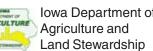




Natural Resources Conservation Service



Iowa Department of

IOWA STATE UNIVERSITY

Iowa Agriculture and Home Economics Experiment Station

IOWA STATE UNIVERSITY University Extension

In cooperation with Iowa Agriculture and Home **Economics Experiment** Station and Cooperative Extension Service, Iowa State University; and Division of Soil Conservation, Iowa Department of Agriculture and Land Stewardship

Soil Survey of Webster County, Iowa

Part II



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 soils called associations. 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 soil associations on the color-coded map legend, and then refer to the section **General Soil Map Units** in Part I 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** in Part III. 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. The **Contents** in Part I lists the map units and shows the page where each map unit is described.

The **Contents** in Part II shows which table has information on a specific land use or soil property 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 (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Major fieldwork for this soil survey was completed in 2006. Soil names and descriptions were approved in 2006. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 2006. The most current official data are available through the NRCS Web Soil Survey (http://soils.usda.gov).

This survey was made cooperatively by the Natural Resources Conservation Service; the Iowa Agriculture and Home Economics Experiment Station and Cooperative Extension Service, Iowa State University; and the Division of Soil Conservation, Iowa Department of Agriculture and Land Stewardship. The survey is part of the technical assistance furnished to the Webster County Soil and Water Conservation District.

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: Soybeans in an area of Nicollet loam, 1 to 3 percent slopes. Nicollet soils are very productive and are farmed intensively in Webster County.

Additional information about the Nation's natural resources is available online from the Natural Resources Conservation Service at http://www.nrcs.usda.gov.

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Issued 2008

Soil Survey of Webster County, Iowa

Introduction to Part II

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.

This part of the soil survey includes interpretations for various uses of the soils and data on soil properties. This information can be used to plan the use and management of soils for crops and pasture or as sites for buildings, sanitary facilities, highways and other transportation systems, and parks and other recreational facilities. It can be used to identify the potentials and limitations of each soil for specific land uses and to help prevent construction failures caused by unfavorable soil properties.

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 gravel, sand, reclamation material, 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 table "Classification of the Soils" is at the end of this section. Information about the system of soil taxonomy used by the Natural Resources Conservation Service is available in Part I of this publication. The extent of the map units in this survey area is shown in the table "Acreage and Proportionate Extent of the Soils."

Interpretive Ratings

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

Rating Class Terms

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

Numerical Ratings

Numerical ratings in the tables indicate the relative severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.00 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use and the point at which the soil feature is not a limitation. The limitations appear in order from the most limiting to the least limiting. Thus, if more than one limitation is identified, the most severe limitation is listed first and the least severe one is listed last.

Classification of the Soils

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

Soil name	Family or higher taxonomic class
Angus	 Fine-loamy, mixed, superactive, mesic Mollic Hapludalfs
Ankeny	Coarse-loamy, mixed, superactive, mesic Cumulic Hapludolls
Atkinson	Fine-loamy, mixed, superactive, mesic Typic Argiudolls
Aquolls	Aquolls
Belview	Fine-loamy, mixed, superactive, mesic Typic Calciudolls
Billett	Coarse-loamy, mixed, superactive, mesic Mollic Hapludalfs
Biscay	Fine-loamy over sandy or sandy-skeletal, mixed, superactive, mesic Typic Endoaquolls
Blue Earth	Fine-silty, mixed (calcareous), superactive, mesic Mollic Fluvaquents
Brownton	Fine, smectitic, calcareous, mesic Vertic Endoaquolls
Buckney	Sandy, mixed, mesic Typic Hapludolls
Calamine	Fine, mixed, superactive, mesic Typic Argiaquolls
Calcousta	Fine-silty, mixed, superactive, calcareous, mesic Typic Endoaquolls
Canisteo	Fine-loamy, mixed, superactive, calcareous, mesic Typic Endoaquolls
Clarion	Fine-loamy, mixed, superactive, mesic Typic Hapludolls
Clarion	Fine-loamy, mixed, superactive, mesic Typic Eutrudepts
Cokato	Fine-loamy, mixed, superactive, mesic Typic Argiudolls
Coland	Fine-loamy, mixed, superactive, mesic Cumulic Endoaquolls
Collinwood	Fine, smectitic, mesic Aquertic Hapludolls
Copaston	Loamy, mixed, superactive, mesic Lithic Hapludolls
Cordova	Fine-loamy, mixed, superactive, mesic Typic Argiaquolls
Corvuso	Fine, smectitic, mesic Typic Calciaquolls
Cosmos	Fine, smectitic, mesic Vertic Epiaquolls
Crippin	Fine-loamy, mixed, superactive, mesic Aquic Hapludolls
Cylinder	Fine-loamy over sandy or sandy-skeletal, mixed, superactive, mesic Aquic $ $ Hapludolls
Dickinson	Coarse-loamy, mixed, superactive, mesic Typic Hapludolls
Dickman	Sandy, mixed, mesic Typic Hapludolls
Du Page	Fine-loamy, mixed, superactive, mesic Cumulic Hapludolls
Oundas	Fine-loamy, mixed, superactive, mesic Mollic Endoaqualfs
Emeline	Loamy, mixed, superactive, mesic Lithic Hapludolls
Estherville	Sandy, mixed, mesic Typic Hapludolls

Classification of the Soils--Continued

Soil name	Family or higher taxonomic class
Faxon	 Fine-loamy, mixed, superactive, mesic Typic Endoaquolls
Fluvaquents	Mesic Fluvaquents
Fort Dodge	Fine-loamy, mixed, superactive, mesic Cumulic Hapludolls
Garmore	Fine-loamy, mixed, superactive, mesic Typic Hapludolls
Gosport	Fine, illitic, mesic Oxyaquic Dystrudepts
Guckeen	Fine, smectitic, mesic Aquertic Hapludolls
Hanlon	Coarse-loamy, mixed, superactive, mesic Cumulic Hapludolls
Harps	Fine-loamy, mixed, superactive, mesic Typic Calciaquolls
Havelock	Fine-loamy, mixed, superactive, calcareous, mesic Cumulic Endoaquolls
Hawick	Sandy, mixed, mesic Entic Hapludolls
Jacwin	Fine-loamy over clayey, mixed, superactive, mesic Aquic Hapludolls
Joliet	Loamy, mixed, superactive, mesic Lithic Endoaquolls
Kamrar	Fine, smectitic, mesic Oxyaquic Hapludolls
	Fine-loamy over sandy or sandy-skeletal, mixed, superactive, mesic Typic Hapludolls
Kandiyohi	Fine, smectitic, mesic Aquertic Hapludolls
Kilkenny	Fine, smectitic, mesic Oxyaquic Vertic Hapludalfs
Klossner	Loamy, mixed, euic, mesic Terric Haplosaprists
Knoke	Fine, smectitic, calcareous, mesic Cumulic Vertic Endoaquolls
Lanyon	Fine, smectitic, mesic Typic Endoaquolls
Lawson	Fine-silty, mixed, superactive, mesic Aquic Cumulic Hapludolls
Le Sueur	Fine-loamy, mixed, superactive, mesic Aquic Argiudolls
Lerdal	Fine, smectitic, mesic Aeric Vertic Epiaqualfs
Lester	Fine-loamy, mixed, superactive, mesic Mollic Hapludalfs
Luther	Fine-loamy, mixed, superactive, mesic Aeric Endoaqualfs
Malardi	Coarse-loamy, mixed, superactive, mesic Typic Argiudolls
Marna	Fine, smectitic, mesic Vertic Endoaquolls
Minnetonka	Fine, smectitic, mesic Vertic Argiaquolls
Moingona	Fine-loamy, mixed, superactive, mesic Typic Argiudolls
	Fine-loamy, mixed, superactive, mesic Aquic Hapludolls
	Fine, smectitic, mesic Cumulic Vertic Endoaquolls
	Fine-loamy, mixed, superactive, mesic Typic Hapludolls
	Fine-loamy, mixed, superactive, mesic Typic Eutrudepts
	Coarse-loamy, mixed, superactive, mesic Typic Hapludolls
_	Fine-loamy, mixed, superactive, mesic Pachic Hapludolls
	Fine-loamy, mixed, superactive, mesic Typic Argiudolls
	Fine, smectitic, mesic Typic Argialbolls
	Loamy, mixed, superactive, mesic Lithic Endoaquolls
	Sandy, mixed, mesic Typic Hapludolls
Sattre	Fine-loamy over sandy or sandy-skeletal, mixed, superactive, mesic Mollic Hapludalfs
_	Fine-loamy, mixed, superactive, mesic Cumulic Endoaquolls
	Fine, smectitic, mesic Aquertic Argiudolls
_	Fine-loamy, mixed, superactive, mesic Cumulic Hapludolls
	Fine-loamy, mixed, superactive, mesic Typic Eutrudepts
_	Coarse-loamy, mixed, superactive, mesic Typic Eutrudepts
	Fine-loamy over sandy or sandy-skeletal, mixed, superactive, calcareous, mesic Typic Endoaquolls
	Fine-loamy, mixed, superactive, mesic Cumulic Hapludolls
Turlin	Fine-loamy, mixed, superactive, mesic Cumulic Hapludolls
Udifluvents	·
Udorthents	
	Fine-silty, mixed, superactive, mesic Typic Endoaquolls
	Fine-loamy over sandy or sandy-skeletal, mixed, superactive, mesic Typic Hapludolls
Wapsie	Coarse-loamy over sandy or sandy-skeletal, mixed, superactive, mesic Mollic Hapludalfs
	Fine-loamy, mixed, superactive, mesic Typic Endoaquolls

Acreage and Proportionate Extent of the Soils

Map symbol	 Soil name	Acres	 Percent
6	Okoboji silty clay loam, depressional, 0 to 1 percent slopes	20,664	4.5
27B	Terril loam, 1 to 5 percent slopes	1,624	0.4
34	Estherville sandy loam, 0 to 2 percent slopes	85	*
34B	Estherville sandy loam, 2 to 5 percent slopes	611	1
55	Nicollet loam, 1 to 3 percent slopes		
62F	Storden loam, 18 to 25 percent slopes	795	1
90 95	Okoboji mucky silty clay loam, depressional, 0 to 1 percent slopes Harps clay loam, 0 to 2 percent slopes	1,961	
107	Webster silty clay loam, 0 to 2 percent slopes	10,006 85,316	
108	Wadena loam, 0 to 2 percent slopes	2,041	
108B	Wadena loam, 2 to 5 percent slopes	1,366	
108C	Wadena loam, 5 to 9 percent slopes	121	
135	Coland clay loam, 0 to 2 percent slopes, occasionally flooded		1
136	Ankeny fine sandy loam, 0 to 2 percent slopes, rarely flooded	241	*
138B	Clarion loam, 2 to 5 percent slopes	45,261	9.8
138C2	Clarion loam, 5 to 9 percent slopes, moderately eroded	8,299	1.8
201B	Coland-Terril complex, 1 to 5 percent slopes	875	0.2
203	Cylinder loam, 0 to 2 percent slopes	1,235	
227	Wadena loam, loamy substratum, 0 to 2 percent slopes		1
227B	Wadena loam, loamy substratum, 2 to 5 percent slopes	760	1
228	Cylinder loam, loamy substratum, 0 to 2 percent slopes	906	1
236D	Lester loam, 9 to 14 percent slopes	172	1
236E 236F	Lester loam, 14 to 18 percent slopes Lester loam, 18 to 25 percent slopes	181 466	!
250F 259	Biscay clay loam, 0 to 2 percent slopes		1
262G	Lester-Belview complex, 25 to 70 percent slopes	15,666	1
274	Rolfe silt loam, depressional, 0 to 1 percent slopes	270	
278	Biscay clay loam, loamy substratum, 0 to 2 percent slopes	911	1
307	Dundas silt loam, 0 to 2 percent slopes	193	*
315B	Udifluvents, loamy, 2 to 5 percent slopes, occasionally flooded	1,103	0.2
323B	Fort Dodge loam, 2 to 5 percent slopes	429	*
325	Le Sueur loam, 1 to 3 percent slopes	2,697	0.6
338	Garmore loam, 0 to 2 percent slopes		1
342	Estherville sandy loam, loamy substratum, 0 to 2 percent slopes	19	1
342B	Estherville sandy loam, loamy substratum, 2 to 5 percent slopes	460	1
344B 345	Copaston loam, 2 to 5 percent slopes Copaston-Jacwin complex, 1 to 3 percent slopes	138 137	1
355	Luther loam, 1 to 3 percent slopes	998	1
383	Marna silty clay loam, 0 to 2 percent slopes		
385	Guckeen silty clay loam, 1 to 3 percent slopes		1
386	Cordova clay loam, 0 to 2 percent slopes	1,228	
387B	Kamrar silty clay loam, 2 to 5 percent slopes	687	
413G	Gosport-Emeline-Ridgeton complex, 25 to 75 percent slopes	2,301	0.5
457	$ \mbox{Du Page}$ silt loam, 0 to 2 percent slopes, occasionally flooded	720	0.2
485	Spillville loam, 0 to 2 percent slopes, occasionally flooded	1,215	0.3
485B	Spillville loam, 2 to 5 percent slopes, rarely flooded		1
506	Wacousta silty clay loam, depressional, 0 to 1 percent slopes		
507	Canisteo clay loam, 0 to 2 percent slopes		
511	Blue Earth mucky silt loam, depressional, 0 to 1 percent slopes		
526	Wacousta mucky silt loam, depressional, 0 to 1 percent slopes		
536 541C	Hanlon fine sandy loam, 0 to 2 percent slopes, occasionally flooded Estherville-Hawick complex, 5 to 9 percent slopes	1,064 242	
551B	Calamine silty clay loam, 2 to 5 percent slopes		
551D	Calamine silty clay loam, 5 to 14 percent slopes		!
559	Talcot clay loam, 0 to 2 percent slopes		!
561	Talcot clay loam, loamy substratum, 0 to 2 percent slopes		
566C	Moingona loam, 5 to 9 percent slopes		
568D	Cokato loam, 9 to 14 percent slopes		0.1
568E	Cokato loam, 14 to 18 percent slopes		*
583	Minnetonka silty clay loam, 0 to 2 percent slopes		
606	Lanyon silty clay loam, depressional, 0 to 1 percent slopes		1
625	Lerdal silt loam, 1 to 3 percent slopes		
636	Buckney fine sandy loam, 0 to 2 percent slopes, rarely flooded	313	*

See footnote at end of table.

Acreage and Proportionate Extent of the Soils--Continued

Map symbol	Soil name	Acres	Percent
636B	Buckney fine sandy loam, 2 to 5 percent slopes, rarely flooded	151	*
638C2	Clarion-Storden complex, 5 to 9 percent slopes, moderately eroded	981	0.2
650	Joliet-Faxon complex, 0 to 2 percent slopes	184	*
715	Fluvaquents, loamy, 0 to 2 percent slopes, frequently flooded	3,874	0.8
735	Havelock clay loam, 0 to 2 percent slopes, occasionally flooded	519	0.1
740D	Hawick coarse sandy loam, 9 to 14 percent slopes	186	*
775B	Billett fine sandy loam, 2 to 5 percent slopes	198	*
775C	Billett fine sandy loam, 5 to 9 percent slopes	173	*
777B	Wapsie loam, 2 to 5 percent slopes	318	!
835D2 835E2	Storden-Omsrud complex, 9 to 14 percent slopes, moderately eroded Storden-Omsrud complex, 14 to 18 percent slopes, moderately eroded	1,594 482	0.3
836B	Kilkenny silt loam, 2 to 5 percent slopes	1,261	0.1
854D	Fens, Aquolls, 5 to 14 percent slopes	86	*
855	Shorewood silty clay loam, 1 to 3 percent slopes	1,934	0.4
956	Harps-Okoboji, depressional, complex, 0 to 2 percent slopes	1,563	0.3
1007	Cosmos clay loam, 0 to 3 percent slopes, bouldery	371	*
1055B	Kandiyohi clay loam, 2 to 5 percent slopes, bouldery	264	*
1138B	Clarion clay loam, 2 to 5 percent slopes	3,294	0.7
1236B	Angus loam, 2 to 5 percent slopes	3,420	0.7
1236C	Angus loam, 5 to 9 percent slopes	580	0.1
1259	Biscay clay loam, depressional, 0 to 1 percent slopes	129	*
1507	Brownton silty clay loam, 0 to 2 percent slopes	10,908	2.4
1555	Nicollet-Guckeen complex, 1 to 3 percent slopes	11,050	2.4
1836B	Kilkenny-Shorewood complex, 2 to 5 percent slopes	699	0.2
2700C	Ridgeton loam, 5 to 9 percent slopes	419	*
2700D	Ridgeton loam, 9 to 14 percent slopes	183	*
1000	Urban land	728	0.2
1055	Nicollet-Urban land complex, 1 to 3 percent slopes	493	0.1
1107	Webster-Urban land complex, 0 to 2 percent slopes	568	0.1
4138B	Clarion-Urban land complex, 2 to 5 percent slopes	517	0.1
4235B	Angus-Urban land complex, 2 to 5 percent slopes	618	0.1
1236D	Lester-Urban land complex, 9 to 14 percent slopes	309	*
4325	Le Sueur-Urban land complex, 1 to 3 percent slopes	9	*
4444	Jacwin-Urban land complex, 1 to 3 percent slopes	104	*
4507	Canisteo-Urban land complex, 0 to 2 percent slopes	417	*
4551B	Calamine-Urban land complex, 2 to 5 percent slopes	40	*
4551D	Calamine-Urban land complex, 5 to 14 percent slopes	52	*
4635	Buckney-Urban land complex, 0 to 2 percent slopes	87	*
1635B	Buckney-Urban land complex, 2 to 5 percent slopes	16	*
4946B	Udorthents-Highway complex, 0 to 5 percent slopes	1,052	0.2
5010	Pits, sand and gravel	883	0.2
5030	Pits, limestone quarries	236	*
5035	Pits, gypsum quarries	3,849	0.8
5040	Udorthents, loamy (cut and fill land)	1,869	0.4
5049	Aquolls, ponded-Udorthents, loamy, complex	18	*
5060	Pits, clay	353	*
5080	Udorthents, sanitary landfill	164	*
5457	Du Page silt loam, channeled, 0 to 2 percent slopes, frequently flooded	204	*
5507	Corvuso-Brownton complex, 0 to 2 percent slopes	3,710	0.8
AW.	Animal waste lagoon	25	*
§L √	Sewage lagoon Water	191 3,493	* 0.8
	 	459,600	100.0

^{*} Less than 0.1 percent.

Agronomy

This section provides some general information about managing the soils for crops and for hay and pasture. The lowa corn suitability rating system and the system of land capability classification used by the Natural Resources Conservation Service are explained, and the estimated yields of the main crops and hay and pasture plants are listed for each soil. Prime farmland is described, and interpretations for agricultural waste management are provided.

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.

Cropland Management Considerations

The management concerns affecting the use of the detailed soil map units in the county for crops are shown in the table "Cropland Management Considerations" at the end of this section. The main concerns in managing nonirrigated cropland are conserving moisture, controlling wind erosion and water erosion, and maintaining soil fertility.

Conserving moisture consists primarily of reducing the evaporation and runoff rates and increasing the water infiltration rate. 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 wind erosion 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, limited content of organic matter, 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 crusting.—This limitation retards seedling development after periods of heavy rainfall.

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 increase wetness and 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.

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

Excessive permeability.—Saturated hydraulic conductivity is 42 micrometers per second or more within the soil profile.

Flooding.—Flooding is occasional, frequent, or very frequent.

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

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

Ponding.—Ponding duration is assigned to the map unit component. Water 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).—The depth to a seasonal high water table is 4 feet or less, the saturated hydraulic conductivity of any layer is more than 42 micrometers per second, 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, frequently, or very 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.—Saturated hydraulic conductivity is less than 0.42 micrometer per second 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 crusting.—The content of clay is 27 percent or more and the content of organic matter is 2 percent or less in the surface layer.

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 description of the surface layer, or 0.01 to 0.1 percent of the surface is covered by stones or boulders.

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.

Hydrologic groups are described under the heading "Water Features." Erosion factors (e.g., K factor) and wind erodibility groups are described under the heading "Physical Properties."

Cropland Management Considerations

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

Map symbol	Pct. of	Cropland management
and	map unit	considerations
soil name		
6: Okoboji, depressional, ponded	85	Ponding Potential poor tilth and compaction Potential for ground-water contamination Potential for surface-water contamination Water table
27B: Terril	85	Potential for ground-water contamination Potential for surface-water contamination Water erosion
34: Estherville	90	Excessive permeability Limited available water capacity Potential for ground-water contamination Wind erosion
34B: Estherville	85	Excessive permeability Limited available water capacity Potential for ground-water contamination Potential for surface-water contamination Water erosion Wind erosion
55: Nicollet	75	Potential for ground-water contamination Water table
62F: Storden	80	Slope Lime content Potential for surface-water contamination Water erosion Wind erosion
90: Okoboji, mucky, depressional, ponded	85	Ponding Potential for ground-water contamination Potential for surface-water contamination Water table
95: Harps	85	Lime content Potential for ground-water contamination Water table Wind erosion
107: Webster	80	Potential poor tilth and compaction Potential for ground-water contamination Water table
108: Wadena	85	Excessive permeability Potential for ground-water contamination

Cropland Management Considerations--Continued

Map symbol	Pct. of	Cropland management
and	map unit	considerations
soil name		<u> </u>
1-2-		
108B: Wadena	95	Excessive permeability
wadena	95	Limited available water capacity
		Potential for ground-water contamination
		Potential for surface-water contamination
		Water erosion
108C:		
Wadena	75	Excessive permeability
		Limited available water capacity
		Potential for ground-water contamination
		Potential for surface-water contamination
		Water erosion
135:		
Coland, occasionally flooded	85	Flooding
j		Potential poor tilth and compaction
		Potential for ground-water contamination
		Potential for surface-water contamination
		Water table
136:		
Ankeny, rarely flooded	80	Excessive permeability
		Potential for ground-water contamination
		Wind erosion
138B:		
Clarion	80	Potential for ground-water contamination
		Potential for surface-water contamination
		Water erosion
138C2:		
Clarion, moderately eroded	80	Potential for ground-water contamination
		Potential for surface-water contamination
		Previously eroded
		Water erosion
201B:		
Coland	50	Potential poor tilth and compaction
		Potential for ground-water contamination
		Water erosion Water table
		Mater table
Terril	35	Potential for ground-water contamination
		Potential for surface-water contamination
		Water erosion
203:		
Cylinder	80	Excessive permeability
		Potential for ground-water contamination
		Water table
227:		[
Wadena, loamy substratum	70	Excessive permeability
<u> </u>		Potential for ground-water contamination
227B:		
Wadena, loamy substratum	70	Excessive permeability
j		Potential for ground-water contamination
		Potential for surface-water contamination
		Water erosion

Cropland Management Considerations--Continued

Map symbol	Pct. of	Cropland management
and	map unit	considerations
soil name		
228:	7.0	 B
Cylinder, loamy substratum	70	Excessive permeability
		Potential for ground-water contamination Water table
		water table
236D:		
Lester	80	Potential for surface-water contamination
Hester	00	Water erosion
i		Water Glosion
236E:		
Lester	85	 Slope
		Potential for surface-water contamination
		Water erosion
i		
236F:		
Lester	80	Slope
i		Potential for surface-water contamination
i		Water erosion
i		
259:		i İ
Biscay	85	Excessive permeability
		Potential for ground-water contamination
		Water table
262G:		
Lester	60	Slope
		Potential for surface-water contamination
		Water erosion
Belview	20	Slope
		Lime content
		Potential for surface-water contamination
ļ		Water erosion
		Wind erosion
274:		
Rolfe, depressional, ponded	85	 Ponding
norre, depressionar, pended		Potential for ground-water contamination
		Potential for surface-water contamination
		Water table
278:		
Biscay, loamy substratum	70	Excessive permeability
i i		Potential for ground-water contamination
j		Water table
İ		İ
307:		
Dundas	80	Potential for ground-water contamination
		Water table
315B:		
Udifluvents, occasionally		
flooded	80	Flooding
ļ		Potential for ground-water contamination
		Potential for surface-water contamination
!		Wind erosion
323B:	0.5	
Fort Dodge	90	Excessive permeability
		Potential for ground-water contamination
		Potential for surface-water contamination Water erosion
		water erosion
l		I

Cropland Management Considerations -- Continued

Map symbol	Pct. of	Cropland management
and	map unit	considerations
soil name		
325:		
Le Sueur	90	Potential for ground-water contamination
		Water table
338:		
Garmore	100	Potential for ground-water contamination
342:		
Estherville, loamy substratum	70	Excessive permeability
		Limited available water capacity
		Potential for ground-water contamination
		Wind erosion
342B:		
Estherville, loamy substratum	70	Excessive permeability
•		Limited available water capacity
		Potential for ground-water contamination
		Potential for surface-water contamination
		Water erosion
		Wind erosion
344B:		
Copaston	80	Depth to rock
0000000		Lime content
		Limited available water capacity
		Potential for ground-water contamination
		Potential for surface-water contamination
		Water erosion
		Wind erosion
		wind elosion
345:		
Copaston	35	Depth to rock
		Lime content
		Limited available water capacity
		Potential for ground-water contamination
		Potential for surface-water contamination
		Wind erosion
Jacwin	25	Depth to rock
		Potential for ground-water contamination
		Restricted permeability
		Water table
355:		
Luther	85	Potential for ground-water contamination
		Water table
383:		
Marna	80	Potential poor tilth and compaction
		Potential for ground-water contamination
		Water table
385:		
Guckeen	75	Potential poor tilth and compaction
		Potential for ground-water contamination
		Potential for surface-water contamination
		Water table
386:		[
Cordova	85	Potential poor tilth and compaction
		Potential for ground-water contamination
		Water table
l		I

Cropland Management Considerations--Continued

Map symbol	Pct. of	Cropland management
and soil name	map unit	considerations
soli name		<u> </u>
387B:		
Kamrar	85	Potential poor tilth and compaction Potential for ground-water contamination Potential for surface-water contamination Water erosion Water table
413G:		
Gosport	25	Acid soil Slope Depth to rock Limited available water capacity Potential for ground-water contamination Potential for surface-water contamination Restricted permeability Water erosion Water table
Emeline	25	Slope Depth to rock Limited available water capacity Potential for ground-water contamination Potential for surface-water contamination Water erosion
Ridgeton	25	 Slope Potential for surface-water contamination Water erosion
457: Du Page, occasionally flooded	85	 Flooding Potential for ground-water contamination Potential for surface-water contamination
485:		
Spillville, occasionally flooded	80	 Flooding Potential for ground-water contamination Potential for surface-water contamination Water table
485B: Spillville, rarely flooded	85	 Potential for ground-water contamination Potential for surface-water contamination Water erosion
506: Wacousta, depressional, ponded	80	Ponding Potential poor tilth and compaction Potential for ground-water contamination Potential for surface-water contamination Water table
507: Canisteo	75	 Lime content Potential poor tilth and compaction Potential for ground-water contamination Water table Wind erosion

Cropland Management Considerations -- Continued

Map symbol	Pct. of	Cropland management
and	map unit	considerations
soil name		
511: Blue Earth, depressional,		
ponded	85	 High organic matter content
		Lime content
į		Ponding
ĺ		Potential for ground-water contamination
		Potential for surface-water contamination
		Water table
526:		
Wacousta, mucky,		
depressional, ponded	90	 Ponding
		Potential for ground-water contamination
		Potential for surface-water contamination
		Water table
536: Hanlon, occasionally flooded	80	 Flooding
	00	Potential for ground-water contamination
i		Potential for surface-water contamination
		Wind erosion
1		
541C:	4-	
Estherville	45	Excessive permeability Limited available water capacity
		Potential for ground-water contamination
		Potential for surface-water contamination
İ		Water erosion
ĺ		Wind erosion
Hawick	45	Excessive permeability
		Limited available water capacity Limited organic matter content
		Potential for ground-water contamination
į		Potential for surface-water contamination
ĺ		Water erosion
		Wind erosion
FF1D.		
551B: Calamine	85	 Potential for ground-water contamination
	03	Potential for surface-water contamination
İ		Restricted permeability
İ		Water erosion
		Water table
EE1D.		
551D: Calamine	55	 Potential for ground-water contamination
		Potential for surface-water contamination
İ		Restricted permeability
į		Surface stones
İ		Water erosion
		Water table
559:		
Talcot	85	Excessive permeability
		Lime content
į		Potential poor tilth and compaction
İ		Potential for ground-water contamination
		Water table
		Wind erosion
		I

Cropland Management Considerations--Continued

Map symbol	Pct. of	Cropland management
and	map unit	considerations
soil name		
5.61		
561: Talcot, loamy substratum	 70	 Excessive permeability
raicot, roamy substratum	, , , , , , , , , , , , , , , , , , ,	Lime content
		Potential poor tilth and compaction
		Potential for ground-water contamination
		Water table
		Wind erosion
566C:		
Moingona	90	Potential for ground-water contamination
		Potential for surface-water contamination Water erosion
		water erosion
568D:		
Cokato	l 80	Potential for surface-water contamination
		Water erosion
568E:		
Cokato	80	Slope
		Potential for surface-water contamination
		Water erosion
583:	 90	 Detection were tilth and semication
Minnetonka	90	Potential poor tilth and compaction Potential for ground-water contamination
		Water table
606:		
Lanyon, depressional, ponded	80	Ponding
		Potential poor tilth and compaction
		Potential for ground-water contamination
		Potential for surface-water contamination
		Water table
625:		
Lerdal	 80	 Acid soil
		Potential for ground-water contamination
		Potential for surface-water contamination
		Water table
636:		
Buckney, rarely flooded	85	Excessive permeability
		Limited available water capacity
		Potential for ground-water contamination Wind erosion
636B:		
Buckney, rarely flooded	90	Excessive permeability
		Limited available water capacity
		Potential for ground-water contamination
		Potential for surface-water contamination
		Water erosion
		Wind erosion
638C2:		
Clarion, moderately eroded	 50	 Potential for ground-water contamination
		Potential for surface-water contamination
		Previously eroded
		Water erosion
Storden, moderately eroded	35	Lime content
		Potential for surface-water contamination
		Previously eroded
		Water erosion Wind erosion
		I

Cropland Management Considerations -- Continued

Map symbol and soil name	Pct. of map unit	Cropland management considerations
650: Joliet	45	Depth to rock Limited available water capacity Potential for ground-water contamination Water table
Faxon	45	Depth to rock Limited available water capacity Potential for ground-water contamination Water table
715:		
Fluvaquents, frequently flooded	65	Flooding Excessive permeability Potential for ground-water contamination Potential for surface-water contamination Water table Wind erosion
735:		
Havelock, occasionally flooded	85	Flooding Lime content Potential poor tilth and compaction Potential for ground-water contamination Potential for surface-water contamination Water table Wind erosion
740D: Hawick	80	Excessive permeability Limited available water capacity Limited organic matter content Potential for ground-water contamination Potential for surface-water contamination Water erosion Wind erosion
775B: Billett	90	 Excessive permeability
		Limited organic matter content Potential for ground-water contamination Potential for surface-water contamination Water erosion Wind erosion
775C: Billett	85	Excessive permeability Limited organic matter content Potential for ground-water contamination Potential for surface-water contamination Water erosion Wind erosion
777B: Wapsie	85	Acid soil Excessive permeability Potential for ground-water contamination Potential for surface-water contamination Water erosion

Cropland Management Considerations--Continued

Man grmhal	Dat of	Gwanland management
Map symbol and	Pct. of map unit	Cropland management considerations
soil name	map unic	Considerations
BOII name		<u> </u>
835D2:		
Storden, moderately eroded	50	 Lime content Potential for surface-water contamination Previously eroded Water erosion Wind erosion
Omsrud, moderately eroded 	35	Lime content Potential for surface-water contamination Previously eroded Water erosion Wind erosion
835E2:		
Storden, moderately eroded	50	Slope Lime content Potential for surface-water contamination Previously eroded Water erosion Wind erosion
Omsrud, moderately eroded	35	 Slope Potential for surface-water contamination Previously eroded Water erosion
836B: Kilkenny	65	Potential for ground-water contamination Potential for surface-water contamination Water erosion
854D: Fens, Aquolls	80	 High organic matter content Potential for ground-water contamination Water erosion Water table Wind erosion
855: Shorewood	85	 Potential poor tilth and compaction Potential for ground-water contamination Potential for surface-water contamination Water table
956: Harps 	45	 Lime content Potential for ground-water contamination Water table Wind erosion
Okoboji, depressional, ponded	35	Ponding Potential poor tilth and compaction Potential for ground-water contamination Potential for surface-water contamination Water table
1007: Cosmos, bouldery	65	 Dense layer Potential poor tilth and compaction Potential for ground-water contamination Surface stones Water table

Cropland Management Considerations -- Continued

Map symbol and	Pct. of map unit	Cropland management considerations
soil name		<u> </u>
1055B: Kandiyohi, bouldery	65	Dense layer Potential poor tilth and compaction Potential for ground-water contamination Surface stones Water erosion Water table
1138B: Clarion	65	 Potential for ground-water contamination Potential for surface-water contamination Water erosion
1236B: Angus	85	 Potential for surface-water contamination Water erosion
1236C: Angus	80	 Potential for surface-water contamination Water erosion
1259: Biscay, depressional, ponded	80	Excessive permeability Ponding Potential for ground-water contamination Potential for surface-water contamination Water table
1507: Brownton	80	 Lime content Potential poor tilth and compaction Potential for ground-water contamination Water table
1555: Nicollet	40	 Potential for ground-water contamination Water table
Guckeen	25	Potential poor tilth and compaction Potential for ground-water contamination Potential for surface-water contamination Water table
1836B: Kilkenny	65	 Potential for ground-water contamination Potential for surface-water contamination Water erosion
Shorewood	25	Potential poor tilth and compaction Potential for ground-water contamination Potential for surface-water contamination Water erosion Water table
2700C: Ridgeton	75	 - Potential for surface-water contamination Water erosion
2700D: Ridgeton	80	 Potential for surface-water contamination Water erosion

Cropland Management Considerations--Continued

Map symbol	Pct. of	Cropland management
and	map unit	considerations
soil name		
4000		
4000.		
Urban land		
4055		
4055:	50	
Nicollet	50	Potential for ground-water contamination Water table
		water table
Urban land.		
orban land.		
4107:		
Webster	60	Potential poor tilth and compaction
Medacer		Potential for ground-water contamination
		Water table
Urban land.		
4138B:		
Clarion	50	Potential for ground-water contamination
i		Potential for surface-water contamination
İ		Water erosion
İ		
Urban land.		i İ
İ		
4235B:		
Angus	60	Potential for surface-water contamination
		Water erosion
Urban land.		
4236D:		
Lester	50	Potential for surface-water contamination
		Water erosion
Urban land.		
orban land.		
4325:		
Le Sueur	60	Potential for ground-water contamination
Ic bacar		Water table
i		
Urban land.		
İ		
4444:		İ
Jacwin	50	Depth to rock
		Potential for ground-water contamination
		Restricted permeability
		Water table
Urban land.		
4507		
4507:	50	 Lime content
Canisteo	50	
		Potential poor tilth and compaction
		Potential for ground-water contamination
		Water table Wind erosion
· ·		HIMA GLOBION
Urban land.		[
4551B:		
Calamine	50	Potential for ground-water contamination
i		Potential for surface-water contamination
i		Restricted permeability
i		Water erosion
i		Water table
i		
'		•

Cropland Management Considerations -- Continued

Map symbol	Pct. of	Cropland management considerations
and soil name	map unit	considerations
		<u> </u>
4551B:		
Urban land.		
4551D:	50	 Detection for many description
Calamine	50	Potential for ground-water contamination Potential for surface-water contamination
i		Restricted permeability
j		Water erosion
		Water table
Urban land.		
orban land.		
4635:		
Buckney	50	Excessive permeability
		Limited available water capacity
		Potential for ground-water contamination Wind erosion
ļ		Wind erosion
Urban land.		
į		
4635B:	F.0	
Buckney	50	Excessive permeability Limited available water capacity
i		Potential for ground-water contamination
İ		Potential for surface-water contamination
I		Water erosion
		Wind erosion
Urban land.		
4946B:		
Udorthents	70	Onsite investigation required
 Highway	30	 Not applicable
5010.		
Pits, sand and gravel		
5030.		
Pits, limestone quarries		
ĺ		
5035.		
Pits, gypsum quarries		
5040:		
Udorthents, loamy	100	Onsite investigation required
5049: Aquolls, ponded	60	 Onsite investigation required
Aquoiis, ponded	00	onsite investigation required
Udorthents, loamy	30	Onsite investigation required
5050		
5060. Pits, clay		
5080:		
Udorthents	100	Onsite investigation required
5457.		
5457: Du Page, channeled,		
frequently flooded	80	 Flooding
		Channeled
!		Potential for ground-water contamination
		Potential for surface-water contamination

Cropland Management Considerations--Continued

Map symbol	Pct. of	Cropland management
and	map unit	considerations
soil name		
5507:		
Corvuso	55	Lime content Potential poor tilth and compaction Potential for ground-water contamination Water table Wind erosion
Brownton	35	Lime content Potential poor tilth and compaction Potential for ground-water contamination Water table
AW.		
Animal waste lagoon		
SL. Sewage lagoon		
W. Water		

Crop Yield Estimates

The tables "Land Capability, Corn Suitability Rating, and Yields per Acre of Crops" and "Land Capability and Yields per Acre of Pasture" are described in this section. Crops other than those shown in the tables 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 the Cooperative Extension Service can provide information about the management and productivity of the soils for those crops.

Land Capability Classification

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

In the capability system, soils are generally grouped at three levels—capability class, subclass, and unit.

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

Class 1 soils have slight limitations that restrict their use.

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

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

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

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

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

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

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

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

In class 1 there are no subclasses because the soils of this class have few limitations. Class 5 contains only the subclasses indicated by w, s, or c because the

soils in class 5 are subject to little or no erosion. They have other limitations that restrict their use to pasture, rangeland, forestland, or wildlife habitat.

Capability units are soil groups within a subclass. The soils in a capability unit are enough alike to be suited to the same crops and pasture plants, to require similar management, and to have similar productivity. Capability units are generally designated by adding an Arabic numeral to the subclass symbol, for example, 2e-4 and 3e-6. These units are not given in all soil surveys.

[Reference: United States Department of Agriculture, Soil Conservation Service. 1961. Land capability classification. USDA Handbook 210.]

Corn Suitability Rating

The corn suitability rating (CSR) system was developed in lowa to rate the productivity of each different kind of soil for row crops. CSRs provide a relative ranking of all soils mapped in the State of Iowa. They can be used to compare the potential yield production of one soil with that of other soils. Ratings range from 5 to 100. A rating of 5 indicates severe limitations for row crop production. Soil properties and weather conditions are the dominant factors that affect productivity.

Crop Yields

The average yields per acre that can be expected of the principal crops under a high level of management are shown in the table. 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 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.

Pasture Yields

Some pasture yields are expressed in the table in terms of animal unit months. An animal unit month (AUM) is the amount of forage required by one mature cow of approximately 1,000 pounds weight, with or without a calf, for 1 month.

The local office of the Natural Resources Conservation Service or the Cooperative Extension Service can provide information about forage yields other than those shown in the table.

