet.

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.

Sloughed till. Water-saturated till that has flowed slowly downhill from its original place of deposit by glacial ice. It may rest on other till, on glacial outwash, or on a glaciolacustrine deposit.

Slow intake (in tables). The slow movement of water into the soil.

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

Small stones (in tables). Rock fragments less than 3 inches (7.6 centimeters) in diameter. Small stones adversely affect the specified use of the soil.

Soft bedrock. Bedrock that can be excavated with trenching machines, backhoes, small rippers, and other equipment commonly used in construction.

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

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

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

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A, E, and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the material below the solum. The living roots and plant and animal activities are largely confined to the solum.

Spring (spot symbol). This symbol is used on the detailed soil maps to show seepy or springlike areas on side slopes. These areas most commonly support hydrophytic vegetation and are not cultivated. They are less than 3 acres in size.

Stagnation moraine. A body of drift released by the melting of a glacier that ceased flowing. Commonly (but not always) occurs near ice margins. Composed of till, ice-contact stratified drift, and small areas of glacial lake sediment. Typical landforms include knob-and-kettle topography, locally including ice-walled lake plains.

Stone line. A concentration of coarse fragments in a soil. Generally, it is indicative of an old weathered surface. In a cross section, the line may be one fragment or more thick. It generally overlies material that weathered in place and is overlain by recent sediment of variable thickness.

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

Stony. Refers to a soil containing stones in numbers that interfere with or prevent tillage.

Stripcropping. Growing crops in a systematic arrangement of strips or bands that provide vegetative barriers to soil blowing and water erosion.

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 grain* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

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

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. Any surface soil horizon (A, E, AB, or EB) below the surface layer.

Summit. The topographically highest position of a hillslope. It has a nearly level (planar or only slightly convex) surface.

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

Surface soil. The A, E, AB, and EB horizons, considered collectively. It includes all subdivisions of these horizons.

Swale. A slight depression in the midst of generally level land. A shallow depression in an undulating ground moraine caused by uneven glacial deposition.

Taxadjuncts. Soils that cannot be classified in a series recognized in the classification system. Such soils are named for a series they strongly resemble and are designated as taxadjuncts to that series because they differ in ways too small to be of consequence in interpreting their use and behavior. Soils are recognized as taxadjuncts only when one or more of their characteristics are slightly outside the range defined for the family of the series for which the soils are named.

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

Terrace. An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that water soaks into the soil or flows slowly to a prepared outlet. A terrace in a field generally is built so that the field can be farmed. A terrace intended mainly for drainage has a deep channel that is maintained in permanent sod.

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

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

Till. Unsorted, nonstratified glacial drift consisting of clay, silt, sand, and boulders transported and deposited by glacial ice.

Till plain. An extensive area of nearly level to undulating soils underlain by glacial till.

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

Toeslope. The position that forms the gently inclined surface at the base of a hillslope. Toeslopes in profile are commonly gentle and linear and are

constructional surfaces forming the lower part of a hillslope continuum that grades to valley or closed-depression floors.

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.

Trace elements. Chemical elements, for example, zinc, cobalt, manganese, copper, and iron, in soils in extremely small amounts. They are essential to plant growth.

Upland. 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.

Variegation. Refers to patterns of contrasting colors assumed to be inherited from the parent material rather than to be the result of poor drainage.

Varve. A sedimentary layer or a lamina or sequence of laminae deposited in a body of still water within a year. Specifically, a thin pair of graded glaciolacustrine layers seasonally deposited, usually by meltwater streams, in a glacial lake or other body of still water in front of a glacier.

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.

Wet spot (spot symbol). This symbol is used on the detailed soil maps to show areas of very poorly drained soils that do not support cattails and that can be cropped in some years. These areas are 1/4 acre to 3 acres in size.

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