Land Capability, Corn Suitability Rating, and Yields per Acre of Crops

(The crop yield estimates were determined through recent research conducted by Iowa State
University. They are based on a high level of management and are for nonirrigated areas. See
text for additional information. Absence of a yield 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	Pct. of map unit	 Land capability 	Corn suitability rating	Corn	Soybeans	 Oats
				Bu	Bu	Bu
6Okoboji, depressional, ponded	 85 	 3w 	 62 	136	 35 	 76
27B Terril	 85 	 2e 	 82 	190	 49 	 93
34 Estherville	90	3s	37	79	 25 	34
34B Estherville	 85 	3s	32	51	 16 	33
55 Nicollet	 75 	1	90	173	45	 99
62F Storden	 80 	 6e 	 22 			
90 Okoboji, mucky, depressional, ponded	 85 	 3w 	 67 	140	36	 79
95 Harps	 85 	 2w 	 67 	143	 36 	 79
107 Webster	 80 	 2w 	 82 	163	42 	 92
108 Wadena	 85 	 2s 	 52 	96	30	 66
108B Wadena	 95 	 2e 	47 	91	29	 63
108C Wadena	 75 	 3e 	 27 	90	 27 	 62
135Coland, occasionally flooded	 85 	 2w 	 82 	157	4 0	 87
136 Ankeny, rarely flooded	 80 	2s	52	104	32	 69
138B Clarion	 80 	 2e 	 82 	176	 45 	 99
138C2 Clarion, moderately eroded	 80 	 3e 	 65 	163	42 	 92
201B Coland Terril		 2w 2e	73 	167	39 	 85

Land Capability, Corn Suitability Rating, and Yields per Acre of Crops--Continued

	I	1	I			 I
Map symbol and soil name	Pct. of map unit	 Land capability 	 Corn suitability rating		Soybeans	 Oats
				Bu	Bu	Bu
203 Cylinder	80	 2s 	 75 		40	 87
227 Wadena, loamy substratum	1	 2s 	 62 		33	 69
227B Wadena, loamy substratum	!	 2e 	 57 		31	 65
228 Cylinder, loamy substratum	70 	 2s 	 82 	125 	46	90
236D Lester	 80 	 3e 	52 	139 	39	 85
236E Lester	 85 	4e 	 42 	115 	32	70
236F Lester	 80 	6e	 22 	 		
259Biscay	 85 	2w 	77 	 118	38	83
262G	İ	İ	11			
LesterBelview	1	6e 6e 	 	 		
274 Rolfe, depressional, ponded	85 	3w 	 55 	104 	30	67
278Biscay, loamy substratum	!	2w 	72 	113 	33	78
307 Dundas	 80 	2w 	 67 	131 	32	71
315B Udifluvents, occasionally flooded	 80 	 5w 	 5 	 		
323BFort Dodge	90	 2e 	 77 	110 	35	 76
325 Le Sueur	90	 1 	 85 		47	103
338Garmore	 100 	 1 	 87 		44	 96
342 Estherville, loamy substratum	 70 	 3s 	 47 		28	37
342B Estherville, loamy substratum	 70 	 3s 	 42 	 79 	25	34
344BCopaston	 80 	 4s 	 25 	 76 	23	 51

Land Capability, Corn Suitability Rating, and Yields per Acre of Crops--Continued

Map symbol and soil name	Pct. of map unit	 Land capability 	Corn suitability rating	Corn	Soybeans	Oats
				Bu	Bu	Bu
345 Copaston Jacwin	 35 25	 4s 2w	45 45 	115	 25 	53
355Luther	 85 	 1 	73 	168	 44 	95
883 Marna	 80 	 2w 	73	158	40	88
385 Guckeen	 75 	 1 	87 87	139	44 	97
386 Cordova	 85 	 2w 	72 7	168		95
387B Kamrar	 85 	 2e 	82	136	42	91
413G Gosport Emeline Ridgeton	 25 25 25	 7e 7s 6e	5 5 		 	
457 Du Page, occasionally flooded	 85 	 2w 	82 81 1	170	46 	82
485 Spillville, occasionally flooded	1	 2w 	87 87 	189	52 	110
485B Spillville, rarely flooded	 85 	 2e 	82 81 	185	49 	107
506 Wacousta, depressional, ponded	 80 	 3w 	62	141	36 	79
507 Canisteo	 75 	 2w 	77	156	41	89
511 Blue Earth, depressional, ponded	 85 	 3w 	57 	94	30	65
526 Wacousta, mucky, depressional, ponded	90	 3w 	62	147	38	84
536 Hanlon, occasionally flooded	 80 	 2s 	57 	129	33	72
541C Estherville Hawick	1	 4s 4s	12 1 1 	59	 22 	28
551B Calamine	 85 	 3w 	60	99	31	68

Land Capability, Corn Suitability Rating, and Yields per Acre of Crops--Continued

Map symbol and soil name	Pct. of map unit	Land capability	Corn suitability rating	Corn	Soybeans	Oats
			!	Bu	Bu	Bu
551DCalamine	55	4e	35 3	86 	27 	58
559 Talcot	85	2w	 67 	113 	36 	79
561 Talcot, loamy substratum	70	2w	62 62	108	31 	74
566C Moingona	90	3e	73	157	40 	87
568D Cokato	80	3e	52	159	35 	70
568E Cokato	80	4e	42 4	135	32 	65
583 Minnetonka	90	2w	67 67	135	35 	76
606 Lanyon, depressional, ponded	80	3w	54 54 	110	32 	70
625 Lerdal	80	2e	70 70	174	45 	85
636Buckney, rarely flooded	85	3s	52 52	100	31 	68
636B Buckney, rarely flooded	90	3e	47 47	98	30 	66
638C2 Clarion, moderately eroded	50	3e	63 63 	149 	40 	90
Storden, moderately eroded	35] 3e			 	
650			51	82	32	71
JolietFaxon	45 45	4w 3w			 	
715Fluvaquents, frequently flooded	65	5w	5		 	
735 Havelock, occasionally flooded	85	2w	69	145	37 	81
740D Hawick	80	4s	7 7	42	11 	25
775B Billett	90	3s	43 43	97 	32 	69
775C Billett	85	3e		93	30 	66

Land Capability, Corn Suitability Rating, and Yields per Acre of Crops--Continued

Map symbol and soil name	Pct. of map unit 	Land capability	Corn suitability rating	Corn	Soybeans	Oats
			ļ <u> </u>	Bu	Bu	Bu
77B Wapsie	 85 	 2e 		82	25 	55
35D2Storden, moderately	 	 		149	38	84
eroded	50	3e				
Omsrud, moderately eroded	 35 	 3e				
35E2Storden, moderately	 	 	42	139	33	73
erodedOmsrud, moderately	50 	4e				
eroded	35 	4e	i i		į	
36BKilkenny	65 	2e	67	122	36	80
54DFens, Aquolls	 80 	 5w 	5			
55 Shorewood	 85 	 2w 	77	131	42	91
56			65	139	39	85
HarpsOkoboji, depressional,	45 35	2w 3w				
007				142	42	0.1
Cosmos, bouldery	65 	2w 	73	143	42	83
055B Kandiyohi, bouldery	 65 	2e	77	156	37	75
138B Clarion	 65 	2e	80	172	42	92
236B Angus	 85 	 2e 		171	45	85
236C Angus	 80 	 2e 		165	44	83
259Biscay, depressional, ponded	 80 	 3w 	52 51 	99	33	72
507 Brownton	 80 	 2w 	68	157	42	91
555 Nicollet	 40	 1		157	45	99
Guckeen	25	1				
836B			68	122	36	80
Kilkenny Shorewood	65 25	2e 2w				
700C	75	4e	62	154	38	83

Land Capability, Corn Suitability Rating, and Yields per Acre of Crops--Continued

700DRidgeton 000. Urban land	 80 	 4e 	52	Bu 136	Bu	Bu
Ridgeton 000. Urban land 055	 80 	 4e 	52	126		
Urban land	 	1		130	35	77
	.					
Nicollet	1	1	[[
Urban land	· 50 					
107	1		j j			
Webster	1	2 w				
Urban land	· 40 				 	
138B	· į	j	i i		i i	
Clarion	1	2e	[[
Urban land	30					
235B	.		i i			
Angus	60	2e				
Urban land	40					
236D	.					
Lester	- 50	3e			1	
Urban land	50					
325	.					
Le Sueur	60	1	į į		į į	
Urban land	40					
444	 -	 				
Jacwin	50	2w	į į		į į	
Urban land	50					
507	 -	 				
Canisteo	50	2w	i i		i i	
Urban land	50					
551B	 -	 				
Calamine	50	3w	i i		i i	
Urban land	50					
551D	 					
Calamine	50	4e	i i		į į	
Urban land	50					
635	 					
Buckney	50	3s	i i		į į	
Urban land	50					
635B	 -	 				
Buckney	1	3e	i i		į į	
Urban land	50		į į		į į	
946B: Udorthents-Highway		 				
010	100	 8s			 	
Pits, sand and gravel	į	į	į i		į i	
030	 100	 8s				
Pits, limestone quarries	!	05				

Land Capability, Corn Suitability Rating, and Yields per Acre of Crops--Continued

Map symbol	Pct. of	Land	Corn	Corn	Soybeans	Oats
and soil name	map unit	capability	suitability	į	į	
			rating	ĺ	<u> </u>	
			!	Bu	Bu	Bu
035	 100	 8s		 		
Pits, gypsum quarries					į	
040.	 			 		
Udorthents, loamy						
049.	 			 		
Aquolls, ponded-				ĺ	į	
Udorthents, loamy					į	
060.	 			 	I	
Pits, clay					ļ	
080.	 	 		 		
Udorthents					ļ	
457	80	 2w	 67	 172	42	8
Du Page, channeled,					1	
frequently flooded						
507	 		61	 160	37	8:
Corvuso	55	2w			1	
Brownton	35	2w			-	
w.	 			 		
Animal waste lagoon	 	 				
L.	 	 		 		
Sewage lagoon					į	
Water	İ	İ	İ	İ	i	

Land Capability and Yields per Acre of Pasture

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

Map symbol	Pct. of	Land	Bromegrass-	Smooth	Kentucky	Bromegrass-
and soil name	map unit		alfalfa hay	bromegrass	bluegrass	alfalfa
		oupublilog	Tons	AUM*	AUM*	AUM*
6	85 	3w	3.3	 4.5 	 2.7 	 5.5
27B Terril	85 	2e	 5.6 	5.5	3.3	9.4
34 Estherville	90	3s	2.0	2.0	 1.2 	5.5
34B Estherville	85 	3s	 1.7 	1.7	1.0	2.8
55 Nicollet	75 	1	 5.7 	5.8	 3.5 	9.5
62F Storden	80 	6e	2.5	3.1	 1.8 	3.7
90 Okoboji, mucky, depressional, ponded	85 	3w	 3.4 	4.6	 2.8 	5.7
95	85 	2w	3.4	4.6	2.8	5.7
107 Webster	80	2w	3.9	5.4	3.2	6.5
108 Wadena	85 	2s	3.9	3.9	2.3	6.5
108B Wadena	95 	2e	3.7	3.6	2.1	6.2
108C Wadena	75 	3e	3.5	3.3	2.0	4.2
135 Coland, occasionally flooded	85 	2w	3.7	5.1	3.1 	6.2
136 Ankeny, rarely flooded	80	2s	4.2	4.1	2.4	8.1
138B Clarion	80	2e	5.6	5.8	3.5	9.2
138C2 Clarion, moderately eroded	80 	3e	 5.5 	5.4 	 3.2 	 8.5
201B Coland Terril	55 35	2w 2e	 3.0 	5.0	 3.0 	5.0

Land Capability and Yields per Acre of Pasture--Continued

Map symbol and soil name	Pct. of map unit	Land capability	 Bromegrass- alfalfa hay	Smooth bromegrass	 Kentucky bluegrass	Bromegrass- alfalfa
			Tons	AUM*	AUM*	AUM*
203Cylinder	80	2s	 4.9 	 5.0 	3.0	8.2
227Wadena, loamy substratum	70	2s	4.2 	 4.2 	2.6 	6.8
227B	70	2e	4.0 	4.0 	2.5	6.7
228 Cylinder, loamy substratum	70 	2s	5.1 	5.2 	3.4 	8.3
236D Lester	80	3e	 5.1 	 4.5 	3.0	6.5
236E Lester	85	4e	4.2 	4.1 	2.5	6.0
236F Lester	80	6e	4.0 	3.9 	2.3	4.5
259 Biscay	85	2w	3.6	 4.9 	 2.9 	6.0
262G Lester Belview	60 20	6e 6e	3.3 	3.6	2.0	4.0
274 Rolfe, depressional, ponded	85 	3w	 2.8 	 4.0 	 2.4 	4.7
278Biscay, loamy substratum	70	2w	3.1	 4.4 	2.4	5.5
307 Dundas	80	2w	3.0	4.2 	2.5	5.0
315B Udifluvents, occasionally flooded	80	5w	 	 	 	
323BFort Dodge	90	2e	4.6 	4.5 	2.7	9.4
325 Le Sueur	90	1	 5.9 	 6.2 	3.6	6.7
338Garmore	100	1	 5.8 	 5.6 	3.4	10.1
342Estherville, loamy	70 	3s	 2.3 	 2.3 	 1.5 	 5.8
342BEstherville, loamy substratum	70 	3 ន	 2.1 	 1.9 	1.2	5.7

Land Capability and Yields per Acre of Pasture--Continued

	1		1	1	1	1
Map symbol and soil name	Pct. of map unit	Land capability	 Bromegrass- alfalfa hay	 Smooth bromegrass	 Kentucky bluegrass	 Bromegrass- alfalfa
			Tons	AUM*	AUM*	AUM*
344BCopaston	 80 	4s	3.1	 2.6 	 1.5 	6.1
345			3.3	2.8	1.7	6.2
Copaston Jacwin		4s 2w	 	 	 	
355 Luther	 85 	1	 5.4 	 5.6 	 3.3 	9.1
383 Marna	 80 	2w	 3.8 	 5.2 	 3.1 	 5.9
385Guckeen	75 75	1	5.5	5.7	3.4	7.0
386 Cordova	 85 	2w	4.1	5.6	3.3	6.0
387B Kamrar	 85 	2e	5.5	5.3	3.2	9.1
413GGosportEmeline		7e 7s	 	1.3 	0.7 	
Ridgeton	25	6e	į	 -	 	İ
457 Du Page, occasionally flooded	 85 	2w	5.7	5.6 	3.3	6.0
485Spillville, occasionally flooded		2w	6.3	6.5 	3.9 	10.3
485BSpillville, rarely flooded	 85 	2e	6.1	 6.3 	 3.8 	10.2
506 Wacousta, depressional, ponded	 80 	3w	3.5	 4.8 	 2.9 	5.8
507 Canisteo	 75 	2w	3.8	 5.2 	 3.1 	6.3
511 Blue Earth, depressional, ponded	 85 	3w	4.2	 5.6 	3.4 	7.0
526 Wacousta, mucky, depressional, ponded	 90 	3w	 3.4 	 4.9 	 3.0 	 4.8
536 Hanlon, occasionally flooded	 80 	2s	 4.3 	 4.2 	 2.5 	 8.4

Land Capability and Yields per Acre of Pasture--Continued

Map symbol and soil name	Pct. of map unit	Land capability	 Bromegrass- alfalfa hay	Smooth	 Kentucky bluegrass	 Bromegrass- alfalfa
	!		Tons	AUM*	AUM*	AUM*
541C Estherville	45	4s	 1.7 	 1.6 	 1.0 	4.9
Hawick	45	4s	1	l I	 	
551B Calamine	85 	3w	3.0	 4.1 	2.4	6.1
551D Calamine	55 	4e	2.8	3.8 	2.0	5.4
559 Talcot	85 	2w	 3.4 	 4.6 	 2.8 	5.7
561 Talcot, loamy substratum	70 	2w	2.9	 4.1 	2.3	5.2
566C Moingona	90	3e	5.2	 5.1 	3.1	9.5
568D Cokato	80	3e	 5.5 	 5.4 	3.4	7.7
568E Cokato	80 	4e	 4.6 	 5.3 	3.1	7.1
583 Minnetonka	90	2w	3.3	 4.5 	2.7	6.0
606 Lanyon, depressional, ponded	80 	3w	 3.0 	 4.1 	 2.5 	5.0
625 Lerdal	80 	2e	6.0	 4.1 	 3.1 	7.5
636Buckney, rarely flooded	85 	3s	 4.1 	 4.0 	 2.4 	6.6
636B Buckney, rarely flooded	90	3e	 3.9 	 3.9 	2.3	6.4
638C2			 5.4 	 5.3 	3.0	8.2
erodedStorden, moderately eroded	50 35	3e 3e	 	 	 	
650 Joliet Faxon	45 45	4w	2.3	 2.9 	 1.3 	3.9
715 Fluvaquents, frequently	45 65	3w 5w	 	 	 	
flooded	85 	2w	 3.4 	 4.7 	 2.8 	 5.7

Land Capability and Yields per Acre of Pasture--Continued

Map symbol and soil name	Pct. of map unit	Land	 Bromegrass- alfalfa hay	Smooth	 Kentucky bluegrass	 Bromegrass- alfalfa
and boll name	map unit	Capability	Tons	AUM*	AUM*	AUM*
740D	 80 	4s	1.7	2.0	1.2	2.6
775B Billett	 90 	3s	 4.2 	 4.1 	 2.4 	6.1
775C Billett	 85 	3e	3.9	 3.9 	2.3	6.0
777B Wapsie	 85 	2e	3.3	 3.2 	 1.9 	 6.5
835D2 Storden, moderately		_	4.8	 4.5 	3.0	4.9
eroded Omsrud, moderately eroded		3e 3e	 	 	 	
835E2Storden, moderately	 50	4e	 4.4 	 2.9 	 2.6 	 4.6
Omsrud, moderately eroded	30	4e 4e	 	 	 	
836B Kilkenny	 65 	2e	 4.8 	 4.7 	2.8	6.7
854DFens, Aquolls	 80 	5w	 	 	 	
855 Shorewood	 85 	2w	5.2	 5.3 	3.2	6.7
956 Harps Okoboji, depressional,	 	2w	3.7 	 5.0 	3.0	6.3
ponded	35	3w				
1007Cosmos, bouldery	 65 	2w	3.8	 3.9 	 2.3 	4.9
1055B Kandiyohi, bouldery	65 65	2e	3.8	3.9 	2.3	5.8
1138BClarion	65 65	2e	5.5	 5.4 	3.2	9.1
1236BAngus	 85 	2e	6.5	 6.8 	5.2	8.1
1236CAngus	 80 	2e	 6.4 	 6.7 	 5.0 	 8.0
1259 Biscay, depressional, ponded	 80 	3w	3.1	 4.3 	 2.6 	 5.2
1507 Brownton	 80 	2w	 3.9 	 5.1 	 3.2 	 6.1

Land Capability and Yields per Acre of Pasture--Continued

Map symbol	 Pct. of	Land	 Bromegrass-	Smooth	 Kentucky	 Bromegrass-
and soil name	map unit	capability	alfalfa hay	bromegrass	bluegrass	alfalfa
			Tons	AUM*	AUM*	AUM*
1555	 		5.7	 5.8	3.5	9.5
Nicollet	40	1			İ	
Guckeen	25	1			İ	
1836B	i i		4.8	4.7	2.8	6.7
Kilkenny	65	2e				
Shorewood	25	2w			[
2700C	75	4e	3.2	3.3	1.7	4.1
Ridgeton					!	
2700D	80	4e	3.0	3.1	1.5	3.9
Ridgeton						
4000.				 	l I	
Urban land			I I	 	 	I I
orban rand	 		I I	 	 	I I
4055				 	 	i
Nicollet	 50	1		! 	İ	
Urban land	50				i	
					İ	İ
4107	i i			i	i	i
Webster	60	2w			ĺ	
Urban land	40				[
4138B						
Clarion	50	2e				
Urban land	30				!	
10055						
4235B		0 -				
Angus Urban land	60 40	2e 		 	l I	
orban land	410		I I	 	 	I I
4236D	 			l 	 	
Lester	 50	3e		! 	İ	
Urban land	50				İ	İ
	i i		İ	İ	İ	İ
4325	İ					
Le Sueur	60	1				
Urban land	40					
4444						
Jacwin	50	2w				
Urban land	50					
4507				 	 	
Canisteo	 50	2w		 	 	
Urban land	50 50		1	 	I I	
	30			! 	İ	
4551B						
Calamine	50	3w	İ	İ	İ	İ
Urban land	50					
İ	ĺ					
4551D						
Calamine	50	4 e				
Urban land	50		!	!	!	!
			!		!	!
4635		_				
Buckney, rarely flooded	50	3s				
Urban land	50					

Land Capability and Yields per Acre of Pasture--Continued

Map symbol and soil name	Pct. of map unit	Land capability	Bromegrass-	Smooth bromegrass	Kentucky bluegrass	Bromegrass
and soll name	map unic	Capability	Tons	AUM*	AUM*	AUM*
 4635B					 	
Buckney, rarely flooded	50	3e		 	 	
Urban land	50					
4946B. Udorthents-Highway	 		 	 	 	
5010 Pits, sand and gravel	100 	8s	 	 	 	
5030 Pits, limestone quarries	100	8s		 	 	
5035 Pits, gypsum quarries	100	8s		 	 	
5040. Udorthents, loamy	 		 	 	 	
5049. Aquolls, ponded- Udorthents, loamy	 		 	 	 	
5060. Pits, clay	 		 		 	
5080. Udorthents	 		 	 	 	
5457 Du Page, channeled, frequently flooded	80 	2w	5.5	 5.5 	3.1	5.9
۱ 5507	I		3.6	 3.7	 2.1	4.7
Corvuso	55	2w				1
Brownton	35	2w		 	 	į
AW. Animal waste lagoon			 	 	 	
SL. Sewage lagoon	 		[
W. Water	 		 	 	 	

^{*} Animal unit month: The amount of forage required to feed one mature cow, of approximately 1,000 pounds weight, with or without a calf, for 30 days.

Prime Farmland and Other Important Farmland

The table "Prime Farmland and Other Important Farmland" lists the map units in the survey area that are considered prime farmland and farmland of statewide importance. This list does not constitute a recommendation for a particular land use.

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

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

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

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

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

In some areas, land that does not meet the criteria for prime farmland is considered to be *farmland of statewide importance* for the production of food, feed, fiber, forage, and oilseed crops. The criteria for defining and delineating farmland of statewide importance are determined by the appropriate State agencies. Generally, this land includes areas of soils that nearly meet the requirements for prime farmland and that economically produce high yields of crops when treated and managed according to acceptable farming methods. Some areas may produce as high a yield as prime farmland if conditions are favorable. Farmland of statewide importance may include tracts of land that have been designated for agriculture by State law.

Prime Farmland and Other Important Farmland

(Only the soils considered prime or important farmland are listed. Urban or built-up areas of the soils listed are not considered prime or important farmland. If a soil is prime or important farmland only under certain conditions, such as "where drained," those conditions are specified)

55 1 95 1 107 1 108 1	Terril loam, 1 to 5 percent slopes Nicollet loam, 1 to 3 percent slopes Harps clay loam, 0 to 2 percent slopes Webster silty clay loam, 0 to 2 percent slopes Wadena loam, 0 to 2 percent slopes Wadena loam, 2 to 5 percent slopes	Prime farmland Prime farmland Prime farmland where drained Prime farmland where drained
95 1 107 1 108 1	Harps clay loam, 0 to 2 percent slopes Webster silty clay loam, 0 to 2 percent slopes Wadena loam, 0 to 2 percent slopes	Prime farmland where drained
107 1 108 1 108B 1	Webster silty clay loam, 0 to 2 percent slopes Wadena loam, 0 to 2 percent slopes	·
108 108B	Wadena loam, 0 to 2 percent slopes	Prime farmland where drained
108B		
	Wadena loam, 2 to 5 percent slopes	Prime farmland
135 - 		Prime farmland
	Coland clay loam, 0 to 2 percent slopes, occasionally flooded	Prime farmland where drained and either protected from flooding or not frequently flooded during the growing season
136 . 	Ankeny fine sandy loam, 0 to 2 percent slopes, rarely flooded	Prime farmland
138B	Clarion loam, 2 to 5 percent slopes	Prime farmland
201B	Coland-Terril complex, 1 to 5 percent slopes	Prime farmland where drained
203	Cylinder loam, 0 to 2 percent slopes	Prime farmland
227 1	Wadena loam, loamy substratum, 0 to 2 percent slopes	Prime farmland
	Wadena loam, loamy substratum, 2 to 5 percent slopes	Prime farmland
	Cylinder loam, loamy substratum, 0 to 2 percent slopes	Prime farmland
	Biscay clay loam, 0 to 2 percent slopes	Prime farmland where drained
	Biscay clay loam, loamy substratum, 0 to 2 percent slopes	Prime farmland where drained
	Dundas silt loam, 0 to 2 percent slopes	Prime farmland where drained
	Fort Dodge loam, 2 to 5 percent slopes	Prime farmland
	Le Sueur loam, 1 to 3 percent slopes	Prime farmland
	Garmore loam, 0 to 2 percent slopes	Prime farmland Prime farmland
	Luther loam, 1 to 3 percent slopes Marna silty clay loam, 0 to 2 percent slopes	Prime farmland Prime farmland where drained
	Guckeen silty clay loam, 1 to 3 percent slopes	Prime farmland where drained
	Cordova clay loam, 0 to 2 percent slopes	Prime farmland where drained
	Kamrar silty clay loam, 2 to 5 percent slopes	Prime farmland where drained
457 I	Du Page silt loam, 0 to 2 percent slopes, occasionally flooded	Prime farmland
485 : 	Spillville loam, 0 to 2 percent slopes, occasionally flooded	Prime farmland
	Spillville loam, 2 to 5 percent slopes, rarely flooded	Prime farmland
	Canisteo clay loam, 0 to 2 percent slopes	Prime farmland where drained
536 1 	Hanlon fine sandy loam, 0 to 2 percent slopes, occasionally flooded	Prime farmland where protected from flooding or not frequently flooded during the growing season
551B	Calamine silty clay loam, 2 to 5 percent slopes	Prime farmland where drained
559	Talcot clay loam, 0 to 2 percent slopes	Prime farmland where drained
561	Talcot clay loam, loamy substratum, 0 to 2 percent slopes	Prime farmland where drained
	Minnetonka silty clay loam, 0 to 2 percent slopes	Prime farmland where drained
	Lerdal silt loam, 1 to 3 percent slopes	Prime farmland
į Į	Havelock clay loam, 0 to 2 percent slopes, occasionally flooded	Prime farmland where drained and either protected from flooding or not frequently flooded during the growing season
	Wapsie loam, 2 to 5 percent slopes	Prime farmland
	Kilkenny silt loam, 2 to 5 percent slopes	Prime farmland
	Shorewood silty clay loam, 1 to 3 percent slopes	Prime farmland
	Harps-Okoboji, depressional, complex, 0 to 2 percent slopes	•
	Cosmos clay loam, 0 to 3 percent slopes, bouldery	Prime farmland where drained
	Kandiyohi clay loam, 2 to 5 percent slopes, bouldery	Prime farmland Prime farmland
	Clarion clay loam, 2 to 5 percent slopes	·
	Angus loam, 2 to 5 percent slopes Brownton silty clay loam, 0 to 2 percent slopes	Prime farmland Prime farmland where drained
	Nicollet-Guckeen complex, 1 to 3 percent slopes	Prime farmland where drained Prime farmland
	Nicollet-Guckeen complex, 1 to 3 percent slopes Kilkenny-Shorewood complex, 2 to 5 percent slopes	Prime farmland
	Corvuso-Brownton complex, 0 to 2 percent slopes	Prime farmland Prime farmland where drained
	Wadena loam, 5 to 9 percent slopes	Farmland of statewide importance
	Clarion loam, 5 to 9 percent slopes, moderately eroded	Farmland of statewide importance

Prime Farmland and Other Important Farmland--Continued

Map symbol	Map unit name	Fa	armland cla	ssification
236D	 Lester loam, 9 to 14 percent slopes	 Farmland of	. statewide	importance
236E	Lester loam, 14 to 18 percent slopes	Farmland of	statewide	importance
344B	Copaston loam, 2 to 5 percent slopes	Farmland of	statewide	importance
526	Wacousta mucky silt loam, depressional, 0 to 1 percent slopes	Farmland of	f statewide	importance
551D	Calamine silty clay loam, 5 to 14 percent slopes	Farmland of	f statewide	importance
566C	Moingona loam, 5 to 9 percent slopes	Farmland of	f statewide	importance
568D	Cokato loam, 9 to 14 percent slopes	Farmland of	f statewide	importance
568E	Cokato loam, 14 to 18 percent slopes	Farmland of	f statewide	importance
638C2	Clarion-Storden complex, 5 to 9 percent slopes, moderately eroded	Farmland of	statewide	importance
650	Joliet-Faxon complex, 0 to 2 percent slopes	Farmland of	f statewide	importance
740D	Hawick coarse sandy loam, 9 to 14 percent slopes	Farmland of	f statewide	importance
835D2	Storden-Omsrud complex, 9 to 14 percent slopes, moderately eroded	Farmland of	statewide	importance
835E2	Storden-Omsrud complex, 14 to 18 percent slopes, moderately eroded	Farmland of	statewide	importance
1236C	Angus loam, 5 to 9 percent slopes	Farmland of	statewide	importance
1259	Biscay clay loam, depressional, 0 to 1 percent slopes	Farmland of	statewide	importance
2700C	Ridgeton loam, 5 to 9 percent slopes	Farmland of	statewide	importance
2700D	Ridgeton loam, 9 to 14 percent slopes	Farmland of	statewide	importance

Agricultural Waste Management

The table "Agricultural Waste Management" is described in this section.

Soil properties are important considerations in areas where soils are used as sites for the treatment and disposal of organic waste and wastewater. Selection of soils with properties that favor waste management can help to prevent environmental damage.

This table shows the degree and kind of soil limitations affecting the treatment of agricultural waste, including municipal and food-processing wastewater and effluent from lagoons or storage ponds. Municipal wastewater is the waste stream from a municipality. It contains domestic waste and may contain industrial waste. It may have received primary or secondary treatment. It is rarely untreated sewage. Foodprocessing wastewater results from the preparation of fruits, vegetables, milk, cheese, and meats for public consumption. In places it is high in content of sodium and chloride. In the context of this table, the effluent in lagoons and storage ponds is from facilities used to treat or store food-processing wastewater or domestic or animal waste. Domestic and food-processing wastewater is very dilute, and the effluent from the facilities that treat or store it commonly is very low in content of carbonaceous and nitrogenous material; the content of nitrogen commonly ranges from 10 to 30 milligrams per liter. The wastewater from animal waste treatment lagoons or storage ponds, however, has much higher concentrations of these materials, mainly because the manure has not been diluted as much as the domestic waste. The content of nitrogen in this wastewater generally ranges from 50 to 2,000 milligrams per liter. When wastewater is applied, checks should be made to ensure that nitrogen, heavy metals, and salts are not added in excessive amounts.

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

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

Application of manure and food-processing waste not only disposes of waste material but also can improve crop production by increasing the supply of nutrients in the soils where the material is applied. Manure is the excrement of livestock and poultry, and food-processing waste is damaged fruit and vegetables and the peelings, stems, leaves, pits, and soil particles removed in food preparation. The manure and food-processing waste are solid, slurry, or liquid. Their nitrogen content varies. A high content of nitrogen limits the application rate. Toxic or otherwise dangerous wastes, such as those mixed with the lye used in food processing, are not considered in the ratings.

The ratings are based on the soil properties that affect absorption, plant growth, microbial activity, erodibility, the rate at which the waste is applied, and the method by which the waste is applied. The properties that affect absorption include permeability, depth to a water table, ponding, the sodium adsorption ratio, depth to bedrock or a

cemented pan, and available water capacity. The properties that affect plant growth and microbial activity include reaction, the sodium adsorption ratio, salinity, and bulk density. The wind erodibility group, the soil erosion factor K, and slope are considered in estimating the likelihood that wind erosion or water erosion will transport the waste material from the application site. Stones, cobbles, a water table, ponding, and flooding can hinder the application of waste. Permanently frozen soils are unsuitable for waste treatment.

Application of sewage sludge not only disposes of waste material but also can improve crop production by increasing the supply of nutrients in the soils where the material is applied. In the context of this table, sewage sludge is the residual product of the treatment of municipal sewage. The solid component consists mainly of cell mass, primarily bacteria cells that developed during secondary treatment and have incorporated soluble organics into their own bodies. The sludge has small amounts of sand, silt, and other solid debris. The content of nitrogen varies. Some sludge has constituents that are toxic to plants or hazardous to the food chain, such as heavy metals and exotic organic compounds, and should be analyzed chemically prior to use.

The content of water in the sludge ranges from about 98 percent to less than 40 percent. The sludge is considered liquid if it is more than about 90 percent water, slurry if it is about 50 to 90 percent water, and solid if it is less than about 50 percent water.

The ratings in the table are based on the soil properties that affect absorption, plant growth, microbial activity, erodibility, the rate at which the sludge is applied, and the method by which the sludge is applied. The properties that affect absorption, plant growth, and microbial activity include permeability, depth to a water table, ponding, the sodium adsorption ratio, depth to bedrock or a cemented pan, available water capacity, reaction, salinity, and bulk density. The wind erodibility group, the soil erosion factor K, and slope are considered in estimating the likelihood that wind erosion or water erosion will transport the waste material from the application site. Stones, cobbles, a water table, ponding, and flooding can hinder the application of sludge. Permanently frozen soils are unsuitable for waste treatment.

Disposal of wastewater by irrigation not only disposes of municipal wastewater and wastewater from food-processing plants, lagoons, and storage ponds but also can improve crop production by increasing the amount of water available to crops. The ratings in the table are based on the soil properties that affect the design, construction, management, and performance of the irrigation system. The properties that affect design and management include the sodium adsorption ratio, depth to a water table, ponding, available water capacity, permeability, slope, and flooding. The properties that affect construction include stones, cobbles, depth to bedrock or a cemented pan, depth to a water table, and ponding. The properties that affect performance include depth to bedrock or a cemented pan, bulk density, the sodium adsorption ratio, salinity, reaction, and the cation-exchange capacity, which is used to estimate the capacity of a soil to adsorb heavy metals. Permanently frozen soils are not suitable for disposal of wastewater by irrigation.

A soil feature considered in the ratings for application of manure, sewage sludge, and wastewater is depth to the top of a water table (saturated zone). During August, September, and October, this depth is generally more than 60 cm in normal years. For soils that are limited by wetness, "Nov-Jul" indicates the most problematic months of the year for application of manure, sewage sludge, and wastewater. These soils may be slow to drain and can become waterlogged and boggy during periods of heavy precipitation.

Agricultural Waste Management

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table)

Pct. of map unit	manure and food- processing waste		Application of sewage sludg	e	Disposal of wastewater by irrigation	
 	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
	 	 	 - -	 	 	
 85 	 Very limited Depth to saturated zone (Nov-Jul)	 1.00 	 Very limited Depth to saturated zone (Nov-Jul)	 1.00 	 Very limited Depth to saturated zone (Nov-Jul)	 1.00
 	Ponding Leaching	1.00 0.70 	Ponding Slow water movement	1.00 0.22 	Ponding Slow water movement	1.00 0.22
 85 	 Not limited 	 	 Not limited 	 	 Somewhat limited Too steep for surface application	0.08
 90 	 Very limited Filtering capacity Droughty	1.00	Filtering capacity	1.00	Filtering capacity	 1.00 0.30
 85 	 Very limited Filtering	 	 Very limited Filtering	 1.00	 Very limited Filtering	1.00
 	capacity Droughty 	 0.30 		 0.30 	Capacity Droughty Too steep for surface application	0.30
 75 	 Very limited Depth to saturated zone (Nov-Jul)			 1.00 	 Very limited Depth to saturated zone (Nov-Jul)	1.00
 80 	 Very limited Slope 	 1.00 	 Very limited Slope 	 1.00 	 Very limited Too steep for sprinkler application Too steep for surface	 1.00 1.00
	of map unit	of manure and food processing wast unit Rating class and limiting features 85 Very limited Depth to saturated zone (Nov-Jul) Ponding Leaching 85 Not limited Filtering capacity Droughty 85 Very limited Filtering capacity Droughty 75 Very limited Depth to saturated zone (Nov-Jul)	of manure and food- map processing waste unit Rating class and Value limiting features 85 Very limited Depth to 1.00 saturated zone (Nov-Jul) Ponding 1.00 Leaching 0.70 85 Not limited Filtering 1.00 capacity Droughty 0.30 85 Very limited Filtering 1.00 capacity Droughty 0.30 85 Very limited Filtering 1.00 capacity Droughty 0.30 75 Very limited Depth to 1.00 saturated zone (Nov-Jul) 80 Very limited	of manure and food- map processing waste unit Rating class and limiting features 85 Very limited Very limited Depth to 1.00 Depth to Saturated zone Saturated zone (Nov-Jul) Ponding 1.00 Ponding Leaching 0.70 Slow water movement 85 Not limited Not limited 85 Not limited Very limited Filtering 1.00 Filtering Capacity Droughty 0.30 Droughty 85 Very limited Very limited Filtering 1.00 Filtering Capacity Droughty 0.30 Droughty 85 Very limited Very limited Filtering 1.00 Filtering Capacity Capacity Droughty 0.30 Droughty 86 Very limited Very limited Filtering 1.00 Filtering Capacity Capacity Droughty 0.30 Droughty 87 Very limited Very limited Saturated zone Saturated zone (Nov-Jul) (Nov-Jul)	of manure and food-processing waste unit Rating class and limiting features Value limiting features Very limited Depth to saturated zone (Nov-Jul) Solow water movement Solow water Depth to capacity Drought	Of manure and food processing waste Process

Agricultural Waste Management--Continued

Map symbol and soil name	Pct. of map unit	manure and food processing wast	-	Application of sewage sludg	e	Disposal of wastewater by irrigation	ı
	<u> </u> 	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
90: Okoboji, mucky, depressional,	 	 	 	 	 	 	
ponded	85 	Very limited Depth to saturated zone (Nov-Jul)	 1.00 	Very limited Depth to saturated zone (Nov-Jul)	 1.00 	Very limited Depth to saturated zone (Nov-Jul)	 1.00
	 	Ponding Leaching 	1.00 0.70 	Ponding Slow water movement	1.00 0.22 	Ponding Slow water movement	1.00 0.22
95: Harps	 85 	 Very limited Depth to saturated zone (Nov-Jul) Leaching	1.00	 Very limited Depth to saturated zone (Nov-Jul)	 1.00 	 Very limited Depth to saturated zone (Nov-Jul)	 1.00
107: Webster	 80 	 Very limited Depth to saturated zone (Nov-Jul) Leaching	 1.00 0.70	 Very limited Depth to saturated zone (Nov-Jul)	 1.00 	 Very limited Depth to saturated zone (Nov-Jul)	 1.00
108: Wadena	 85 	 Very limited Filtering capacity	 1.00	 Very limited Filtering capacity	 1.00	 Very limited Filtering capacity	1.00
108B: Wadena	 95 	 Very limited Filtering capacity 	 1.00 	 Very limited Filtering capacity 	 1.00 	 Very limited Filtering capacity Too steep for surface application	 1.00 0.08
108C: Wadena	 75 	 Very limited Filtering capacity 	 1.00 	 Very limited Filtering capacity 	 1.00 	 Very limited Filtering capacity Too steep for surface application	 1.00 0.92
135: Coland, occasionally		 	 	 	 	Too steep for sprinkler application	0.02
flooded	85 	Depth to saturated zone (Nov-Jul)	 1.00 	Very limited Depth to saturated zone (Nov-Jul)	 1.00 	saturated zone	 1.00
		Leaching Flooding 	0.70 0.60 	Flooding 	1.00	Flooding 	0.60

Map symbol and soil name	Pct. of map unit	manure and food processing wast	-	Application of sewage sludg	e	Disposal of wastewater by irrigation	ı
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
136: Ankeny, rarely flooded	 80 	 Very limited Filtering capacity	 1.00	Very limited Filtering capacity Flooding	 1.00 0.40	 Very limited Filtering capacity	 1.00
138B: Clarion	 80 	 Not limited 	 	 Not limited 	 	 Somewhat limited Too steep for surface application	0.08
138C2: Clarion, moderately eroded	 80 	 Not limited 	 	 Not limited 		 Somewhat limited Too steep for surface application Too steep for sprinkler application	 0.92 0.02
201B: Coland	 50 	Depth to saturated zone (Nov-Jul)	 1.00 0.70	 Very limited Depth to saturated zone (Nov-Jul)	 1.00 	 Very limited Depth to saturated zone (Nov-Jul)	1.00
Terril	 35 	 Not limited 	 	 Not limited 	 		 0.08
203: Cylinder	 80 	 Very limited Filtering capacity Depth to saturated zone (Nov-Jul)	 1.00 1.00	 Very limited Filtering capacity Depth to saturated zone (Nov-Jul)	 1.00 1.00	 Very limited Filtering capacity Depth to saturated zone (Nov-Jul)	 1.00 1.00
227: Wadena, loamy substratum	 70 	 Very limited Filtering capacity	 1.00	 Very limited Filtering capacity	 1.00	 Very limited Filtering capacity	 1.00
227B: Wadena, loamy substratum	 70 	 	 1.00 	Very limited Filtering capacity	 1.00 	 	 1.00 0.08

Agricultural Waste Management--Continued

Map symbol and soil name	Pct. of map	Application of manure and food processing wast	-	Application of sewage sludg	e	Disposal of wastewater by irrigation		
	unit 	Rating class and limiting features	Value	 Rating class and limiting features	Value	 Rating class and limiting features	Value	
228: Cylinder, loamy substratum	 70 	Very limited Filtering capacity Depth to saturated zone (Nov-Jul)	 1.00 1.00	Very limited iltering capacity Depth to saturated zone (Nov-Jul)	 1.00 1.00	Very limited Filtering capacity Depth to saturated zone (Nov-Jul)	 1.00 1.00	
236D: Lester	 80 	 Somewhat limited Slope 	 0.63 	 Somewhat limited Slope 	 0.63 	Very limited Too steep for surface application Too steep for sprinkler application	 1.00 0.78	
236E: Lester	 85 	 Very limited Slope 	 1.00 	 - Very limited Slope - -	 1.00 	Very limited Too steep for surface application Too steep for sprinkler application	 1.00 1.00	
236F: Lester	 80 	 Very limited Slope 	 1.00 	 Very limited Slope 	 1.00 	Very limited Too steep for sprinkler application Too steep for surface application	 1.00 1.00	
259: Biscay	 85 	 Very limited Filtering capacity Depth to saturated zone (Nov-Jul) Leaching	 1.00 1.00 0.70	 Very limited Filtering capacity Depth to saturated zone (Nov-Jul)	 1.00 1.00	 Very limited Filtering capacity Depth to saturated zone (Nov-Jul)	 1.00 1.00	
262G: Lester	 60 	 Very limited Slope 	 1.00 	 Very limited Slope 	 1.00 		 1.00 1.00	

Rating class and Value Rating class and limiting features limiting limiting features limitited limiting features limitited limitited limiting features limitited limitit	sposal of stewater irrigation	wastewat	e	cation e sludg	Appli of sewag	-	manure and food processing wast	Pct. of map unit	Map symbol and soil name
Belview		 Rating class a limiting featu	Value			Value	Rating class and	uni c 	
274: Rolfe, depressional, Depth to Depth to Saturated Zone Silwaturated Zone Silwaturated Zone Saturated Zone Saturated Zone Saturated Zone Saturated Zone Silwatu	ep for 1.00	Too steep for	 1.00 	l	. –	 1.00		 20 	
Rolfe, depressional, ponded	ep for 1.00	Too steep for			 	 	 - -	 	
Depth to saturated zone 1.00 Depth to saturated zone (Nov-Jul) (Nov-					 				Rolfe, depressional,
movement noding 1.00 Ponding Ponding 1.00 Ponding Pon	o 1.00 ted zone	Depth to saturated zo	 1.00 		Depth to saturated	:	Depth to saturated zone	85 	ponded
Biscay, loamy substratum	nt	movement			movement		movement	 	
Substratum		 			 		 	 	
Saturated zone Saturated zone Saturated zone Saturated (Nov-Jul) (No	ng 1.00	Filtering	 1.00 	l	Filtering	 1.00	Filtering	 70 	
Dundas	ted zone	saturated zo	1.00 	zone	saturated		saturated zone (Nov-Jul)	 	
Depth to 1.00 Depth to 1.00 Depth to saturated zone saturated zone saturated zone saturated zone (Nov-Jul) (Nov-Jul) (Nov-Jul) (Nov-Jul) (Nov-Jul) (Nov-Jul) Leaching 0.70 Slow water 0.22 Slow water Slow water 0.30 movement movement movement		 			 		 	 	307:
Slow water 0.30 movement	o 1.00 ted zone	Depth to		zone	Depth to saturated	:	Depth to saturated zone	80 	Dundas
Udifluvents, occasionally flooded	!	!	0.22			!	Slow water	 	
Flooding 0.60 Flooding 1.00 Flooding Leaching 0.45 Filtering 0.01 Filtering capacity capacity capacity		 	 		 	 	 	 	Udifluvents,
323B: Fort Dodge	g 0.60 ng 0.01	Filtering	1.00	l	Flooding Filtering	0.60	Flooding	80 	flooded
Fort Dodge		capacity 			capacity 		 	 	2220.
surface application	ng 1.00	Filtering	1	l	Filtering	:	Filtering	 90 	
	e	Too steep for surface application			 	 	 	 	
Le Sueur	0 1.00	: -			Depth to	:	Depth to	 90 	
(Nov-Jul) (Nov-Jul) (Nov-Jul) Too acid 0.02 Too acid 0.07 Too acid	ul)	(Nov-Jul)	0.07		(Nov-Jul)	0.02	(Nov-Jul)	 	

Agricultural Waste Management--Continued

Map symbol and soil name	Pct. of map unit	manure and food processing wast		Application of sewage sludg	e	Disposal of wastewater by irrigation	L
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
338: Garmore	 100 	 Somewhat limited Too acid		 Somewhat limited Too acid	0.07	 Somewhat limited Too acid	0.07
342: Estherville, loamy substratum	 70 	 - Very limited Filtering capacity Droughty	 1.00 0.15	 - Very limited Filtering capacity Droughty	 1.00 0.15	 - Very limited Filtering capacity Droughty	 1.00 0.15
342B: Estherville, loamy substratum	 70 	 Very limited Filtering	 1.00	 Very limited Filtering	 1.00	 Very limited Filtering	 1.00
	 	capacity Droughty	 0.15 	capacity Droughty 	 0.15 	capacity Droughty Too steep for surface application	 0.15 0.08
344B: Copaston	 80 	Droughty	 1.00 1.00 0.40	 Very limited Droughty Low adsorption Depth to bedrock	 1.00 1.00 1.00	 Very limited Droughty Depth to bedrock Filtering capacity	 1.00 1.00 0.01
345: Copaston	 35 	 Very limited Droughty Depth to bedrock Runoff	 1.00 1.00 0.40	 Very limited Droughty Low adsorption Depth to bedrock	 1.00 1.00 1.00	 Very limited Droughty Depth to bedrock Filtering capacity	 1.00 1.00 0.01
Jacwin	 25 	 Very limited Slow water movement Depth to saturated zone (Nov-Jul)	 1.00 1.00 	Very limited Slow water movement Depth to saturated zone (Nov-Jul) Low adsorption	 1.00 1.00 1.00	 Very limited Slow water movement Depth to saturated zone (Nov-Jul)	 1.00 1.00
355: Luther	 85 	 Very limited Depth to saturated zone (Nov-Jul) Slow water movement	 1.00 0.30	saturated zone	 1.00 0.22	saturated zone (Nov-Jul)	 1.00 0.22
383: Marna	 80 	Depth to saturated zone (Nov-Jul) Slow water	 1.00 1.00	 Very limited Depth to saturated zone (Nov-Jul) Slow water	 1.00 1.00	!	 1.00 1.00
	 	movement Leaching 	0.50	movement 	 	movement 	

Map symbol and soil name	Pct. of map	Application of manure and food processing wast	-	Application of sewage sludg	e	Disposal of wastewater by irrigation	1
	unit 	Rating class and limiting features	Value	 Rating class and limiting features	Value	 Rating class and limiting features	Value
385: Guckeen	 75 	Very limited Depth to saturated zone (Nov-Jul) Slow water	 1.00 0.30	Very limited Depth to saturated zone (Nov-Jul) Slow water	 1.00 0.22	Very limited Depth to saturated zone (Nov-Jul) Slow water	 1.00 0.22
386:	 	movement 		movement 	 	movement 	
Cordova	85 	Very limited Depth to saturated zone (Nov-Jul) Leaching Slow water movement	 1.00 0.50 0.30	Very limited Depth to saturated zone (Nov-Jul) Slow water movement	 1.00 0.22	Very limited Depth to saturated zone (Nov-Jul) Slow water movement	1.00
387B: Kamrar	 85 	 Very limited Depth to saturated zone (Nov-Jul)	 1.00 	 Very limited Depth to saturated zone (Nov-Jul)	 1.00 	 Very limited Depth to saturated zone (Nov-Jul)	1.00
	 	Slow water movement 	0.30 	Slow water movement 	0.22 	Slow water movement Too steep for surface application	0.22 0.08
413G: Gosport	 25 	Very limited Slope Slow water movement Depth to saturated zone (Nov-Jul)	 1.00 1.00 1.00 1.00	 Very limited Slow water movement Slope Low adsorption	 1.00 1.00 1.00 1.00	Very limited Slow water movement Too steep for sprinkler application Too steep for surface application	 1.00 1.00 1.00
Emeline	 25 	 Very limited Slope Depth to bedrock 	 1.00 1.00 	 Very limited Droughty Depth to bedrock 	 1.00 1.00 	 Very limited Droughty Too steep for sprinkler application	 1.00 1.00
Ridgeton	 25 	 Very limited Slope 	 1.00 	 Very limited Slope 	 1.00 	Very limited Too steep for sprinkler application Too steep for surface application	 1.00 1.00
457: Du Page, occasionally flooded	 85 	 Somewhat limited Flooding	 0.60	 Very limited Flooding	 1.00	 Somewhat limited Flooding	 0.60

Agricultural Waste Management--Continued

Map symbol and soil name	Pct. of map	Application of manure and food processing wast	-	Application of sewage sludg	e	Disposal of wastewater by irrigation	<u>.</u>
	unit 	 Rating class and limiting features	Value	 Rating class and limiting features	Value	 Rating class and limiting features	Value
485: Spillville, occasionally	 	 	 	 	 	 	
flooded	80 	Very limited Depth to saturated zone (Nov-Jul) Flooding	 1.00 0.60	Very limited Depth to saturated zone (Nov-Jul) Flooding	 1.00 1.00	Very limited Depth to saturated zone (Nov-Jul) Flooding	 1.00 0.60
40ED :	į		į		į		į
485B: Spillville, rarely flooded	 85 	 Not limited 	 	 Somewhat limited Flooding	 0.40	 Not limited 	
506: Wacousta, depressional,		 	 	 		 	
ponded	80 	Very limited Depth to saturated zone (Nov-Jul)	 1.00 	Very limited Depth to saturated zone (Nov-Jul)	 1.00 	Very limited Depth to saturated zone (Nov-Jul)	1.00
		Ponding Leaching	1.00	Ponding	1.00	Ponding	1.00
507:		 					
Canisteo	75 	Very limited Depth to saturated zone (Nov-Jul) Leaching	 1.00 0.70	Very limited Depth to saturated zone (Nov-Jul)	 1.00 	Very limited Depth to saturated zone (Nov-Jul)	 1.00
511: Blue Earth, depressional,		 	 	 	 	 	
ponded	 85 	 Very limited Depth to saturated zone (Nov-Jul)	 1.00 	Very limited Depth to saturated zone (Nov-Jul)	1.00	Very limited Depth to saturated zone (Nov-Jul)	1.00
	 	Ponding Leaching 	1.00	Ponding Slow water movement	1.00	Ponding Slow water movement	1.00
526: Wacousta, mucky, depressional,		 	 	 	 	 	
ponded	90	Very limited Depth to saturated zone (Nov-Jul) Ponding Localing	 1.00 1.00	Very limited Depth to saturated zone (Nov-Jul) Ponding	 1.00 1.00	Very limited Depth to saturated zone (Nov-Jul) Ponding	 1.00 1.00
536: Hanlon, occasionally		Leaching 	0.70 	 	 	 	
flooded	1	 Somewhat limited Flooding Filtering capacity	 0.60 0.01 	 Very limited Flooding Filtering capacity	 1.00 0.01 	 Somewhat limited Flooding Filtering capacity	0.60

Agricultural Waste Management--Continued

Map symbol and soil name	Pct. of map unit	manure and food processing wast	l-	Application of sewage sludg	e	Disposal of wastewater by irrigation	ı
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
541C: Estherville	 45 	 Very limited Filtering	 1.00	 Very limited Filtering	 1.00	 Very limited Filtering	 1.00
		capacity Droughty 	0.30	capacity Droughty 	 0.30 	capacity Too steep for surface application	 0.92
Hawick	 45	 Very limited	 	 Very limited	 	Droughty Very limited	0.30
		Filtering capacity Droughty	1.00	Filtering capacity Droughty	1.00 0.74	Filtering capacity Too steep for	1.00
	 		į Į	broughty		surface application	
551B:	 	Leaching 	0.45 	 	 	Droughty 	0.74
Calamine	85 	Very limited Slow water movement	1.00	Very limited Slow water movement	1.00	 Very limited Slow water movement	1.00
	 	Depth to saturated zone (Nov-Jul)	1.00	Depth to saturated zone (Nov-Jul)	1.00	Depth to saturated zone (Nov-Jul)	1.00
	 	Runoff	0.40	Low adsorption	1.00	Too steep for surface application	0.08
551D: Calamine	 55 	 Very limited Slow water	1.00	 Very limited Slow water	1.00	 Very limited Slow water	1.00
	 	movement Depth to saturated zone (Nov-Jul)	1.00	movement Depth to saturated zone (Nov-Jul)	 1.00 	movement Depth to saturated zone (Nov-Jul)	1.00
	 	Runoff	0.40	Low adsorption	1.00	Too steep for surface application	1.00
559: Talcot	85			 Very limited		 Very limited	
	 	Filtering capacity Depth to	1.00 1.00	Filtering capacity Depth to	1.00 1.00	Filtering capacity Depth to	1.00 1.00
	 	saturated zone (Nov-Jul) Leaching	 0.70	saturated zone (Nov-Jul)	 	saturated zone (Nov-Jul)	
561: Talcot, loamy	 	 		 	 	 - -	
substratum	70 	Very limited Filtering capacity	 1.00 	Very limited Filtering capacity	 1.00 	Very limited Filtering capacity	 1.00
	 	Depth to saturated zone (Nov-Jul)	1.00 	Depth to saturated zone (Nov-Jul)	1.00 	Depth to saturated zone (Nov-Jul)	1.00
		Leaching 	0.70	 		 	

Agricultural Waste Management--Continued

Map symbol and soil name	Pct. of map	Application of manure and food processing wast	-	Application of sewage sludg	e	Disposal of wastewater by irrigation	ı
	unit 	Rating class and limiting features	Value	 Rating class and limiting features	Value	 Rating class and limiting features	Value
566C: Moingona	 90 	 Not limited 	 	 Not limited 		Somewhat limited Too steep for surface application Too steep for sprinkler application	 0.92 0.02
568D: Cokato	 80 	 Somewhat limited Slope 	 0.04 	 Somewhat limited Slope 	 0.04 	Very limited Too steep for surface application Too steep for sprinkler application	 1.00 0.22
568E: Cokato	 80 	 Very limited Slope 	 1.00 	 Very limited Slope 	 1.00 	 Very limited Too steep for surface application Too steep for sprinkler application	 1.00 1.00
583: Minnetonka	 90 	 Very limited Depth to saturated zone (Nov-Jul) Slow water movement Runoff	 1.00 1.00 0.40	Very limited Depth to saturated zone (Nov-Jul) Slow water movement Too acid	 1.00 1.00 0.07	 Very limited Depth to saturated zone (Nov-Jul) Slow water movement Too acid	 1.00 1.00 0.07
606: Lanyon, depressional, ponded	 80 	 Very limited Depth to saturated zone (Nov-Jul) Slow water movement Ponding	 1.00 1.00	Very limited Depth to saturated zone (Nov-Jul) Slow water movement Ponding	 1.00 1.00	Very limited Depth to saturated zone (Nov-Jul) Slow water movement Ponding	 1.00 1.00
625: Lerdal	 80 	 Very limited Depth to saturated zone (Nov-Jul) Slow water movement	 1.00 0.30 0.03	 Very limited Depth to saturated zone (Nov-Jul) Slow water movement Too acid	 1.00 0.22 0.14	 Very limited Depth to saturated zone (Nov-Jul) Slow water movement	 1.00 0.22 0.14

Map symbol and soil name	Pct. of map unit	manure and food processing wast	Application of sewage sludg 	e	Disposal of wastewater by irrigation		
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
636: Buckney, rarely flooded	 85 	 	 1.00 0.92	Very limited Filtering capacity Droughty Flooding	 1.00 0.92 0.40	 Very limited Filtering capacity Droughty	 1.00 0.92
636B: Buckney, rarely flooded	 90 	 Very limited Filtering capacity Droughty	 1.00 0.92 	Very limited Filtering capacity Droughty Flooding	 1.00 0.92 0.40	 Very limited Filtering capacity Droughty Too steep for surface application	 1.00 0.92 0.08
638C2: Clarion, moderately eroded	 50 	 Not limited 	 	 		Somewhat limited Too steep for surface application Too steep for sprinkler application	 0.92 0.02
Storden, moderately eroded	 35 	 Not limited 	 	 Not limited 	 	Somewhat limited Too steep for surface application Too steep for sprinkler application	 0.92 0.02
650: Joliet	 45 	 Very limited Depth to saturated zone (Nov-Jul) Depth to bedrock Droughty	1.00	 Very limited Depth to saturated zone (Nov-Jul) Low adsorption Depth to bedrock	 1.00 1.00 1.00	Very limited Depth to saturated zone (Nov-Jul) Depth to bedrock Droughty	 1.00 1.00
Faxon	 45 	Very limited Depth to saturated zone (Nov-Jul) Leaching Depth to bedrock	 1.00 0.70	Very limited Depth to saturated zone (Nov-Jul) Low adsorption Depth to bedrock	 1.00 1.00	Very limited Depth to saturated zone (Nov-Jul) Depth to bedrock Droughty	 1.00
715: Fluvaquents, frequently flooded	 65 	 Very limited Filtering capacity Depth to saturated zone (Nov-Jul)	 1.00 1.00	 Very limited Filtering capacity Depth to saturated zone (Nov-Jul)	 1.00 1.00	Very limited Filtering capacity Depth to saturated zone (Nov-Jul)	 1.00 1.00

Agricultural Waste Management--Continued

Map symbol and soil name	Pct. of map	Application of manure and food processing wast	-	Application of sewage sludg	e	Disposal of wastewater by irrigation	ı
	unit 	 Rating class and limiting features	Value	 Rating class and limiting features	Value	 Rating class and limiting features	Value
735: Havelock, occasionally	 	 	 	 		 	
flooded	 85 	Very limited Depth to saturated zone (Nov-Jul)	 1.00 	 Very limited Depth to saturated zone (Nov-Jul)	1.00	 Very limited Depth to saturated zone (Nov-Jul)	 1.00
	 	Leaching Flooding 	0.70 0.60 	Flooding Filtering capacity 	1.00 0.01 	Flooding Filtering capacity	0.60 0.01
740D: Hawick	 80 	 Very limited Filtering	 1.00	 Very limited Filtering	1.00	 Very limited Filtering	 1.00
	 	capacity Droughty Slope	 0.74 0.63	capacity Droughty Slope	0.74	capacity Too steep for surface	1.00
	 	 	 	 	 	application Too steep for sprinkler application	 0.78
775B: Billett	90	Filtering	 1.00	 Very limited Filtering	1.00	 Very limited Filtering	1.00
	 	capacity Too acid 	 0.02 	capacity Too acid 	 0.07 	capacity Too acid 	0.07
775C: Billett	 85 	 Very limited Filtering	 1.00	 Very limited Filtering	 1.00	 Very limited Filtering	 1.00
	 	capacity Too acid Slope	 0.02 0.01	capacity Too acid Slope	0.07	capacity Too steep for surface	1.00
	 		 			application Too steep for sprinkler application	0.10
777B: Wapsie	 85 	 Very limited Filtering	 1.00	 Very limited Filtering	 1.00	 Very limited Filtering	 1.00
		capacity 		capacity	 	capacity Too steep for surface application	0.08
835D2: Storden, moderately eroded	 50	 Somewhat limited	 	 Somewhat limited	 	 Very limited	
		Slope	0.63	Slope	0.63	Too steep for surface application	1.00
	 	 	 	 		Too steep for sprinkler application	0.78

Map symbol and soil name	Pct. of map unit	of manure and food- map processing waste		Application of sewage sludg	e	Disposal of wastewater by irrigation		
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	
835D2: Omsrud, moderately eroded	 35 	 Somewhat limited Slope 	 0.63 	 Somewhat limited Slope 	 0.63 	 Very limited Too steep for surface application Too steep for sprinkler application	 1.00 0.78	
835E2: Storden, moderately eroded	 50 	 Very limited Slope 	 1.00 	 Very limited Slope 	 1.00 	 Very limited Too steep for surface application Too steep for sprinkler application	 1.00 	
Omsrud, moderately eroded	 35 	 Very limited Slope 	 1.00 	 Very limited Slope 	 1.00 	Very limited Too steep for surface application Too steep for sprinkler application	 1.00 1.00	
836B: Kilkenny	 65 	 Somewhat limited Slow water movement Too acid	 0.30 0.05 	 Somewhat limited Slow water movement Too acid	 0.22 0.21 	Somewhat limited Slow water movement Too acid Too steep for surface application	 0.22 0.21 0.08	
854D: Fens, Aquolls	 80 	 Very limited Depth to saturated zone (Nov-Jul) Leaching Slope	 1.00 0.90 0.16	 Very limited Depth to saturated zone (Nov-Jul) Slope	 1.00 0.16 		 1.00 1.00 0.40	
855: Shorewood	 85 	 Very limited Depth to saturated zone (Nov-Jul) Slow water movement	 1.00 0.89	 Very limited Depth to saturated zone (Nov-Jul) Slow water movement	 1.00 0.78	 Very limited	 1.00 0.78	

Agricultural Waste Management--Continued

Map symbol and soil name	Pct. of map unit	Application of manure and food processing wast	-	Application of sewage sludg	e	Disposal of wastewater by irrigation	1
	 	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
956:		 				 	
Harps	45 	Very limited Depth to saturated zone (Nov-Jul) Leaching	 1.00 0.70	 Very limited Depth to saturated zone (Nov-Jul)	 1.00 	Very limited Depth to saturated zone (Nov-Jul)	1.00
Okoboji,		 		1		 	
depressional,						 	i
ponded	35 	Very limited Depth to saturated zone (Nov-Jul) Ponding Leaching	 1.00 1.00 0.70	Very limited Depth to saturated zone (Nov-Jul) Ponding Slow water movement	 1.00 1.00 0.22	Very limited Depth to saturated zone (Nov-Jul) Ponding Slow water movement	 1.00 1.00 0.22
1007:							
Cosmos, bouldery	 65 	 Very limited Depth to saturated zone (Nov-Jul)	 1.00 	 Very limited Depth to saturated zone (Nov-Jul)	 1.00 	 Very limited Depth to saturated zone (Nov-Jul)	 1.00
	 	Slow water movement Leaching	1.00 0.50	Slow water movement 	1.00 	Slow water movement 	1.00
1055B: Kandiyohi, bouldery	 65 	 Very limited Depth to saturated zone	 1.00	 Very limited Depth to saturated zone	 1.00	 Very limited Depth to saturated zone	 1.00
	 	(Nov-Jul) Slow water movement	1.00	(Nov-Jul) Slow water movement	1.00	(Nov-Jul) Slow water movement	1.00
	 	Leaching 	0.50			Too steep for surface application	0.08
1138B: Clarion	 65 	 Not limited 	 	 Not limited 		 Somewhat limited Too steep for surface application	0.08
1236B: Angus	 85 	 Not limited 	 	 Not limited 	 	 Somewhat limited Too steep for surface application	0.08
1236C: Angus	 80 	 Not limited 	 	 Not limited 	 	 Somewhat limited Too steep for surface application	 0.92
	 		 			application Too steep for sprinkler application	0.02

Pct. of map unit	manure and food processing wast		Application of sewage sludg	e	Disposal of wastewater by irrigation 	n			
	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value			
80 	Very limited Filtering capacity Depth to saturated zone	 1.00 1.00	Very limited Filtering capacity Depth to saturated zone	 1.00 1.00	Very limited Filtering capacity Depth to saturated zone	 1.00 1.00			
 	(Nov-Jul) Ponding 	1.00	(Nov-Jul) Ponding 	1.00	(Nov-Jul) Ponding 	1.00			
 80 	Depth to	1.00	 Very limited Depth to	1.00	 Very limited Depth to	1.00			
 	(Nov-Jul) Slow water movement Leaching	1.00	(Nov-Jul) Slow water movement	1.00	(Nov-Jul) Slow water movement	1.00			
 40 	 Very limited Depth to saturated zone (Nov-Jul)	 1.00 	 Very limited Depth to saturated zone (Nov-Jul)	 1.00 	 Very limited Depth to saturated zone (Nov-Jul)	 1.00			
 25 	 Very limited Depth to saturated zone (Nov-Jul)	 1.00 	 Very limited Depth to saturated zone (Nov-Jul)	 1.00 	 Very limited Depth to saturated zone (Nov-Jul)	 1.00 			
 	Slow water movement	0.30	Slow water movement	0.22	Slow water movement	0.22			
 65 	Somewhat limited Slow water movement Too acid	 0.30 0.05 	 Somewhat limited Slow water movement Too acid	 0.22 0.21 	Somewhat limited Slow water movement Too acid Too steep for surface application	 0.22 0.21 0.08			
 25 	Depth to saturated zone (Nov-Jul) Slow water	 1.00 0.89		 1.00 0.78	saturated zone (Nov-Jul) Slow water	 1.00 0.78			
 75			movement Not limited		movement Somewhat limited				
 	 	 	 	 	Too steep for surface application Too steep for sprinkler	0.92			
	of map unit	of manure and food map processing wast unit Rating class and limiting features 80 Very limited Filtering capacity Depth to saturated zone (Nov-Jul) Ponding 80 Very limited Depth to saturated zone (Nov-Jul) Slow water movement Leaching 40 Very limited Depth to saturated zone (Nov-Jul) 25 Very limited Depth to saturated zone (Nov-Jul) 25 Very limited Depth to saturated zone (Nov-Jul) 5 Very limited Depth to saturated zone (Nov-Jul) 65 Somewhat limited Slow water movement Too acid 10 Very limited Depth to saturated zone (Nov-Jul) 11 Very limited Slow water movement 12 Very limited Slow water movement 13 Very limited Slow water movement 14 Very limited Slow water movement 15 Very limited Depth to saturated zone (Nov-Jul) 15 Very limited Depth to saturated zone (Nov-Jul)	of manure and food- map processing waste unit Rating class and Value Iimiting features	of manure and food- map processing waste unit Rating class and limiting features Rating class and limiting features Very limited	Of	Manure and food-processing waste Depth to Saturated zone Nov-Jul) Slow water Depth to Saturated zone Nov-Jul) Slow water Depth to Saturated zone Nov-Jul) Slow water Depth to Saturated zone Nov-Jul) Slow water Depth to Saturated zone Nov-Jul) Slow water Depth to Saturated zone Saturated zone Saturated zone Saturated zone Nov-Jul) Slow water Depth to Saturated zone Saturated zone Nov-Jul) Slow water Depth to Saturated zone Sa			

Agricultural Waste Management--Continued

Map symbol and soil name	Pct. of map unit	manure and food processing wast	-	Application of sewage sludg	e	Disposal of wastewater by irrigation	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
2700D: Ridgeton	 80 	 Somewhat limited Slope 	 0.63 	 Somewhat limited Slope 	 0.63 	Very limited Too steep for surface application Too steep for sprinkler application	 1.00 0.78
4000: Urban land	 100	 Not rated	 	 Not rated	 	 Not rated	
4055: Nicollet	 50 	 Very limited Depth to saturated zone (Nov-Jul)	 1.00 	Very limited Depth to saturated zone (Nov-Jul)	 1.00	 Very limited Depth to saturated zone (Nov-Jul)	 1.00
Urban land	 50 	 Not rated 	 	 Not rated 	 	 Not rated 	
4107: Webster	 60 	 Very limited Depth to saturated zone (Nov-Jul) Leaching	 1.00 0.70	 Very limited Depth to saturated zone (Nov-Jul)	 1.00 	 Very limited Depth to saturated zone (Nov-Jul)	 1.00
Urban land	 40 	 Not rated 	 	 Not rated 	 	 Not rated 	
4138B: Clarion	 50 	 Not limited 	 	 Not limited 	 	 Somewhat limited Too steep for surface application	 0.08
Urban land	 30 	 Not rated 	 	 Not rated 	 	 Not rated 	
4235B: Angus	 60 	 Not limited 	 	 Not limited 	 	Somewhat limited Too steep for surface application	 0.08
Urban land	 40 	 Not rated 	 	 Not rated 	 	 Not rated 	
4236D: Lester	50 	 Somewhat limited Slope 	 0.63 	 Somewhat limited Slope 	 0.63 	Very limited Too steep for surface application Too steep for sprinkler application	 1.00 0.78
Urban land	50 	 Not rated 	 	 Not rated 		 Not rated 	

and soil name of	Pct. of map	Application of manure and food processing wast	-	Application of sewage sludg 	e	Disposal of wastewater by irrigation	n		
	unit 	Rating class and limiting features	Value	 Rating class and limiting features	Value	 Rating class and limiting features	Value		
4325:		 							
Le Sueur	60 	 Very limited Depth to saturated zone	 1.00	 Very limited Depth to saturated zone	1.00	 Very limited Depth to saturated zone	1.00		
	 	(Nov-Jul) Too acid	 0.02	(Nov-Jul) Too acid	 0.07	(Nov-Jul) Too acid	0.07		
Urban land	 40 	 Not rated 	 	 Not rated 	 	 Not rated 			
4444:									
Jacwin	50 	Very limited Slow water movement	 1.00 	Very limited Slow water movement	 1.00 	Very limited Slow water movement	1.00		
	 	Depth to saturated zone (Nov-Jul)	1.00 	Depth to saturated zone (Nov-Jul) Low adsorption	1.00 1.00	Depth to saturated zone (Nov-Jul)	1.00 		
Urban land		Not rated	 	 Not rated	į	 Not rated			
	30								
4507: Canisteo 5	 50 	 Very limited Depth to saturated zone	 1.00	 Very limited Depth to saturated zone	 1.00	 Very limited Depth to saturated zone	 1.00		
		(Nov-Jul)	0.70	(Nov-Jul)		(Nov-Jul)			
Urban land	 50	 Not rated		 Not rated		 Not rated			
4551B:	 			 		 			
Calamine	50 	 Very limited Slow water movement	 1.00	 Very limited Slow water movement	1.00		1.00		
	 	Depth to saturated zone (Nov-Jul)	 1.00 	Depth to saturated zone (Nov-Jul)	1.00	Depth to saturated zone (Nov-Jul)	1.00		
	 	Runoff	0.40	Low adsorption	1.00	Too steep for surface application	0.08		
Urban land	50	 Not rated		 Not rated		 Not rated			
4551D:	 	 	 	 		 			
Calamine	50	!	1.00	Very limited Slow water	1.00	!	1.00		
	 	saturated zone	 1.00 	movement Depth to saturated zone	1.00	movement Depth to saturated zone	1.00		
	 	(Nov-Jul) Runoff 	 0.40 	(Nov-Jul) Low adsorption 	 1.00 	(Nov-Jul) Too steep for surface application	1.00		
Urban land	 50	 Not rated		 Not rated		 Not rated			

Agricultural Waste Management--Continued

and soil name of map	Pct. of map unit	manure and food processing waste	-	Application of sewage sludg	e	Disposal of wastewater by irrigation			
	 	Rating class and	Value	Rating class and limiting features	Value	Rating class and	Value		
4635: Buckney	 50 	 Very limited Filtering capacity	1.00	 Very limited Filtering capacity	1.00	 Very limited Filtering capacity			
Urban land	 50	Droughty Not rated	İ	Droughty Not rated	0.92 	Droughty Not rated	0.92 		
							į		
4635B: Buckney	 50 	 Very limited Filtering capacity Droughty	1.00	 Very limited Filtering capacity Droughty		 Very limited Filtering capacity Droughty	 1.00 0.92		
Urban land	 50	 Not rated		 Not rated		 Not rated			
4946B: Udorthents	 70	 Not rated	 	 Not rated	 	 Not rated			
Highway	 30	 Not rated 	 	 Not rated 	 	 Not rated 			
5010: Pits, sand and gravel	 100	 Not rated	 	 Not rated	 	 Not rated			
5030: Pits, limestone quarries	 100	 Not rated	 	 Not rated	 	 Not rated	 		
5035: Pits, gypsum quarries	 100	 Not rated	 	 Not rated	 	 Not rated			
5040: Udorthents, loamy	 100	 Not rated	 	 Not rated	 	 Not rated			
5049: Aquolls, ponded	 60	 Not rated	 	 Not rated	 	 Not rated			
Udorthents, loamy	30	 Not rated		 Not rated		 Not rated			
5060: Pits, clay	 100	 Not rated	 	 Not rated	 	 Not rated			
5080: Udorthents	 100	 Not rated	 	 Not rated	 	 Not rated			
5457: Du Page, channeled, frequently flooded	 80 	 Very limited Flooding	 1.00	 Very limited Flooding	 1.00	 Very limited Flooding	 1.00		

Agricultural Waste Management--Continued

Map symbol	Pct.			Application		Disposal of	
map	of map unit	manure and food- comprocessing waste		of sewage sludge 		wastewater by irrigation 	
	 	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
5507:	 		 	 		 	
Corvuso	 	Very limited Depth to saturated zone (Nov-Jul) Slow water movement Leaching Very limited Depth to saturated zone (Nov-Jul) Slow water movement Leaching	1.00	Very limited Depth to saturated zone (Nov-Jul) Slow water movement Very limited Depth to saturated zone (Nov-Jul) Slow water movement	1.00 1.00 	Very limited Depth to saturated zone (Nov-Jul) Slow water movement Very limited Depth to saturated zone (Nov-Jul) Slow water movement	1.00 1.00 1.00 1.00 1.00 1.00
AW: Animal waste lagoon	 100			 Not rated		 Not rated	
GL: Sewage lagoon	 100	Not rated	 	 Not rated	 	 Not rated	
W: Water	 100	Not rated	 	 Not rated	 	 Not rated	

Recreational Development

The titles of the tables described in this section are:

- "Camp Areas, Picnic Areas, and Playgrounds"
- "Paths, Trails, and Golf Fairways"

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

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

The ratings in the tables are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, vegetation, access to water, potential water impoundment sites, and access to public sewer lines. The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation also are important. Soils that are subject to flooding are limited for recreational uses by the duration and intensity of flooding and the season when flooding occurs. In planning recreational facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

The information in these tables can be supplemented by other information in this survey, for example, interpretations for dwellings without basements, for local roads and streets, and for septic tank absorption fields.

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

surface layer, depth to a water table, ponding, flooding, permeability, and large stones. The soil properties that affect the growth of plants are depth to bedrock or a cemented pan, permeability, and toxic substances in the soil.

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

Playgrounds require soils that are nearly level, are free of stones, and can withstand intensive foot traffic. The ratings are based on the soil properties that affect the ease of developing playgrounds and that influence trafficability and the growth of vegetation after development. Slope and stoniness are the main concerns affecting the development of playgrounds. For good trafficability, the surface of the playgrounds should absorb rainfall readily, remain firm under heavy foot traffic, and not be dusty when dry. The soil properties that influence trafficability are texture of the surface layer, depth to a water table, ponding, flooding, permeability, and large stones. The soil properties that affect the growth of plants are depth to bedrock or a cemented pan, permeability, and toxic substances in the soil.

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

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

Golf fairways are subject to heavy foot traffic and some light vehicular traffic. Cutting or filling may be required. Irrigation is not considered in the ratings. The ratings are based on the soil properties that affect plant growth and trafficability after vegetation is established. The properties that affect plant growth are reaction; depth to a water table; ponding; depth to bedrock or a cemented pan; the available water capacity in the upper 40 inches; the content of salts, sodium, or calcium carbonate; and sulfidic materials. The properties that affect trafficability are flooding, depth to a water table, ponding, slope, stoniness, and the amount of sand, clay, or organic matter in the surface layer. The suitability of the soil for traps, tees, roughs, and greens is not considered in the ratings.

Camp Areas, Picnic Areas, and Playgrounds

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table)

and soil name o	Pct. of map unit	- 		Picnic areas		Playgrounds 	3		
	unii c 	Rating class and limiting features	Value	Rating class and limiting features	Value	 Rating class and limiting features	Value		
6: Okoboji, depressional, ponded	 85 	 Very limited Depth to saturated zone Ponding Slow water movement	 1.00 1.00 0.15	 	 1.00 1.00 0.15	 Very limited Depth to saturated zone Ponding Slow water movement	 1.00 1.00 0.15		
27B: Terril	 85 	 Not limited 	 	 Not limited 	 	 Somewhat limited Slope	 0.50		
34: Estherville	 90 	 Not limited 	 	 Not limited 	 	 Somewhat limited Gravel content	0.37		
34B: Estherville	 85 	 Not limited 	 	 Not limited 	 	 Somewhat limited Slope Gravel content	0.50		
55: Nicollet	 75 	 Very limited Depth to saturated zone	 1.00 	 Very limited Depth to saturated zone	 1.00 	 Very limited Depth to saturated zone Gravel content	 1.00 0.01		
62F: Storden	 80 	 Very limited Slope 	 1.00	 Very limited Slope 	 1.00	 Very limited Slope 	 1.00		
90: Okoboji, mucky, depressional, ponded	 85 	 Very limited Depth to saturated zone Ponding Slow water movement	 1.00 1.00 0.15	 Very limited Depth to saturated zone Ponding Slow water movement	 1.00 1.00 0.15	Very limited Depth to saturated zone Ponding Slow water movement	 1.00 1.00 0.15		
95: Harps	 85 	 Not rated 		 Not rated 	 	 Not rated 			
107: Webster	 80 	 Very limited Depth to saturated zone	 1.00 	 Very limited Depth to saturated zone	 1.00 	 Very limited Depth to saturated zone	1.00		
108: Wadena	 85	 Not limited		 Not limited		 Not limited			

Camp Areas, Picnic Areas, and Playgrounds--Continued

Map symbol and soil name	Pct. of map unit				Playgrounds 		
	unit 	 Rating class and limiting features	Value	 Rating class and limiting features	Value	 Rating class and limiting features	Value
108B: Wadena	 95 	 Not limited 	 	 Not limited 	 	 Somewhat limited Slope	
108C: Wadena	 75 	 Not limited 	 	 Not limited 		 Very limited Slope	1.00
135: Coland, occasionally flooded		 Very limited Depth to saturated zone Flooding	 1.00 1.00	 Very limited Depth to saturated zone	 1.00	Very limited Depth to saturated zone Flooding	1.00
136: Ankeny, rarely flooded	 80	 Very limited Flooding	 1.00	 Not limited 	 	 Not limited 	
138B: Clarion	 80 	 Not limited 	 	 Not limited 		 Somewhat limited Slope	 0.50
138C2: Clarion, moderately eroded	 80 	 Not limited 	 	 Not limited 	 	 Very limited Slope	
201B: Coland	 50 	 Very limited Depth to saturated zone	 1.00 	 Very limited Depth to saturated zone	 1.00 	 Very limited Depth to saturated zone Slope	 1.00 0.12
Terril	 35 	 Not limited 	 	 Not limited 		 Somewhat limited Slope	 0.50
203: Cylinder	 80 	 Very limited Depth to saturated zone	 1.00	Very limited Depth to saturated zone	 1.00	 Very limited Depth to saturated zone	
227: Wadena, loamy substratum	 70	 Not limited		 Not limited		 Not limited	
227B: Wadena, loamy substratum	 70 	 Not limited		 Not limited 		 Somewhat limited Slope	
228: Cylinder, loamy substratum	 70 	 Very limited Depth to saturated zone	 1.00	 	 1.00	 	

Camp Areas, Picnic Areas, and Playgrounds--Continued

Map symbol and soil name	Pct. of map	- 		Picnic areas		Playgrounds 	
	unit 	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
236D: Lester	 80 	 Somewhat limited Slope	 0.63	 Somewhat limited Slope	 0.63	 Very limited Slope	1.00
236E: Lester	 85 	 Very limited Slope	 1.00	 Very limited Slope	 1.00	 Very limited Slope	 1.00
236F: Lester	 80 	 Very limited Slope	1.00	 Very limited Slope	1.00	 Very limited Slope	1.00
259: Biscay	 85 	 Very limited Depth to saturated zone	 1.00	 Very limited Depth to saturated zone	 1.00	 Very limited Depth to saturated zone	1.00
262G: Lester	 60 	 Very limited Slope	1.00	 Very limited Slope	1.00	 Very limited Slope	1.00
Belview	 20 	 Very limited Slope	1.00	 Very limited Slope	1 1.00	 Very limited Slope	1.00
274: Rolfe, depressional, ponded		 Very limited Depth to saturated zone Ponding Slow water movement	 1.00 1.00 0.94	 Very limited Depth to saturated zone Ponding Slow water movement	 1.00 1.00 0.94	 Very limited Depth to saturated zone Ponding Slow water movement	 1.00 1.00 0.94
278: Biscay, loamy substratum	 70 	 Very limited Depth to saturated zone	 1.00	 - Very limited Depth to saturated zone	 1.00	 - Very limited Depth to saturated zone	 1.00
307: Dundas	 80 	Very limited Depth to saturated zone Slow water movement	 1.00 0.15	 Very limited Depth to saturated zone Slow water movement	 1.00 0.15	Very limited Depth to saturated zone Slow water movement	 1.00 0.15
315B: Udifluvents, occasionally flooded	 80 	 	 1.00	 Not limited 	 	 Somewhat limited Flooding Slope	0.60
323B: Fort Dodge	 90 	 Not limited 	 	 Not limited 	 	 Somewhat limited Slope 	0.50

Camp Areas, Picnic Areas, and Playgrounds--Continued

Map symbol and soil name	 Pct. of map unit	of map		 Picnic areas 		 Playgrounds 	
	 	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
325: Le Sueur	 90 	 Very limited Depth to saturated zone	 1.00	 Very limited Depth to saturated zone	 1.00	Very limited Depth to saturated zone	 1.00
338: Garmore	 100	 Not limited	 	 Not limited	 	 Not limited	
342: Estherville, loamy substratum	 70	 Not limited 	 	 Not limited 	 	 Somewhat limited Gravel content	0.37
342B: Estherville, loamy substratum	 70 	 	 	 Not limited 		 Somewhat limited Slope Gravel content	0.50
344B: Copaston	 80 	 Very limited Depth to bedrock 		 Very limited Depth to bedrock 	1	 Very limited Depth to bedrock Gravel content Slope	 1.00 0.27 0.12
345: Copaston	 35 	 Very limited Depth to bedrock 		 Very limited Depth to bedrock 	1	 Very limited Depth to bedrock Gravel content Slope	 1.00 0.27 0.12
Jacwin	 25 	Very limited Depth to saturated zone Slow water movement	 1.00 1.00	Very limited Depth to saturated zone Slow water movement	 1.00 1.00	Very limited Depth to saturated zone Slow water movement	 1.00 1.00
355: Luther	 85 	 Very limited Depth to saturated zone Slow water movement	 1.00 0.15	 Very limited Depth to saturated zone Slow water movement	 1.00 0.15	 Very limited Depth to saturated zone Slow water movement	 1.00 0.15
383: Marna	 80 	 Very limited Depth to saturated zone Slow water movement	 1.00 0.94 	saturated zone	 1.00 0.94 	 Very limited Depth to saturated zone Slow water movement	 1.00 0.94
385: Guckeen	 75 	 Very limited Depth to saturated zone Slow water movement	 1.00 0.15	 Very limited Depth to saturated zone Slow water movement	 1.00 0.15	 Very limited Depth to saturated zone Slow water movement	 1.00 0.15

Camp Areas, Picnic Areas, and Playgrounds--Continued

Map symbol and soil name	Pct. of map unit	E		 Picnic areas 		 Playgrounds 	
	 	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
386: Cordova	 85 	 Very limited Depth to saturated zone Slow water movement	 1.00 0.15	Very limited Depth to saturated zone Slow water movement	 1.00 0.15	Very limited Depth to saturated zone Slow water movement	 1.00 0.15
387B: Kamrar	 85 	 Somewhat limited Depth to saturated zone Slow water movement	 0.39 0.15	 Somewhat limited Depth to saturated zone Slow water movement	 0.19 0.15	 Somewhat limited Slope Depth to saturated zone Slow water movement	 0.50 0.39 0.15
413G: Gosport	 25 	 Very limited Slope Slow water movement Depth to saturated zone	 1.00 1.00 0.39	 Very limited Slope Slow water movement Depth to saturated zone	 1.00 1.00 0.19	 Very limited Slope Slow water movement Depth to bedrock	 1.00 1.00 0.46
Emeline	 25 	 Very limited Slope Depth to bedrock 	 1.00 1.00	 Very limited Slope Depth to bedrock	 1.00 1.00	 Very limited Slope Depth to bedrock Gravel content	 1.00 1.00 0.77
Ridgeton	 25 	 Very limited Slope	 1.00	 Very limited Slope	 1.00	 Very limited Slope	 1.00
457: Du Page, occasionally flooded	 85 	 Very limited Flooding	 1.00	 Not limited 	 	 Somewhat limited Flooding	 0.60
485: Spillville, occasionally flooded	 80 	 Very limited Depth to saturated zone Flooding	 1.00	 Very limited Depth to saturated zone	 1.00	Very limited Depth to saturated zone Flooding	 1.00 0.60
485B: Spillville, rarely flooded	 85 	 Very limited Flooding	 1.00	 Not limited 	 	 Somewhat limited Slope	 0.12
506: Wacousta, depressional, ponded	 80 	 - Very limited Depth to saturated zone Ponding	 1.00 1.00	 - Very limited Depth to saturated zone Ponding	 1.00 1.00	 - Very limited Depth to saturated zone Ponding	 1.00 1.00

Camp Areas, Picnic Areas, and Playgrounds--Continued

Map symbol and soil name	Pct. of map unit			Picnic areas 		 Playgrounds 	
	 	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
507: Canisteo	 75 	 Very limited Depth to saturated zone	 1.00	 Very limited Depth to saturated zone	 1.00	 Very limited Depth to saturated zone	
511: Blue Earth, depressional, ponded	 85 	 Very limited Depth to saturated zone Ponding	 1.00 1.00	 Very limited Depth to saturated zone Ponding	 1.00 1.00	 	 1.00 1.00
526: Wacousta, mucky, depressional, ponded	 90 	 	 1.00	 	 1.00	 	 1.00
536: Hanlon, occasionally flooded		 Very limited Flooding	 1.00	 - Not limited 	 	 Somewhat limited Flooding	0.60
541C: Estherville	 45 	 Not limited 	 	 Not limited 	 	 Very limited Slope Gravel content	 1.00 0.37
Hawick	 45 	 Not limited 	 	 Not limited 	 	 Very limited Slope Gravel content	 1.00 0.59
551B: Calamine	 85 	 Very limited Depth to saturated zone Slow water movement	 1.00 1.00 	 Very limited Depth to saturated zone Slow water movement	 1.00 1.00 	 Very limited Depth to saturated zone Slow water movement Slope	 1.00 1.00 0.50
551D: Calamine	 55 	 Very limited Depth to saturated zone Slow water movement Slope	 1.00 1.00 0.16	 Very limited Depth to saturated zone Slow water movement Slope	 1.00 1.00 0.16	 Very limited Depth to saturated zone Slow water movement Slope	 1.00 1.00 1.00
559: Talcot	 85 	 Very limited Depth to saturated zone	 1.00 	 Very limited Depth to saturated zone	 1.00 	 Very limited Depth to saturated zone	1.00

Camp Areas, Picnic Areas, and Playgrounds--Continued

Map symbol and soil name	Pct. of map unit	!		Picnic areas 		Playgrounds 	
	<u> </u> 	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
561: Talcot, loamy substratum	 70 	 	 1.00	 - Very limited Depth to saturated zone	 1.00	 Very limited Depth to saturated zone	 1.00
566C: Moingona	 90 	 Not limited		 Not limited 	 	 Very limited Slope	1.00
568D: Cokato	 80 	 Somewhat limited Slope 	 0.04	 Somewhat limited Slope 	 0.04	 Very limited Slope 	 1.00
568E: Cokato	 80 	 Very limited Slope	1.00	 Very limited Slope	1.00	 Very limited Slope	1.00
583: Minnetonka	 90 	 Very limited Depth to saturated zone Slow water movement	 1.00 0.94	 Very limited Depth to saturated zone Slow water movement	 1.00 0.94	 Very limited Depth to saturated zone Slow water movement	 1.00 0.94
606: Lanyon, depressional,	 	 		 	 	 	
ponded	80 	Very limited Depth to saturated zone Ponding Slow water movement	 1.00 1.00 0.94	Very limited Depth to saturated zone Ponding Slow water movement	 1.00 1.00 0.94	Very limited Depth to saturated zone Ponding Slow water movement	 1.00 1.00 0.94
625: Lerdal	 80 	Very limited Depth to saturated zone Slow water movement	 1.00 0.15	 Very limited Depth to saturated zone Slow water movement	 1.00 0.15	 Very limited Depth to saturated zone Slow water movement	 1.00 0.15
636: Buckney, rarely flooded	 85 	 Very limited Flooding	 1.00	 Not limited 	 	 Not limited 	
636B: Buckney, rarely flooded	 90	 Very limited Flooding	 1.00	 - Not limited -	 	 Somewhat limited Slope	0.50
638C2: Clarion, moderately eroded	50	 Not limited	 	 Not limited 	 	 Very limited Slope	1.00
Storden, moderately eroded	 35 	 Not limited 	 	 Not limited 	 	 Very limited Slope	1.00

Camp Areas, Picnic Areas, and Playgrounds--Continued

Map symbol and soil name	Pct. of map	Camp areas 		Picnic areas		 Playgrounds 	
	unit	Rating class and limiting features	Value	 Rating class and limiting features	Value	 Rating class and limiting features	Value
650: Joliet	 45 	 Very limited Depth to saturated zone	 1.00	 Very limited Depth to saturated zone	 1.00	 Very limited Depth to saturated zone	 1.00
	 	Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock Gravel content	1.00
Faxon	 45 	 Very limited Depth to saturated zone	 1.00 	 Very limited Depth to saturated zone	1.00	 Very limited Depth to saturated zone	 1.00
715: Fluvaquents, frequently flooded	 65 	 Very limited Depth to saturated zone Flooding Too sandy	 1.00 1.00 0.87	 Very limited Depth to saturated zone Too sandy Flooding	 1.00 0.87 0.40	 Very limited Depth to saturated zone Flooding Too sandy	 1.00 1.00 0.87
735: Havelock, occasionally flooded	 85 	 Very limited Depth to saturated zone Flooding	 1.00	 Very limited Depth to saturated zone	 1.00	 Very limited Depth to saturated zone Flooding	 1.00 0.60
740D: Hawick	 80 	 Somewhat limited Slope 	 0.63	 Somewhat limited Slope 	 0.63	 Very limited Slope Gravel content	 1.00 0.59
775B: Billett	 90 	 Not limited 	 	 Not limited 		 Somewhat limited Slope	0.12
775C: Billett	 85 	 Somewhat limited Slope	 0.01	 Somewhat limited Slope	0.01	 Very limited Slope	1.00
777B: Wapsie	 85 	 Not limited 		 Not limited 		 Somewhat limited Slope	0.50
835D2: Storden, moderately eroded	 50 	 Somewhat limited Slope	 0.63	 Somewhat limited Slope	 0.63	 Very limited Slope	1.00
Omsrud, moderately eroded	 35 	 - Somewhat limited Slope 	 0.63	 Somewhat limited Slope 	0.63	 Very limited Slope	1.00
835E2: Storden, moderately eroded	 50 	 Very limited Slope 	 1.00	 Very limited Slope 	 1.00	 Very limited Slope 	 1.00

Camp Areas, Picnic Areas, and Playgrounds--Continued

Map symbol and soil name	Pct. Camp areas of map unit			 Picnic areas 		 Playgrounds 	
	 	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
835E2: Omsrud, moderately eroded	 35 	 Very limited Slope	 1.00	 Very limited Slope	 1.00	 Very limited Slope	 1.00
836B: Kilkenny	 65 	 Somewhat limited Slow water movement	 0.15 	 Somewhat limited Slow water movement	 0.15 	 Somewhat limited Slope Slow water movement	 0.50 0.15
854D: Fens, Aquolls	 80 	 Not rated 	 	 Not rated 	 	 Not rated 	
855: Shorewood	 85 	 Very limited Depth to saturated zone Slow water movement	 1.00 0.60	 Very limited Depth to saturated zone Slow water movement	 1.00 0.60	 Very limited Depth to saturated zone Slow water movement	 1.00 0.60
956: Harps	 45	 Not rated		 Not rated		 Not rated	
Okoboji, depressional, ponded	 35 	 Very limited Depth to saturated zone Ponding Slow water movement	 1.00 1.00 0.15	 	 1.00 1.00 0.15	 Very limited Depth to saturated zone Ponding Slow water movement	 1.00 1.00 0.15
1007: Cosmos, bouldery	 65 	 Very limited Depth to saturated zone Slow water movement	 1.00 0.94	 Very limited Depth to saturated zone Slow water movement	 1.00 0.94	 Very limited Depth to saturated zone Slow water movement	 1.00 0.94
1055B: Kandiyohi, bouldery	 65 	 Very limited Depth to saturated zone Slow water movement	 1.00 0.94	 Very limited Depth to saturated zone Slow water movement	 1.00 0.94	 Very limited Depth to saturated zone Slow water movement Slope	 1.00 0.94 0.50
1138B: Clarion	 65 	 Not limited 	 	 Not limited 	 	 Somewhat limited Slope	 0.50
1236B: Angus	 85 	 Not limited 	 	 Not limited 	 	 Somewhat limited Slope	 0.50
1236C: Angus	 80 	 Not limited 	 	 Not limited 	 	 Very limited Slope 	1.00

Camp Areas, Picnic Areas, and Playgrounds--Continued

Map symbol and soil name	Pct. Camp areas		 Picnic areas 		 Playgrounds 		
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
1259: Biscay, depressional,	 	 	 	 	 	 - -	
ponded	80 	Very limited Depth to saturated zone Ponding	 1.00 1.00	 Very limited Depth to saturated zone Ponding	 1.00 1.00	 Very limited Depth to saturated zone Ponding	 1.00 1.00
1507: Brownton	 80	 - Very limited		 - Very limited		 Very limited	
	 	Depth to saturated zone Slow water movement	1.00 0.94	Depth to saturated zone Slow water movement	1.00 0.94	Depth to saturated zone Slow water movement	1.00
1555: Nicollet	 40 	 Very limited Depth to saturated zone	 1.00 	 Very limited Depth to saturated zone	 1.00 	 Very limited Depth to saturated zone Gravel content	 1.00 0.01
Guckeen	 25 	 Very limited Depth to saturated zone Slow water movement	 1.00 0.15	 Very limited Depth to saturated zone Slow water movement	 1.00 0.15	 Very limited Depth to saturated zone Slow water movement	 1.00 0.15
1836B: Kilkenny	 65 	 Somewhat limited Slow water movement	 0.15 	 Somewhat limited Slow water movement	 0.15 	 Somewhat limited Slope Slow water movement	 0.50 0.15
Shorewood	 25 	 Very limited Depth to saturated zone Slow water movement	 1.00 0.60	 Very limited Depth to saturated zone Slow water movement	 1.00 0.60	 Very limited Depth to saturated zone Slow water movement	 1.00 0.60
2700C: Ridgeton	 75 	 Not limited 	 	 Not limited 	 	 Very limited Slope	 1.00
2700D: Ridgeton	 80 	 Somewhat limited Slope	 0.63	 Somewhat limited Slope 	 0.63	 Very limited Slope	 1.00
4000: Urban land	 100 	 Not rated 	 	 Not rated 	 	 Not rated 	
4055: Nicollet	 50 	 Very limited Depth to saturated zone	:	 Very limited Depth to saturated zone	1	 Very limited Depth to saturated zone Gravel content	 1.00 0.01
Urban land	 50 	 Not rated 		 Not rated 	 	 Not rated 	

Camp Areas, Picnic Areas, and Playgrounds--Continued

and soil name	Pct. of map unit	- 		 Picnic areas 	 Playgrounds 		
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
4107: Webster	 60 	 Very limited Depth to saturated zone	 1.00	 Very limited Depth to saturated zone	 1.00	 Very limited Depth to saturated zone	 1.00
Urban land	 40 	 Not rated 	 	 Not rated	 	 Not rated 	
4138B: Clarion	 50 	 Not limited 	 	 Not limited 	 	 Somewhat limited Slope	 0.50
Urban land	 30 	 Not rated	 	 Not rated	 	 Not rated 	
4235B: Angus	 60 	 Not limited		 Not limited 	 	 Somewhat limited Slope	0.50
Urban land	 40 	 Not rated 	 	 Not rated 	 	 Not rated 	
4236D: Lester	 50	 Somewhat limited Slope	0.63	 Somewhat limited Slope	0.63	 Very limited Slope	1.00
Urban land	 50 	 Not rated	 	 Not rated	 	 Not rated	
4325: Le Sueur	 60 	 Very limited Depth to saturated zone	 1.00	 Very limited Depth to saturated zone	 1.00	 Very limited Depth to saturated zone	1.00
Urban land	40	 Not rated 	 	 Not rated 	 	 Not rated 	İ
4444: Jacwin	 50 	 Very limited Depth to saturated zone Slow water movement	 1.00 1.00	saturated zone	 1.00 1.00	saturated zone	 1.00 1.00
Urban land	 50 	 Not rated 	 	 Not rated	 	 Not rated 	
4507: Canisteo	 50 	 Very limited Depth to saturated zone	 1.00	 Very limited Depth to saturated zone	 1.00	 Very limited Depth to saturated zone	1.00
Urban land	 50 	 Not rated 	 	 Not rated 	 	 Not rated 	
4551B: Calamine	 50 	 Very limited Depth to saturated zone Slow water movement	 1.00 1.00	 Very limited Depth to saturated zone Slow water movement	 1.00 1.00	saturated zone	 1.00 1.00 0.50
Urban land	50	 Not rated	<u> </u> 	 Not rated	<u> </u> 	 Not rated	į Į

Camp Areas, Picnic Areas, and Playgrounds--Continued

Map symbol and soil name	Pct. Camp areas of map unit			Picnic areas		Playgrounds 	
	unit 	!	Value	 Rating class and limiting features	Value	 Rating class and limiting features	Value
4551D: Calamine	 50 	Very limited Depth to saturated zone Slow water movement Slope	 1.00 1.00 0.16	saturated zone Slow water movement	 1.00 1.00 0.16	saturated zone Slow water movement	 1.00 1.00
Urban land	 50 	 Not rated	 	 Not rated	 	 Not rated 	
4635: Buckney	 50 	 Not limited 	 	 Not limited 	 	 Not limited 	
Urban land	50	Not rated 	 	 Not rated 	j 	 Not rated 	j I
4635B: Buckney	 50 	 Not limited 	 	 Not limited 	 	 Somewhat limited Slope	0.12
Urban land	 50 	 Not rated 	 	 Not rated 	 	 Not rated 	
4946B: Udorthents	 70	 Not rated 	 	 Not rated 	 	 Not rated 	
Highway	30	 Not rated 	 	 Not rated 		 Not rated 	
5010: Pits, sand and gravel	 100	 Not rated 	 	 Not rated 	 	 Not rated 	
5030: Pits, limestone quarries	 100	 Not rated 	 	 Not rated 	 	 Not rated 	
5035: Pits, gypsum quarries	 100 	 Not rated 	 	 Not rated 	 	 Not rated 	
5040: Udorthents, loamy	 100	 Not rated 	 	 Not rated 	 	 Not rated 	
5049: Aquolls, ponded	 60	 Not rated	 	 Not rated		 Not rated	<u> </u>
Udorthents, loamy	30 30	 Not rated 	 	 Not rated 	 	 Not rated 	
5060: Pits, clay	 100 	 Not rated 	 	 Not rated 	 	 Not rated 	
5080: Udorthents	 100 	 Not rated 	 	 Not rated 	 	 Not rated 	
5457: Du Page, channeled, frequently flooded	 80 	 Very limited Flooding 	 1.00	 Somewhat limited Flooding	 0.40	 Very limited Flooding	 1.00

Camp Areas, Picnic Areas, and Playgrounds--Continued

Map symbol	Pct.	Camp areas		Picnic areas		Playgrounds	
and soil name	of map unit	 		 		 	
		Rating class and	Value	Rating class and	Value	Rating class and	Value
		limiting features		limiting features		limiting features	
5507:					 		
Corvuso	55	 Very limited	İ	 Very limited	İ	 Very limited	i
	İ	Depth to	1.00	Depth to	1.00	Depth to	1.00
	ĺ	saturated zone	İ	saturated zone	ĺ	saturated zone	Ì
		Slow water	0.96	Slow water	0.96	Slow water	0.96
		movement		movement		movement	
Brownton	35	 Very limited		 Very limited	 	 Very limited	
	İ	Depth to	1.00	Depth to	1.00	Depth to	1.00
	İ	saturated zone	İ	saturated zone	İ	saturated zone	İ
	İ	Slow water	0.94	Slow water	0.94	Slow water	0.94
	İ	movement		movement	İ	movement	İ
AW:				 	 	 	
Animal waste lagoon	100	Not rated		 Not rated		 Not rated	
SL:				 		 	
Sewage lagoon	100	Not rated		Not rated		Not rated	
₩:				 		 	
Water	100	Not rated		Not rated		Not rated	

Paths, Trails, and Golf Fairways

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table)

and soil name	Pct. of map unit		s	 Off-road motorcycle trai 	ls	Golf fairways 	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
6: Okoboji, depressional, ponded	 85 	Very limited Depth to saturated zone Ponding	 1.00	Very limited Depth to saturated zone Ponding	 1.00	Very limited Depth to saturated zone Ponding	 1.00 1.00
27B: Terril	 85 	 Not limited 	 	 Not limited 		 Not limited 	
34: Estherville	90	 Not limited	 	 Not limited		 Somewhat limited Droughty	0.10
34B: Estherville	 85 	 Not limited 	 	 Not limited 		 Somewhat limited Droughty	0.10
55: Nicollet	 75 	 Very limited Depth to saturated zone	 1.00	 Very limited Depth to saturated zone	 1.00	 Very limited Depth to saturated zone	1.00
62F: Storden	 80 	 Somewhat limited Slope	0.82	 Not limited 		 Very limited Slope	1.00
90: Okoboji, mucky, depressional, ponded	 85 	Very limited Depth to saturated zone Ponding	 1.00	 Very limited Depth to saturated zone Ponding	 1.00	 Very limited Depth to saturated zone Ponding	 1.00 1.00
95: Harps	 85 	 Not rated 	 	 Not rated 	 	 Very limited Depth to saturated zone	1.00
107: Webster	 80 	 Very limited Depth to saturated zone	 1.00	 Very limited Depth to saturated zone	 1.00	 Very limited Depth to saturated zone	 1.00
108: Wadena	 85	 Not limited	 	 Not limited 		 Not limited 	
108B: Wadena	 95	 Not limited 	 	 Not limited 		 Not limited 	

Paths, Trails, and Golf Fairways--Continued

Map symbol and soil name	Pct. of map		s	Off-road motorcycle trai 	ls	 Golf fairways 	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
108C: Wadena	 75 	 Not limited 	 	 Not limited 	 	 Not limited 	
135: Coland, occasionally flooded		 Very limited Depth to saturated zone	 1.00 	 Very limited Depth to saturated zone	 1.00 	Very limited Depth to saturated zone Flooding	 1.00 0.60
136: Ankeny, rarely flooded	 80	 Not limited	 	 Not limited	 	 Not limited	
138B: Clarion	80	 Not limited	 	 Not limited	 	 Not limited	j
138C2: Clarion, moderately eroded	 80	 Not limited	 	 Not limited	 	 Not limited	
201B: Coland	 50 	-	 1.00	 Very limited Depth to saturated zone	 1.00	 Very limited Depth to saturated zone	1.00
Terril	35	 Not limited		 Not limited	 	 Not limited	
203: Cylinder	 80 	: -	 1.00	 Very limited Depth to saturated zone	 1.00	 Very limited Depth to saturated zone	 1.00
227: Wadena, loamy substratum	 70	 - - Not limited	 	 - - Not limited	 	 Not limited	
227B: Wadena, loamy substratum	 70	 Not limited	 	 Not limited	 	 Not limited	
228: Cylinder, loamy substratum	 70 	 Very limited Depth to saturated zone	 1.00	 - Very limited Depth to saturated zone	 1.00	 Very limited Depth to saturated zone	 1.00
236D: Lester	 80	 Not limited 	 	 Not limited 	 	 Somewhat limited Slope	0.63
236E: Lester	 85 	 Somewhat limited Slope 	 0.02	 Not limited 	 	 Very limited Slope 	 1.00
236F: Lester	 80 	 Somewhat limited Slope	 0.82 	 Not limited 	 	 Very limited Slope	 1.00

Paths, Trails, and Golf Fairways--Continued

Map symbol and soil name	Pct. of map unit		Off-road motorcycle trai 	ls	 Golf fairways 	;	
	<u> </u> 	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
259: Biscay	 85 	 Very limited Depth to saturated zone	 1.00	 Very limited Depth to saturated zone	 1.00	 Very limited Depth to saturated zone	 1.00
262G: Lester	 60 	 Very limited Slope	 1.00	 Very limited Slope	1.00	 Very limited Slope	1.00
Belview	20	 Very limited Slope	1.00	Very limited Slope	1.00	 Very limited Slope	1.00
274: Rolfe, depressional, ponded	1	 Very limited Depth to saturated zone Ponding	 1.00 1.00	 Very limited Depth to saturated zone Ponding	 1.00 1.00	 Very limited Depth to saturated zone Ponding	 1.00 1.00
278: Biscay, loamy substratum	 70	 Verv limited	 	 Very limited		 Very limited	
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
307: Dundas	 80 	 Very limited Depth to saturated zone	 1.00	 Very limited Depth to saturated zone	1.00	 Very limited Depth to saturated zone	1.00
315B: Udifluvents, occasionally flooded	 80	 Not limited	 	 Not limited	 	 Not rated	
323B: Fort Dodge	 90	 Not limited	 	 Not limited		 Not limited	
325: Le Sueur	 90 	 Very limited Depth to saturated zone	 1.00	 Very limited Depth to saturated zone	1.00	 Very limited Depth to saturated zone	1.00
338: Garmore	100	 Not limited	 	 Not limited		 Not limited	
342: Estherville, loamy substratum	 70 	 Not limited	 	 Not limited 		 Somewhat limited Droughty	0.36
342B: Estherville, loamy substratum	 70 	 Not limited	 	 Not limited		 Somewhat limited Droughty	0.36
344B: Copaston	80	 Not limited 	 	 Not limited 		 Very limited Depth to bedrock Droughty	 1.00 0.81

Paths, Trails, and Golf Fairways--Continued

Map symbol and soil name	Pct. of map unit		s	Off-road motorcycle trai	ls	Golf fairways 		
		!	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	
345: Copaston	 35 	 Not limited 	 	 Not limited 	 	 Very limited Depth to bedrock Droughty	 1.00 0.81	
Jacwin	 25 	 Very limited Depth to saturated zone	:	 Very limited Depth to saturated zone	 1.00 	 Very limited Depth to saturated zone	 1.00 	
355: Luther	 85 	 Very limited Depth to saturated zone	 1.00 	 - Very limited Depth to saturated zone	 1.00	 Very limited Depth to saturated zone	 1.00	
383: Marna	 80 	 Very limited Depth to saturated zone	 1.00 	 Very limited Depth to saturated zone	 1.00 	 Very limited Depth to saturated zone	 1.00 	
385: Guckeen	 75 	 Very limited Depth to saturated zone	 1.00 	 Very limited Depth to saturated zone	 1.00 	 Very limited Depth to saturated zone	 1.00 	
386: Cordova	 85 	 Very limited Depth to saturated zone	:	 Very limited Depth to saturated zone	 1.00	 Very limited Depth to saturated zone	 1.00	
387B: Kamrar	 85 	 Not limited 	 	 Not limited 	 	 Somewhat limited Depth to saturated zone	 0.19 	
413G: Gosport	 25 	 Very limited Slope Water erosion 	 1.00 1.00	 Very limited Water erosion Slope 	 1.00 0.78 	· -	 1.00 0.46 0.19	
Emeline	 25 	 Very limited Slope 	 1.00 	 Not limited 	 	 Very limited Depth to bedrock Slope Droughty	 1.00 1.00 1.00	
Ridgeton	 25 	 Very limited Slope	 1.00	 Somewhat limited Slope	 0.44	 Very limited Slope	 1.00	
457: Du Page, occasionally flooded	 85 	 Not limited 	 	 Not limited 	 	 Somewhat limited Flooding	 0.60	

Paths, Trails, and Golf Fairways--Continued

Map symbol and soil name	Pct. of map		s	Off-road motorcycle trai	ls	Golf fairways 	3
	unit 	Rating class and limiting features	Value	Rating class and limiting features	Value	 Rating class and limiting features	Value
485: Spillville, occasionally flooded	 80 	 Very limited Depth to saturated zone	 1.00	Very limited Depth to saturated zone	 1.00	 Very limited Depth to saturated zone Flooding	 1.00 0.60
485B: Spillville, rarely flooded	 85	 Not limited	 	 Not limited		 Not limited	
506: Wacousta, depressional, ponded	 80	 Very limited	 	 Very limited	 	 Very limited	
	 	Depth to saturated zone Ponding	1.00 1.00	Depth to saturated zone Ponding	1.00 1.00	Depth to saturated zone Ponding	1.00 1.00
507: Canisteo	 75 	 Very limited Depth to saturated zone	 1.00	 Very limited Depth to saturated zone	 1.00	 Very limited Depth to saturated zone	 1.00
511: Blue Earth, depressional, ponded	 85 	 - Very limited Depth to saturated zone Ponding	 1.00	 - Very limited Depth to saturated zone Ponding	 1.00	Very limited Depth to saturated zone Ponding	 1.00 1.00
526: Wacousta, mucky, depressional, ponded	 90 	 Very limited Depth to saturated zone Ponding	 1.00	 Very limited Depth to saturated zone Ponding	 1.00	 Very limited Depth to saturated zone Ponding	 1.00 1.00
536: Hanlon, occasionally flooded		 Not limited	 	 Not limited	 	 Somewhat limited Flooding	 0.60
541C: Estherville	 45 	 Not limited 	 	 Not limited 	 	 Somewhat limited Droughty	 0.10
Hawick	 45 	 Not limited 	 	 Not limited 		 Somewhat limited Droughty	0.91
551B: Calamine	 85 	 Very limited Depth to saturated zone	 1.00	 Very limited Depth to saturated zone	 1.00	 Very limited Depth to saturated zone	 1.00

Paths, Trails, and Golf Fairways--Continued

Map symbol and soil name	Pct. of map		5	 Off-road motorcycle trai	ls	 Golf fairways 	
	unit 	·	Value	 Rating class and limiting features	Value	 Rating class and limiting features	Value
551D: Calamine	 55 	 Very limited Depth to saturated zone	 1.00	 Very limited Depth to saturated zone	 1.00 	 Very limited Depth to saturated zone Slope	 1.00 0.16
559: Talcot	 85 	 Very limited Depth to saturated zone	 1.00 	 Very limited Depth to saturated zone	 1.00 	 Very limited Depth to saturated zone	 1.00
561: Talcot, loamy substratum	 70 	 Very limited Depth to saturated zone	 1.00	 	 1.00 	 	 1.00
566C: Moingona	 90	 Not limited	 	 Not limited 	 	 Not limited 	
568D: Cokato	 80 	 Not limited	 	 Not limited 	 	 Somewhat limited Slope	0.04
568E: Cokato	 80	 Not limited	 	 Not limited 	 	 Very limited Slope	1.00
583: Minnetonka	 90 	 Very limited Depth to saturated zone	 1.00	 Very limited Depth to saturated zone	 1.00	 Very limited Depth to saturated zone	 1.00
606: Lanyon, depressional, ponded	 80 		 1.00	 Very limited Depth to saturated zone Ponding	 1.00	 Very limited Depth to saturated zone Ponding	 1.00
625: Lerdal	 80 	 Very limited Depth to saturated zone	 1.00	 Very limited Depth to saturated zone	 1.00	 Very limited Depth to saturated zone	 1.00
636: Buckney, rarely flooded	 85 	 Not limited 	 	 Not limited 	 	 Somewhat limited Droughty	 0.70
636B: Buckney, rarely flooded	 90 	 Not limited 	 	 Not limited 	 	 Somewhat limited Droughty	 0.70

Paths, Trails, and Golf Fairways--Continued

Map symbol and soil name	Pct. of map unit		s	Off-road motorcycle trai 	ls	 Golf fairways 	1
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
638C2: Clarion, moderately eroded	 50	 Not limited 	 	 Not limited 	 	 Not limited 	
Storden, moderately eroded	35	 Not limited		 Not limited		 Not limited	
650: Joliet	 45 		 1.00 	 Very limited Depth to saturated zone 	 1.00 	 Very limited Depth to saturated zone Depth to bedrock Droughty	 1.00 1.00 0.48
Faxon	 45 	 Very limited Depth to saturated zone 	 1.00 	 Very limited Depth to saturated zone 	 1.00 	Very limited Depth to saturated zone Depth to bedrock Content of large stones	1
715: Fluvaquents, frequently flooded	 65 	 Very limited Depth to saturated zone Too sandy Flooding	 1.00 0.87 0.40	 - Very limited Depth to saturated zone Too sandy Flooding	 1.00 0.87 0.40	 Not rated 	
735: Havelock, occasionally flooded	 85 	! -	 1.00	 Very limited Depth to saturated zone	 1.00	Very limited Depth to saturated zone Flooding	 1.00 0.60
740D: Hawick	 80 	 Not limited 	 	 Not limited 	 	 Somewhat limited Droughty Slope	 0.91 0.63
775B: Billett	 90	 Not limited	 	 Not limited	 	 Not limited	
775C: Billett	 85 	 Not limited 	 	 Not limited 	 	 Somewhat limited Slope	 0.01
777B: Wapsie	 85	 Not limited 	 	 Not limited 		 Not limited 	
835D2: Storden, moderately eroded	 50	 Not limited	 	 Not limited	 	 Somewhat limited Slope	0.63
Omsrud, moderately eroded	 35 	 Not limited 	 	 Not limited 	 	 Somewhat limited Slope 	 0.63

Paths, Trails, and Golf Fairways--Continued

Map symbol and soil name	Pct. of map	Paths and trail	s	Off-road motorcycle trai	ls	Golf fairways 	3
	unit	Rating class and limiting features	Value	 Rating class and limiting features	Value	 Rating class and limiting features	Value
835E2: Storden, moderately eroded	 50	 Somewhat limited Slope	 0.02	 Not limited	 	 Very limited Slope	 1.00
Omsrud, moderately eroded	 35 	 Somewhat limited Slope	 0.02	 Not limited 		 Very limited Slope	1.00
836B: Kilkenny	 65 	 Not limited 	 	 Not limited 		 Not limited 	
854D: Fens, Aquolls	 80	 Not rated 	 	 Not rated 		 Not rated 	
855: Shorewood	 85 	 Very limited Depth to saturated zone	 1.00 	 Very limited Depth to saturated zone	 1.00 	 Very limited Depth to saturated zone	 1.00
956: Harps	 4 5 	 Not rated 	 	 Not rated 	 	 Very limited Depth to saturated zone	 1.00
Okoboji, depressional, ponded	 35 	 Very limited Depth to saturated zone Ponding	 1.00 1.00	Very limited Depth to saturated zone Ponding	 1.00	Very limited Depth to saturated zone Ponding	 1.00 1.00
1007: Cosmos, bouldery	 65 	 Very limited Depth to saturated zone	 1.00	 Very limited Depth to saturated zone	 1.00	 Very limited Depth to saturated zone	 1.00
1055B: Kandiyohi, bouldery	 65 	 Very limited Depth to saturated zone	 1.00	 Very limited Depth to saturated zone	 1.00	 Very limited Depth to saturated zone	 1.00
1138B: Clarion	 65 	 Not limited 	 	 Not limited 		 Not limited 	
1236B: Angus	 85 	 Not limited 	 	 Not limited 		 Not limited 	İ İ
1236C: Angus	 80 	 Not limited 	 	 Not limited 	 	 Not limited 	
1259: Biscay, depressional, ponded	 80	 Verv limited	 	 Very limited		 Very limited	
• • • • • •		Depth to saturated zone Ponding	 1.00 1.00		1.00		1.00

Paths, Trails, and Golf Fairways--Continued

Map symbol and soil name	Pct. of map unit		Off-road motorcycle trai 	ls	Golf fairways		
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
1507: Brownton	 80 	 Very limited Depth to saturated zone	 1.00	 Very limited Depth to saturated zone	 1.00	 Very limited Depth to saturated zone	
1555: Nicollet	 40 	 Very limited Depth to saturated zone	 1.00	 Very limited Depth to saturated zone	 1.00	Very limited Depth to saturated zone	1.00
Guckeen	 25 	 Very limited Depth to saturated zone	 1.00 	 Very limited Depth to saturated zone	 1.00 	 Very limited Depth to saturated zone	1.00
1836B: Kilkenny	65	 Not limited		 Not limited		 Not limited	
Shorewood	 25 	 Very limited Depth to saturated zone	 1.00	 Very limited Depth to saturated zone	1.00	 Very limited Depth to saturated zone	 1.00
2700C: Ridgeton	 75	 Not limited		 Not limited	 	 Not limited	
2700D: Ridgeton	 80 	 Not limited 	 	 Not limited 	 	 Somewhat limited Slope	 0.63
4000: Urban land	 100	 Not rated 	 	 Not rated 		 Not rated 	
4055: Nicollet	 50 	 Very limited Depth to saturated zone	 1.00	 Very limited Depth to saturated zone	 1.00	 Very limited Depth to saturated zone	1.00
Urban land	 50 	 Not rated 	 	 Not rated 	 	 Not rated 	
4107: Webster	 60 	 Very limited Depth to saturated zone	1.00	 Very limited Depth to saturated zone	 1.00 	 Very limited Depth to saturated zone	 1.00
Urban land	40	 Not rated 	 	 Not rated 	 	 Not rated 	
4138B: Clarion	 50	 Not limited		 Not limited		 Not limited	
Urban land	 30 	 Not rated 		 Not rated 	 	 Not rated 	
4235B: Angus	 60	 Not limited		 Not limited	į Į	 Not limited	
Urban land	40	 Not rated 		 Not rated 		 Not rated 	
4236D: Lester	 50	 Not limited 	 	 Not limited 	 	 Somewhat limited Slope	 0.63
Urban land	 50 	 Not rated 	 	 Not rated 	 	 Not rated 	

Paths, Trails, and Golf Fairways--Continued

Map symbol and soil name	 Pct. of map unit	į		Off-road motorcycle trai 	ls	 Golf fairways 	
		·	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
4325: Le Sueur	 60 	 Very limited Depth to saturated zone	 1.00	 Very limited Depth to saturated zone	 1.00	 Very limited Depth to saturated zone	 1.00
Urban land	 40 	 Not rated 	 	 Not rated 	 	 Not rated 	
4444: Jacwin	 50 	! -	 1.00	 Very limited Depth to saturated zone	 1.00	 Very limited Depth to saturated zone	 1.00
Urban land	 50	 Not rated 	 	 Not rated 	 	 Not rated 	
4507: Canisteo	 50 		 1.00	 Very limited Depth to saturated zone	 1.00	 Very limited Depth to saturated zone	 1.00
Urban land	 50 	 Not rated 	 	 Not rated 	 	 Not rated 	
4551B: Calamine	 50 		 1.00	 Very limited Depth to saturated zone	 1.00	 Very limited Depth to saturated zone	 1.00
Urban land	 50	 Not rated 	 	 Not rated	 	 Not rated 	
4551D: Calamine	 50 	! -	 1.00 	 Very limited Depth to saturated zone	 1.00 	 Very limited Depth to saturated zone Slope	 1.00 0.16
Urban land	 50	 Not rated 	 	 Not rated 	 	 Not rated	
4635: Buckney	 50	 Not limited 	 	 Not limited	 	 Somewhat limited Droughty	0.70
Urban land	 50	 Not rated	 	 Not rated	 	 Not rated 	
4635B: Buckney	 50	 Not limited 	 	 Not limited 	 	 Somewhat limited Droughty	0.70
Urban land	50	 Not rated		 Not rated	 	 Not rated	
4946B: Udorthents	 70	 Not rated 	 	 Not rated 	 	 Not rated 	
Highway	30	 Not rated 	 	 Not rated 	i I	 Not rated 	
5010: Pits, sand and gravel	 100	 Not rated	 	 Not rated	 	 Not rated	

Paths, Trails, and Golf Fairways--Continued

Map symbol and soil name	 Pct. of map unit	of ap		 Off-road motorcycle trai 	ls	 Golf fairways 		
	 	·	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	
5030: Pits, limestone quarries	 100	 Not rated	 	 Not rated 	 	 Not rated		
5035: Pits, gypsum quarries	 100	 Not rated	 	 Not rated	 	 Not rated		
5040: Udorthents, loamy	 100 	 Not rated 	 	 Not rated 	 	 Not rated 		
5049: Aquolls, ponded	 60 	 Not rated 	 	 Not rated 	 	 Not rated 	 	
Udorthents, loamy	30	Not rated	 	Not rated		Not rated		
5060: Pits, clay	 100	 Not rated	 	 Not rated 	 	 Not rated 		
5080: Udorthents	 100	 Not rated 	 	 Not rated 		 Not rated 		
5457: Du Page, channeled, frequently flooded	 80 	!	 0.40	 Somewhat limited Flooding	 0.40	 Very limited Flooding		
5507: Corvuso	 55 		 1.00	 Very limited Depth to saturated zone	 1.00	 Very limited Depth to saturated zone	 1.00	
Brownton	 35 		 1.00 	 Very limited Depth to saturated zone	 1.00 	 Very limited Depth to saturated zone	 1.00 	
AW: Animal waste lagoon	 100	 Not rated 	 	 Not rated 	 	 Not rated 		
SL: Sewage lagoon	 100 	 Not rated 	 	 Not rated 	 	 Not rated 		
W: Water	 100	 Not rated 	 	 Not rated 	; 	 Not rated 	 	

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 data in the tables described under the heading "Soil Properties."

Information in this section is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil between the surface and a depth of 5 to 7 feet. Because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

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

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

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

This information can be used to evaluate the potential of areas for residential, commercial, 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, reclamation material, roadfill, and topsoil; plan structures for water management; 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, which is in Part I of this publication.

Building Site Development

The titles of the tables described in this section are:

- "Dwellings and Small Commercial Buildings"
- "Roads and Streets, Shallow Excavations, and Lawns and Landscaping"

Soil properties influence the development of building sites, including the selection of the site, the design of the structure, construction, performance after construction, and maintenance. The tables described in this section show the degree and kind of soil limitations that affect dwellings with and without basements, small commercial buildings, local roads and streets, shallow excavations, and lawns and landscaping.

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

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

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

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

Local roads and streets have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material; a base of gravel, crushed rock, or soil material stabilized by lime or cement; and a surface of flexible material (asphalt), rigid material (concrete), or gravel with a binder. The ratings are based on the soil properties that affect the ease of excavation and grading and the traffic-supporting capacity. The properties that affect the ease of excavation and grading are depth to bedrock or a cemented pan, hardness of bedrock or a cemented pan, depth to a water table, ponding, flooding, the amount of large stones, and slope. The properties that affect the traffic-supporting capacity are soil strength (as inferred from the AASHTO group index number), subsidence, linear extensibility (shrink-swell potential), the potential for frost action, depth to a water table, and ponding.

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

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

Dwellings and Small Commercial Buildings

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table)

Map symbol and soil name	Pct. of map unit	basements	out	Dwellings with basements	Small commercia buildings 	al	
	 	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
6: Okoboji, depressional,	 	 - -		 		 	
ponded	85 	Very limited Depth to saturated zone Shrink-swell Ponding	 1.00 1.00 1.00	Very limited Depth to saturated zone Shrink-swell Ponding	 1.00 1.00 1.00	Very limited Depth to saturated zone Shrink-swell Ponding	 1.00 1.00 1.00
27B: Terril	 85 	 Not limited 		 Somewhat limited Depth to saturated zone	 0.61 	 Not limited 	
34: Estherville	90	 Not limited		 Not limited	 	 Not limited	
34B: Estherville	 85	 Not limited		 Not limited		 Not limited	
55: Nicollet	 75 	 Very limited Depth to saturated zone	1.00	 Very limited Depth to saturated zone	1.00	 Very limited Depth to saturated zone	 1.00
62F: Storden	 80 	 Very limited Slope	1.00	 Very limited Slope	1.00	 Very limited Slope	
90: Okoboji, mucky, depressional, ponded	 85	 Very limited		 Very limited	 	 Very limited	
	 	Depth to saturated zone Shrink-swell Ponding	1.00 1.00 1.00		1.00 1.00 1.00	Depth to saturated zone Shrink-swell Ponding	1.00 1.00 1.00
95: Harps	 85 	 Very limited Depth to saturated zone	1.00	 Very limited Depth to saturated zone	 1.00	 Very limited Depth to saturated zone	 1.00
107: Webster	 80 	Shrink-swell Very limited Depth to saturated zone	0.50 1.00	 Very limited	0.50 1.00	 Very limited	0.50 1.00
108: Wadena	 85	Shrink-swell 	0.32	 Not limited		Shrink-swell Not limited	0.32

Dwellings and Small Commercial Buildings--Continued

Map symbol and soil name	Pct. of map unit	basements	ut	Dwellings with basements		Small commercia buildings 	1
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
108B: Wadena	 95 	 Not limited 	 	 Not limited 	 	 Not limited 	
108C: Wadena	 75 	 Not limited 	 	 Not limited 	 	 Somewhat limited Slope	 0.88
135: Coland, occasionally flooded		 Very limited Flooding Depth to saturated zone Shrink-swell	 1.00 1.00 0.50	Very limited Flooding Depth to saturated zone Shrink-swell	 1.00 1.00 0.50	Very limited Flooding Depth to saturated zone Shrink-swell	 1.00 1.00 0.50
136: Ankeny, rarely flooded	 80 	 Very limited Flooding	 1.00	 Very limited Flooding	 1.00	 Very limited Flooding	1.00
138B: Clarion	 80 	 Not limited 	 	 Somewhat limited Depth to saturated zone	 0.61	 Not limited 	
138C2: Clarion, moderately eroded	 80 	 Not limited 	 	 - Somewhat limited Depth to saturated zone	 0.61	 Somewhat limited Slope 	 0.88
201B: Coland	 50 	 Very limited Depth to saturated zone Shrink-swell	 1.00 0.50	 Very limited Depth to saturated zone Shrink-swell	 1.00 0.50	 Very limited Depth to saturated zone Shrink-swell	 1.00 0.50
Terril	 35 	 Not limited 	 	 Somewhat limited Depth to saturated zone	 0.61 	 Not limited 	
203: Cylinder	 80 	 Very limited Depth to saturated zone	 1.00 	 Very limited Depth to saturated zone	 1.00 	 Very limited Depth to saturated zone	 1.00
227: Wadena, loamy substratum	 70	 Not limited 	 	 Not limited 	 	 Not limited 	
227B: Wadena, loamy substratum	 70	 Not limited	 	 Not limited	; 	 Not limited	
228: Cylinder, loamy substratum	 70 	 	 1.00	 - Very limited Depth to saturated zone	 1.00	 - Very limited Depth to saturated zone	 1.00

Dwellings and Small Commercial Buildings--Continued

Map symbol and soil name	Pct. of map unit	basements		Dwellings with basements		 Small commercial buildings 	
		Rating class and	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
236D: Lester	 80 	 Somewhat limited Slope Shrink-swell	 0.63 0.50	 Somewhat limited Slope Shrink-swell	 0.63 0.50	 Very limited Slope Shrink-swell	 1.00 0.50
236E: Lester	 85 	 Very limited Slope Shrink-swell	 1.00 0.50	 Very limited Slope Shrink-swell	 1.00 0.50	 Very limited Slope Shrink-swell	1.00
236F: Lester	 80 	 Very limited Slope Shrink-swell	 1.00 0.50	 Very limited Slope Shrink-swell	 1.00 0.50	 Very limited Slope Shrink-swell	 1.00 0.50
259: Biscay	 85 	 Very limited Depth to saturated zone Shrink-swell	 1.00 0.50	 Very limited Depth to saturated zone	 1.00 	 Very limited Depth to saturated zone Shrink-swell	1.00
262G: Lester	 60 	 Very limited Slope Shrink-swell	 1.00 0.50	 Very limited Slope Shrink-swell	 1.00 0.50	 Very limited Slope Shrink-swell	 1.00 0.50
Belview	 20 	 Very limited Slope	 1.00	 Very limited Slope	 1.00	 Very limited Slope	 1.00
274: Rolfe, depressional, ponded		 Very limited Depth to saturated zone Shrink-swell Ponding	 1.00 1.00	 Very limited Depth to saturated zone Shrink-swell Ponding	 1.00 1.00	 Very limited Depth to saturated zone Shrink-swell Ponding	 1.00 1.00
278: Biscay, loamy substratum	 70 	 Very limited Depth to saturated zone	 1.00	 Very limited Depth to saturated zone	 1.00	 Very limited Depth to saturated zone	 1.00
307: Dundas	 80 	 Very limited Depth to saturated zone Shrink-swell	 1.00 0.50	 Very limited Depth to saturated zone	 1.00 	 Very limited Depth to saturated zone Shrink-swell	 1.00 0.50
315B: Udifluvents, occasionally flooded	 80	 Very limited Flooding	 1.00	 Very limited Flooding	 1.00	 Very limited Flooding	
323B: Fort Dodge	 90 	 Not limited 		 Not limited 		 Not limited 	

Dwellings and Small Commercial Buildings--Continued

Map symbol and soil name	Pct. of map unit	basements		Dwellings with basements		Small commercial buildings 	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
325: Le Sueur	 90 	 Very limited Depth to saturated zone 	 1.00 	Very limited Depth to saturated zone Shrink-swell	 1.00 0.50	 Very limited Depth to saturated zone 	 1.00
338: Garmore	 100 	 Somewhat limited Shrink-swell 	 0.01 		 0.61 0.01	 Somewhat limited Shrink-swell 	0.01
342: Estherville, loamy substratum	 70	 Not limited	 	 Not limited	 	 Not limited	
342B: Estherville, loamy substratum	 70	 Not limited 	 	 Not limited 	 	 Not limited 	
344B: Copaston	 80 	 Very limited Depth to hard bedrock	 1.00 	 Very limited Depth to hard bedrock	 1.00 	 Very limited Depth to hard bedrock	1.00
345: Copaston	 35 	 Very limited Depth to hard bedrock	 1.00	 Very limited Depth to hard bedrock	 1.00	 Very limited Depth to hard bedrock	1.00
Jacwin	 25 	 Very limited Depth to saturated zone Shrink-swell	 1.00 1.00	 Very limited Depth to saturated zone Shrink-swell	 1.00 1.00	 Very limited Depth to saturated zone Shrink-swell	 1.00 1.00
355: Luther	 85 	 Very limited Depth to saturated zone Shrink-swell	 1.00 0.50	 Very limited Depth to saturated zone	 1.00 	 Very limited Depth to saturated zone Shrink-swell	1.00
383: Marna	 80 	 Very limited Depth to saturated zone Shrink-swell	 1.00 1.00	 Very limited Depth to saturated zone	 1.00 	 Very limited Depth to saturated zone Shrink-swell	1.00
385: Guckeen	 75 	 Very limited Depth to saturated zone	 1.00 	 Very limited Depth to saturated zone	 1.00 	 Very limited Depth to saturated zone	 1.00
386: Cordova	 85 	 Very limited Depth to saturated zone Shrink-swell	 1.00 0.50	 Very limited Depth to saturated zone 	 1.00 	 Very limited Depth to saturated zone Shrink-swell	 1.00 0.50

Dwellings and Small Commercial Buildings--Continued

Map symbol and soil name	Pct. of map unit	basements		Dwellings with basements		Small commercial buildings 	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
387B: Kamrar	 85 	 Somewhat limited Shrink-swell Depth to saturated zone	 0.50 0.39	 Very limited Depth to saturated zone Shrink-swell	 1.00 0.50	 Somewhat limited Shrink-swell Depth to saturated zone	 0.50 0.39
413G: Gosport	 25 	 Very limited Slope Shrink-swell Depth to saturated zone	 1.00 1.00 0.39	 Very limited Slope Depth to saturated zone Shrink-swell	 1.00 1.00 1.00	 Very limited Slope Shrink-swell Depth to saturated zone	 1.00 1.00 0.39
Emeline	 25 	Very limited Slope Depth to hard bedrock	 1.00 1.00 	Very limited Slope Depth to hard bedrock	 1.00 1.00 	Very limited Slope Depth to hard bedrock	 1.00 1.00
Ridgeton	25	 Very limited Slope	1.00	 Very limited Slope	1.00	 Very limited Slope	1.00
457: Du Page, occasionally flooded	 85 	 Very limited Flooding 	 1.00	 - Very limited Flooding Depth to saturated zone	 1.00 0.61	 Very limited Flooding 	 1.00
485: Spillville, occasionally flooded	 80 	 - Very limited Flooding Depth to saturated zone	 1.00 1.00	 - Very limited Flooding Depth to saturated zone	 1.00 1.00	 - Very limited Flooding Depth to saturated zone	 1.00 1.00
485B: Spillville, rarely flooded	 85 	 Very limited Flooding	 1.00	Very limited Flooding Depth to saturated zone	 1.00 0.61	 Very limited Flooding 	 1.00
506: Wacousta, depressional, ponded	 80 	Very limited Depth to saturated zone Ponding	 1.00	 - Very limited Depth to saturated zone Ponding	 1.00	Very limited Depth to saturated zone Ponding	 1.00
507: Canisteo	 75 	Very limited Depth to saturated zone Shrink-swell	 1.00 0.01	Very limited Depth to saturated zone	 1.00 	Very limited Depth to saturated zone Shrink-swell	 1.00 0.01

Dwellings and Small Commercial Buildings--Continued

Map symbol and soil name	Pct. of map	f basements		Dwellings with basements		Small commercial buildings		
	unit 	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	
511: Blue Earth, depressional, ponded	 85 	 Very limited Depth to saturated zone Organic matter content Ponding	 1.00 1.00	Very limited Depth to saturated zone Ponding	 1.00 1.00	 Very limited Depth to saturated zone Organic matter content Ponding	 1.00 1.00	
526: Wacousta, mucky, depressional,	 	 	 	 	 	 	 	
ponded	90 	Very limited Depth to saturated zone Ponding Shrink-swell	 1.00 1.00 0.32	Very limited Depth to saturated zone Ponding	 1.00 1.00	Very limited Depth to saturated zone Ponding Shrink-swell	 1.00 1.00 0.32	
536: Hanlon, occasionally flooded		 Very limited Flooding 	 1.00 	 	 1.00 0.61	 - Very limited Flooding -	 1.00 	
541C: Estherville	 45 	 Not limited 		 Not limited 	 	 Somewhat limited Slope	0.88	
Hawick	 45 	 Not limited 		 Not limited 	 	 Somewhat limited Slope	0.88	
551B: Calamine	 85 	 Very limited Depth to saturated zone	 1.00 	 Very limited Depth to saturated zone Shrink-swell	 1.00 1.00	 Very limited Depth to saturated zone	 1.00 	
551D: Calamine	 55 	 Very limited Depth to saturated zone Slope	 1.00 0.16	saturated zone	 1.00 1.00 0.16	 Very limited Depth to saturated zone Slope	 1.00 1.00	
559: Talcot	 85 	 Very limited Depth to saturated zone Shrink-swell	 1.00 0.50	 Very limited Depth to saturated zone	 1.00 	 Very limited Depth to saturated zone Shrink-swell	 1.00 0.50	
561: Talcot, loamy substratum	 70 	Very limited Depth to saturated zone Shrink-swell	 1.00 0.50	Very limited Depth to saturated zone	 1.00 	Very limited Depth to saturated zone Shrink-swell	 1.00 0.50	

Dwellings and Small Commercial Buildings--Continued

Map symbol and soil name	Pct. Dwellings without of basements map unit		Dwellings with basements		Small commercial buildings 		
	 	Rating class and limiting features	Value	 Rating class and limiting features	Value	 Rating class and limiting features	Value
566C: Moingona	 90 	 Not limited 	 	 Somewhat limited Depth to saturated zone	 0.61	 Somewhat limited Slope 	 0.88
568D: Cokato	 80 	 Somewhat limited Shrink-swell Slope	 0.50 0.04	 Somewhat limited Shrink-swell Slope	 0.50 0.04	 Very limited Slope Shrink-swell	 1.00 0.50
568E: Cokato	 80 	 Very limited Slope Shrink-swell	 1.00 0.50	 Very limited Slope Shrink-swell	 1.00 0.50	 Very limited Slope Shrink-swell	1.00
583: Minnetonka	 90 	 Very limited Depth to saturated zone Shrink-swell	 1.00 1.00	 Very limited Depth to saturated zone Shrink-swell	 1.00 0.50	 Very limited Depth to saturated zone Shrink-swell	 1.00 1.00
606: Lanyon, depressional, ponded	 80 	 	 1.00 1.00	Very limited Depth to saturated zone Shrink-swell Ponding	 1.00 1.00	Very limited Depth to saturated zone Shrink-swell Ponding	 1.00 1.00
625: Lerdal	 80 	 Very limited Depth to saturated zone Shrink-swell	 1.00 1.00	 Very limited Depth to saturated zone Shrink-swell	 1.00 1.00	 Very limited Depth to saturated zone Shrink-swell	 1.00 1.00
636: Buckney, rarely flooded	 85 	 Very limited Flooding	 1.00	 Very limited Flooding	 1.00	 Very limited Flooding	
636B: Buckney, rarely flooded	 90 	 Very limited Flooding	 1.00	 Very limited Flooding	 1.00	 Very limited Flooding	1.00
638C2: Clarion, moderately eroded	 50 	 Not limited		 Somewhat limited Depth to saturated zone	 0.61	 Somewhat limited Slope	0.88
Storden, moderately eroded	 35 	 Not limited 	 	 Not limited 	 	 Somewhat limited Slope 	 0.88

Dwellings and Small Commercial Buildings--Continued

Map symbol and soil name	Pct. of map unit	of basements map		Dwellings with basements		Small commercial buildings 	
	unit 	 Rating class and limiting features	Value	 Rating class and limiting features	Value	 Rating class and limiting features	Value
650: Joliet	 45 	 Very limited Depth to	 1.00	 Very limited Depth to	 1.00	 Very limited Depth to	 1.00
	 	saturated zone Depth to hard bedrock	1.00	saturated zone Depth to hard bedrock	1.00	saturated zone Depth to hard bedrock	1.00
Faxon	 45 	 Very limited Depth to saturated zone	 1.00	 Very limited Depth to saturated zone	 1.00	 Very limited Depth to saturated zone	 1.00
	 	Shrink-swell Depth to hard bedrock	0.50 0.42 	Depth to hard bedrock Shrink-swell	1.00 0.50	Shrink-swell Depth to hard bedrock	0.50
715: Fluvaquents, frequently flooded	 65 	 - Very limited Flooding Depth to saturated zone	 1.00 1.00	 - Very limited Flooding Depth to saturated zone	 1.00 1.00	 - Very limited Flooding Depth to saturated zone	 1.00 1.00
735: Havelock, occasionally	 	 	 	 	 	 	
flooded	85 	Very limited Flooding Depth to saturated zone Shrink-swell	 1.00 1.00 1.00	Very limited Flooding Depth to saturated zone Shrink-swell	 1.00 1.00 1.00	Very limited Flooding Depth to saturated zone Shrink-swell	 1.00 1.00 1.00
740D: Hawick	 80 	 Somewhat limited Slope	 0.63	 Somewhat limited Slope	 0.63	 Very limited Slope	
775B: Billett	 90 	 Not limited 	 	 Not limited 	 	 Not limited 	
775C: Billett	 85 	 Somewhat limited Slope	0.01	 Somewhat limited Slope	0.01	 Very limited Slope	1.00
777B: Wapsie	 85	 Not limited		 Not limited		 Not limited	
835D2: Storden, moderately eroded	 50 	 Somewhat limited Slope	 0.63	 Somewhat limited Slope	 0.63	 Very limited Slope	1.00
Omsrud, moderately eroded	 35 	 Somewhat limited Slope	0.63	 Somewhat limited Slope	0.63	 Very limited Slope	1.00
835E2: Storden, moderately eroded	 50	 Very limited Slope	 1.00	 Very limited Slope	 1.00	 Very limited Slope	 1.00

Dwellings and Small Commercial Buildings--Continued

Map symbol and soil name	Pct. of map unit	f basements		Dwellings with basements		Small commercial buildings 		
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	
835E2: Omsrud, moderately eroded	 35 	 Very limited Slope	 1.00	 Very limited Slope	 1.00	 Very limited Slope	 1.00	
836B: Kilkenny	 65 	 Somewhat limited Shrink-swell 	0.50	 Somewhat limited Depth to saturated zone Shrink-swell	0.61	 Somewhat limited Shrink-swell 	0.50	
854D: Fens, Aquolls	 80 	 Very limited Subsidence Depth to saturated zone Organic matter content	 1.00 1.00 1.00	 Very limited Subsidence Depth to saturated zone Slope	 1.00 1.00 0.16	 Very limited Subsidence Depth to saturated zone Organic matter content	 1.00 1.00 1.00	
855: Shorewood	 85 	 Very limited Depth to saturated zone Shrink-swell	1.00	 Very limited Depth to saturated zone Shrink-swell	 1.00 1.00	 Very limited Depth to saturated zone Shrink-swell	 1.00 1.00	
956: Harps	 45 	 Very limited Depth to saturated zone Shrink-swell	1.00	Very limited Depth to saturated zone Shrink-swell	1.00	Very limited Depth to saturated zone Shrink-swell	 1.00 0.50	
Okoboji, depressional, ponded	 35 	 Very limited Depth to saturated zone Shrink-swell Ponding	 1.00 1.00	Very limited Depth to saturated zone Shrink-swell Ponding	 1.00 1.00	Very limited Depth to saturated zone Shrink-swell Ponding	 1.00 1.00	
1007: Cosmos, bouldery	 65 	 Very limited Depth to saturated zone Shrink-swell	1.00	 Very limited Depth to saturated zone Shrink-swell	 1.00 1.00	 Very limited Depth to saturated zone Shrink-swell	 1.00 1.00	
1055B: Kandiyohi, bouldery	 65 	 Very limited Depth to saturated zone Shrink-swell	1.00	 Very limited Depth to saturated zone Shrink-swell	1.00	 Very limited Depth to saturated zone Shrink-swell	 1.00 1.00	
1138B: Clarion	 65 	 Not limited 		 Somewhat limited Depth to saturated zone	 0.61 	 Not limited 		
1236B: Angus	 85 	 Somewhat limited Shrink-swell	0.50	 Not limited 		 Somewhat limited Shrink-swell 	0.50	

Dwellings and Small Commercial Buildings--Continued

Map symbol and soil name	 Pct. of map unit	basements		Dwellings with basements		 Small commercial buildings 	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
1236C: Angus	 80 	 Somewhat limited Shrink-swell 	 0.50	 Not limited 	 	 Somewhat limited Slope Shrink-swell	 0.88 0.50
1259: Biscay, depressional, ponded	 80 	Very limited Depth to saturated zone Ponding Shrink-swell	 1.00 1.00 0.50	 - Very limited Depth to saturated zone Ponding	 1.00 1.00	 	 1.00 1.00 0.50
1507: Brownton	 80 	 Very limited Depth to saturated zone Shrink-swell	 1.00 1.00	 Very limited Depth to saturated zone	 1.00 	 Very limited Depth to saturated zone Shrink-swell	 1.00 1.00
1555: Nicollet	 40 	 Very limited Depth to saturated zone	 1.00	 Very limited Depth to saturated zone	 1.00	 Very limited Depth to saturated zone	 1.00
Guckeen	 25 	 Very limited Depth to saturated zone	 1.00 	 Very limited Depth to saturated zone	 1.00 	 Very limited Depth to saturated zone	 1.00
1836B: Kilkenny	 65 	 Somewhat limited Shrink-swell 	 0.50 	 Somewhat limited Depth to saturated zone Shrink-swell	 0.61 0.50	 Somewhat limited Shrink-swell 	 0.50
Shorewood	 25 	 Very limited Depth to saturated zone Shrink-swell	 1.00 1.00	 Very limited Depth to saturated zone Shrink-swell	 1.00 1.00	 Very limited Depth to saturated zone Shrink-swell	 1.00 1.00
2700C: Ridgeton	 75 	 Not limited 	 	 Not limited 	 	 Somewhat limited Slope	0.88
2700D: Ridgeton	 80 	 Somewhat limited Slope	 0.63	 Somewhat limited Slope	 0.63	 Very limited Slope	
4000: Urban land	 100 	 Not rated 	 	 Not rated 	 	 Not rated 	
4055: Nicollet	 50 	 Very limited Depth to saturated zone	 1.00	 Very limited Depth to saturated zone	 1.00 	 Very limited Depth to saturated zone	 1.00
Urban land	 50 	 Not rated 	 	 Not rated 	 	 Not rated 	

Dwellings and Small Commercial Buildings--Continued

Map symbol and soil name	Pct. of map unit	basements		Dwellings with basements		 Small commercial buildings 	
	 	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
4107: Webster	 60 	 Very limited Depth to saturated zone Shrink-swell	 1.00 0.32	 Very limited Depth to saturated zone	 1.00 	 Very limited Depth to saturated zone Shrink-swell	 1.00 0.32
Urban land	 40 	 Not rated 	 	 Not rated 	 	 Not rated 	
4138B: Clarion	 50 	 Not limited 	 	 Somewhat limited Depth to saturated zone	 0.61 	 Not limited 	
Urban land	 30 	 Not rated 	 	 Not rated 	 	 Not rated 	
4235B: Angus	 60 	 Somewhat limited Shrink-swell	0.50	 Not limited 		 Somewhat limited Shrink-swell	0.50
Urban land	 40 	 Not rated 	 	 Not rated 	 	 Not rated 	
4236D: Lester	 50 	 Somewhat limited Slope Shrink-swell	0.63	-	0.63	 Very limited Slope Shrink-swell	1.00
Urban land	 50 	 Not rated 	 	 Not rated 	 	 Not rated 	
4325: Le Sueur	 60 	 Very limited Depth to saturated zone	 1.00 	 Very limited Depth to saturated zone Shrink-swell	 1.00 0.50	 Very limited Depth to saturated zone	1.00
Urban land	 40 	 Not rated 	 	 Not rated 	 	 Not rated 	
4444: Jacwin	 50 	 Very limited Depth to saturated zone Shrink-swell	 1.00 1.00	 Very limited Depth to saturated zone Shrink-swell	 1.00 1.00	saturated zone	1.00
Urban land	50	 Not rated 		Not rated		 Not rated 	
4507: Canisteo	50 50 	 Very limited Depth to saturated zone Shrink-swell	 1.00 0.01	 Very limited Depth to saturated zone	 1.00 	 Very limited Depth to saturated zone Shrink-swell	1.00
Urban land	 50 	 Not rated 		 Not rated 		 Not rated 	
4551B: Calamine	 50 	 Very limited Depth to saturated zone	 1.00 	 Very limited Depth to saturated zone Shrink-swell	 1.00 1.00	 Very limited Depth to saturated zone	1.00
Urban land	 50 	 Not rated 		 Not rated 		 Not rated 	

Dwellings and Small Commercial Buildings--Continued

Map symbol and soil name	Pct. of map unit	basements	ut	Dwellings with basements		Small commercial buildings 	
		!	Value	Rating class and	Value	Rating class and limiting features	Value
4551D: Calamine	 50 	Depth to saturated zone	 1.00 0.16	saturated zone	 1.00 1.00 0.16	 Very limited Depth to saturated zone Slope	 1.00 1.00
Urban land	50	 Not rated 	 	 Not rated 	 	 Not rated 	
4635: Buckney	 50	 Not limited 	 	 Not limited 	 	 Not limited 	
Urban land	50	Not rated		 Not rated 		 Not rated 	į į
4635B: Buckney	50	 Not limited		 Not limited	 	 Not limited	ļ ļ
Urban land	50	 Not rated		 Not rated		 Not rated	
4946B: Udorthents	 70	 Not rated	 	 Not rated	 	 Not rated	
Highway	30	 Not rated 	 	 Not rated 	 	 Not rated 	
5010: Pits, sand and gravel	 100	 Not rated 	 	 Not rated	 	 Not rated	
5030: Pits, limestone quarries	 100 	 Not rated 	 	 Not rated 	 	 Not rated 	
5035: Pits, gypsum quarries	 100 	 Not rated 	 	 Not rated 	 	 Not rated 	
5040: Udorthents, loamy	 100	 Not rated		 Not rated		 Not rated	
5049: Aquolls, ponded	 60	 Not rated	 	 Not rated 	 	 Not rated	
Udorthents, loamy	30	 Not rated 	 	 Not rated 	 	 Not rated 	
5060: Pits, clay	 100	 Not rated 	 	 Not rated 	 	 Not rated 	
5080: Udorthents	100	 Not rated	 	 Not rated	i I	 Not rated	į į
5457: Du Page, channeled, frequently flooded	 80 	 Very limited Flooding 	 1.00	Very limited Flooding Depth to saturated zone	 1.00 0.61	 Very limited Flooding	 1.00

Dwellings and Small Commercial Buildings--Continued

Map symbol	Pct.	Dwellings witho	ut	Dwellings with	ı	Small commercia	1
and soil name	of	basements		basements		buildings	
	map						
	unit					<u> </u>	
		, ,	Value	Rating class and	Value	Rating class and	Value
	<u> </u>	limiting features	<u> </u>	limiting features		limiting features	<u> </u>
5507:				 			
Corvuso	55	Very limited		Very limited		Very limited	
		Depth to	1.00	Depth to	1.00	Depth to	1.00
		saturated zone		saturated zone		saturated zone	
		Shrink-swell	1.00	Shrink-swell	1.00	Shrink-swell	1.00
Brownton	35	 Very limited		 Very limited		 Very limited	
		Depth to	1.00	Depth to	1.00	Depth to	1.00
		saturated zone		saturated zone		saturated zone	
		Shrink-swell	1.00			Shrink-swell	1.00
AW:	 	 		 		 	
Animal waste lagoon	100	Not rated	į	Not rated	į	Not rated	į
SL:		 		 			
Sewage lagoon	100	Not rated		Not rated		Not rated	
W:		 		 		 	
Water	100	Not rated		Not rated		Not rated	

Roads and Streets, Shallow Excavations, and Lawns and Landscaping

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table)

Map symbol and soil name	Pct. Local roads and of streets map unit		d	Shallow excavati 	ons	Lawns and landsca	aping
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
6: Okoboji, depressional,	 	 		 	 	 	
ponded	85 	 Very limited Depth to saturated zone	1.00	Very limited Depth to saturated zone	1.00	 Very limited Depth to saturated zone	1.00
	 	Frost action Low strength	1.00	Ponding Cutbanks cave	1.00	Ponding	1.00
27B: Terril	 85	 Somewhat limited	 	 Somewhat limited	 	 Not limited	
	 	Frost action Low strength	0.50	Depth to saturated zone Cutbanks cave	0.61 0.10	 - -	
34:		 				 	
Estherville	90 	NOT limited 	 	Very limited Cutbanks cave 	1.00	Somewhat limited Droughty 	0.10
34B: Estherville	 85 	 Not limited 		 Very limited Cutbanks cave	 1.00	 Somewhat limited Droughty 	0.10
55: Nicollet	 75 	 Very limited Depth to saturated zone Frost action Low strength	 1.00 1.00 1.00	 Very limited Depth to saturated zone Cutbanks cave	 1.00 0.10	 Very limited Depth to saturated zone	1.00
62F: Storden	 80 	 Very limited Slope Low strength Frost action	 1.00 0.78 0.50	 Very limited Slope Cutbanks cave 	 1.00 0.10	 Very limited Slope 	 1.00
90: Okoboji, mucky, depressional,	 	 		 	 	 	
ponded	 85 	 Very limited Depth to saturated zone Frost action	 1.00 1.00	Very limited Depth to saturated zone Ponding	 1.00 1.00	Very limited Depth to saturated zone Ponding	 1.00 1.00
95:	 	Low strength 	1.00 	Cutbanks cave 	0.10 	 	
Harps	85 	Very limited Depth to saturated zone Frost action Shrink-swell	 1.00 1.00 0.50	Very limited Depth to saturated zone Cutbanks cave	 1.00 0.10	Very limited Depth to saturated zone	1.00

Roads and Streets, Shallow Excavations, and Lawns and Landscaping--Continued

Map symbol and soil name	Pct. of map unit	of streets		Shallow excavati 	ons	Lawns and landsca 	ping
	 	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
107: Webster	 80 	 Very limited Depth to saturated zone Frost action Low strength	 1.00 1.00 1.00	 Very limited Depth to saturated zone Cutbanks cave	 1.00 0.10	Very limited Depth to saturated zone	 1.00
108: Wadena	 85	 Somewhat limited Low strength		 Very limited Cutbanks cave	 1.00	 Not limited	
108B: Wadena	 95 	 Somewhat limited Low strength	0.22	 Very limited Cutbanks cave	1.00	 Not limited 	
108C: Wadena	 75 	 Not limited 		 Very limited Cutbanks cave 	1.00	 Not limited 	
135: Coland, occasionally flooded		 Very limited Depth to saturated zone Frost action Flooding	 1.00 1.00 1.00	 Very limited Depth to saturated zone Flooding Cutbanks cave	 1.00 0.60 0.10	 Very limited Depth to saturated zone Flooding	1.00
136: Ankeny, rarely flooded	 80 	 Somewhat limited Frost action Flooding	 0.50 0.40	 Very limited Cutbanks cave 	 1.00	 Not limited 	
138B: Clarion	 80 	 Very limited Low strength Frost action	 1.00 0.50	 Somewhat limited Depth to saturated zone Cutbanks cave	 0.61 0.10	 Not limited - 	
138C2: Clarion, moderately eroded	 80 	 Somewhat limited Frost action 	 0.50	 Somewhat limited Depth to saturated zone Cutbanks cave	 0.61 0.10	 Not limited 	
201B: Coland	 50 	 Very limited Depth to saturated zone Frost action Low strength	 1.00 1.00 1.00	 Very limited Depth to saturated zone Cutbanks cave	 1.00 0.10	 Very limited Depth to saturated zone 	 1.00
Terril	 35 	İ	į	 Somewhat limited Depth to saturated zone Cutbanks cave	0.61	 Not limited 	

Roads and Streets, Shallow Excavations, and Lawns and Landscaping--Continued

Map symbol and soil name	Pct. of map	streets	d	Shallow excavati -	ons	Lawns and landsca	aping
	unit 	Rating class and	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
203: Cylinder	 80 	Very limited Depth to saturated zone Frost action	 1.00 1.00	 Very limited Cutbanks cave Depth to saturated zone	 1.00 1.00	 Very limited Depth to saturated zone	 1.00
227: Wadena, loamy substratum	 70	 Not limited		 Very limited Cutbanks cave		 Not limited	
227B: Wadena, loamy substratum	 70 	 Not limited 		 Very limited Cutbanks cave	 1.00	 Not limited 	
228: Cylinder, loamy substratum	 70 	 Very limited Depth to saturated zone Frost action Low strength	 1.00 1.00 0.22	 Very limited Cutbanks cave Depth to saturated zone	 1.00 1.00	 Very limited Depth to saturated zone	 1.00
236D: Lester	 80 	 Very limited Low strength Slope Shrink-swell	 1.00 0.63 0.50	 Somewhat limited Slope Cutbanks cave	 0.63 0.10	 Somewhat limited Slope 	0.63
236E: Lester	 85 	 Very limited Slope Low strength Shrink-swell	 1.00 1.00 0.50	 Very limited Slope Cutbanks cave	 1.00 0.10	 Very limited Slope 	1.00
236F: Lester	 80 	 Very limited Slope Low strength Shrink-swell	 1.00 1.00 0.50	 Very limited Slope Cutbanks cave	 1.00 0.10	 Very limited Slope 	 1.00
259: Biscay	 85 	 Very limited Depth to saturated zone Frost action Low strength	 1.00 1.00 1.00	Very limited Cutbanks cave Depth to saturated zone	 1.00 1.00	 Very limited Depth to saturated zone	 1.00
262G: Lester	 60 	 Very limited Slope Low strength Shrink-swell	 1.00 1.00 0.50	 Very limited Slope Cutbanks cave	 1.00 0.10	 Very limited Slope 	 1.00
Belview	 20 	 Very limited Slope Frost action Low strength	 1.00 0.50 0.22	 Very limited Slope Cutbanks cave	 1.00 0.10	 Very limited Slope 	 1.00

Roads and Streets, Shallow Excavations, and Lawns and Landscaping--Continued

Map symbol and soil name	Pct. of map unit	streets	d	 Shallow excavati 	ons	 Lawns and landsca 	ping
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
274: Rolfe, depressional, ponded	 85 	 Very limited Depth to saturated zone Frost action Low strength	 1.00 1.00 1.00	Very limited Depth to saturated zone Ponding Cutbanks cave	 1.00 1.00 0.10	Very limited Depth to saturated zone Ponding	 1.00 1.00
278: Biscay, loamy substratum	 70 	 Very limited Depth to saturated zone Frost action	 1.00 1.00	 Very limited Cutbanks cave Depth to saturated zone	 1.00 1.00	 Very limited Depth to saturated zone	 1.00
307: Dundas	 80 	 Very limited Depth to saturated zone Frost action Low strength	 1.00 1.00 1.00	 Very limited Depth to saturated zone Cutbanks cave	 1.00 0.10	 Very limited Depth to saturated zone	1.00
315B: Udifluvents, occasionally flooded	 80 	 Very limited Flooding	 1.00	 - Somewhat limited Flooding Cutbanks cave	 0.60 0.10	 - Not rated	
323B: Fort Dodge	 90 	 Very limited Low strength Frost action	 1.00 0.50	 Very limited Cutbanks cave	 1.00	 Not limited 	
325: Le Sueur	 90 	 Very limited Depth to saturated zone Frost action Low strength	 1.00 1.00 0.22	 Very limited Depth to saturated zone Cutbanks cave	 1.00 0.10	 Very limited Depth to saturated zone 	 1.00
338: Garmore	 100 	Frost action	 1.00 1.00 0.01	 Somewhat limited Depth to saturated zone Cutbanks cave	 0.61 0.10	 Not limited 	
342: Estherville, loamy substratum	 70 	 - Not limited -	 	 Very limited Cutbanks cave	 1.00	 Somewhat limited Droughty	 0.36
342B: Estherville, loamy substratum	 70 	 Not limited 	 	 Very limited Cutbanks cave	 1.00	 Somewhat limited Droughty 	 0.36

Roads and Streets, Shallow Excavations, and Lawns and Landscaping--Continued

Map symbol and soil name	Pct. of map unit	streets	d	 Shallow excavati 	ons	 Lawns and landsca 	ping
	<u> </u> 	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
344B: Copaston	 80 	 Very limited Depth to hard bedrock Frost action	 1.00 0.50	 Very limited Depth to hard bedrock Cutbanks cave	 1.00 0.10	 Very limited Depth to bedrock Droughty 	 1.00 0.81
345: Copaston	 35 	 Very limited Depth to hard bedrock Frost action	 1.00 0.50	 Very limited Depth to hard bedrock Cutbanks cave	 1.00 0.10	 Very limited Depth to bedrock Droughty	 1.00 0.81
Jacwin	25 	Very limited Shrink-swell Depth to saturated zone Frost action	 1.00 1.00 1.00	 Very limited Depth to saturated zone Too clayey Cutbanks cave	 1.00 0.72 0.10	 Very limited Depth to saturated zone 	 1.00
355: Luther	 85 	 Very limited Depth to saturated zone Frost action Low strength	 1.00 1.00 1.00	 Very limited Depth to saturated zone Cutbanks cave	 1.00 0.10	 Very limited Depth to saturated zone	 1.00
383: Marna	 80 	 Very limited Depth to saturated zone Frost action Low strength	 1.00 1.00 1.00	 Very limited Depth to saturated zone Too clayey Cutbanks cave	 1.00 0.28 0.10	 Very limited Depth to saturated zone	 1.00
385: Guckeen	 75 	 Very limited Depth to saturated zone Frost action Low strength	 1.00 1.00 0.22	 Very limited Depth to saturated zone Cutbanks cave Too clayey	 1.00 0.10 0.02	 Very limited Depth to saturated zone	 1.00
386: Cordova	 85 	Very limited Depth to saturated zone Frost action Low strength	 1.00 1.00	 Very limited Depth to saturated zone Cutbanks cave	 1.00 0.10	 Very limited Depth to saturated zone	 1.00
387B: Kamrar	 85 	 Very limited Low strength Shrink-swell Frost action	 1.00 0.50 0.50	 Very limited Depth to saturated zone Cutbanks cave	 1.00 0.10	 Somewhat limited Depth to saturated zone 	 0.19
413G: Gosport	 25 	 Very limited Slope Low strength Shrink-swell	 1.00 1.00 1.00 	 Very limited Slope Depth to saturated zone Depth to soft bedrock	 1.00 1.00 0.46	 Very limited Slope Depth to bedrock Depth to saturated zone	 1.00 0.46 0.19

Roads and Streets, Shallow Excavations, and Lawns and Landscaping--Continued

Map symbol and soil name	Pct. of map unit	streets	d	 Shallow excavati 	ons	Lawns and landsca - 	ping
	 	Rating class and limiting features	Value	Rating class and limiting features	1	Rating class and limiting features	Value
413G: Emeline	 25 	 Very limited Depth to hard bedrock Slope Frost action	 1.00 1.00 0.50	 Very limited Depth to hard bedrock Slope Cutbanks cave	 1.00 1.00 0.10	 Very limited Depth to bedrock Slope Droughty	 1.00 1.00 1.00
Ridgeton	 25 	 Very limited Slope Low strength Frost action	 1.00 0.78 0.50	 Very limited Slope Cutbanks cave	 1.00 0.10	 Very limited Slope 	1.00
457: Du Page, occasionally flooded	 85 	 Very limited Flooding Low strength Frost action	 1.00 1.00 0.50	saturated zone	 0.61 0.60 0.10	 Somewhat limited Flooding 	 0.60
485: Spillville, occasionally flooded	 80 	 Very limited Depth to saturated zone Flooding Low strength	 1.00 1.00		 1.00 0.60 0.10	 Very limited Depth to saturated zone Flooding	 1.00 0.60
485B: Spillville, rarely flooded	 85 	 Very limited Low strength Frost action Flooding	 1.00 0.50 0.40	 Somewhat limited Depth to saturated zone Cutbanks cave	 0.61 0.10	 Not limited 	
506: Wacousta, depressional, ponded	 80 	 Very limited Depth to saturated zone Frost action Low strength	 1.00 1.00	 Very limited Depth to saturated zone Ponding Cutbanks cave	 1.00 1.00 0.10	 Very limited Depth to saturated zone Ponding	 1.00 1.00
507: Canisteo	 75 	Very limited Depth to saturated zone Frost action Low strength	 1.00 1.00 1.00	Very limited Depth to saturated zone Cutbanks cave	 1.00 0.10	 Very limited Depth to saturated zone 	 1.00

Roads and Streets, Shallow Excavations, and Lawns and Landscaping--Continued

Map symbol and soil name	Pct. of map unit	of streets		Shallow excavati 	ons	 Lawns and landsca 	ping
	<u> </u> 	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
511: Blue Earth, depressional, ponded	 85 	 Very limited Depth to saturated zone Frost action Low strength	 1.00 1.00	Very limited Depth to saturated zone Organic matter content Ponding	 1.00 1.00	Very limited Depth to saturated zone Ponding	 1.00 1.00
526: Wacousta, mucky, depressional, ponded	 90 	 Very limited Depth to saturated zone Frost action Low strength	 1.00 1.00	 Very limited Depth to saturated zone Ponding Cutbanks cave	 1.00 1.00	 Very limited Depth to saturated zone Ponding	 1.00 1.00
536: Hanlon, occasionally flooded		 Very limited Flooding Frost action	 1.00 0.50 	 Somewhat limited Depth to saturated zone Flooding Cutbanks cave	0.61	 Somewhat limited Flooding 	0.60
541C: Estherville	 45 	 Not limited 		 Very limited Cutbanks cave	1.00	 Somewhat limited Droughty	0.10
Hawick	 45 	 Not limited 	 	 Very limited Cutbanks cave	1.00	 Somewhat limited Droughty	0.91
551B: Calamine	 85 	 Very limited Depth to saturated zone Low strength Frost action	 1.00 1.00 0.50	 Very limited Depth to saturated zone Cutbanks cave Too clayey	 1.00 0.10 0.03	Very limited Depth to saturated zone	 1.00
551D: Calamine	 55 	 Very limited Depth to saturated zone Low strength Frost action	 1.00 1.00 0.50	 Very limited Depth to saturated zone Slope Cutbanks cave	 1.00 0.16 0.10	Very limited Depth to saturated zone Slope	 1.00 0.16
559: Talcot	 85 	 Very limited Depth to saturated zone Frost action Low strength	 1.00 1.00 1.00	 Very limited Cutbanks cave Depth to saturated zone	 1.00 1.00 	 Very limited Depth to saturated zone 	 1.00

Roads and Streets, Shallow Excavations, and Lawns and Landscaping--Continued

Map symbol and soil name	Pct. of map	f streets		Shallow excavati 	ons	Lawns and landscaping 		
	unit 	Rating class and limiting features	Value	 Rating class and limiting features	Value	 Rating class and limiting features	Value	
561: Talcot, loamy substratum	 70 	 Very limited Depth to saturated zone Frost action Shrink-swell	 1.00 1.00 0.50	 Very limited Cutbanks cave Depth to saturated zone	 1.00 1.00	Very limited Depth to saturated zone	1.00	
566C: Moingona	 90 	 Very limited Low strength Frost action	 1.00 0.50	 Somewhat limited Depth to saturated zone Cutbanks cave	 0.61 0.10	 Not limited 		
568D: Cokato	 80 	 Very limited Low strength Shrink-swell Frost action	 1.00 0.50 0.50	 Somewhat limited Cutbanks cave Slope 	 0.10 0.04 	 Somewhat limited Slope 	 0.04 	
568E: Cokato	 80 	 Very limited Slope Low strength Shrink-swell	 1.00 1.00 0.50	 Very limited Slope Cutbanks cave	 1.00 0.10	 Very limited Slope 	1.00	
583: Minnetonka	 90 	 Very limited Depth to saturated zone Frost action Low strength	 1.00 1.00	 Very limited Depth to saturated zone Too clayey Cutbanks cave	 1.00 0.12 0.10	 Very limited Depth to saturated zone 	 1.00 	
606: Lanyon, depressional, ponded	 80 	 Very limited Depth to saturated zone Frost action Low strength	 1.00 1.00	Very limited Depth to saturated zone Ponding Too clayey	 1.00 1.00 0.28	Very limited Depth to saturated zone Ponding	 1.00 1.00	
Lerdal	 80 	Very limited Depth to saturated zone Frost action Low strength	 1.00 1.00 1.00	Very limited Depth to saturated zone Cutbanks cave	 1.00 0.10	Very limited Depth to saturated zone	 1.00 	
636: Buckney, rarely flooded	 85 	 Somewhat limited Flooding	 0.40	 Very limited Cutbanks cave	 1.00	 Somewhat limited Droughty		
636B: Buckney, rarely flooded	 90 	 Somewhat limited Flooding 	 0.40	 Very limited Cutbanks cave 	 1.00	 Somewhat limited Droughty 	 0.70	

Roads and Streets, Shallow Excavations, and Lawns and Landscaping--Continued

Map symbol and soil name	Pct. of map unit	streets		 Shallow excavati 	ons	Lawns and landsca	ping
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
638C2: Clarion, moderately eroded	 50 	 Somewhat limited Frost action 	 0.50	 Somewhat limited Depth to saturated zone Cutbanks cave	 0.61 0.10	 Not limited 	
Storden, moderately eroded	 35 	 Somewhat limited Low strength Frost action	 0.78 0.50	 Somewhat limited Cutbanks cave	 0.10	 Not limited 	
650: Joliet	 45 	 Very limited Depth to hard bedrock Depth to saturated zone Frost action	 1.00 1.00 	bedrock Depth to saturated zone	 1.00 1.00 0.10	saturated zone	 1.00 1.00 0.48
Faxon	 45 	 Very limited Depth to saturated zone Frost action Shrink-swell	 1.00 1.00 0.50	 Very limited Depth to hard bedrock Depth to saturated zone Cutbanks cave	 1.00 1.00 0.10	 Very limited Depth to saturated zone Depth to bedrock Content of large stones	 1.00 0.42 0.01
715: Fluvaquents, frequently flooded	 65 	Very limited Depth to saturated zone Flooding	 1.00 1.00	 Very limited Cutbanks cave Depth to saturated zone Flooding	 1.00 1.00 0.80	 Not rated 	
735: Havelock, occasionally flooded	 85 	 Very limited Depth to saturated zone Frost action Flooding	 1.00 1.00	 	 1.00 0.60 0.10	 Very limited Depth to saturated zone Flooding	 1.00 0.60
740D: Hawick	 80 	 Somewhat limited Slope 	 0.63	 Very limited Cutbanks cave Slope	 1.00 0.63	 Somewhat limited Droughty Slope	0.91
775B: Billett	 90 	 Somewhat limited Frost action 	0.50	 Very limited Cutbanks cave	 1.00	 Not limited 	
775C: Billett	 85 	 Somewhat limited Frost action Slope	 0.50 0.01	 Very limited Cutbanks cave Slope	 1.00 0.01	 Somewhat limited Slope 	0.01

Roads and Streets, Shallow Excavations, and Lawns and Landscaping--Continued

Map symbol and soil name	Pct. of map unit	streets	d	Shallow excavati 	ons	Lawns and landsca - 	aping
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
777B: Wapsie	 85 	 Not limited 	 	 Very limited Cutbanks cave	 1.00	 Not limited 	
835D2: Storden, moderately eroded	 50 	 Somewhat limited Low strength Slope Frost action	 0.78 0.63 0.50	 Somewhat limited Slope Cutbanks cave	 0.63 0.10	 Somewhat limited Slope 	0.63
Omsrud, moderately eroded	 35 	 Very limited Low strength Slope Frost action	 1.00 0.63 0.50	 Somewhat limited Slope Cutbanks cave	 0.63 0.10	 Somewhat limited Slope 	 0.63
835E2: Storden, moderately eroded	 50 	 Very limited Slope Low strength Frost action	 1.00 0.78 0.50	 	 1.00 0.10	 Very limited Slope 	 1.00
Omsrud, moderately eroded	 35 	 Very limited Slope Low strength Frost action	 1.00 1.00 0.50	 Very limited Slope Cutbanks cave	 1.00 0.10	 Very limited Slope 	1.00
836B: Kilkenny	 65 	 Very limited Low strength Shrink-swell Frost action	 1.00 0.50 0.50	 Somewhat limited Depth to saturated zone Cutbanks cave	 0.61 0.10	 Not limited 	
854D: Fens, Aquolls	 80 	 Very limited Depth to saturated zone Subsidence Frost action	 1.00 1.00 1.00	Very limited Depth to saturated zone Organic matter content Slope	 1.00 1.00 0.16	 Not rated 	
855: Shorewood	 85 	 Very limited Depth to saturated zone Frost action Low strength	 1.00 1.00 1.00	 Very limited Depth to saturated zone Too clayey Cutbanks cave	 1.00 0.15 0.10	 Very limited Depth to saturated zone 	 1.00
956: Harps	 45 	 Very limited Depth to saturated zone Frost action Shrink-swell	 1.00 1.00 0.50	 Very limited Depth to saturated zone Cutbanks cave	 1.00 0.10	 Very limited Depth to saturated zone	1.00

Roads and Streets, Shallow Excavations, and Lawns and Landscaping--Continued

and soil name	Pct. of map unit	streets	d	Shallow excavati 	ons	 Lawns and landsca 	ping
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
956: Okoboji, depressional,		 	 	 	 	 	
ponded	35	 Very limited Depth to	1.00	 Very limited Depth to	1.00	 Very limited Depth to	1.00
	 	saturated zone Frost action Low strength	 1.00 1.00	saturated zone Ponding Cutbanks cave	 1.00 0.10	saturated zone Ponding	1.00
1007:						 	
Cosmos, bouldery	65 	Very limited Depth to saturated zone Frost action	 1.00 1.00	Very limited Depth to saturated zone Dense layer	 1.00 0.50	Very limited Depth to saturated zone	 1.00
		Low strength	1.00	Too clayey	0.28		
1055B: Kandiyohi, bouldery	 65 	 Very limited Depth to saturated zone	 1.00	 Very limited Depth to saturated zone	 1.00	 Very limited Depth to saturated zone	 1.00
		Frost action Low strength	1.00 1.00	Too clayey Cutbanks cave	0.28	 	
1138B: Clarion	65	Low strength	 1.00	 Somewhat limited Depth to	 0.61	 Not limited 	
	 	Frost action 	0.50 	saturated zone Cutbanks cave	 0.10 	 	
1236B: Angus	 85 	 Very limited Low strength Shrink-swell Frost action	 1.00 0.50 0.50	 Somewhat limited Cutbanks cave 	 0.10 	 Not limited 	
1236C: Angus	 80	 Very limited Low strength	 1.00	 Somewhat limited Cutbanks cave	 0.10	 Not limited 	
	 	Shrink-swell Frost action	0.50	 	 	 	
1259: Biscay, depressional,	 	 	 	 		 	
ponded	80	 Very limited Depth to saturated zone	1.00	 Very limited Cutbanks cave Depth to	 1.00 1.00	Very limited Depth to saturated zone	1.00
	 	Frost action Ponding 	1.00 1.00 	saturated zone Ponding 	 1.00 	Ponding 	1.00
1507: Brownton	 80 	Depth to	1.00		1.00	: -	1.00
	 	saturated zone Frost action Low strength	 1.00 1.00	saturated zone Too clayey Cutbanks cave	 0.28 0.10	saturated zone	

Roads and Streets, Shallow Excavations, and Lawns and Landscaping--Continued

Map symbol and soil name	Pct. of map unit	streets	đ	 Shallow excavati 	ons	 Lawns and landsca 	ping
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
1555: Nicollet	 40 	 Very limited Depth to saturated zone Frost action Low strength	 1.00 1.00	Very limited Depth to saturated zone Cutbanks cave	 1.00 0.10	Very limited Depth to saturated zone	 1.00
Guckeen	 25 	 Very limited Depth to saturated zone Frost action Low strength	 1.00 1.00 0.22	 Very limited Depth to saturated zone Cutbanks cave Too clayey	 1.00 0.10 0.02	 Very limited Depth to saturated zone	1.00
1836B:				 	l		i
Kilkenny	 65 	Very limited Low strength Shrink-swell Frost action	 1.00 0.50 0.50	Somewhat limited Depth to saturated zone Cutbanks cave	 0.61 0.10	Not limited	
Shorewood	 25 	Very limited Depth to saturated zone Frost action Low strength	 1.00 1.00 1.00	 Very limited Depth to saturated zone Too clayey Cutbanks cave	 1.00 0.15 0.10	 Very limited Depth to saturated zone	1.00
2700C: Ridgeton	 75 	 Somewhat limited Low strength Frost action	 0.78 0.50	 Somewhat limited Cutbanks cave	 0.10	 Not limited 	
2700D: Ridgeton	 80 	 Somewhat limited Low strength Slope Frost action	 0.78 0.63 0.50	 Somewhat limited Slope Cutbanks cave	 0.63 0.10	 Somewhat limited Slope 	0.63
4000: Urban land	 100	 Not rated 		 Not rated 	 	 Not rated 	
4055: Nicollet	 50 	 Very limited Depth to saturated zone Frost action Low strength	 1.00 1.00	 Very limited Depth to saturated zone Cutbanks cave	 1.00 0.10	 Very limited Depth to saturated zone	1.00
Urban land	 50 	 Not rated 		 Not rated 	 	 Not rated 	
4107: Webster	 60 	 Very limited Depth to saturated zone Frost action Low strength	 1.00 1.00 1.00	 Very limited Depth to saturated zone Cutbanks cave	 	 Very limited Depth to saturated zone	1.00
Urban land	40	 Not rated	!	 Not rated		 Not rated	

Roads and Streets, Shallow Excavations, and Lawns and Landscaping--Continued

Map symbol P and soil name m u		streets	d	 Shallow excavati 	ons	 Lawns and landsca 	nping
	<u> </u>	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
4138B: Clarion	 50 	 Very limited Low strength Frost action	 1.00 0.50	 Somewhat limited Depth to saturated zone Cutbanks cave	 0.61 0.10	 Not limited - 	
Urban land	30	 Not rated		 Not rated		 Not rated	
4235B:	 	 		 		 	
Angus	60 	Very limited Low strength Shrink-swell Frost action	 1.00 0.50 0.50	Somewhat limited Cutbanks cave 	 0.10 	Not limited - -	
Urban land	 40 	 Not rated 	 	 Not rated 	 	 Not rated 	
4236D: Lester	 50 	 Very limited Low strength Slope Shrink-swell	 1.00 0.63 0.50	 Somewhat limited Slope Cutbanks cave	 0.63 0.10	 Somewhat limited Slope 	0.63
Urban land	 50 	 Not rated 	 	 Not rated 	 	 Not rated 	
4325: Le Sueur	 60 	 Very limited Depth to saturated zone Frost action Low strength	 1.00 1.00 0.22	 Very limited Depth to saturated zone Cutbanks cave	 1.00 0.10	 Very limited Depth to saturated zone	1.00
Urban land	 40 	 Not rated 	 	 Not rated 	 	 Not rated 	
4444: Jacwin	 50 	 Very limited Shrink-swell Depth to saturated zone Frost action	 1.00 1.00 1.00	Too clayey	 1.00 0.72 0.10	 Very limited Depth to saturated zone	1.00
Urban land	 50 	 Not rated 	 	 Not rated 	 	 Not rated 	
4507: Canisteo	 50 	 Very limited Depth to saturated zone Frost action Low strength	 1.00 1.00 1.00	 Very limited Depth to saturated zone Cutbanks cave	 1.00 0.10	 Very limited Depth to saturated zone	1.00
Urban land	 50 	 Not rated 	 	 Not rated 	 	 Not rated 	
4551B: Calamine	 50 	 Very limited Depth to saturated zone Low strength Frost action	 1.00 1.00 0.50	 Very limited Depth to saturated zone Cutbanks cave Too clayey	 1.00 0.10 0.03	 Very limited Depth to saturated zone	1.00
Urban land	50	 Not rated		 Not rated		 Not rated	

Roads and Streets, Shallow Excavations, and Lawns and Landscaping--Continued

Map symbol and soil name	Pct. of map unit	streets	đ	 Shallow excavati 	ons	 Lawns and landsca 	ping
	unit	·	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
4551D: Calamine	 50 	Depth to saturated zone Low strength	 1.00 1.00 0.50	saturated zone	 1.00 0.16 0.10	 Very limited Depth to saturated zone Slope	 1.00 0.16
Urban land	 50	 Not rated	 	 Not rated		 Not rated	
4635: Buckney	 50 	 Not limited 	 	 Very limited Cutbanks cave		 Somewhat limited Droughty	0.70
Urban land	 50 	 Not rated 	 	 Not rated 	 	 Not rated 	
4635B: Buckney	 50 	 Not limited 	 	 Very limited Cutbanks cave	1.00	 Somewhat limited Droughty	0.70
Urban land	 50 	 Not rated 	 	 Not rated 	 	 Not rated 	
4946B: Udorthents	 70	 Not rated	 	 Not rated		 Not rated	
Highway	 30 	 Not rated 	 	 Not rated 	 	 Not rated 	
5010: Pits, sand and gravel	 100	 Not rated	 	 Not rated 	 	 Not rated 	
5030: Pits, limestone quarries	 100	 Not rated	 	 Not rated 	 	 Not rated 	
5035: Pits, gypsum quarries	 100	 Not rated	 	 - Not rated	 	 Not rated 	
5040: Udorthents, loamy	 100	 Not rated		 Not rated		 Not rated	
5049: Aquolls, ponded	 60	 Not rated		 Not rated		 Not rated	
Udorthents, loamy	 30 	 Not rated 	 	 Not rated 	 	 Not rated 	
5060: Pits, clay	 100	 Not rated	 	 Not rated		 Not rated	
5080: Udorthents	 100	 Not rated 	 	 Not rated 	 	 Not rated 	
5457: Du Page, channeled, frequently flooded	 80 	Low strength	 1.00 1.00 0.50	Depth to	0.80	 Very limited Flooding 	 1.00

Roads and Streets, Shallow Excavations, and Lawns and Landscaping--Continued

Map symbol	Pct.	Local roads and	d	Shallow excavati	ons	Lawns and landsca	ping
and soil name	of map unit	streets				 	
		Rating class and	Value	Rating class and	Value	Rating class and	Value
		limiting features		limiting features		limiting features	
5507:	 	 	 	 	 	 	
Corvuso	55	Very limited		Very limited		Very limited	
		Depth to	1.00	Depth to	1.00	Depth to	1.00
		saturated zone		saturated zone		saturated zone	
		Frost action	1.00	Too clayey	0.28		
		Low strength	1.00	Cutbanks cave	0.10		
Brownton	 35	 Very limited	 	 Very limited	 	 Very limited	
	İ	Depth to	1.00	Depth to	1.00	Depth to	1.00
	İ	saturated zone	į	saturated zone	İ	saturated zone	İ
	İ	Frost action	1.00	Too clayey	0.28	İ	İ
	į	Low strength	1.00	Cutbanks cave	0.10		į
AW:	 	 	 	 		 	
Animal waste lagoon	100	 Not rated		 Not rated		 Not rated	
SL:	 	 	 	 		 	
Sewage lagoon	100	Not rated		Not rated		Not rated	
W:	 	 	 	 		 	
Water	100	Not rated		Not rated	ļ	Not rated	ļ

Sanitary Facilities

The titles of the tables described in this section are:

- "Sewage Disposal"
- "Landfills"

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

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

Septic tank absorption fields are areas in which effluent from a septic tank is distributed into the soil through subsurface tiles or perforated pipe. Only that part of the soil between depths of 24 and 60 inches is evaluated. The ratings are based on the soil properties that affect absorption of the effluent, construction and maintenance of the system, and public health. Permeability, depth to a water table, ponding, depth to bedrock or a cemented pan, and flooding affect absorption of the effluent. Stones and boulders, ice, and bedrock or a cemented pan interfere with installation. Subsidence interferes with installation and maintenance. Excessive slope may cause lateral seepage and surfacing of the effluent in downslope areas.

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

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

Soil permeability is a critical property affecting the suitability for sewage lagoons. Most porous soils eventually become sealed when they are used as sites for sewage lagoons. Until sealing occurs, however, the hazard of pollution is severe. Soils that have a permeability rate of more than 2 inches per hour are too porous for the proper functioning of sewage lagoons. In these soils, seepage of the effluent can result in contamination of the ground water. Ground-water contamination is also a hazard if fractured bedrock is within a depth of 40 inches, if the water table is high enough to raise the level of sewage in the lagoon, or if floodwater overtops the lagoon.

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

A trench sanitary landfill is an area where solid waste is placed in successive layers in an excavated trench. The waste is spread, compacted, and covered daily with a thin layer of soil excavated at the site. When the trench is full, a final cover of soil material at least 2 feet thick is placed over the landfill. The ratings in the table are based on the soil properties that affect the risk of pollution, the ease of excavation, trafficability, and revegetation. These properties include permeability, depth to bedrock or a cemented pan, depth to a water table, ponding, slope, flooding, texture, stones and boulders, highly organic layers, soil reaction, and content of salts and sodium. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet. For deeper trenches, onsite investigation may be needed.

Hard, nonrippable bedrock, creviced bedrock, or highly permeable strata in or directly below the proposed trench bottom can affect the ease of excavation and the hazard of ground-water pollution. Slope affects construction of the trenches and the movement of surface water around the landfill. It also affects the construction and performance of roads in areas of the landfill.

Soil texture and consistence affect the ease with which the trench is dug and the ease with which the soil can be used as daily or final cover. They determine the workability of the soil when dry and when wet. Soils that are plastic and sticky when wet are difficult to excavate, grade, or compact and are difficult to place as a uniformly thick cover over a layer of refuse.

The soil material used as the final cover for a trench landfill should be suitable for plants. It should not have excess sodium or salts and should not be too acid. The surface layer generally has the best workability, the highest content of organic matter, and the best potential for plants. Material from the surface layer should be stockpiled for use as the final cover.

In an *area sanitary landfill*, solid waste is placed in successive layers on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil from a source away from the site. A final cover of soil material at least 2 feet thick is placed over the completed landfill. The ratings in the table are based on the soil properties that affect trafficability and the risk of pollution. These properties include flooding, permeability, depth to a water table, ponding, slope, and depth to bedrock or a cemented pan.

Flooding is a serious problem because it can result in pollution in areas downstream from the landfill. If permeability is too rapid or if fractured bedrock, a fractured cemented pan, or the water table is close to the surface, the leachate can contaminate the water supply. Slope is a consideration because of the extra grading required to maintain roads in the steeper areas of the landfill. Also, leachate may flow along the surface of the soils in the steeper areas and cause difficult seepage problems.

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 ratings in the table also apply to the final cover for a landfill. They are based on the soil properties that affect workability, the ease of digging, and the ease of moving and spreading the material over the refuse daily during wet and dry periods. These properties include soil texture, depth to a water table, ponding, rock fragments, slope, depth to bedrock or a cemented pan, reaction, and content of salts, sodium, or lime.

Loamy or silty soils that are free of large stones and excess gravel are the best cover for a landfill. Clayey soils may be sticky and difficult to spread; sandy soils are subject to wind erosion.

Slope affects the ease of excavation and of moving the cover material. Also, it can influence runoff, erosion, and reclamation of the borrow area.

After soil material has been removed, the soil material remaining in the borrow area must be thick enough over bedrock, a cemented pan, or the water table to permit revegetation. The soil material used as the final cover for a landfill should be suitable for plants. It should not have excess sodium, salts, or lime and should not be too acid.

Sewage Disposal

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table)

Map symbol and soil name	Pct. of map unit	absorption fiel	ds	 Sewage lagoons 	
	 	Rating class and limiting features	Value	Rating class and limiting features	Value
6: Okoboji, depressional,	 	 		 - -	
ponded	85 	Very limited Depth to saturated zone Slow water movement Ponding	 1.00 1.00 1.00	Very limited Depth to saturated zone Ponding Organic matter content	 1.00 1.00 1.00
27B: Terril	 85 	 Somewhat limited Depth to saturated zone Slow water movement	 0.99 0.50	 Somewhat limited Depth to saturated zone Seepage Slope	 0.71 0.50 0.32
34: Estherville	 90 	 Very limited Filtering capacity Seepage, bottom layer	 1.00 1.00	 Very limited Seepage 	 1.00
34B: Estherville	 85 	 Very limited Filtering capacity Seepage, bottom layer	 1.00 1.00	 Very limited Seepage Slope 	 1.00 0.32
55: Nicollet	 75 	 Very limited Depth to saturated zone Slow water movement	 1.00 0.50	 Very limited Depth to saturated zone Seepage	 1.00 0.50
62F: Storden	 80 	 Very limited Slope Slow water movement	 1.00 0.50	 Very limited Slope Seepage	 1.00 0.50
90: Okoboji, mucky, depressional, ponded	 85 	 	 1.00 1.00	Very limited Depth to saturated zone Ponding Organic matter content	 1.00 1.00

Sewage Disposal--Continued

Map symbol and soil name	Pct. of map	absorption fiel	ds	 Sewage lagoons 	
	unit 	Rating class and limiting features	Value	Rating class and limiting features	Value
95: Harps	 85 	Very limited Depth to saturated zone Slow water movement	 1.00 0.50	 Not rated 	
107: Webster	 80 	 Very limited Depth to saturated zone Slow water movement	 	 Very limited Depth to saturated zone Seepage	 1.00 0.50
108: Wadena	 85 	 Very limited Seepage, bottom layer Slow water movement	 1.00 0.46	 Very limited Seepage 	 1.00
108B: Wadena	 95 	 Very limited Seepage, bottom layer Slow water movement	 1.00 0.46	 Very limited Seepage Slope 	 1.00 0.32
108C: Wadena	 75 		 1.00 0.46	 Very limited Seepage Slope 	 1.00 1.00
135: Coland, occasionally flooded		 Very limited Flooding Depth to saturated zone Slow water movement	 1.00 1.00 0.75	Very limited Flooding Depth to saturated zone Seepage	 1.00 1.00 0.53
136: Ankeny, rarely flooded	 80 	 	 1.00 0.40	 - Very limited Seepage Flooding 	 1.00 0.40
138B: Clarion	 80 	 Somewhat limited Depth to saturated zone Slow water movement	 0.99 0.50	 Somewhat limited Depth to saturated zone Seepage Slope	 0.71 0.50 0.32

Sewage Disposal--Continued

Map symbol and soil name	Pct.	Septic tank absorption fiel	ds	Sewage lagoons		
	map unit	[[
	 	Rating class and limiting features	Value	Rating class and limiting features	Value	
138C2:	 	 		 		
Clarion, moderately	İ		İ		İ	
eroded	80	Somewhat limited	1	Very limited		
		Depth to	0.99	Slope	1.00	
	 	saturated zone	0.50	Depth to saturated zone	0.71	
		movement		Seepage	0.50	
201B:	 	 		 		
Coland	50	Very limited		Very limited		
		Depth to	1.00		1.00	
		saturated zone		saturated zone		
	 	Slow water movement	0.75	Seepage Slope	0.53	
Terril	 35	 Somewhat limited		 Somewhat limited		
		Depth to	0.99	Depth to	0.71	
	ĺ	saturated zone	İ	saturated zone	Ì	
		Slow water	0.50	Seepage	0.50	
	 	movement		Slope 	0.32	
203:			į		İ	
Cylinder	80	Very limited Depth to	1.00	Very limited Seepage	1.00	
		saturated zone		Depth to	1.00	
		Seepage, bottom	1.00	saturated zone	i	
	ĺ	layer	İ	İ	Ì	
	 	Slow water movement	0.50	 		
005	į		į		į	
227: Wadena, loamy	 			 		
substratum	70	Somewhat limited	İ	Very limited	İ	
		Slow water	0.50	Seepage	1.00	
	 	movement				
227B: Wadena, loamy		1		 -	İ	
substratum	 70	 Somewhat limited		 Very limited		
		Slow water	0.50	Seepage	1.00	
	 	movement	İ	Slope	0.32	
228:				 		
Cylinder, loamy			[
substratum	70	! -	:	Very limited	1 00	
	 	Depth to saturated zone	1.00	Seepage Depth to	1.00	
		Slow water	0.50	saturated zone		
	 	movement			į	
236D:	 	[[
Lester	80	Somewhat limited	[Very limited		
		Slope	0.63	Slope	1.00	
		Slow water	0.50	Seepage	0.50	
	!	movement	!	!	1	

Sewage Disposal--Continued

Map symbol and soil name	Pct. of map	Septic tank absorption fiel	ds	 Sewage lagoons 	
	map unit	 		 	
	 	Rating class and limiting features		Rating class and limiting features	Value
236E: Lester	 85 	 Very limited Slope Slow water movement	 1.00 0.50	 Very limited Slope Seepage	 1.00 0.50
236F: Lester	 80 	 Very limited Slope Slow water movement	 1.00 0.50	 Very limited Slope Seepage	 1.00 0.50
259: Biscay	 85 	Very limited Depth to saturated zone Seepage, bottom layer Slow water movement	 1.00 1.00 0.50	Depth to	 1.00 1.00
262G:	 	 		 	
Lester	60 	Very limited Slope Slow water movement	 1.00 0.50	Very limited Slope Seepage	1.00
Belview	 20 	 Very limited Slope Slow water movement	 1.00 0.46	 Very limited Slope Seepage	 1.00 0.53
274: Rolfe, depressional, ponded	 85 	 Very limited Slow water movement Depth to saturated zone Ponding	 1.00 1.00	 Very limited Depth to saturated zone Ponding Seepage	 1.00 1.00 0.50
278: Biscay, loamy substratum	 70 	 Very limited Depth to saturated zone Slow water movement	 1.00 0.50	Depth to	 1.00 1.00
307: Dundas	 80 	 Very limited Depth to saturated zone Slow water movement	 1.00 1.00	 Very limited Depth to saturated zone Seepage	 1.00 0.50

Sewage Disposal--Continued

Map symbol and soil name	Pct. of map	-	ds	 Sewage lagoons 	ı
	unit	 		 	
	 	Rating class and limiting features	Value	Rating class and limiting features	Value
315B: Udifluvents, occasionally	 	 		 	
flooded	80 	Very limited Flooding Seepage, bottom layer	 1.00 1.00 	Very limited Flooding Seepage Slope	 1.00 1.00 0.08
323B:					
Fort Dodge	90 	Very limited Seepage, bottom layer Slow water movement	 1.00 0.50	Very limited Seepage Slope 	 1.00 0.32
325:	 	 		 	
Le Sueur	 90 	Very limited Depth to saturated zone	1.00	Very limited Depth to saturated zone	1.00
	 	Slow water movement	0.50	Seepage	0.50
338: Garmore	 100 	 Somewhat limited Depth to saturated zone	 0.99	 Somewhat limited Depth to saturated zone	 0.71
	 	Slow water movement	0.50	Seepage 	0.50
342: Estherville, loamy substratum	 70 	 Somewhat limited Slow water movement	 0.50	 Very limited Seepage 	 1.00
342B: Estherville, loamy	 	 	 	 	
substratum	70 	Somewhat limited Slow water movement	0.50	Very limited Seepage Slope	 1.00 0.32
344B:		 		 	İ
Copaston	 80 			 Very limited Depth to hard bedrock	1.00
	 	layer		Seepage Slope	1.00
345:	 25	 		 Very limited	
Copaston	35 	Very limited Depth to bedrock Seepage, bottom	1.00	Depth to hard bedrock	1.00
	 	layer 	 	Seepage Slope 	1.00

Sewage Disposal--Continued

Map symbol and soil name	Pct. of map	absorption fiel	ds	Sewage lagoons 	
	unit 	 Rating class and limiting features	Value	 Rating class and limiting features	Value
345: Jacwin	 25 	 Very limited Slow water movement Depth to saturated zone Depth to bedrock	1.00 1.00 	 Very limited Depth to saturated zone Depth to soft bedrock Seepage	 1.00 0.99
355: Luther	 85 	 Very limited Depth to saturated zone Slow water movement	 1.00 1.00	Very limited Depth to saturated zone Seepage	 1.00 0.50
383: Marna	 80 	 Very limited Slow water movement Depth to saturated zone	 1.00 1.00	 Very limited Depth to saturated zone Seepage	 1.00 0.50
385: Guckeen	 75 	 Very limited Depth to saturated zone Slow water movement	 1.00 1.00	 Very limited Depth to saturated zone Seepage	 1.00 0.50
386: Cordova	 85 	 Very limited Depth to saturated zone Slow water movement	 1.00 1.00	Very limited Depth to saturated zone Seepage	 1.00 0.50
387B: Kamrar	 85 	 Very limited Depth to saturated zone Slow water movement	 1.00 1.00	 Very limited Depth to saturated zone Seepage Slope	 1.00 0.50 0.32
413G: Gosport	 25 	 Very limited Slow water movement Depth to saturated zone Slope	 1.00 1.00 	bedrock	 1.00 1.00 1.00
Emeline	 25 	 Very limited Depth to bedrock Slope 		 Very limited Depth to hard bedrock Slope	 1.00 1.00
Ridgeton	 25 	 Very limited Slope Slow water movement	 1.00 0.50 	 Very limited Slope Seepage 	 1.00 0.50

Sewage Disposal--Continued

Map symbol and soil name	Pct. of map	Septic tank absorption fiel	ds	Sewage lagoons 	
	unit	 Rating class and limiting features	Value	 Rating class and limiting features	Value
457:	 				
Du Page, occasionally flooded	 85 	 Very limited Flooding Depth to saturated zone Slow water movement	 1.00 0.99 0.46	 Very limited Flooding Depth to saturated zone Seepage	 1.00 0.71 0.53
485: Spillville, occasionally flooded	 80	 Very limited		 Very limited	
	 	Flooding Depth to saturated zone Slow water movement	1.00 1.00 0.50	Flooding Depth to saturated zone Seepage	1.00 1.00 0.50
485B: Spillville, rarely flooded	 85	 Somewhat limited		 Somewhat limited	
	 	Depth to saturated zone Slow water movement Flooding	0.99	Depth to saturated zone Seepage Flooding	0.71
506: Wacousta, depressional,	 	 	 	 	
ponded	80 	Very limited Depth to saturated zone Ponding Slow water movement	 1.00 1.00 0.50	Very limited Depth to saturated zone Ponding Seepage	 1.00 1.00 0.50
507: Canisteo	 75 	 Very limited Depth to saturated zone Slow water movement	 1.00 0.50	 Very limited Depth to saturated zone Seepage	 1.00 0.50
511: Blue Earth, depressional,	 	 		 - -	
ponded	85 	Very limited Depth to saturated zone Slow water	 1.00 1.00	Very limited Depth to saturated zone Ponding	 1.00 1.00
	 	movement Ponding	1.00	Organic matter content	1.00

Sewage Disposal--Continued

Map symbol and soil name	Pct. of map	of absorption fields ap		Sewage lagoons 	
	unit 	Rating class and limiting features	Value	 Rating class and limiting features	Value
526: Wacousta, mucky, depressional, ponded	 90 	 Very limited Depth to saturated zone Ponding Slow water movement	 1.00 1.00	 	 1.00 1.00 0.50
536: Hanlon, occasionally flooded		 	 1.00 1.00 0.99	 	 1.00 1.00 0.71
541C: Estherville	 45 	 Very limited Filtering capacity Seepage, bottom layer	 1.00 1.00	 Very limited Seepage Slope 	 1.00 1.00
Hawick	 45 	 Very limited Filtering capacity Seepage, bottom layer	 1.00 1.00	 Very limited Seepage Slope 	 1.00 1.00
551B: Calamine	 85 	 Very limited Slow water movement Depth to saturated zone Depth to bedrock	 1.00 1.00 0.78	 Very limited Depth to saturated zone Seepage Depth to soft bedrock	 1.00 0.50 0.42
551D: Calamine	 55 	Very limited Slow water movement Depth to saturated zone Depth to bedrock	1.00 1.00	 Very limited Depth to saturated zone Slope Seepage	 1.00 1.00 0.50
559: Talcot	 85 		 1.00 1.00 0.46	 Very limited Seepage Depth to saturated zone	 1.00 1.00

Sewage Disposal--Continued

Map symbol and soil name	Pct. of map	absorption fiel	.ds	Sewage lagoons	
	unit 	Rating class and limiting features	Value	Rating class and limiting features	Value
561: Talcot, loamy substratum	 70 	 Very limited Depth to saturated zone Slow water movement	 1.00 0.50	 Very limited Seepage Depth to saturated zone	 1.00 1.00
566C: Moingona	 90 	Somewhat limited Depth to saturated zone Slow water movement	 0.99 0.50	 Very limited Slope Depth to saturated zone Seepage	 1.00 0.71 0.50
568D: Cokato	 80 		0.50	 Very limited Slope Seepage	 1.00 0.50
568E: Cokato	 80 	 Very limited Slope Slow water movement	1.00	 Very limited Slope Seepage	 1.00 0.50
583: Minnetonka	 90 	 Very limited Slow water movement Depth to saturated zone	 1.00 1.00	 Very limited Depth to saturated zone Seepage	 1.00 0.32
606: Lanyon, depressional, ponded	 80 	 	 1.00 1.00	 - Very limited Depth to saturated zone Ponding Seepage	 1.00 1.00 0.50
625: Lerdal	 80 	 Very limited Depth to saturated zone Slow water movement	 1.00 1.00	 Very limited Depth to saturated zone Seepage	 1.00 0.50
636: Buckney, rarely flooded	 85 	 Very limited Filtering capacity Seepage, bottom layer Flooding	 1.00 1.00 0.40	 Very limited Seepage Flooding 	 1.00 0.40

Sewage Disposal--Continued

	ļ	[<u> </u>	
Map symbol and soil name	Pct.	Septic tank absorption fiel	ds	Sewage lagoons	
	map				
	unit	!	1		1
		Rating class and limiting features	:	Rating class and limiting features	Value
636B:	 	l		l	
Buckney, rarely		 		 	
flooded	90	Very limited	İ	Very limited	İ
		Filtering	1.00	Seepage	1.00
		capacity		Flooding Slope	0.40
	 	Seepage, bottom layer	1.00 0.40	B10pe	
		Flooding 		 	
638C2:	į		İ		į
Clarion, moderately eroded	 50	 Somewhat limited		 Very limited	
eloded	30	Depth to	0.99	: -	1.00
	İ	saturated zone		Depth to	0.71
		Slow water	0.50	saturated zone	1
	 	movement		Seepage	0.50
Storden, moderately		 		 	
eroded	35	Somewhat limited	į	Very limited	İ
		Slow water	0.50	Slope	1.00
	 	movement		Seepage 	0.50
650:	İ		İ	İ	į
Joliet	45	Very limited		Very limited	
	 	Depth to bedrock Depth to	1.00	Depth to hard bedrock	1.00
		saturated zone		Depth to	1.00
		[[saturated zone	1
		 		Seepage	0.53
Faxon	45	 Very limited		 Very limited	
	İ	Depth to	1.00	Depth to hard	1.00
		saturated zone		bedrock	
		Depth to bedrock	1.00	Seepage Depth to	1.00 1.00
				saturated zone	
	į		İ		į
715: Fluvaquents,		 		 	
frequently flooded	65	 Very limited		 Very limited	
	İ	Flooding	1.00	: -	1.00
		Depth to	1.00	Seepage	1.00
	 	saturated zone	1.00	Depth to saturated zone	1.00
		capacity		sacuraced zone	
735:		 		 	
Havelock,					İ
occasionally					
flooded	85	Very limited	1.00	Very limited	1.00
		Flooding Depth to	1.00	Flooding Seepage	1.00
	İ	saturated zone		Depth to	1.00
		Seepage, bottom	1.00	saturated zone	[
	 	layer		 	
	I	I	1	I	1

Sewage Disposal--Continued

Map symbol and soil name	Pct.	· -	ds	Sewage lagoons	1
	map unit	 		 	
		Rating class and limiting features	Value	Rating class and limiting features	Value
740D:	 	 		 	
Hawick	 80 	 Very limited Filtering	1.00	 Very limited Slope	1.00
	 	capacity Seepage, bottom layer	1.00	Seepage 	1.00
	 	Slope	0.63	 	
775B:		 		 	
Billett	90 	Very limited Seepage, bottom layer	 1.00 	Very limited Seepage Slope	 1.00 0.08
775C:	 	l		 	
Billett	 85 	 Very limited Seepage, bottom	1.00	 Very limited Seepage	1.00
	 	layer Slope	0.01	Slope 	1.00
	į		į		į
777B: Wapsie 8 	 85 	 Very limited Seepage, bottom	1.00	 Very limited Seepage	 1.00 0.32
	 	layer Slow water movement	0.50	Slope 	0.32
835D2:	 			 	
Storden, moderately eroded	 50	 Somewhat limited			
eroded	50	Slope	0.63	Very limited Slope	1.00
	 	Slow water movement	0.50	Seepage 	0.50
Omsrud, moderately		 		 	
eroded	35	Somewhat limited		Very limited	
	 	Slope Slow water	0.63	Slope Seepage	1.00
	 	movement			
835E2:	į		į		į
Storden, moderately eroded	 50	 Verv limited		 Very limited	
		Slope	1.00	Slope	1.00
	 	Slow water movement	0.50	Seepage 	0.50
Omsrud, moderately	 	 		 	
eroded	35	 Very limited		 Very limited	İ
	 	Slope	1.00	Slope Seepage	1.00
	 	Slow water movement		Beepage	
836B:	 	 		 	1
Kilkenny	65	Very limited	į.	Somewhat limited	İ
	 	Slow water movement	1.00	Depth to saturated zone	0.71
		Depth to	0.99	Seepage	0.50
		saturated zone		Slope	0.32

Sewage Disposal--Continued

Map symbol	Pct.	Septic tank		Sewage lagoons	
and soil name	of	absorption fiel	ds		
	map				
	unit				
		Rating class and	Value	Rating class and	Value
	<u> </u>	limiting features	<u> </u>	limiting features	<u> </u>
0545					
854D:		177 24444			
Fens, Aquolls	80	-	1 00	Very limited	11 00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Subsidence	1.00	Slope	1.00
		Slow water	0.72	Seepage	1.00
		movement	0.72	bccpage	
			i		i
855:	İ		i		i
Shorewood	85	Very limited	İ	Very limited	İ
	İ	Depth to	1.00	Depth to	1.00
		saturated zone		saturated zone	
		Slow water	1.00	Seepage	0.50
		movement			
956:			ļ	 	ļ
Harps	45	Very limited	:	Not rated	
		Depth to	1.00		
		saturated zone	0.50	 	
	 	Slow water movement	10.50	 	
	 		1	 	
956: Okoboji, depressional,	 	 		 	
ponded	35	 Very limited	i	 Very limited	i
•		Depth to	1.00	: -	1.00
	İ	saturated zone	į	saturated zone	i
	ĺ	Slow water	1.00	Ponding	1.00
		movement		Organic matter	1.00
		Ponding	1.00	content	
1005					
1007:	 6E	 Town limited		 Town limited	
Cosmos, bouldery	65	Slow water	1.00	Very limited Depth to	1.00
		movement	1	saturated zone	1
		Depth to	1.00		i
	İ	saturated zone	i		i
	İ	İ	į	İ	į
1055B:					
Kandiyohi, bouldery	65			Very limited	ļ
		Slow water	1.00	Depth to	1.00
		movement		saturated zone	
		Depth to	1.00	Slope	0.32
		saturated zone	1	 	
1138B:	 		1	 	
Clarion	65		İ	 Somewhat limited	i
		Depth to	0.99	•	0.71
	i	saturated zone	İ	saturated zone	i
	İ	Slow water	0.50	Seepage	0.50
		movement		Slope	0.32
		[[
1236B:		!		[ļ
Angus	85	Somewhat limited		Somewhat limited	
		Slow water	0.50	Seepage	0.50
	 	movement	1	Slope	0.32
	I	I	I	I	I

Sewage Disposal--Continued

Map symbol and soil name	Pct.		ds	Sewage lagoons	
	map				
	unit 	 Rating class and limiting features	Value	 Rating class and limiting features	Value
10065					
1236C: Angus	 80 	 Somewhat limited Slow water movement	 0.50 	 Very limited Slope Seepage	 1.00 0.50
1259:				! 	i
Biscay, depressional, ponded	 80	 Very limited Depth to	1.00	 - Very limited	
	 	saturated zone Seepage, bottom	1.00	Seepage Depth to saturated zone	1.00 1.00
	 	layer Ponding 	 1.00 	Ponding 	1.00
1507:					
Brownton	80 	Very limited Slow water movement	1.00	Very limited Depth to saturated zone	1.00
	 	Depth to saturated zone	1.00	Seepage 	0.50
1555: Nicollet	 40	 Very limited Depth to	1.00	 Very limited Depth to	 1.00
	 	saturated zone	0.50	saturated zone Seepage	0.50
	 	movement		 	
Guckeen	25	Very limited Depth to	1.00	 Very limited Depth to	1.00
	 	saturated zone Slow water movement	1.00	saturated zone Seepage 	0.50
1836B:				 	
Kilkenny	65 	Very limited Slow water	1.00	Somewhat limited Depth to	0.71
	 	movement Depth to	0.99	saturated zone Seepage	0.50
	і І	saturated zone	<u> </u> 	Slope	0.32
Shorewood	25 	Very limited Depth to saturated zone	1.00	Very limited Depth to saturated zone	1.00
	 	Slow water movement	1.00	Seepage	0.50
2700C:	 	[
Ridgeton	75	Somewhat limited Slow water	0.50	Very limited Slope	1.00
	 	movement		Seepage 	0.50
2700D: Ridgeton	80	 Somewhat limited	1	 Very limited	
	 	Slope Slow water movement	0.63	Slope Seepage 	1.00 0.50
	<u> </u>				
4000: Urban land	 100	 Not rated		 Not rated 	

Sewage Disposal--Continued

Map symbol and soil name	Pct. of map	absorption fields		Sewage lagoons	
	unit 	Rating class and limiting features	Value	 Rating class and limiting features	Value
4055: Nicollet	 50 	 Very limited Depth to saturated zone Slow water movement	 1.00 0.50	 Very limited Depth to saturated zone Seepage	 1.00 0.50
Urban land	 50 	 Not rated 	 	 Not rated 	
4107: Webster	 60 	 Very limited Depth to saturated zone Slow water movement	 1.00 0.50	saturated zone	 1.00 0.50
Urban land	 40 	 Not rated 	 	 Not rated 	
4138B: Clarion	 50 		 0.99 0.50	 Somewhat limited Depth to saturated zone Seepage Slope	 0.71 0.50 0.32
Urban land	30	 Not rated	į Į	 Not rated	į Į
4235B: Angus	 60 	 Somewhat limited Slow water movement	 0.50 	 Somewhat limited Seepage Slope	 0.50 0.32
Urban land	40 	 Not rated 		 Not rated 	İ
4236D: Lester	 50 	Somewhat limited Slope Slow water movement	 0.63 0.50	: -	 1.00 0.50
Urban land	 50 	 Not rated 	 	 Not rated 	
4325: Le Sueur	 60 	. –	 1.00 0.50	saturated zone	 1.00 0.50
Urban land	 40	 Not rated		 Not rated	
4444: Jacwin	 50 	 Very limited Slow water movement Depth to saturated zone Depth to bedrock	1.00 1.00	saturated zone Depth to soft bedrock	 1.00 0.99 0.50
Urban land	 50	 Not rated		 Not rated	

Sewage Disposal--Continued

Map symbol and soil name	Pct. of map	absorption fields		Sewage lagoons	
	unit 	Rating class and limiting features	Value	 Rating class and limiting features	Value
4507: Canisteo	 50 	 Very limited Depth to saturated zone Slow water movement	 1.00 0.50	 Very limited Depth to saturated zone Seepage	 1.00 0.50
Urban land	 50 	 Not rated 	 	 Not rated 	
4551B: Calamine	 50 	Very limited Slow water movement Depth to saturated zone Depth to bedrock	1.00	 Very limited Depth to saturated zone Seepage Depth to soft bedrock	 1.00 0.50 0.42
Urban land	 50 	 Not rated 	 	 Not rated 	
4551D: Calamine	 50 	Very limited Slow water movement Depth to saturated zone Depth to bedrock	1.00 1.00	 Very limited Depth to saturated zone Slope Seepage	 1.00 1.00 0.50
Urban land	 50 	 Not rated 	 	 Not rated 	
4635: Buckney	 50 	 Very limited Filtering capacity Seepage, bottom layer	 1.00 1.00	 Very limited Seepage 	 1.00
Urban land	 50 	 Not rated 	 	 Not rated 	
4635B: Buckney	 50 	 Very limited Filtering capacity Seepage, bottom layer	1.00	 Very limited Seepage Slope 	 1.00 0.08
Urban land	 50 	 Not rated 	 	 Not rated 	
4946B: Udorthents	 70	 Not rated 	 	 Not rated 	
Highway	30 	 Not rated 		 Not rated 	
5010: Pits, sand and gravel	 100	 Not rated	 	 Not rated 	
5030: Pits, limestone quarries	 100 	 Not rated 	 	 Not rated 	

Sewage Disposal--Continued

				Sewage lagoons		
and soil name	of	-	ds			
	map	'				
	unit	· ——————				
			Value	Rating class and	Value	
	<u> </u>	limiting features	<u> </u>	limiting features	<u> </u>	
5035:		 		 		
Pits, gypsum	l I	 	 	 		
quarries	1100	Not mated	 	 Not rated	i i	
quarries	1	NOC Taced	 	NOC Tated 		
5040:			i		i	
Udorthents, loamy	100	Not rated	İ	Not rated	i	
	ĺ		ĺ		j	
5049:						
Aquolls, ponded	60	Not rated		Not rated		
			!			
Udorthents, loamy	30	Not rated		Not rated		
5060:		 		 		
Pits, clay	1100	Not rated	 	 Not rated		
Fics, Clay	1	NOC Taced	 	NOC Taced		
5080:			 	 	i	
Udorthents	100	Not rated	<u> </u>	 Not rated	i	
			i		i	
5457:	į		į	İ	İ	
Du Page, channeled,						
frequently flooded	80	Very limited		Very limited		
		Flooding	1.00	Flooding	1.00	
		Depth to	0.99	Depth to	0.71	
		saturated zone		saturated zone		
		'	0.46	Seepage	0.53	
		movement				
5507:		 		 -		
Corvuso	 55	 Very limited	 	 Very limited		
0011400	33	Slow water	1.00	Depth to	1.00	
		movement		saturated zone		
		Depth to	1.00		i	
	İ	saturated zone	i		i	
	į	İ	į	İ	j	
Brownton	35	Very limited		Very limited		
		Slow water	1.00	Depth to	1.00	
		movement		saturated zone		
			1.00	Seepage	0.50	
		saturated zone	!		!	
AW:	1100	37-5				
Animal waste lagoon	1	Not rated 	 	Not rated		
SL:	 	 		 		
Sewage lagoon	100	Not rated	i	 Not rated	i	
			i		i	
W:	į		i	İ	i	
Water	100	Not rated		Not rated		

Landfills

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table)

Map symbol and soil name	Pct. of map unit	landfill	У	Area sanitary		Daily cover fo	or
	 	 Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
6: Okoboji, depressional,		 		 		 	
ponded	85 	Very limited Depth to saturated zone Ponding Too clayey	 1.00 1.00 0.50	Very limited Depth to saturated zone Ponding 	 1.00 1.00 	Very limited Depth to saturated zone Hard to compact Ponding	 1.00 1.00 1.00
27B: Terril	 85 	 Very limited Depth to saturated zone	 1.00 	 Very limited Depth to saturated zone	 1.00 	 Not limited 	
34: Estherville	90	 Very limited Seepage, bottom layer Too sandy	1.00	 Very limited Seepage 	 1.00 	 Very limited Too sandy Seepage Gravel content	 1.00 1.00 0.19
34B: Estherville	 85 	 Very limited Seepage, bottom layer Too sandy	1.00	 Very limited Seepage 	 1.00	 Very limited Too sandy Seepage Gravel content	 1.00 1.00 0.19
55: Nicollet	 75 	 Very limited Depth to saturated zone	 1.00 	 Very limited Depth to saturated zone	 1.00	 Very limited Depth to saturated zone	1.00
62F: Storden	 80 	 Very limited Slope	1.00	 Very limited Slope	1.00	 Very limited Slope	1.00
90: Okoboji, mucky, depressional, ponded	 85 	 	 1.00 0.50	 - Very limited Depth to saturated zone Ponding 	 1.00 	saturated zone	 1.00 1.00
95: Harps	 85 	 Very limited Depth to saturated zone	 1.00	 Very limited Depth to saturated zone	 1.00 	 Not rated 	
107: Webster	 80 	 Very limited Depth to saturated zone	 1.00	 Very limited Depth to saturated zone	 1.00	 Very limited Depth to saturated zone	1.00

Landfills--Continued

Map symbol and soil name	Pct. Trench sanitary of landfill map unit		У	Area sanitary landfill 		Daily cover fo	r
			'	Rating class and limiting features		Rating class and limiting features	Value
108: Wadena	 85 	Seepage, bottom	 1.00 1.00	 Very limited Seepage 	 1.00 	 Very limited Too sandy Seepage Gravel content	 1.00 1.00 0.15
108B: Wadena	 95 	Seepage, bottom		 Very limited Seepage 	 1.00 	 Very limited Too sandy Seepage Gravel content	 1.00 1.00 0.28
108C: Wadena	 75 	Seepage, bottom	1	 Very limited Seepage 	 1.00 	 Very limited Too sandy Seepage Gravel content	 1.00 1.00 0.28
135: Coland, occasionally flooded		! -	 1.00 1.00 0.50		 1.00 1.00		 1.00 0.50
136: Ankeny, rarely flooded	 80 	 Very limited Seepage, bottom layer Flooding		 Very limited Seepage Flooding	 1.00 0.40	 Somewhat limited Seepage 	 0.50
138B: Clarion	 80 	Very limited Depth to saturated zone	 1.00	 Very limited Depth to saturated zone	 1.00	 Not limited 	
138C2: Clarion, moderately eroded	 80 	 Very limited Depth to saturated zone	 1.00	 	 1.00	 Not limited 	
201B: Coland	 50 	 Very limited Depth to saturated zone Too clayey	 1.00 0.50	 Very limited Depth to saturated zone	 1.00 	 Very limited Depth to saturated zone Too clayey	1.00
Terril	 35 	 Very limited Depth to saturated zone	 1.00 	 Very limited Depth to saturated zone	 1.00 	 Not limited 	

Landfills--Continued

Map symbol and soil name	Pct. of map	landfill	У	Area sanitary		Daily cover fo	r
	unit 	Rating class and limiting features	Value	Rating class and limiting features	Value	 Rating class and limiting features	Value
203: Cylinder	 80 	Very limited Depth to saturated zone Seepage, bottom layer Too sandy	 1.00 1.00 0.50	Very limited Depth to saturated zone Seepage	 1.00 1.00	 Very limited Depth to saturated zone Seepage Too sandy	 1.00 1.00 0.50
227:	 	 				 	
Wadena, loamy substratum	 70 	 Very limited Too sandy 	 1.00 	 Very limited Seepage 	 1.00 	 Very limited Too sandy Seepage Gravel content	 1.00 1.00 0.01
227B: Wadena, loamy substratum	 70 	 Very limited Too sandy 	 1.00	 Very limited Seepage 	 1.00	 Very limited Too sandy Seepage Gravel content	 1.00 1.00 0.01
228: Cylinder, loamy substratum	 70 	 Very limited Depth to saturated zone Too sandy	 1.00 0.50	Very limited Depth to saturated zone Seepage	 1.00 1.00	 Very limited Depth to saturated zone Seepage Too sandy	 1.00 1.00 0.50
236D: Lester	 80 	 Somewhat limited Slope Too clayey	 0.63 0.50	 Somewhat limited Slope	 0.63	 Somewhat limited Slope Too clayey	0.63
236E: Lester	 85 	 Very limited Slope Too clayey	 1.00 0.50	 Very limited Slope 	 1.00	 Very limited Slope Too clayey	 1.00 0.50
236F: Lester	 80 	 Very limited Slope Too clayey	 1.00 0.50	 Very limited Slope 	 1.00	 Very limited Slope Too clayey	1.00
259: Biscay	 85 	Very limited Depth to saturated zone Seepage, bottom layer Too sandy	 1.00 1.00 	 Very limited Depth to saturated zone Seepage 	 1.00 1.00	 Very limited Depth to saturated zone Too sandy Seepage	 1.00 1.00 1.00
262G: Lester	 60 	 Very limited Slope Too clayey	 1.00 0.50	 Very limited Slope 	 1.00	 Very limited Slope Too clayey	 1.00 0.50
Belview	 20 	 Very limited Slope 	 1.00	 Very limited Slope 	 1.00	 Very limited Slope 	 1.00

Landfills--Continued

Map symbol and soil name	Pct. of map unit	landfill	У	Area sanitary landfill		Daily cover fo	or
	 	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
274: Rolfe, depressional, ponded	:	 	 1.00 1.00	Very limited Depth to saturated zone Ponding	 1.00 1.00	 	 1.00 1.00
278: Biscay, loamy substratum	 70 	 - Very limited Depth to saturated zone Too sandy	 1.00 0.50	 - Very limited Depth to saturated zone Seepage	 1.00 1.00	 	 1.00 1.00 0.50
307: Dundas	 80 	 Very limited Depth to saturated zone	 1.00 	 Very limited Depth to saturated zone	 1.00 	 Very limited Depth to saturated zone Too clayey	 1.00 0.50
315B: Udifluvents, occasionally flooded	 80 	 	 1.00 1.00	 - Very limited Flooding Seepage	 1.00 1.00	 Somewhat limited Seepage 	 0.50
323B: Fort Dodge	 90 	 Very limited Seepage, bottom layer	 1.00	 Not limited 	 	 Not limited 	
325: Le Sueur	 90 	Very limited Depth to saturated zone	 1.00 	Very limited Depth to saturated zone	 1.00 	 Very limited Depth to saturated zone Too clayey	 1.00 0.50
338: Garmore	 100 	 Very limited Depth to saturated zone Too clayey	 1.00 0.50	 Very limited Depth to saturated zone 	 1.00 	 Somewhat limited Too clayey 	 0.50
342: Estherville, loamy substratum	 70 	 Very limited Too sandy 	 1.00	 Very limited Seepage 	 1.00	 Very limited Too sandy Seepage Gravel content	 1.00 1.00 0.25
342B: Estherville, loamy substratum	 70 	 Very limited Too sandy 	 1.00	 - Very limited Seepage 	 1.00	 - Very limited Too sandy Seepage Gravel content	 1.00 1.00 0.25

Landfills--Continued

Map symbol and soil name	Pct. of map unit	landfill	У	Area sanitary		Daily cover fo	r
	unit 	 Rating class and limiting features	Value	 Rating class and limiting features	Value	 Rating class and limiting features	Value
344B: Copaston	 80 	 Very limited Depth to bedrock Seepage, bottom layer	 1.00 1.00	 Very limited Seepage Depth to bedrock	 1.00 1.00	 Very limited Depth to bedrock Seepage	 1.00 0.52
345: Copaston	 35 	Depth to bedrock	1	 Very limited Seepage Depth to bedrock	1.00	 Very limited Depth to bedrock Seepage	 1.00 0.52
Jacwin	 25 	 Very limited Depth to saturated zone Depth to bedrock Too clayey	 1.00 1.00 1.00	 Very limited Depth to saturated zone Depth to bedrock	 1.00 0.99		 1.00 1.00 1.00
355: Luther	 85 	 Very limited Depth to saturated zone	 1.00 	 Very limited Depth to saturated zone 	 1.00 	 Very limited Depth to saturated zone Too clayey	 1.00 0.50
383: Marna	 80 	 Very limited Depth to saturated zone	 1.00 	 Very limited Depth to saturated zone	 1.00 	 Very limited Depth to saturated zone	1.00
385: Guckeen	 75 	 Very limited Depth to saturated zone	 1.00 	 Very limited Depth to saturated zone	 1.00 	 Very limited Depth to saturated zone	1.00
386: Cordova	 85 	 Very limited Depth to saturated zone	 1.00	 Very limited Depth to saturated zone	 1.00 	 Very limited Depth to saturated zone	1.00
387B: Kamrar	 85 	 Very limited Depth to saturated zone Too clayey	 1.00 0.50	 Very limited Depth to saturated zone	 1.00 		 0.86 0.50
413G: Gosport	 25 	 Very limited Depth to saturated zone Slope Depth to bedrock	 1.00 1.00 1.00	 Very limited Slope Depth to saturated zone Depth to bedrock	 1.00 1.00 1.00	 Very limited Slope Too clayey Hard to compact	 1.00 1.00 1.00
Emeline	 25 	 Very limited Slope Depth to bedrock	 1.00 1.00	 Very limited Slope Depth to bedrock	 1.00 1.00	 Very limited Depth to bedrock Slope	 1.00 1.00
Ridgeton	 25 	 Very limited Slope 	 1.00	 Very limited Slope 	1.00	 Very limited Slope 	 1.00

Landfills--Continued

Map symbol and soil name	Pct. of map unit	landfill	У	Area sanitary		Daily cover fo	or
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
457: Du Page, occasionally flooded	 85 	 - Very limited Flooding Depth to saturated zone	 1.00 1.00	 - Very limited Flooding Depth to saturated zone	 1.00 1.00	 Not limited 	
485: Spillville, occasionally flooded	 80 	 - Very limited Flooding Depth to saturated zone	 1.00 1.00	 - Very limited Flooding Depth to saturated zone	 1.00 1.00	 - Very limited Depth to saturated zone	 1.00
485B: Spillville, rarely flooded	 85 	 Very limited Depth to saturated zone Flooding	 1.00 0.40	 Very limited Depth to saturated zone Flooding	 1.00 0.40	 Not limited 	
506: Wacousta, depressional, ponded	 80 	Very limited Depth to saturated zone Ponding Too clayey	 1.00 1.00	 - Very limited Depth to saturated zone Ponding	 1.00 1.00	Very limited Depth to saturated zone Ponding Too clayey	 1.00 1.00
507: Canisteo	 75 	 Very limited Depth to saturated zone	 1.00 	 Very limited Depth to saturated zone	1.00	 Very limited Depth to saturated zone	1.00
511: Blue Earth, depressional, ponded	 85 	 	 1.00 1.00	Very limited Depth to saturated zone Ponding	 1.00 1.00	Very limited Depth to saturated zone Hard to compact Ponding	 1.00 1.00
526: Wacousta, mucky, depressional, ponded	 90 	 Very limited Depth to saturated zone Ponding	 1.00	 Very limited Depth to saturated zone Ponding	 1.00 1.00	Very limited Depth to saturated zone Ponding	 1.00 1.00

Landfills--Continued

Map symbol and soil name	Pct. of map unit	landfill	У	Area sanitary landfill		Daily cover fo landfill	or
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
536: Hanlon, occasionally flooded		 Very limited Flooding Depth to saturated zone Seepage, bottom layer	 1.00 1.00 1.00	Very limited Flooding Depth to saturated zone Seepage	 1.00 1.00 1.00	 Somewhat limited Seepage 	 0.50
541C: Estherville	 45 	 Very limited Seepage, bottom layer Too sandy	 1.00 1.00	 Very limited Seepage 	 1.00 	 Very limited Too sandy Seepage Gravel content	 1.00 1.00 0.19
Hawick	 45 	 Very limited Seepage, bottom layer Too sandy	 1.00 1.00	 Very limited Seepage 	 1.00 	 Very limited Too sandy Seepage Gravel content	 1.00 1.00 0.01
551B: Calamine	 85 	 Very limited Depth to saturated zone Depth to bedrock Too clayey	 1.00 1.00 1.00	 Very limited Depth to saturated zone Depth to bedrock	1.00	 Very limited Depth to saturated zone Too clayey Hard to compact	 1.00 1.00 1.00
551D: Calamine	 55 	 Very limited Depth to saturated zone Depth to bedrock Too clayey	 1.00 1.00 1.00	 Very limited Depth to saturated zone Depth to bedrock Slope	 1.00 0.42 0.16	 Very limited Depth to saturated zone Too clayey Hard to compact	 1.00 1.00 1.00
559: Talcot	 85 	 Very limited Depth to saturated zone Seepage, bottom layer Too sandy	 1.00 1.00 	 Very limited Depth to saturated zone Seepage 	 1.00 1.00	 Very limited Depth to saturated zone Too sandy Seepage	 1.00 1.00 1.00
561: Talcot, loamy substratum	 70 	 Very limited Depth to saturated zone Too sandy	 1.00 1.00	 Very limited Depth to saturated zone Seepage	 1.00 1.00	 Very limited Depth to saturated zone Too sandy Seepage	 1.00 1.00
566C: Moingona	 90 	 Very limited Depth to saturated zone Too clayey	 1.00 0.50	 Very limited Depth to saturated zone	 1.00 	 Somewhat limited Too clayey	0.50
568D: Cokato	 80 	 Somewhat limited Too clayey Slope	 0.50 0.04	 Somewhat limited Slope 	 0.04 	 Somewhat limited Too clayey Slope	 0.50 0.04

Landfills--Continued

Map symbol and soil name	Pct. of map unit	of landfill		Area sanitary landfill		Daily cover fo landfill 	r
	 	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
568E: Cokato	 80 	 Very limited Slope Too clayey	 1.00 0.50	 Very limited Slope 	 1.00	 Very limited Slope Too clayey	 1.00 0.50
583: Minnetonka	 90 	 Very limited Depth to saturated zone Too clayey	1.00	 Very limited Depth to saturated zone	 1.00 	 Very limited Depth to saturated zone Too clayey	1.00
606: Lanyon, depressional, ponded	 80 	 	 1.00 1.00	Very limited Depth to saturated zone Ponding	 1.00 1.00	 	 1.00 1.00
625: Lerdal	 80 	 Very limited Depth to saturated zone Too clayey	 1.00 0.50	 Very limited Depth to saturated zone 	 1.00 	 Very limited Depth to saturated zone Hard to compact Too clayey	 1.00 1.00 0.50
636: Buckney, rarely flooded	 85 	 Very limited Seepage, bottom layer Too sandy Flooding	 1.00 0.50 0.40	 Very limited Seepage Flooding 	 1.00 0.40 	 Very limited Seepage Too sandy 	 1.00 0.50
636B: Buckney, rarely flooded	 90 	 Very limited Seepage, bottom layer Too sandy Flooding	 1.00 0.50 0.40	 Very limited Seepage Flooding 	 1.00 0.40	 Very limited Seepage Too sandy 	 1.00 0.50
638C2: Clarion, moderately eroded	 50 	 - Very limited Depth to saturated zone	 1.00	 - Very limited Depth to saturated zone	 1.00	 - Not limited - 	
Storden, moderately eroded	 35 	 Not limited	 	 Not limited 	 	 Not limited 	
650: Joliet	45 45 	 Very limited Depth to saturated zone Depth to bedrock	1.00	saturated zone	1.00	Depth to	 1.00 1.00

Landfills--Continued

Map symbol and soil name	Pct. of map unit	landfill	У	Area sanitary landfill		Daily cover fo	r
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
650: Faxon	 45 	Very limited Depth to saturated zone Depth to bedrock	 1.00 1.00	 Very limited Depth to saturated zone Seepage Depth to bedrock	 1.00 1.00 1.00	Very limited Depth to saturated zone Depth to bedrock	 1.00 1.00
715: Fluvaquents, frequently flooded	 65 	 Very limited Flooding Depth to saturated zone Seepage, bottom layer	 1.00 1.00 1.00	 Very limited Flooding Depth to saturated zone Seepage	 1.00 1.00 1.00	 Very limited Depth to saturated zone Too sandy Seepage	 1.00 1.00 1.00
735: Havelock, occasionally flooded	 85 	 Very limited Flooding Depth to saturated zone Seepage, bottom layer	 1.00 1.00 1.00	 Very limited Flooding Depth to saturated zone	 1.00 1.00 	 Very limited Depth to saturated zone Too clayey	 1.00 0.50
740D: Hawick	 80 	 Very limited Seepage, bottom layer Too sandy Slope	 1.00 1.00 0.63	 Very limited Seepage Slope 	 1.00 0.63 	 Very limited Too sandy Seepage Slope	 1.00 1.00 0.63
775B: Billett	 90 	 Very limited Seepage, bottom layer	 1.00	 Very limited Seepage 	 1.00	 Somewhat limited Seepage 	 0.50
775C: Billett	 85 	 Very limited Seepage, bottom layer Slope	 1.00 0.01	 Very limited Seepage Slope	 1.00 0.01	 Somewhat limited Seepage Slope	 0.50 0.01
777B: Wapsie	 85 	 Very limited Seepage, bottom layer Too sandy	 1.00 1.00	 Very limited Seepage 	 1.00	 Very limited Too sandy Seepage	 1.00 1.00
835D2: Storden, moderately eroded	 50 	 Somewhat limited Slope	 0.63	 Somewhat limited Slope	 0.63	 Somewhat limited Slope	 0.63
Omsrud, moderately eroded	 35 	 Somewhat limited Slope	 0.63	 Somewhat limited Slope	 0.63	 Somewhat limited Slope	0.63

Landfills--Continued

Map symbol and soil name	Pct. of map unit	landfill	У	Area sanitary		 Daily cover fo landfill 	or
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
835E2: Storden, moderately eroded	 50 	 Very limited Slope	 1.00	 Very limited Slope	 1.00	 Very limited Slope	 1.00
Omsrud, moderately eroded	 35 	 Very limited Slope	 1.00	 Very limited Slope	 1.00	 Very limited Slope	1.00
836B: Kilkenny	 65 	 Very limited Depth to saturated zone Too clayey	 1.00 0.50	 Very limited Depth to saturated zone	 1.00 	 Somewhat limited Too clayey 	0.50
854D: Fens, Aquolls	 80 	 Very limited Depth to saturated zone Too clayey Slope	 	 Very limited Depth to saturated zone Seepage Slope	 1.00 1.00 0.16	 Very limited Depth to saturated zone Slope	 1.00 0.16
855: Shorewood	 85 	 Very limited Depth to saturated zone Too clayey	 1.00 1.00	 Very limited Depth to saturated zone 	 1.00 	 Very limited Depth to saturated zone Too clayey Hard to compact	 1.00 1.00 1.00
956: Harps	 45 	 Very limited Depth to saturated zone	 1.00	 Very limited Depth to saturated zone	 1.00	 Not rated 	
Okoboji, depressional, ponded	 35 	 Very limited Depth to saturated zone Ponding Too clayey	 1.00 1.00 0.50	 Very limited Depth to saturated zone Ponding	 1.00 1.00	 Very limited Depth to saturated zone Hard to compact Ponding	 1.00 1.00
1007: Cosmos, bouldery	 65 	 Very limited Depth to saturated zone Too clayey	 1.00 0.50	 Very limited Depth to saturated zone 	 1.00 	 Very limited Depth to saturated zone Hard to compact Too clayey	 1.00 1.00 0.50
1055B: Kandiyohi, bouldery	 65 	 Very limited Depth to saturated zone Too clayey	 1.00 0.50	 Very limited Depth to saturated zone 	 1.00 	 Very limited Depth to saturated zone Hard to compact Too clayey	 1.00 1.00 0.50

Landfills--Continued

Map symbol and soil name	Pct. of map	landfill	У	Area sanitary		Daily cover fo	or
	unit 	Rating class and limiting features	Value	Rating class and limiting features	Value	 Rating class and limiting features	Value
1138B: Clarion	 65 	 Very limited Depth to saturated zone	 1.00 	 Very limited Depth to saturated zone	 1.00	 Not limited 	
1236B: Angus	 85 	 Not limited 		 Not limited 		 Somewhat limited Too clayey 	 0.50
1236C: Angus	 80 	 Not limited 		 Not limited	 	 Somewhat limited Too clayey	0.50
1259: Biscay, depressional,	 	 - -	 	 	 	 	
ponded	80 	Very limited Depth to saturated zone Seepage, bottom layer Too sandy	 1.00 1.00 1.00	Very limited Depth to saturated zone Seepage Ponding	 1.00 1.00 1.00	Very limited Depth to saturated zone Too sandy Seepage	 1.00 1.00 1.00
1507: Brownton	 80 	 Very limited Depth to saturated zone Too clayey	 1.00 0.50	 Very limited Depth to saturated zone	 1.00	 Very limited Depth to saturated zone Too clayey	 1.00 0.50
1555: Nicollet	 40 	 Very limited Depth to saturated zone	 1.00	 Very limited Depth to saturated zone	 1.00	 Very limited Depth to saturated zone	 1.00
Guckeen	 25 	 Very limited Depth to saturated zone	 1.00	 Very limited Depth to saturated zone	 1.00	 Very limited Depth to saturated zone	 1.00
1836B: Kilkenny	 65 	 Very limited Depth to saturated zone Too clayey	 1.00 0.50	 Very limited Depth to saturated zone	 1.00 	 Somewhat limited Too clayey 	 0.50
Shorewood	 25 	 Very limited Depth to saturated zone Too clayey	 1.00 1.00	 Very limited Depth to saturated zone 	 1.00 	saturated zone Too clayey	 1.00 1.00 1.00
2700C: Ridgeton	 75 	 Not limited 	 	 Not limited 	 	 Not limited 	
2700D: Ridgeton	 80 	 Somewhat limited Slope	 0.63	 Somewhat limited Slope	 0.63	 Somewhat limited Slope	 0.63
4000: Urban land	 100	 Not rated 	 	 Not rated 	 	 Not rated 	

Landfills--Continued

Map symbol and soil name	Pct. of map	landfill	У	Area sanitary		Daily cover fo	or
	unit 	Rating class and limiting features	Value	Rating class and limiting features	Value	 Rating class and limiting features	Value
4055: Nicollet	 50 	 Very limited Depth to saturated zone	 1.00	 Very limited Depth to saturated zone	 1.00	 Very limited Depth to saturated zone	 1.00
Urban land	 50 	 Not rated 	 	 Not limited 	 	 Not rated 	
4107: Webster	 60 	: -	 1.00	 Very limited Depth to saturated zone	 1.00	 Very limited Depth to saturated zone	1.00
Urban land	 40 	 Not rated 	 	 Not limited 	 	 Not rated 	
4138B: Clarion	 50 	! -	 1.00	 Very limited Depth to saturated zone	 1.00	 Not limited 	
Urban land	 30 	 Not rated 	 	 Not limited 		 Not rated	
4235B: Angus	 60 	 Not limited 	 	 Not limited 	 	 Somewhat limited Too clayey	0.50
Urban land	 40	 Not rated		 Not limited		 Not rated	
4236D: Lester	 50 	 Somewhat limited Slope Too clayey	 0.63 0.50	 Somewhat limited Slope 	 0.63	 Somewhat limited Slope Too clayey	0.63
Urban land	 50 	 Not rated 	 	 Somewhat limited Slope	0.63	 Not rated 	
4325: Le Sueur	 60 	 Very limited Depth to saturated zone	 1.00 	 Very limited Depth to saturated zone	 1.00 	 Very limited Depth to saturated zone Too clayey	 1.00 0.50
Urban land	 40	 Not rated		 Not limited		 Not rated	
4444: Jacwin	 50 		1.00	Very limited Depth to saturated zone Depth to bedrock	1.00	 Very limited Depth to saturated zone Too clayey Hard to compact	 1.00 1.00 1.00
Urban land	50	 Not rated 	 	 Not limited 		 Not rated 	
4507: Canisteo	 50 		 1.00	 Very limited Depth to saturated zone	 1.00	 Very limited Depth to saturated zone	1.00
Urban land	 50	 Not rated		 Not limited		 Not rated	

Landfills--Continued

Map symbol and soil name	Pct. of map	landfill	Y	 Area sanitary landfill 	Daily cover for landfill		
	unit 	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
4551B: Calamine	 50 	Very limited Depth to saturated zone Depth to bedrock Too clayey	 1.00 1.00	 Very limited Depth to saturated zone Depth to bedrock	1.00	Very limited Depth to saturated zone Too clayey Hard to compact	 1.00 1.00
Urban land	 50 	 Not rated 	 	 Not limited 	 	 Not rated 	
4551D: Calamine	 50 	 Very limited Depth to saturated zone Depth to bedrock Too clayey	1.00	 Very limited Depth to saturated zone Depth to bedrock Slope	1.00	 Very limited Depth to saturated zone Too clayey Hard to compact	 1.00 1.00 1.00
Urban land	 50 	 Not rated 	 	 Somewhat limited Slope	0.16	 Not rated 	
4635: Buckney	 50 	: -	 1.00 0.50	 Very limited Seepage 	 1.00	 Very limited Seepage Too sandy	 1.00 0.50
Urban land	 50 	 Not rated 	 	 Not limited 		 Not rated 	
4635B: Buckney	 50 	: -	 1.00 0.50	 Very limited Seepage 	 1.00 	 Very limited Seepage Too sandy	 1.00 0.50
Urban land	 50 	 Not rated 	 	 Not limited	 	 Not rated 	
4946B: Udorthents	 70	 Not rated 	 	 Not limited		 Not rated 	
Highway	30	 Not rated 	 	 Not limited 	 	 Not rated 	
5010: Pits, sand and gravel	 100	 Not rated	 	 Not rated	 	 Not rated	
5030: Pits, limestone quarries	 100	 Not rated 	 	 Not rated 	; 	 Not rated 	
5035: Pits, gypsum quarries	 100	 Not rated 	 	 Not rated 	 	 Not rated 	
5040: Udorthents, loamy	 100	 Not rated	 	 Not rated	 	 Not rated	
5049: Aquolls, ponded	 60	 Not rated	 	 Not rated		 Not rated	
Udorthents, loamy	30	 Not rated 	 	 Not rated 		 Not rated 	

Landfills--Continued

Map symbol Po		Trench sanitar	Area sanitary		Daily cover for landfill		
	map unit					 	
		Rating class and	Value	Rating class and	Value	Rating class and	Value
	<u> </u>	limiting features	<u> </u>	limiting features	<u> </u>	limiting features	1
5060:	 	 	 	 		 	l I
Pits, clay	100	Not rated	į	Not rated		 Not rated	į
5080:	 			 		 	
Udorthents	100	Not rated	į	 Not rated		 Not rated	į
5457:	 	 		 		 	
Du Page, channeled,			[1	[1
frequently flooded	80	Very limited	'	Very limited	1	Not limited	!
		Flooding	1.00		1.00		ļ
		Depth to	1.00	Depth to	1.00		ļ
	 	saturated zone		saturated zone		 	
5507:	 					 	
Corvuso	55	Very limited		Very limited		Very limited	
		Depth to	1.00	Depth to	1.00	Depth to	1.00
		saturated zone		saturated zone		saturated zone	
		Too clayey	0.50			Hard to compact	1.00
						Too clayey	0.50
Brownton	35	 Very limited		 Very limited		 Very limited	
		Depth to	1.00	Depth to	1.00	Depth to	1.00
		saturated zone		saturated zone		saturated zone	
		Too clayey	0.50			Too clayey	0.50
AW:	 	[
Animal waste lagoon	100	Not rated		Not rated		Not rated	
SL:	 	 		 		 	
Sewage lagoon	100	Not rated		Not rated		Not rated	İ
W:	 	 		 		 	
Water	100	Not rated		Not rated		Not rated	

Construction Materials

The titles of the tables described in this section are:

- "Source of Sand and Gravel"
- "Source of Reclamation Material, Roadfill, and Topsoil"

These tables give information about the soils as potential sources of gravel, sand, reclamation material, roadfill, and topsoil. Normal compaction, minor processing, and other standard construction practices are assumed.

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

The soils are rated as *improbable*, *possible*, *probable*, or *very likely* sources of gravel. The bottom layer and the thickest layer of the soils are assigned numerical ratings. These ratings indicate the likelihood that the layer is a source of gravel. The number 0.00 indicates an improbable source; 0.01 to 0.39, a possible source; 0.40 to 0.99, a probable source; and 1.00, a very likely source.

The soils are rated *good, fair,* or *poor* as potential sources of sand. A rating of good or fair means that the source material is likely to be in or below the soil. The bottom layer and the thickest layer of the soils are assigned numerical ratings. The larger the number, the greater the likelihood that the layer is a source of sand.

In the table "Source of Reclamation Material, Roadfill, and Topsoil," the rating class terms are *good*, *fair*, and *poor*. The features that limit the soils as sources of these materials are specified in the tables. The numerical ratings given after the specified features indicate the degree to which the features limit the soils as sources of reclamation material, roadfill, and topsoil. The lower the number, the greater the limitation.

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

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

The ratings are for the whole soil, from the surface to a depth of about 5 feet. It is assumed that soil layers will be mixed when the soil material is excavated and spread.

The ratings are based on the amount of suitable material and on soil properties that affect the ease of excavation and the performance of the material after it is in place. The thickness of the suitable material is a major consideration. The ease of excavation

is affected by large stones, depth to a water table, and slope. How well the soil performs in place after it has been compacted and drained is determined by its strength (as inferred from the AASHTO classification of the soil) and linear extensibility (shrink-swell potential).

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

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

Source of Sand and Gravel

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The ratings given for the thickest layer are for the thickest layer above and excluding the bottom layer. The numbers in the value columns range from 0.00 to 0.99. The greater the value, the greater the likelihood that the bottom layer or thickest layer of the soil is a source of sand or gravel. See text for further explanation of ratings in this table)

and soil name	Pct. of map unit	of gravel	urce	Potential as source of sand 	
		Rating class	Value	Rating class	Value
6:					
Okoboji,	 	 		 	
depressional,	i				i
ponded	85	 Improbable		Poor	i
•	i	Thickest layer	0.00	Bottom layer	0.00
		Bottom layer	0.00	Thickest layer	0.00
27B:	 	 		 	
Terril	85	Improbable		Poor	
		Bottom layer	0.00	Thickest layer	0.00
	 	Thickest layer	0.00	Bottom layer	0.00
34:		 	į	 	į
Estherville	90	Improbable Bottom layer	0.00	Fair Thickest layer	0.03
	l I	Thickest layer	0.00	Bottom layer	0.69
		Inickest layer		Boccom Tayer	
34B: Estherville	 85	 Improbable		 Fair	
	i	Bottom layer	0.00	Thickest layer	0.03
	į	Thickest layer	0.00	Bottom layer	0.69
55:	 			 	
Nicollet	75	Improbable		Poor	
		Thickest layer	0.00	Bottom layer	0.00
	 	Bottom layer	0.00	Thickest layer 	0.00
62F:			į	 	į
Storden	80	Improbable	1	Poor	
	 	Thickest layer Bottom layer	0.00	Bottom layer Thickest layer	0.00
		Bottom Tayer		Inickest layer 	
90: Okoboji, mucky,	 			 	
depressional,	İ		j		ĺ
ponded	85	Improbable		Poor	
		Thickest layer	0.00	Bottom layer	0.00
	 	Bottom layer	0.00	Thickest layer	0.00
95:					ļ
Harps	85	Improbable		Not rated	ļ
		Thickest layer	0.00		- [
	 	Bottom layer	0.00	[
107: Webster	80	 Improbable		Poor	
HENDLET	00	Bottom layer	0.00	Bottom layer	0.00
		Thickest layer	0.00	Thickest layer	0.00
	1	Interest tayet	0.00	Interest tayer	0.00

Source of Sand and Gravel--Continued

Map symbol and soil name	Pct. of map	Potential as source of gravel		 Potential as source of sand		
	unit					
	<u> </u>	Rating class	Value	Rating class	Value	
108: Wadena	 85 	 Improbable Thickest layer Bottom layer	 0.00 0.00	 Fair Thickest layer Bottom layer	 0.00 0.63	
108B: Wadena	 95 	 Improbable Thickest layer Bottom layer	 0.00 0.00	 Fair Thickest layer Bottom layer	 0.00 0.63	
108C: Wadena	 75 	 Improbable Bottom layer Thickest layer	0.00	 Fair Thickest layer Bottom layer	0.00	
135: Coland, occasionally flooded		 Improbable Thickest layer Bottom layer	0.00	 - Fair Thickest layer Bottom layer	0.00	
136: Ankeny, rarely flooded	 80 	 Improbable Bottom layer Thickest layer	0.00	 - Fair Thickest layer Bottom layer	0.00	
138B: Clarion	 80 	 Improbable Thickest layer Bottom layer	 0.00 0.00	 Poor Bottom layer Thickest layer	 0.00 0.00	
138C2: Clarion, moderately eroded	 80 	 Improbable Thickest layer Bottom layer	 0.00 0.00	 - Poor Bottom layer Thickest layer	 0.00 0.00	
201B: Coland	 50 	 Improbable Bottom layer Thickest layer	0.00	 Fair Thickest layer Bottom layer	0.00	
Terril	 35 	 Improbable Thickest layer Bottom layer	 0.00 0.00	 Poor Bottom layer Thickest layer 	 0.00 0.00	
203: Cylinder	 80 	 Possible Thickest layer Bottom layer	 0.00 0.04	 Fair Thickest layer Bottom layer	 0.00 0.10	
227: Wadena, loamy substratum	 70 	 Improbable Bottom layer Thickest layer	 0.00 0.00	 Fair Bottom layer Thickest layer 	 0.00 0.63	

Source of Sand and Gravel--Continued

Map symbol and soil name	Pct. of map	of gravel	irce	Potential as source of sand	
	unit	!	1**- 7	l Battlera 3	1
	l	Rating class	Value	Rating class	Value
227B: Wadena, loamy substratum	 70 	 Improbable Bottom layer Thickest layer	0.00	:	 0.00 0.63
228: Cylinder, loamy substratum	 70 	 Possible Bottom layer Thickest layer	 0.00 0.04	 Fair Bottom layer Thickest layer	 0.00 0.10
236D: Lester	 80 	 Improbable Thickest layer Bottom layer	0.00	 Poor Bottom layer Thickest layer	0.00
236E: Lester	 85 	 Improbable Bottom layer Thickest layer	0.00	 Poor Thickest layer Bottom layer	0.00
236F: Lester	 80 	 Improbable Thickest layer Bottom layer	0.00	 Poor Bottom layer Thickest layer	0.00
259: Biscay	 85 	 Improbable Thickest layer Bottom layer	0.00	 Fair Thickest layer Bottom layer	 0.00 0.47
262G: Lester	 60 	 Improbable Thickest layer Bottom layer	0.00	 Poor Bottom layer Thickest layer	0.00
Belview	 20 	 Improbable Bottom layer Thickest layer 	 0.00 0.00	 Poor Thickest layer Bottom layer 	0.00
274: Rolfe, depressional, ponded		 Improbable Thickest layer Bottom layer	0.00	 Poor Bottom layer Thickest layer	0.00
278: Biscay, loamy substratum	 70 	 Improbable Thickest layer Bottom layer	0.00	 - Fair Bottom layer Thickest layer	0.00
307: Dundas	 80 	 Improbable Thickest layer Bottom layer	 0.00 0.00	 Poor Bottom layer Thickest layer	0.00

Source of Sand and Gravel--Continued

Map symbol and soil name	Pct. of	!	ource	Potential as source of sand		
	map unit					
		Rating class	Value	Rating class	Value	
315B: Udifluvents, occasionally flooded	 80 	 Improbable Thickest layer Bottom layer	0.00	 Poor Thickest layer Bottom layer	0.00	
323B: Fort Dodge	 90 	 Improbable Thickest layer Bottom layer	0.00	 Fair Thickest layer Bottom layer	 0.00 0.10	
325: Le Sueur	 90 	 Improbable Bottom layer Thickest layer	0.00	 Poor Thickest layer Bottom layer	0.00	
338: Garmore	 100 	 Improbable Bottom layer Thickest layer	0.00	· -	0.00	
342: Estherville, loamy substratum	 70 	 Improbable Bottom layer Thickest layer	0.00	 Fair Bottom layer Thickest layer	0.00	
342B: Estherville, loamy substratum	 70 	 Improbable Bottom layer Thickest layer	0.00		0.00	
344B: Copaston	 80 	 Improbable Thickest layer Bottom layer	 0.00 0.00	 Poor Thickest layer Bottom layer	 0.00 0.00	
345: Copaston	 35 	 Improbable Thickest layer Bottom layer	 0.00 0.00	 Poor Bottom layer Thickest layer	 0.00 0.00	
Jacwin	 25 	 Improbable Bottom layer Thickest layer 	 0.00 0.00	 Poor Thickest layer Bottom layer 	0.00	
355: Luther	 85 	 Improbable Thickest layer Bottom layer	 0.00 0.00	 Poor Bottom layer Thickest layer	0.00	
383: Marna	 80 	 Improbable Thickest layer Bottom layer	0.00	 Poor Bottom layer Thickest layer	0.00	

Source of Sand and Gravel--Continued

Map symbol and soil name	Pct.	of of gravel ap		rce Potential as source of sand		
	map unit					
		Rating class	Value	Rating class	Value	
385:						
Guckeen	75	 Improbable		Poor		
	İ	Thickest layer	0.00	Bottom layer	0.00	
		Bottom layer	0.00	Thickest layer	0.00	
386:				 		
Cordova	85	Improbable	1	Poor		
		Thickest layer	0.00	Thickest layer	0.00	
		Bottom layer	0.00	Bottom layer	0.00	
387B:	į		į	į	į	
Kamrar	85	Improbable		Poor		
	 	Bottom layer Thickest layer	0.00	Thickest layer Bottom layer	0.00	
413G:	25	 Improbable		Poor		
Gosport	23	Bottom layer	0.00	Thickest layer	0.00	
	į	Thickest layer	0.00	Bottom layer	0.00	
Emeline		 				
rmeline	25	Improbable Thickest layer	0.00	Poor Bottom layer	0.00	
	İ	Bottom layer	0.00	Thickest layer	0.00	
Ridgeton	25	 Improbable		 Poor		
Riagecon	23	Thickest layer	0.00	Bottom layer	0.00	
	į	Bottom layer	0.00	Thickest layer	0.00	
457:		 		 		
Du Page,	į	İ	j	j	i	
occasionally					ļ	
flooded	85	Improbable Thickest layer	0.00	Poor Bottom layer	0.00	
	İ	Bottom layer	0.00	Thickest layer	0.00	
				į	į	
485: Spillville,		 		 		
occasionally	İ		i	İ	i	
flooded	80	Improbable		Poor		
		Thickest layer Bottom layer	0.00	Bottom layer Thickest layer	0.00	
		Boccom rayer		Inickest layer		
485B:					ļ	
Spillville, rarely flooded	85	 Improbable		 Poor		
11000eu	03	Thickest layer	0.00	Bottom layer	0.00	
	į	Bottom layer	0.00	Thickest layer	0.00	
506:		 		 		
Wacousta,	İ		i	İ	i	
depressional,						
ponded	80	Improbable Thickest layer		Poor	0.00	
		Thickest layer Bottom layer	0.00	Bottom layer Thickest layer	0.00	
	į	<u> </u>	į	į	į	
507: Canisteo	 75	 Improbable		Poor		
		Thickest layer	0.00	Bottom layer	0.00	
		Bottom layer	0.00	Thickest layer	0.00	
		-	1	-	- :	

Source of Sand and Gravel--Continued

Map symbol and soil name	Pct. of map	 Potential as so of gravel 	Potential as source of sand		
	unit	Rating class	Value	Rating class	Value
511:	 				
Blue Earth, depressional, ponded	 85 	 Improbable Thickest layer Bottom layer	0.00	:	0.00
526: Wacousta, mucky, depressional, ponded	 90 	 Improbable Thickest layer Bottom layer	0.00	 Poor Bottom layer Thickest layer	 0.00 0.00
536: Hanlon, occasionally flooded		 Improbable Thickest layer Bottom layer	0.00	 Fair Thickest layer Bottom layer	0.00
541C: Estherville	 45 	 Improbable Thickest layer Bottom layer	0.00	 Fair Thickest layer Bottom layer	 0.03 0.69
Hawick	 45 	 Possible Thickest layer Bottom layer	0.00	 Fair Thickest layer Bottom layer	 0.07 0.50
551B: Calamine	 85 	 Improbable Thickest layer Bottom layer	0.00	 Poor Bottom layer Thickest layer	0.00
551D: Calamine	 55 	 Improbable Thickest layer Bottom layer	0.00	: -	0.00
559: Talcot	 85 	 Improbable Bottom layer Thickest layer	0.00	 Fair Thickest layer Bottom layer	 0.00 0.75
561: Talcot, loamy substratum	 70 	 Improbable Thickest layer Bottom layer	0.00	 - Fair Bottom layer Thickest layer	0.00
566C: Moingona	 90 	 Improbable Bottom layer Thickest layer	0.00	 Poor Thickest layer Bottom layer	0.00
568D: Cokato	 80 	 Improbable Thickest layer Bottom layer 	0.00	 Poor Bottom layer Thickest layer 	0.00

Source of Sand and Gravel--Continued

Map symbol and soil name	Pct.	Potential as so of gravel	ource	Potential as so of sand	ource
	map unit			 	
		Rating class	Value	Rating class	Value
ECOR.					
568E: Cokato	80	 Improbable		Poor	l I
	į	Thickest layer	0.00	Thickest layer	0.00
		Bottom layer	0.00	Bottom layer	0.00
583:					į
Minnetonka	90	Improbable		Poor	
		Bottom layer Thickest layer	0.00	Thickest layer Bottom layer	0.00
606:		 		 	
Lanyon,	ĺ	İ	İ	ĺ	ĺ
depressional,		!		!	
ponded	80	Improbable		Poor	
		Bottom layer	0.00	Thickest layer	0.00
	 	Thickest layer 		Bottom layer 	
625: Lerdal	 80	 Improbable		 Poor	
Deruar	00	Bottom layer	0.00	Thickest layer	0.00
		Thickest layer	0.00	Bottom layer	0.00
	į	_	į	į	į
636: Buckney, rarely	 	 		 	
flooded	85	Improbable	i	Fair	i
		Thickest layer	0.00	Thickest layer	0.00
		Bottom layer	0.00	Bottom layer	0.06
636B:					
Buckney, rarely					
flooded	90	Improbable	0.00	Fair	0.00
		Bottom layer Thickest layer	0.00	Thickest layer Bottom layer	0.06
500.00					
638C2: Clarion, moderately	 	 		 	
eroded	50	Improbable	i	Poor	i
	ĺ	Thickest layer	0.00	Bottom layer	0.00
	 	Bottom layer	0.00	Thickest layer	0.00
Storden, moderately			İ		İ
eroded	35	Improbable		Poor	
		Thickest layer	0.00	Thickest layer Bottom layer	0.00
	 	Bottom layer		Boccom Tayer	
650:					
Joliet	45	Improbable Thickest layer	0.00	Poor Thickest layer	0.00
		Bottom layer	0.00	Bottom layer	0.00
Faxon	 45	 Improbable		 Poor	
		Thickest layer	0.00	Thickest layer	0.00
	į	Bottom layer	0.00	Bottom layer	0.00
715:	 	 		 	
Fluvaquents,	į	į		į	į
frequently flooded	65	Improbable		Fair	
	 	Bottom layer	0.00	Thickest layer	0.10
	 	Thickest layer	0.00	Bottom layer	0.42

Source of Sand and Gravel--Continued

Map symbol and soil name	Pct. of map	 Potential as sou of gravel 	ırce	Potential as source of sand	
	unit	Rating class	Value	Rating class	Value
735: Havelock, occasionally flooded	 85	 Improbable Thickest layer		 Fair Thickest layer	0.00
740D: Hawick	 80 	Bottom layer Possible Thickest layer Bottom layer	0.00 0.00 0.04	- Fair	0.03 0.07 0.50
775B: Billett	 90 	 Improbable Thickest layer Bottom layer	0.00	: -	0.04
775C: Billett	 85 	 Improbable Bottom layer Thickest layer	0.00	: -	 0.04 0.08
777B: Wapsie	 85 	 Improbable Bottom layer Thickest layer	0.00	: -	 0.00 0.41
835D2: Storden, moderately eroded	 50 	 Improbable Thickest layer Bottom layer	0.00	· -	0.00
Omsrud, moderately eroded	 35 	 Improbable Thickest layer Bottom layer	0.00	· -	0.00
835E2: Storden, moderately eroded	 50 	 Improbable Thickest layer Bottom layer	 0.00 0.00	 - Poor Bottom layer Thickest layer	0.00
Omsrud, moderately eroded	 35 	 Improbable Thickest layer Bottom layer	0.00	:	0.00
836B: Kilkenny	 65 	 Improbable Bottom layer Thickest layer	0.00	 Poor Thickest layer Bottom layer	0.00
854D: Fens, Aquolls	 80 	 Not rated 	 	 Not rated 	

Source of Sand and Gravel--Continued

Map symbol and soil name	Pct. Potential as source of of gravel			Potential as source of sand		
	map					
	unit 	Rating class	Value	Rating class	Value	
055						
855: Shorewood	 85	 Improbable	l	 Poor		
51101011000		Thickest layer	0.00	Bottom layer	0.00	
	į	Bottom layer	0.00	Thickest layer	0.00	
956:	 	 	l	 		
Harps	45	Improbable	į	Not rated	į	
		Bottom layer	0.00			
	 	Thickest layer	0.00	 		
Okoboji,			İ			
depressional,	 35	 Improbable		 Poor		
ponded	33	Thickest layer	0.00	Bottom layer	0.00	
		Bottom layer	0.00	Thickest layer	0.00	
		Boccom rayer		Interest Tayer		
1007: Cosmos, bouldery		 Improbable		 Poor		
cosmos, bouldery	03	Thickest layer	0.00	Bottom layer	0.00	
		Bottom layer	0.00	Thickest layer	0.00	
1055B: Kandiyohi, bouldery	 65	 Improbable	l I	 Poor		
,,		Bottom layer	0.00	Thickest layer	0.00	
		Thickest layer	0.00	Bottom layer	0.00	
1138B:	 	 		 		
Clarion	65	Improbable		Poor		
		Thickest layer	0.00	Bottom layer	0.00	
	 	Bottom layer	0.00	Thickest layer	0.00	
1236B:			į		į	
Angus	85	Improbable		Poor		
		Bottom layer	0.00	Thickest layer	0.00	
	 	Thickest layer 	0.00	Bottom layer 	0.00	
1236C:			İ	 	İ	
Angus	80	Improbable Thickest layer	0.00	Poor Bottom layer	0.00	
		Bottom layer	0.00	Thickest layer	0.00	
1250.						
1259: Biscay,	 	 	l	 		
depressional,	İ		i		i	
ponded	80	Improbable	į	Fair	į	
		Bottom layer	0.00	Thickest layer	0.00	
		Thickest layer	0.00	Bottom layer	0.47	
1507:						
Brownton	80	Improbable		Poor		
		Thickest layer	0.00	Thickest layer	0.00	
		Bottom layer 	0.00	Bottom layer 	0.00	
1555:		 		 Danie		
Nicollet	40	Improbable		Poor Bottom layer		
	 	Thickest layer Bottom layer	0.00	Bottom layer Thickest layer	0.00	
		Doctom Tayer		Infoncise rayer		

Source of Sand and Gravel--Continued

Map symbol and soil name	Pct. of map	:	irce	Potential as source of sand		
	unit	:		<u> </u>		
	<u> </u>	Rating class	Value	Rating class	Value	
1555: Guckeen	 25 	 Improbable Thickest layer Bottom layer	0.00	· -	 0.00 0.00	
1836B: Kilkenny	 65 	 Improbable Thickest layer Bottom layer	0.00	:	0.00	
Shorewood	 25 	 Improbable Thickest layer Bottom layer	0.00		0.00	
2700C: Ridgeton	 75 	 Improbable Thickest layer Bottom layer	0.00	:	0.00	
2700D: Ridgeton	 80 	 Improbable Thickest layer Bottom layer	0.00	· -	0.00	
4000: Urban land	 100	 Not rated 	 	 Not rated 		
4055: Nicollet	 50 	 Improbable Bottom layer Thickest layer	0.00		0.00	
Urban land	 50 	 Not rated 	 	 Not rated 		
4107: Webster	 60 	 Improbable Thickest layer Bottom layer	0.00	· -	0.00	
Urban land	 40 	 Not rated 	 	 Not rated 		
4138B: Clarion	 50 	 Improbable Bottom layer Thickest layer	0.00		0.00	
Urban land	 30 	 Not rated 	 	 Not rated 		
4235B: Angus	 60 	 Improbable Bottom layer Thickest layer	0.00		0.00	
Urban land	 40 	 Not rated 	 	 Not rated 		
4236D: Lester	 50 	 Improbable Bottom layer Thickest layer	0.00	 Poor Bottom layer Thickest layer	0.00	

Source of Sand and Gravel--Continued

and soil name	map	of gravel		Potential as source of sand		
	unit			<u> </u>		
	1	Rating class	Value	Rating class	Value	
4236D:		 		 	İ	
Urban land	50	 Not rated 	j i	 Not rated 	į	
4325:	į	į	į	ĺ	į	
Le Sueur	60	: -		Poor		
		Thickest layer Bottom layer	0.00	Bottom layer Thickest layer	0.00	
	İ	į	į	į	i	
Urban land	40	Not rated 		Not rated 		
4444:			į		İ	
Jacwin	50	: -		Poor	0.00	
		Thickest layer Bottom layer	0.00	Bottom layer Thickest layer	0.00	
	İ	į	į	į	i	
Urban land	50	Not rated 		Not rated 		
4507:	į	į	į		į	
Canisteo	50	Improbable		Poor		
		Thickest layer Bottom layer	0.00		0.00	
Weber land		į		 Not rated		
Urban land	30	NOT Tated		NOC Tated	i	
4551B:	į	į	į	ĺ	į	
Calamine	50	: -		Poor		
		Bottom layer Thickest layer	0.00	· -	0.00	
			į	·		
Urban land	50	Not rated		Not rated	l I	
4551D:					i	
Calamine	50	: -		Poor		
		Bottom layer Thickest layer	0.00	· -	0.00	
Urban land	50	Not rated		Not rated	ļ	
4635:		 		 		
Buckney	50	. –	İ	Fair	ĺ	
		Thickest layer	0.00	·	0.00	
		Bottom layer	0.00	Bottom layer	0.06	
Urban land	50	Not rated	į	Not rated	į	
4635B:		 		 	İ	
Buckney	50	Improbable	İ	 Fair	i	
		· -	0.00	:	0.00	
		Bottom layer	0.00	Bottom layer	0.06	
Urban land	50	 Not rated		 Not rated		
4946B:		 		 		
Udorthents	70	Not rated	İ	Not rated	i	
Highway	30	 Not rated		 Not rated		
					į	
5010: Pits, sand and		 		 	ļ	
gravel	100	 Not rated		 Not rated	i	
-	j	İ	İ	İ	j	

Source of Sand and Gravel--Continued

	Pct.	!	Potential as source				
and soil name	of	of gravel		of sand			
	map						
	unit						
	<u> </u>	Rating class	Value	Rating class	Value		
5030:	 			 			
Pits, limestone	i	! 		i I	i		
quarries	100	 Not rated		 Not rated 			
5035:					i		
Pits, gypsum	İ		İ	İ	j		
quarries	100	Not rated	į	Not rated	į		
5040:	 			 			
Udorthents, loamy	100	Not rated	i	Not rated	i		
			1	!	- [
5049:		37.1					
Aquolls, ponded	60	Not rated		Not rated 			
Udorthents, loamy	30	 Not rated	į	 Not rated			
5060:				 			
Pits, clay	100	Not rated	į	Not rated	į		
5080:				 	-		
Udorthents	100	Not rated	į	 Not rated	į		
5457:				 			
Du Page, channeled,	į		i	İ	i		
frequently flooded	80	Improbable		Poor			
		Thickest layer	0.00	Bottom layer	0.00		
		Bottom layer	0.00	Thickest layer	0.00		
5507:	 			 			
Corvuso	55	Improbable	j	Poor	j		
		Thickest layer	0.00	Bottom layer	0.00		
		Bottom layer	0.00	Thickest layer	0.00		
Brownton	 35	 Improbable		 Poor	-		
22000		Thickest layer	0.00	!	0.00		
	İ	Bottom layer	0.00	· -	0.00		
AW:		 		 			
Animal waste lagoon	100	 Not rated		 Not rated			
SL:	 	 		 			
Sewage lagoon	100	 Not rated		 Not rated			
W:	 	[
Water	100	Not rated	i	Not rated	i		

Source of Reclamation Material, Roadfill, and Topsoil

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.00 to 0.99. The smaller the value, the greater the limitation. See text for further explanation of ratings in this table)

Map symbol and soil name	Pct. of map unit		·		Potential as source of topsoil 		
		Rating class and limiting features	Value 	Rating class and limiting features	Value	Rating class and limiting features	Value
6: Okoboji, depressional, ponded	 85	!		 Poor	1	 Poor	
	 	Too clayey Carbonate content 	0.05 0.97 	Wetness Low strength Shrink-swell 	0.00 0.00 0.16	1	0.00 0.05
27B: Terril	 85 	 Fair Carbonate content 	 0.97 	 Fair Low strength 	0.78	 Good 	
34: Estherville	 90 	 Poor Too sandy Content of organic matter Droughty	 0.00 0.12 0.70	 Good 	 	Too sandy	 0.00 0.00 0.32
34B: Estherville	 85 	Poor Too sandy Content of organic matter Droughty	0.00	 Good 		Too sandy	0.00
55: Nicollet	 75 	 Fair Content of organic matter Carbonate content Water erosion	 0.12 0.97 0.99	 Poor Wetness 	 0.00 	 Poor Wetness 	 0.00
62F: Storden	 80 	 Fair Content of organic matter Carbonate content Water erosion	 0.88 0.97 0.99	 Fair Slope Low strength 	 0.18 0.22 		 0.00 0.97
90: Okoboji, mucky, depressional, ponded	 85 	 - Fair Too clayey Carbonate content 	0.05		 0.00 0.42	!	 0.00
95: Harps	85 85	 Fair Carbonate content 	 0.68 	 Poor Wetness Shrink-swell	 0.00 0.87	!	 0.00 0.68

Source of Reclamation Material, Roadfill, and Topsoil--Continued

Map symbol and soil name	Pct. of map unit	of reclamation materia		Potential as sou of roadfill	Potential as source of topsoil		
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
107: Webster	 80 	 Fair Content of organic matter Carbonate content Water erosion	0.12	 Poor Wetness 	0.00	 Poor Wetness 	 0.00
108: Wadena	 85 	 Fair Content of organic matter	 0.12 	 Good 	 	 Fair Hard to reclaim (rock fragments) Rock fragments	 0.01 0.92
108B: Wadena	 95 	 Fair Content of organic matter 	 0.12 	 Good 	 	 Fair Hard to reclaim (rock fragments) Rock fragments	 0.01 0.92
108C: Wadena	 75 	!	 0.12 	 Good 	 	 Fair Hard to reclaim (rock fragments) Rock fragments	 0.01 0.92
135: Coland, occasionally flooded	1	 Fair Too clayey 	 0.98 	 Poor Low strength Wetness Shrink-swell	0.00	 Poor Wetness Too clayey	 0.00 0.98
136: Ankeny, rarely flooded	 80 	 Good	 	 Good	 	 Good	
138B: Clarion	 80 	 Fair Content of organic matter Carbonate content Water erosion	 0.12 0.97 0.99	 Good 	 	 Fair Rock fragments 	 0.99
138C2: Clarion, moderately eroded	 80 	Content of organic matter Carbonate content	0.12	 Good 		 Good 	
201B: Coland	 50 	!	 0.98 	 Poor Wetness Low strength Shrink-swell	 0.00 0.00 0.99	!	 0.00 0.98
Terril	35	 Fair Carbonate content	!	 Fair Low strength	0.78	 Good 	

Source of Reclamation Material, Roadfill, and Topsoil--Continued

Map symbol and soil name	Pct. of map unit	of reclamation material		Potential as source of roadfill 		Potential as source of topsoil 	
	 	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
203: Cylinder	 80 	 Fair Too sandy Content of organic matter	 0.01 0.12	 Poor Wetness 	 0.00 	 Poor Rock fragments Wetness Too sandy	 0.00 0.00 0.01
227: Wadena, loamy substratum	 70 	 - Poor Too sandy Content of organic matter	 0.00 0.12 	 Good 		 Poor Rock fragments Too sandy Hard to reclaim (rock fragments)	 0.00 0.00 0.01
227B: Wadena, loamy substratum	 70 	 	 0.00 0.12 	 Good 		 Poor Rock fragments Too sandy Hard to reclaim (rock fragments)	 0.00 0.00 0.01
228: Cylinder, loamy substratum	 70 	 Fair Content of organic matter 	 0.12 	 Poor Wetness 	 0.00 	 Poor Wetness Hard to reclaim (rock fragments) Rock fragments	 0.00 0.01 0.95
236D: Lester	 80 	 Fair Content of organic matter Carbonate content	 0.88 0.97	 Poor Low strength Shrink-swell	 0.00 0.97	 Fair Slope 	 0.37
236E: Lester	 85 	 Fair Content of organic matter Carbonate content	 0.88 0.97	 Poor Low strength Shrink-swell Slope	 0.00 0.97 0.98	 Poor Slope	0.00
236F: Lester	 80 	!	 0.88 0.97	Slope	 0.00 0.18 0.97	 Poor Slope 	0.00
259: Biscay	 85 	!	0.12	 Poor Wetness 	 0.00 	 Poor Wetness Hard to reclaim (rock fragments)	
262G: Lester	 60 	!	 0.88 0.97	Slope	 0.00 0.00 0.97	 Poor Slope 	 0.00

Source of Reclamation Material, Roadfill, and Topsoil--Continued

Map symbol and soil name	Pct. of map unit	Potential as source reclamation mater:	•				rce
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
262G: Belview	 20 	!	 0.12 0.97	 Poor Slope Low strength	 0.00 0.78		 0.00 0.97
274: Rolfe, depressional, ponded	1	Too clayey Content of organic matter	 0.00 0.88 0.97	 - Poor Wetness Low strength Shrink-swell	 0.00 0.00 0.53	 - Poor Wetness Too clayey 	 0.00 0.00
278: Biscay, loamy substratum	 70 	!	 0.12 0.97	 Poor Wetness 	 0.00 	 - Poor Wetness Hard to reclaim (rock fragments)	 0.00 0.68
307: Dundas	 80 	 Fair Content of organic matter Too acid Carbonate content	 0.12 0.92 0.97	 Poor Wetness 	 0.00 	 Poor Wetness 	 0.00
315B: Udifluvents, occasionally flooded	 80	 Not rated	 	 Good		 Not rated	
323B: Fort Dodge	 90 	 Good 	 	 Poor Low strength	 0.00	 Good 	
325: Le Sueur	 90 	Content of organic matter	 0.12 0.97 0.97	 Poor Wetness Shrink-swell 	 0.00 0.99	 Poor Wetness 	 0.00
338: Garmore	 100 	Content of organic matter	 0.50 0.97 0.99	 Poor Low strength 	 0.00 	 Good 	
342: Estherville, loamy substratum	 70 	 Poor Too sandy Content of organic matter Droughty	 0.00 0.12 0.85	 Good 		Rock fragments	 0.00 0.32

Source of Reclamation Material, Roadfill, and Topsoil--Continued

Map symbol and soil name	Pct. of map unit	reclamation mater:	Potential as sou of roadfill	rce	Potential as sou of topsoil	rce	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
342B: Estherville, loamy		 Poor	 			 - -	
substratum	70 	Too sandy Content of organic matter Droughty	 0.00 0.12 0.85	Good 	 	Poor Rock fragments Too sandy Hard to reclaim (rock fragments)	0.00 0.00 0.32
344B:	 	 	 	l I	İ	i I	İ
Copaston	80 	Poor Depth to bedrock Droughty	 0.00 0.00	Poor Depth to bedrock 	0.00	Poor Depth to bedrock Rock fragments	0.00
345: Copaston	35	 Poor	 	Poor		 Poor	
		Droughty	0.00	Depth to bedrock	0.00	Depth to bedrock Rock fragments	0.00
Jacwin	25	 Poor	 	 Poor		 Poor	
	 	Too clayey Content of organic matter Carbonate content	0.00 0.50 0.97	Wetness Low strength Depth to bedrock	0.00	Wetness Too clayey 	0.00
355:		 	 			 	
Luther	85 	Fair Content of organic matter Too acid Carbonate content	 0.12 0.92 0.97	Poor Wetness 	 0.00 	Poor Wetness 	 0.00
383:		 	 			 	
Marna	80 	Fair Too clayey Content of organic matter Carbonate content	0.05 0.12 0.97	Poor Wetness Shrink-swell Low strength	 0.00 0.74 0.78	Poor Wetness Too clayey 	0.00
385:		 	 			 	
Guckeen	75 	Fair Content of organic matter Too clayey Water erosion	 0.12 0.12 0.99	Poor Wetness Low strength Shrink-swell	 0.00 0.78 0.91 	Poor Wetness Too clayey 	 0.00 0.12
386:					į		
Cordova	85 	Fair Content of organic matter Too acid Too clayey	 0.12 0.84 0.95	Low strength	 0.00 0.78 0.97	Too clayey	 0.00 0.94 0.99
387B: Kamrar	85	 Fair	 	 Fair		 Fair	
ACMIT GL		Too clayey Carbonate content	0.02	1	0.22	Too clayey	0.02

Source of Reclamation Material, Roadfill, and Topsoil--Continued

and soil name		c. Potential as source of		Potential as source of roadfill		Potential as source of topsoil	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
413G: Gosport	 25 	Droughty	 0.00 0.12 0.12	 Poor Depth to bedrock Low strength Slope	0.00	 Poor Slope Too clayey Wetness	 0.00 0.00 0.53
Emeline	 25 	Depth to bedrock	 0.00 0.00	 Poor Slope Depth to bedrock	0.00	 Not rated 	
Ridgeton	 25 	 Good 	 	 Poor Slope Low strength	0.00	 Poor Slope 	0.00
457: Du Page, occasionally flooded	 85 	!	 0.68	 Good 	 	 Good 	
485: Spillville, occasionally flooded	 80 	 Good 	 	 - Poor Wetness Low strength	 0.00	 Poor Wetness	 0.00
485B: Spillville, rarely flooded	 85 	 Good 	 	 - Poor Low strength	 0.00	 Good	
506: Wacousta, depressional, ponded	 80 	Content of organic matter	 0.50 0.90 0.97	 - Poor Low strength Wetness	 0.00 0.00	 Poor Wetness 	 0.00
507: Canisteo	 75 	Content of organic matter Carbonate content	 0.12 0.97 0.99	 Poor Wetness 	0.00	 Poor Wetness 	0.00
511: Blue Earth, depressional, ponded	 85 	 - Fair Carbonate content - 	 0.80 	 - Poor Wetness Low strength 	 0.00 0.00	 	 0.00 0.00 0.84

Source of Reclamation Material, Roadfill, and Topsoil--Continued

Map symbol and soil name	Pct. of map unit	reclamation mater			rce	Potential as sou of topsoil	rce
	<u> </u>	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
526: Wacousta, mucky, depressional, ponded	 90 	Fair Content of organic matter Water erosion Carbonate content	0.50	 - Poor Wetness Low strength 	 0.00 0.00	 Poor Wetness 	 0.00
536: Hanlon, occasionally flooded		 Good	 	 Good	 	 Good	
541C: Estherville	 45 	Poor Too sandy Content of organic matter Droughty	 0.00 0.12 	 Good 		 Poor Rock fragments Too sandy Hard to reclaim (rock fragments)	 0.00 0.00 0.32
Hawick	 45 	Poor Too sandy Content of organic matter Droughty	 0.00 0.12 0.26	 Good 	 	Poor Too sandy Rock fragments Hard to reclaim (rock fragments)	 0.00 0.03 0.98
551B: Calamine	 85 	 Fair Water erosion 	 0.90 	Poor Wetness Low strength Depth to bedrock	 0.00 0.00 0.58	 Poor Wetness 	 0.00
551D: Calamine	 55 	 Fair Water erosion 	 0.90 	 Poor Wetness Low strength Depth to bedrock	 0.00 0.00 0.58	 Poor Wetness Slope	 0.00 0.84
559: Talcot	 85 	Fair Content of organic matter Too clayey Carbonate content	0.88	 Poor Wetness 	0.00	 Poor Wetness Hard to reclaim (rock fragments) Too clayey	0.00
561: Talcot, loamy substratum	 70 	 Fair Content of organic matter Too clayey Carbonate content	0.88	 - Poor Wetness Shrink-swell 	 0.00 0.99	!	 0.00 0.82 0.88
566C: Moingona	90	 Fair Content of organic matter	 0.88	 Poor Low strength 	 0.00	 Good 	

Source of Reclamation Material, Roadfill, and Topsoil--Continued

Map symbol and soil name	Pct. of map unit	reclamation mater:	Potential as source of reclamation material		Potential as source of roadfill		rce
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
568D: Cokato	 80 	Carbonate content	!	 Poor Low strength Shrink-swell	 0.00 0.93	 Fair Slope 	 0.96
568E: Cokato	 80 	Carbonate content	!		 0.00 0.93	 Poor Slope 	 0.00
583: Minnetonka	 90 	Poor Too clayey Content of organic matter Too acid	0.00		 0.00 0.00 0.55	 Poor Too clayey Wetness 	0.00
606: Lanyon, depressional, ponded	 80	!	 0.00 0.68		 0.00 0.00 0.21	 - Poor Wetness Too clayey Carbonate content	 0.00 0.00 0.94
625: Lerdal	 80 	 Fair Too clayey Content of organic matter Too acid	 0.02 0.50 0.92		 0.00 0.00 0.41	 Poor Wetness Too clayey 	 0.00 0.01
636: Buckney, rarely flooded	 85 	 Poor Too sandy Droughty Content of organic matter	 0.00 0.08 0.12	 Good 	 	 - Poor Too sandy 	 0.00
636B: Buckney, rarely flooded	 90 	 Poor Too sandy Droughty Content of organic matter	 0.00 0.08 0.12	 Good 		 Poor Too sandy 	 0.00
638C2: Clarion, moderately eroded	 50 	 Fair Content of organic matter Carbonate content Water erosion	 0.12 0.97 0.99	 Good 		 Good 	

Source of Reclamation Material, Roadfill, and Topsoil--Continued

Map symbol and soil name	Pct. of map unit	Potential as source reclamation mater:	Potential as sou of roadfill	rce	Potential as source of topsoil		
		'	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
638C2: Storden, moderately eroded	 35 	 Fair Content of organic matter Carbonate content Water erosion	0.88	 Fair Low strength 	 0.22	 Fair Carbonate content 	 0.97
650: Joliet	 45 	 Poor Depth to bedrock Droughty	 0.00 0.00	 Poor Low strength Wetness Depth to bedrock	0.00	!	 0.00 0.00 0.50
Faxon	 45 	 Fair Depth to bedrock Droughty 	 0.58 0.99 	Poor Depth to bedrock Wetness Low strength	1	 Poor Wetness Depth to bedrock Rock fragments	 0.00 0.58 0.68
715: Fluvaquents, frequently flooded	 65 	 Not rated 	 	 Poor Wetness 	 0.00	 Not rated 	
735: Havelock, occasionally flooded	 85 	 Fair Carbonate content Too clayey	 0.97 0.98	 - Poor Low strength Wetness Shrink-swell	 0.00 0.00 0.73	1	 0.00 0.93 0.97
740D: Hawick	 80 	 Poor Too sandy Content of organic matter Droughty	 0.00 0.12 0.26	 - Good - - -	 	 Poor Too sandy Rock fragments Slope	0.00
775B: Billett	 90 	!	 0.12 0.84	 Good 	 	 Good 	
775C: Billett	 85 	 Fair Content of organic matter Too acid	 0.12 0.84	 Good 	 	 - Good - - -	
777B: Wapsie	 85 	 Fair Content of organic matter Too acid	 0.12 0.84	 Good 	 	 Fair Rock fragments 	 0.24

Source of Reclamation Material, Roadfill, and Topsoil--Continued

Map symbol and soil name	Pct. of map unit	Potential as source reclamation mater:		Potential as sou of roadfill	rce	Potential as source of topsoil	
	 	'	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
835D2: Storden, moderately eroded	 50 	Content of organic matter Carbonate content	0.88	 - Fair Low strength 	 0.22	 - Fair Slope Carbonate content 	 0.37 0.97
Omsrud, moderately eroded	 35 	 Fair Content of organic matter Carbonate content	 0.12	 Good 		 Fair Slope Rock fragments 	 0.37 0.92
835E2: Storden, moderately eroded	 50 	Content of organic matter Carbonate content	0.88	 - Fair Low strength Slope 	 0.22 0.98		 0.00 0.97
Omsrud, moderately eroded	 35 	organic matter Carbonate content	0.12	 Fair Slope 	 0.98 	 Poor Slope Rock fragments 	0.00
836B: Kilkenny	 65 	Too clayey Content of organic matter	0.02	Shrink-swell	 0.00 0.91 	 Fair Too clayey 	 0.01
854D: Fens, Aquolls	 80 	 Not rated 	 	 Poor Wetness	0.00	 Not rated 	
855: Shorewood	 85 	Too clayey	 0.00 0.68 	!	 0.00 0.00 0.76	 Poor Too clayey Wetness	 0.00 0.00
956: Harps	 45 	 - Fair Carbonate content - 	 0.68 	 Poor Wetness Shrink-swell	 0.00 0.87		 0.00 0.68
Okoboji, depressional, ponded	 35 		 0.05 0.97		 0.00 0.00 0.16	 - Poor Wetness Too clayey 	 0.00 0.05

Source of Reclamation Material, Roadfill, and Topsoil--Continued

Map symbol and soil name	Pct. of map unit	, į		 Potential as sou of roadfill 	rce	Potential as source of topsoil	
		'	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
1007:		 	 	 		 	
Cosmos, bouldery	65	•	ļ	Poor		Poor	
		Too clayey	0.00	Wetness	0.00	Too clayey	0.00
		Content of organic matter	0.12	Low strength Shrink-swell	0.00	Wetness	0.00
		Carbonate content	0.92	SHIIR-SWEII		 	
10FFD:							
1055B: Kandiyohi, bouldery	 65	 Fair	 	Poor	l I	 Poor	
nundifoni, bouldery	03	Too clayey	0.01	Wetness	0.00	Wetness	0.00
	i	Content of	0.50	!	0.00	Too clayey	0.00
	i	organic matter	į	Shrink-swell	0.02	j	į
		Carbonate content	0.80				
1138B:			 		 	 	l I
Clarion	65	Fair	j	Good	j	Fair	j
		Content of	0.12			Rock fragments	0.99
		organic matter					ļ
		Carbonate content Water erosion	0.97 0.99	1			
		water erosion	0.33			 	
1236B:	į	į	į	į	į	į	į
Angus	85	!		Good		Good	
		Content of	0.12	l I		 	
		organic matter Too acid	 0.97	 	l I	 	l I
		Carbonate content					
10067							
1236C: Angus	80	 Fair	 	Good	l I	 Good	
32		Content of	0.12		i		i
	i	organic matter			İ		İ
	İ	Too acid	0.97	İ	j	j	į
		Carbonate content	0.97				
1259:			 		 	 	l I
Biscay,	İ	j	İ	İ	İ	į	İ
depressional,							
ponded	80	!		Poor		Poor	
		Content of	0.12	Wetness	0.00	Wetness Hard to reclaim	0.00
		organic matter Carbonate content	 0 97	 	 	(rock fragments)	1
						(20011 22431101105)	
1507:							
Brownton	80	!		Poor Low strength	0.00	Poor	0.00
		Carbonate content			0.00		0.12
				Shrink-swell	0.68		
1555.							
1555: Nicollet	40	 Fair	 	Poor	 	 Poor	
	i	! -	0.12	· ·	0.00	•	0.00
	İ	organic matter	İ	İ	İ	İ	İ
		Carbonate content					
		Water erosion	0.99		ļ		
	İ	İ	İ	İ	İ	İ	İ

Source of Reclamation Material, Roadfill, and Topsoil--Continued

Map symbol and soil name	Pct. of map unit			 Potential as sou of roadfill 	rce	Potential as source of topsoil	
		!	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
1555:	 		 		 		
Guckeen	25	Fair	į	Poor	İ	Poor	į
			0.12	!	0.00		0.00
		!	0.12		0.78	Too clayey	0.12
	 	organic matter Water erosion	 0.99	Shrink-swell	0.91 		
	į		į		į		į
1836B: Kilkenny	 65	 Fair	 	 Poor		 Fair	
KIIKemiy	03	!	0.02	!	0.00	!	0.01
			0.50		0.91		
	į	organic matter	į	İ	İ		į
		Too acid	0.92				
Shorewood	 25	 Poor	 	 Poor	 	 Poor	
		!	0.00	!	0.00	Too clayey	0.00
	İ	Too acid	0.68	Wetness	0.00	Wetness	0.00
				Shrink-swell	0.76		
2700C:	 			 			
Ridgeton	75	Good	į	Fair	İ	Good	į
				Low strength	0.78		
2700D:	 	 		 		 	
Ridgeton	80	Good	i	Fair	İ	Fair	i
				Low strength	0.78	Slope	0.37
4000:	 	 		 		 	
Urban land	100	Not rated	İ	Not rated	İ	Not rated	İ
4055:		l		 		l	
Nicollet	 50	 Fair	 	 Poor	 	 Poor	
		1	0.12	1	0.00	l .	0.00
	į	organic matter	į	İ	j		İ
		Carbonate content					1
	 	Water erosion	0.99	 	l I	 	
Urban land	50	 Not rated		 Not rated		 Not rated	
4107: Webster	 60	 Fair		 Poor		 Poor	
HODBOOL		!	0.12	!	0.00		0.00
	į	organic matter	į	İ	j		į
		Carbonate content					
		Water erosion	0.99				
Urban land	40	 Not rated		 Not rated		 Not rated	
4120D.							
4138B: Clarion	 50	 Fair	 	 Good	 	 Fair	1
		Content of				Rock fragments	0.99
	į	organic matter	İ	İ	j		į
		Carbonate content	:	[
		Water erosion	0.99				
Urban land	30	 Not rated	 	 Not rated	 	 Not rated	

Source of Reclamation Material, Roadfill, and Topsoil--Continued

		Potential as source reclamation mater:		Potential as sou of roadfill	rce	Potential as sou of topsoil	irce
		'	Value	Rating class and limiting features		Rating class and limiting features	Value
4235B: Angus	 60 	Content of organic matter	 0.12 0.97	 Good 	 	 Good 	
Urban land	40	 Not rated	 	 Not rated		 Not rated	
4236D: Lester	 50 	!	0.88	 Poor Low strength Shrink-swell	!	 Fair Slope 	0.37
Urban land	 50 	 Not rated 	 	 Not rated	 	 Not rated 	
4325: Le Sueur	 60 	!	0.12	 Poor Wetness Shrink-swell 	 0.00 0.99 	 Poor Wetness 	0.00
Urban land	40	 Not rated 	 	 Not rated	 	 Not rated	
4444: Jacwin	 50 	Too clayey	0.00	 Poor Wetness Low strength Depth to bedrock	0.00	:	0.00
Urban land	 50	 Not rated	 	 Not rated	 	 Not rated	
4507: Canisteo	 50 	Content of organic matter Carbonate content	0.12	 Poor Wetness 	 0.00 	 Poor Wetness 	0.00
Urban land	 50 	 Not rated 	 	 Not rated 	 	 Not rated 	
4551B: Calamine	 50 	!	!	 Poor Low strength Wetness Depth to bedrock	0.00	!	0.00
Urban land	 50	 Not rated	 	 Not rated	 	 Not rated	
4551D: Calamine	50	!	!		0.00	 Poor Wetness Slope	0.00
Urban land	50	 Not rated 	 	 Not rated 		 Not rated 	

Source of Reclamation Material, Roadfill, and Topsoil--Continued

Map symbol and soil name	Pct. of map unit			Potential as sou of roadfill	rce	Potential as sou of topsoil	irce
	unit 	!	Value	 Rating class and limiting features	Value	 Rating class and limiting features	Value
4635: Buckney	 50 	Too sandy Droughty	 0.00 0.08 0.12	 Good 		 Poor Too sandy 	 0.00
Urban land	 50	 Not rated 	 	 Not rated 		 Not rated 	
4635B: Buckney	 50 	Too sandy Droughty	 0.00 0.08 0.12	 Good 	 	 Poor Too sandy 	 0.00
Urban land	 50 	 Not rated 	 	 Not rated 		 Not rated 	
4946B: Udorthents	 70	 Not rated		 Not rated		 Not rated	
Highway	 30 	 Not rated 	 	 Not rated 	 	 Not rated 	
5010: Pits, sand and gravel	 100	 Not rated	 	 Not rated		 Not rated	
5030: Pits, limestone quarries	 100	 Not rated	 	 Not rated 		 Not rated 	
5035: Pits, gypsum quarries	 100	 Not rated	 	 Not rated		 Not rated	
5040: Udorthents, loamy	 100	 Not rated		 Not rated	į Į	 Not rated	į Į
5049: Aquolls, ponded	 60	 Not rated	 	 Not rated		 Not rated	
Udorthents, loamy	 30 	 Not rated 	 	 Not rated 	 	 Not rated 	
5060: Pits, clay	 100	 Not rated		 Not rated		 Not rated	
5080: Udorthents	 100	 Not rated	 	 Not rated	 	 Not rated	
5457: Du Page, channeled, frequently flooded	 80 	:	 0.68 0.80	 Good 		 Good 	

Source of Reclamation Material, Roadfill, and Topsoil--Continued

Map symbol	Pct.	Potential as source	e of	Potential as sou	rce	Potential as sou	rce
and soil name	of	reclamation mater:	ial	of roadfill		of topsoil	
	map						
	unit						
		Rating class and	Value	Rating class and	Value	Rating class and	Value
		limiting features		limiting features	<u> </u>	limiting features	
5507:			 	 		 	
Corvuso	- 55	Fair		Poor		Poor	
		Too clayey	0.02	Low strength	0.00	Wetness	0.00
		Content of	0.12	Wetness	0.00	Too clayey	0.02
		organic matter		Shrink-swell	0.12		
		Carbonate content	0.92				
Brownton	· 35	 Fair	 	 Poor		 Poor	
		Too clayey	0.12	Wetness	0.00	Wetness	0.00
		Carbonate content	0.99	Low strength	0.00	Too clayey	0.12
				Shrink-swell	0.68	Carbonate content	0.99
AW:			 	 		 	
Animal waste lagoon	100	Not rated	 	Not rated	į	Not rated	į
SL:		 	 	 		 	
Sewage lagoon	- 100	Not rated		Not rated		Not rated	
₩:						 	
Water	- 100	Not rated		Not rated		Not rated	

Water Management

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

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

Pond reservoir areas hold water behind a dam or embankment. Soils best suited to this use have low seepage potential in the upper 60 inches. The seepage potential is determined by the 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. Embankments that have zoned construction (core and shell) are not considered. In this table, the soils are rated as a source of material for embankment fill. The ratings apply to the soil material below the surface layer to a depth of 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 greater than the height of the embankment can affect performance and safety of the embankment. Generally, deeper onsite investigation is needed to determine these properties.

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

Aquifer-fed excavated ponds are pits or dugouts that extend to a ground-water aquifer or to a depth below a permanent water table. Excluded are ponds that are fed only by surface runoff and embankment ponds that impound water 3 feet or more above the original surface. Excavated ponds are affected by depth to a permanent water table, 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.

Ponds and Embankments

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table)

Map symbol and soil name	Pct. Pond reservoir areas of map unit		eas	Embankments, dikes levees 	Aquifer-fed excavated pond	ls	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
6: Okoboji, depressional, ponded	 85 	 Somewhat limited Seepage 	 0.70 	 - Very limited Depth to saturated zone Ponding Hard to pack	 1.00 1.00	 Somewhat limited Slow refill Cutbanks cave 	 0.30 0.10
27B: Terril	 85 	 Somewhat limited Seepage 	 0.70 	 Somewhat limited Piping 	 0.49 		0.81
34: Estherville	 90 	 Very limited Seepage	1.00	 Somewhat limited Seepage	0.69	 Very limited Depth to water	1.00
34B: Estherville	 85 	 Very limited Seepage	1.00	 Somewhat limited Seepage	0.69	 Very limited Depth to water	1.00
55: Nicollet	 75 	 Somewhat limited Seepage 	 0.70 	 Very limited Depth to saturated zone Piping	 1.00 0.44	 Somewhat limited Slow refill Cutbanks cave	 0.30 0.10
62F: Storden	 80 	 Somewhat limited Seepage Slope	 0.70 0.18	 Very limited Piping 	 0.99 	 Very limited Depth to water 	 1.00
90: Okoboji, mucky, depressional, ponded	 85 	 Somewhat limited Seepage 	 0.70 	 - Very limited Depth to saturated zone Ponding Hard to pack	 1.00 1.00 0.09	 Somewhat limited Slow refill Cutbanks cave 	0.30
95: Harps	 85 	 Somewhat limited Seepage	 0.70	 Very limited Depth to saturated zone	 1.00	 Somewhat limited Slow refill Cutbanks cave	0.30
107: Webster	 80 	 Somewhat limited Seepage 	 0.70 	 Very limited Depth to saturated zone Piping	 1.00 0.21	 Somewhat limited Slow refill Cutbanks cave 	0.30

Map symbol and soil name	Pct. of map unit	 Pond reservoir ar 	eas	 Embankments, dikes levees 	, and	Aquifer-fed excavated ponds		
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	
108: Wadena	 85 	 Very limited Seepage	 1.00	 Somewhat limited Seepage	 0.63	 Very limited Depth to water		
108B: Wadena	 95 	 Very limited Seepage	1.00	 Somewhat limited Seepage	0.63	 Very limited Depth to water	1.00	
108C: Wadena	 75 	 Very limited Seepage	1.00	 Somewhat limited Seepage	0.52	 Very limited Depth to water	1.00	
135: Coland, occasionally flooded	1	 Somewhat limited Seepage 	 0.72 	 Very limited Depth to saturated zone Piping Seepage	 1.00 0.15 0.01	 Somewhat limited Slow refill Cutbanks cave	 0.28 0.10	
136: Ankeny, rarely flooded	 80	 Very limited Seepage	 1.00	 Somewhat limited Seepage		 Very limited Depth to water	1.00	
138B: Clarion	 80 	 Somewhat limited Seepage 	 0.70 	 Very limited Piping 	 0.99 	 Somewhat limited Depth to saturated zone Slow refill Cutbanks cave	 0.81 0.30 0.10	
138C2: Clarion, moderately eroded	 80 	 Somewhat limited Seepage 	 0.70 	 - Very limited Piping - -	 0.99 	 Somewhat limited Depth to saturated zone Slow refill Cutbanks cave	 0.81 0.30 0.10	
201B: Coland	 50 	 Somewhat limited Seepage 	 0.72 	 Very limited Depth to saturated zone Piping Seepage	 1.00 0.15 0.01	 Somewhat limited Slow refill Cutbanks cave 	 0.28 0.10	
Terril	 35 	 Somewhat limited Seepage 	 0.70 	 Somewhat limited Piping 	 0.49 	Somewhat limited Depth to saturated zone Slow refill Cutbanks cave	 0.81 0.30 0.10	
203: Cylinder	 80 	 Very limited Seepage 	 1.00 	 Very limited Depth to saturated zone Seepage	 1.00 0.10	 Very limited Cutbanks cave 	 1.00	

Ponds and Embankments--Continued

Map symbol and soil name	Pct. of map	Pond reservoir ar	eas Embankments, dikes, and levees 			Aquifer-fed excavated pond	ls
	unit 	 Rating class and limiting features	Value	 Rating class and limiting features	Value	 Rating class and limiting features	Value
	İ		İ	Ī	İ	Ī	İ
227: Wadena, loamy substratum	 70 	 Very limited Seepage	 1.00	 Somewhat limited Seepage	0.63	 Very limited Depth to water	 1.00
227B:	l I	 	l I	l I		 	
Wadena, loamy substratum	 70 	 Very limited Seepage	1.00	 Somewhat limited Seepage	0.63	 Very limited Depth to water	1.00
228:						 	
Cylinder, loamy substratum	 70 	 Very limited Seepage 	 1.00 	 Very limited Depth to saturated zone Piping Seepage	 1.00 0.99 0.10	 Very limited Cutbanks cave 	1.00
236D:	l I	 	l I	l I		 	
Lester	 80 	 Somewhat limited Seepage Slope	0.70	 Somewhat limited Piping 	0.46	 Very limited Depth to water 	1.00
236E:	 	 		 		 	
Lester	85 	Somewhat limited Seepage Slope	 0.70 0.04	Somewhat limited Piping	0.46	 Very limited Depth to water	1.00
236F:	 	 		 		 	
Lester	80 	Somewhat limited Seepage Slope	 0.70 0.18	Somewhat limited Piping	0.46	 Very limited Depth to water	1.00
259:	 	 		 		 	
Biscay	85 	Very limited Seepage 	 1.00 	Very limited Depth to saturated zone Seepage	 1.00 0.47	Very limited Cutbanks cave 	1.00
262G:						 	
Lester	60 	Somewhat limited Slope Seepage	 0.99 0.70	Somewhat limited Piping	0.46	 Very limited Depth to water 	1.00
Belview	 20 	 Somewhat limited Slope Seepage	 0.97 0.72	 Somewhat limited Piping 	0.73	 Very limited Depth to water 	1.00
274: Rolfe, depressional, ponded		 Somewhat limited Seepage 	 0.70	 Very limited Depth to saturated zone Ponding	 1.00	 Somewhat limited Slow refill Cutbanks cave	0.30

Map symbol and soil name	Pct. of map unit	i i		 Embankments, dikes levees 	Embankments, dikes, and levees		ls
	unii c 	Rating class and limiting features	Value	 Rating class and limiting features	Value	 Rating class and limiting features	Value
278: Biscay, loamy substratum	 70 	 Very limited Seepage	 1.00	Very limited Depth to saturated zone Seepage	 1.00 0.08	 Very limited Cutbanks cave 	 1.00
307: Dundas	 80 	 Somewhat limited Seepage	 0.70 	 Very limited Depth to saturated zone Piping	 1.00 0.72	 Somewhat limited Slow refill Cutbanks cave	 0.30 0.10
315B: Udifluvents, occasionally flooded	 80 	 Very limited Seepage	 1.00	 Not limited 	 	 - Very limited Depth to water	 1.00
323B: Fort Dodge	 90 	 Very limited Seepage	 1.00 	 Somewhat limited Piping Seepage	 0.92 0.10	 Very limited Depth to water 	 1.00
325: Le Sueur	 90 	 Somewhat limited Seepage 	 0.70 	 Very limited Depth to saturated zone Piping	 1.00 0.90	 Somewhat limited Slow refill Cutbanks cave	 0.30 0.10
338: Garmore	 100 	 Somewhat limited Seepage 	 0.70 	 Somewhat limited Piping 	 0.54 	 Somewhat limited Depth to saturated zone Slow refill Cutbanks cave	 0.81 0.30 0.10
342: Estherville, loamy substratum	 70 	 Very limited Seepage	 1.00	 Somewhat limited Seepage	 0.52	 Very limited Depth to water	 1.00
342B: Estherville, loamy substratum	 70 	 Very limited Seepage	 1.00	 Somewhat limited Seepage 	 0.52	 Very limited Depth to water	 1.00
344B: Copaston	 80 	 Very limited Seepage Depth to bedrock	 1.00 1.00	 Very limited Thin layer 	 1.00	 Very limited Depth to water	1.00
345: Copaston	 35 	_	1.00	 Very limited Thin layer 	 1.00 	 Very limited Depth to water 	 1.00

Map symbol and soil name	Pct. Pond reservoir areas of map unit			 Embankments, dikes levees 	, and	Aquifer-fed excavated ponds 		
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	
345: Jacwin	 25 	 Somewhat limited Seepage Depth to bedrock	 0.70 0.01	Very limited Depth to saturated zone Thin layer	 1.00 0.46	 Somewhat limited Slow refill Cutbanks cave	 0.30 0.10	
355: Luther	 85 	 Somewhat limited Seepage 	 0.70 	 Very limited Depth to saturated zone Piping	 1.00 0.72	 Somewhat limited Slow refill Cutbanks cave	0.30	
383: Marna	 80 	 Somewhat limited Seepage 	 0.70 	 Very limited Depth to saturated zone	 1.00 	 Somewhat limited Slow refill Cutbanks cave	0.30	
385: Guckeen	 75 	 Somewhat limited Seepage 	 0.70 	 Very limited Depth to saturated zone Piping	 1.00 0.01	 Somewhat limited Slow refill Cutbanks cave	0.30	
386: Cordova	 85 	 Somewhat limited Seepage 	 0.70 	 Very limited Depth to saturated zone Piping	 1.00 0.09	 Somewhat limited Slow refill Cutbanks cave	0.30	
387B: Kamrar	 85 	 Somewhat limited Seepage 	 0.70 	 Very limited Depth to saturated zone	 0.99 	Somewhat limited Slow refill Cutbanks cave Depth to saturated zone	 0.30 0.10 0.01	
413G: Gosport	 25 	 Somewhat limited Slope Depth to bedrock	 0.72 0.11 	 Very limited Depth to saturated zone Thin layer Hard to pack	 0.99 0.86 0.28	 Very limited Slow refill Cutbanks cave Depth to saturated zone	 1.00 0.10 0.01	
Emeline	25 	 Very limited Depth to bedrock Slope Seepage	 1.00 0.28 0.05	 Very limited Thin layer Piping 	 1.00 0.92	 Very limited Depth to water 	 1.00 	
Ridgeton	 25 	 Somewhat limited Seepage Slope	 0.70 0.59	 Somewhat limited Piping 	 0.51 	 Very limited Depth to water 	 1.00 	
457: Du Page, occasionally flooded	 85 	 Somewhat limited Seepage 	 0.72 	 Somewhat limited Piping 	 0.90 	 Somewhat limited Depth to saturated zone Slow refill Cutbanks cave	 0.81 0.28 0.10	

Map symbol and soil name	 Pct. of map unit	 Pond reservoir ar 	eas	 Embankments, dikes levees 	, and	Aquifer-fed excavated ponds			
	unit	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value		
485: Spillville, occasionally flooded	 80 	 Somewhat limited Seepage	 0.70	Very limited Depth to saturated zone Piping	 1.00 0.72	 - Somewhat limited Slow refill Cutbanks cave	 0.30 0.10		
485B: Spillville, rarely flooded	 85 	 Somewhat limited Seepage 	 0.70 	 Somewhat limited Piping 	 0.72 	 Somewhat limited Depth to saturated zone Slow refill Cutbanks cave	0.81		
506: Wacousta, depressional, ponded	 80 	 Somewhat limited Seepage 	 0.70 	 	 1.00 1.00	 Somewhat limited Slow refill Cutbanks cave	 0.30 0.10		
507: Canisteo	 75 	 Somewhat limited Seepage 	 0.70 	 Very limited Depth to saturated zone Piping	 1.00 0.55	 Somewhat limited Slow refill Cutbanks cave	0.30		
511: Blue Earth, depressional, ponded	 85 	 Somewhat limited Seepage 	 0.70 		 1.00 1.00	 - Somewhat limited Slow refill Cutbanks cave -	 0.30 0.10 		
526: Wacousta, mucky, depressional, ponded	 90 	 Somewhat limited Seepage 	 0.70 	 Very limited Depth to saturated zone Ponding Piping	 1.00 1.00 0.12	 Somewhat limited Slow refill Cutbanks cave 	 0.30 0.10		
536: Hanlon, occasionally flooded		 Very limited Seepage 	 1.00 	 Somewhat limited Seepage 	 0.03 	 Somewhat limited Depth to saturated zone Cutbanks cave	 0.81 0.10		

Ponds and Embankments--Continued

Map symbol and soil name	Pct. of map	Pond reservoir ar	eas	Embankments, dikes levees	, and	Aquifer-fed excavated ponds			
	unit 	 Rating class and limiting features	Value	 Rating class and limiting features	Value	 Rating class and limiting features	Value		
541C: Estherville	 45 	 Very limited Seepage	 1.00	 Somewhat limited Seepage	 0.69	 Very limited Depth to water			
Hawick	 45 	 Very limited Seepage	1.00	 Somewhat limited Seepage	 0.50	 Very limited Depth to water	1.00		
551B: Calamine	 85 	 Somewhat limited Seepage Depth to bedrock	 0.70 0.01	 Very limited Depth to saturated zone Thin layer	 1.00 0.11	 Somewhat limited Slow refill Cutbanks cave	0.30		
551D: Calamine	 55 	 Somewhat limited Seepage Depth to bedrock	 0.70 0.01	 Very limited Depth to saturated zone Thin layer	 1.00 0.11	 Somewhat limited Slow refill Cutbanks cave	0.30		
559: Talcot	 85 	 Very limited Seepage	 1.00 	 Very limited Depth to saturated zone Seepage	 1.00 0.75	 Very limited Cutbanks cave 	1.00		
561: Talcot, loamy substratum	 70 	 	 1.00 	 - Very limited Depth to saturated zone Seepage	 1.00 0.47	 - Very limited Cutbanks cave 	 1.00 		
566C: Moingona	 90 	 Somewhat limited Seepage 	 0.70 	 Somewhat limited Piping 	 0.38 	Somewhat limited Depth to saturated zone Slow refill Cutbanks cave	 0.81 0.30 0.10		
568D: Cokato	 80 	 Somewhat limited Seepage	 0.70	 Somewhat limited Piping	 0.24	 Very limited Depth to water	1.00		
568E: Cokato	 80 	 Somewhat limited Seepage Slope	 0.70 0.03	 Somewhat limited Piping 	 0.24 	 Very limited Depth to water 	1.00		
583: Minnetonka	90 90 	 Somewhat limited Seepage 	 0.57 	 Very limited Depth to saturated zone	 1.00 	 Somewhat limited Slow refill Cutbanks cave	 0.43 0.10		

Map symbol and soil name	Pct. of map	Pond reservoir ar 	eas	Embankments, dikes levees 	, and	Aquifer-fed excavated ponds 			
	unit 	Rating class and	Value	Rating class and limiting features	Value	Rating class and limiting features	Value		
606: Lanyon, depressional, ponded	 80 	 Somewhat limited Seepage 	 0.70 	 - Very limited Depth to saturated zone Ponding Hard to pack	 1.00 1.00	 Somewhat limited Slow refill Cutbanks cave 	 0.30 0.10		
625: Lerdal	 80 	 Somewhat limited Seepage	 0.70 	 Very limited Depth to saturated zone	 1.00	 Somewhat limited Slow refill Cutbanks cave	0.30		
636: Buckney, rarely flooded	 85 	 Very limited Seepage	 1.00	 Somewhat limited Seepage	 0.06	 - Very limited Depth to water			
636B: Buckney, rarely flooded	 90 	 Very limited Seepage	 1.00	 Somewhat limited Seepage	 0.06	 Very limited Depth to water	1.00		
638C2: Clarion, moderately eroded	 50 	 Somewhat limited Seepage 	 0.70 	 Very limited Piping 	 0.99 	 Somewhat limited Depth to saturated zone Slow refill Cutbanks cave	 0.81 0.30 0.10		
Storden, moderately eroded	 35 	 Somewhat limited Seepage 	 0.70	 Very limited Piping 	 0.99	 Very limited Depth to water 	 1.00		
650: Joliet	 45 	 Very limited Depth to bedrock Seepage	 1.00 0.02	 Very limited Depth to saturated zone Thin layer Piping	 1.00 1.00 0.68	 Very limited Depth to hard bedrock Slow refill Cutbanks cave	 1.00 0.28 0.10		
Faxon	 4 5 	 Very limited Seepage Depth to bedrock	 1.00 0.85	 Very limited Depth to saturated zone Thin layer	 1.00 0.85	 Very limited Depth to hard bedrock Cutbanks cave	 1.00 0.10		
715: Fluvaquents, frequently flooded	 65 	 Very limited Seepage 	 1.00	Piping Very limited Depth to saturated zone Seepage	0.05 1.00 0.42	 Very limited Cutbanks cave 	 1.00		

Map symbol and soil name	Pct. of map unit		eas	Embankments, dikes levees	, and	Aquifer-fed excavated ponds		
	unit	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	
735: Havelock, occasionally flooded	 85 	 Very limited Seepage 	 1.00	Very limited Depth to saturated zone Seepage	 1.00 0.03 0.03	 Somewhat limited Cutbanks cave 	 0.10	
740D: Hawick	 80 	 Very limited Seepage Slope	 1.00 0.01	 Somewhat limited Seepage 	 0.50	 Very limited Depth to water 	 1.00	
775B: Billett	90	 Very limited Seepage	1.00	 Somewhat limited Seepage	0.08	 Very limited Depth to water	1.00	
775C: Billett	 85 	 Very limited Seepage	1.00	 Somewhat limited Seepage	0.08	 Very limited Depth to water	1.00	
777B: Wapsie	 85 	 Very limited Seepage	1.00	 Somewhat limited Seepage	0.41	 Very limited Depth to water	1.00	
835D2: Storden, moderately eroded	 50 	 Somewhat limited Seepage Slope	 0.70 0.01	 Very limited Piping	 0.99	 Very limited Depth to water	 1.00	
Omsrud, moderately eroded	 35 	 Somewhat limited Seepage Slope	 0.70 0.01	 Somewhat limited Piping 	 0.81 	 Very limited Depth to water 	 1.00	
835E2: Storden, moderately eroded	 50 	 Somewhat limited Seepage Slope	 0.70 0.04	 Very limited Piping	 0.99	 Very limited Depth to water	 1.00	
Omsrud, moderately eroded	 35 	 Somewhat limited Seepage Slope	 0.70 0.04	 Somewhat limited Piping 	 0.81	 Very limited Depth to water	 1.00	
836B: Kilkenny	 65 	 Somewhat limited Seepage 	 0.70 	 Not limited 	 	 Somewhat limited Depth to saturated zone Slow refill Cutbanks cave	 0.81 0.30 0.10	
854D: Fens, Aquolls	 80 	 Very limited Seepage 	1.00	 Not rated 	 	 Somewhat limited Cutbanks cave 	 0.10	

Map symbol and soil name	Pct. of map	Pond reservoir ar 	eas	Embankments, dikes levees 	, and	Aquifer-fed excavated ponds			
	unit 	Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value		
855: Shorewood	 85 	 Somewhat limited Seepage 	 0.70 	 Very limited Depth to saturated zone	 1.00	 Somewhat limited Slow refill Cutbanks cave	 0.30 0.10		
956: Harps	 45 	 Somewhat limited Seepage	 0.70 	 Very limited Depth to saturated zone	1.00	 Somewhat limited Slow refill Cutbanks cave	0.30		
Okoboji, depressional, ponded	 35 	 Somewhat limited Seepage 	 0.70 	 Very limited Depth to saturated zone Ponding Hard to pack	 1.00 1.00 0.25	 Somewhat limited Slow refill Cutbanks cave 	 0.30 0.10		
1007: Cosmos, bouldery	 65 	 Not limited 	 	Very limited Depth to saturated zone Hard to pack	 1.00 0.59	 Very limited Slow refill Cutbanks cave	 1.00 0.10		
1055B: Kandiyohi, bouldery	 65 	 Somewhat limited Seepage 	 0.05 	 Very limited Depth to saturated zone Hard to pack	1.00	 Somewhat limited Slow refill Cutbanks cave	0.95		
1138B: Clarion	 65 	 Somewhat limited Seepage 	 0.70 	 Somewhat limited Piping 	 0.94 	 Somewhat limited Depth to saturated zone Slow refill Cutbanks cave	0.81		
1236B: Angus	 85 	 Somewhat limited Seepage	0.70	 Somewhat limited Piping	0.42	 Very limited Depth to water	1.00		
1236C: Angus	 80 	 Somewhat limited Seepage	0.70	 Somewhat limited Piping	0.42	 Very limited Depth to water	1.00		
1259: Biscay, depressional, ponded	 80 	 Very limited Seepage 	 1.00	 	 1.00 1.00	 Very limited Cutbanks cave 	 1.00 		
1507: Brownton	 80 	 Somewhat limited Seepage 	 0.70 	 Very limited Depth to saturated zone Hard to pack	 1.00 0.15	 Somewhat limited Slow refill Cutbanks cave	 0.30 0.10		

Ponds and Embankments--Continued

Map symbol and soil name	 Pct. of map unit		eas	 Embankments, dikes levees 	, and	Aquifer-fed excavated ponds 			
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value		
1555: Nicollet	 40 	 Somewhat limited Seepage 	 0.70 	 Very limited Depth to saturated zone Piping	 1.00 0.44	 Somewhat limited Slow refill Cutbanks cave	 0.30 0.10		
Guckeen	 25 	 Somewhat limited Seepage 	 0.70 	 Very limited Depth to saturated zone Piping	 1.00 0.01	 Somewhat limited Slow refill Cutbanks cave 	 0.30 0.10 		
1836B: Kilkenny	 65 	 Somewhat limited Seepage 	0.70	 Not limited 	 	 Somewhat limited Depth to saturated zone Slow refill Cutbanks cave	 0.81 0.30 0.10		
Shorewood	 25 	 Somewhat limited Seepage 	 0.70 	 Very limited Depth to saturated zone	 1.00 	 Somewhat limited Slow refill Cutbanks cave	 0.30 0.10		
2700C: Ridgeton	 75 	 Somewhat limited Seepage 	0.70	 Somewhat limited Piping 	 0.51	 Very limited Depth to water 	1.00		
2700D: Ridgeton	 80 	 Somewhat limited Seepage Slope	 0.70 0.01	 Somewhat limited Piping 	 0.51 	 Very limited Depth to water 			
4000: Urban land	 100	 Not rated 		 Not rated 		 Not rated 			
4055: Nicollet	 50 	 Somewhat limited Seepage 	0.70	 Very limited Depth to saturated zone Piping	 1.00 0.44	Somewhat limited Slow refill Cutbanks cave	 0.30 0.10		
Urban land	 50 	 Not limited 	 	 Not rated 	 	 Not rated 	 		
4107: Webster	 60 	 Somewhat limited Seepage 	 0.70 	 Very limited Depth to saturated zone Piping	 1.00 0.21	 Somewhat limited Slow refill Cutbanks cave	 0.30 0.10		
Urban land	 40 	 Not limited 	 	 Not rated 	 	 Not rated 	 		
4138B: Clarion	 50 	 Somewhat limited Seepage 	 0.70 	 Very limited Piping 	 0.99 	Somewhat limited Depth to saturated zone Slow refill Cutbanks cave	0.81		
Urban land	 30 	 Not limited 	 	 Not rated 	 	 Not rated 	 		

Map symbol and soil name	Pct. of map	Pond reservoir ar	eas	 Embankments, dikes levees	, and	Aquifer-fed excavated ponds			
	unit 	Rating class and limiting features	Value	 Rating class and limiting features	Value	 Rating class and limiting features	Value		
4235B: Angus	 60 	 Somewhat limited Seepage	 0.70	 Somewhat limited Piping	 0.42	 Very limited Depth to water	1.00		
Urban land	40	 Not limited		 Not rated 		 Not rated 			
4236D: Lester	 50 	 Somewhat limited Seepage Slope	 0.70 0.01	 Somewhat limited Piping 	 0.46	 Very limited Depth to water	1.00		
Urban land	 50 	 Somewhat limited Slope 	 0.01	 Not rated 	 	 Not rated 	 		
4325: Le Sueur	 60 	 Somewhat limited Seepage 	 0.70 	 Very limited Depth to saturated zone Piping	 1.00 0.90	 Somewhat limited Slow refill Cutbanks cave	0.30		
Urban land	 40 	 Not limited 		 Not rated 	 	 Not rated 			
4444: Jacwin	 50 	 Somewhat limited Seepage Depth to bedrock	0.70	 Very limited Depth to saturated zone Thin layer	 1.00 0.46	 Somewhat limited Slow refill Cutbanks cave	0.30		
Urban land	 50	 Not limited		 Not rated		 Not rated			
4507: Canisteo	 50 	 Somewhat limited Seepage 	 0.70 	 Very limited Depth to saturated zone Piping	 1.00 0.55	 Somewhat limited Slow refill Cutbanks cave	 0.30 0.10		
Urban land	 50	 Not limited		 Not rated		 Not rated			
4551B: Calamine	 50 	 Somewhat limited Seepage Depth to bedrock	 0.70 0.01	 Very limited Depth to saturated zone Thin layer	 1.00 0.11	 Somewhat limited Slow refill Cutbanks cave	 0.30 0.10		
Urban land	 50	 Not limited		 Not rated	 	 Not rated			
4551D: Calamine	 50 	 Somewhat limited Seepage Depth to bedrock	0.70	 Very limited Depth to saturated zone Thin layer	 1.00 0.11	 Somewhat limited Slow refill Cutbanks cave	 0.30 0.10		
Urban land	 50	 Not limited		 Not rated		 Not rated			
4635: Buckney	 50 	 Very limited Seepage	 1.00	 Somewhat limited Seepage	 0.06	 Very limited Depth to water	 1.00		
Urban land	 50	 Not limited	 	 Not rated		 Not rated			

Ponds and Embankments--Continued

						<u> </u>			
Map symbol and soil name	Pct. of map	Pond reservoir ard 	eas	Embankments, dikes levees 	, and	Aquifer-fed excavated ponds			
	unit	Rating class and limiting features	Value	 Rating class and limiting features	Value	 Rating class and limiting features	Value		
4635B: Buckney	 50 	 Very limited Seepage	 1.00	 Somewhat limited Seepage	 0.06	 Very limited Depth to water			
Urban land	50	 Not limited	 	 Not rated 		 Not rated 			
4946B: Udorthents	 70	 Not limited	 	 Not rated 	 	 Not rated 			
Highway	30	 Not limited	 	 Not rated		 Not rated			
5010: Pits, sand and gravel	 100	 Not rated	 	 Not rated 	 	 Not rated 			
5030: Pits, limestone quarries	 100 	 Not rated 	 	 Not rated 	 	 Not rated 	 		
5035: Pits, gypsum quarries	 100 	 Not rated 	 	 Not rated 	 	 Not rated 			
5040: Udorthents, loamy	 100	 Not rated		 Not rated		 Not rated			
5049: Aquolls, ponded	 60 	 Not rated 	 	 Not rated 	 	 Not rated 	 		
Udorthents, loamy	30	Not rated	 	 Not rated 	į į	 Not rated 	į		
5060: Pits, clay	 100 	 Not rated 	 	 Not rated 	 	 Not rated 			
5080: Udorthents	100	 Not rated		 Not rated	j 	 Not rated	į Į		
5457: Du Page, channeled, frequently flooded	 80 	 Somewhat limited Seepage 	 0.72 	 Somewhat limited Piping 	 0.90 	 Somewhat limited Depth to saturated zone Slow refill Cutbanks cave	 0.81 0.28 0.10		
5507: Corvuso	 55 	 Somewhat limited Seepage 	 0.02 	 Very limited Depth to saturated zone Hard to pack	 1.00 0.38	 Somewhat limited Slow refill Cutbanks cave	 0.98 0.10		
Brownton	 35 	 Somewhat limited Seepage 	 0.70 	 Very limited Depth to saturated zone Hard to pack	 1.00 0.15	 Somewhat limited Slow refill Cutbanks cave 	 0.30 0.10		
AW: Animal waste lagoon	 100 	 Not rated 	 	 Not rated 	 	 Not rated 	 		

Map symbol and soil name	Pct. of map unit			Embankments, dikes levees 	s, and	Aquifer-fed excavated ponds 		
		'	Value	Rating class and limiting features	Value	Rating class and limiting features	Value	
SL: Sewage lagoon	- 100	 Not rated 	 	 Not rated 		 Not rated 		
W: Water	- - 	 Not rated 	 	 Not rated 	 	 Not rated 	 	

Soil Properties

Data relating to soil properties are collected during the course of the soil survey. 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 particle-size distribution, plasticity, and compaction characteristics.

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

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

Engineering Properties

The table described in this section gives the engineering classifications and the range of engineering properties for the layers of each soil in the survey area.

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

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

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

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

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

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

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

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an 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.

References:

American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.

American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487–00.

Engineering Properties

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

Map symbol	Depth	USDA texture	Classif	ication	Frag	Fragments		Percentage passing sieve number				 Plas-
and soil name	 	 	Unified	AASHTO	>10 inches	3-10	 4	10	40	200	limit	ticity
	In	<u> </u>			Pct	Pct	<u> </u>				Pct	
6:	 	 			1	 	 	 	 			
Okoboji,	İ		i	į	i	i	İ	i	i	i	i	i
depressional,	İ		İ	i	i	i	İ	İ	i	İ	i	i
ponded	0-6	Silty clay loam	ОН	A-7-6	0	0	100	100	95-100	91-96	64-76	24-28
-	6-32	Silty clay loam	MH	A-7-5	0	0	100	100	95-100	91-96	51-69	25-28
	32-56	Silty clay loam, silty clay	СН	A-7-6	0	, 0 	100	100	95-100	90-97	46-59	25-30
	56-60	Loam, silty clay loam	CL	A-6	0	0-4	95-100	84-100	79-100	70-93	35-46	17-25
27B:	 	1				 	 	 	 	 		
Terril	0-9	Loam	CL	A-6	0	0-5	94-100	89-100	75-97	55-74	33-47	11-21
		Clay loam, loam	CL	A-6	0						29-47	1
		Loam, clay loam	CL	A-7, A-6	0						35-42	1
	50-60	Loam, sandy loam	SC-SM, SC,	A-4, A-6	0	0-4	 91-100 	 78-100 	65-93	46-69	22-32	7-15
34:	 	 		 	1	 	 	 	 			
Estherville	 0-7 	Sandy loam	SM, SC, SC-SM	A-2, A-4, A-	0	0-5	 89-100 	70-100	51-82	24-45	19-32	2-10
	7-18	Sandy loam, loam, coarse sandy loam	SC-SM, SC	A-4, A-2, A-	0	0-4	87-100	70-100	51-81	25-43	21-31	6-12
	18-80 	Gravelly coarse sand, very gravelly sand, loamy coarse sand	SP, SM, SP-SM 	A-1-b 	0	0-7 	66-92 	35-92 	16-48 	2-13 	0-21 	NP - 4
34B:	 			}		 	 	 	 	 		
Estherville	 0-7 	Sandy loam	SC, SC-SM, SM	A-2, A-2-4,	0	0-5	 89-100 	70-100	51-82	24-45	19-32	2-10
	7-18 	Sandy loam, loam, coarse sandy loam	SC, SC-SM	A-2, A-2-4, A-4	0	0-4	87-100	70-100	51-81	25-43	21-31	6-12
	18-80 	Gravelly coarse sand, very gravelly sand, loamy coarse sand	SM, SP, SP-SM 	A-1-b 	0	0-7 	66-92 	35-92 	16-48 	2-13 	0-21	NP - 4
55:	 	 		 		 	 	 	 	 		
Nicollet	0-10	Loam, clay loam	ML	A-7-6	0	0-5	94-100	82-100	68-93	50-70	39-49	11-18
		Clay loam, loam	CL	A-7-6	0				1	1	36-50	1
		Clay loam, loam	CL	A-6	0						27-44	
		Loam, sandy loam	CL-ML, SC-SM,	1	0						22-32	1

Map symbol	Depth	USDA texture	Classi	fication	Fragments		Percentage passing _ sieve number					 Plas- ticity
and soil name			Unified	AASHTO	>10 inches	3-10 inches	 4	10	40	200	limit	ticity index
	In			İ	Pct	Pct					Pct	
62F:			 			 			 	 		
Storden	0 - 7	Loam	CL, ML	A-4, A-6	0			89-100				5-15
		Loam, clay loam	CL, CL-ML	A-4, A-6	0-1			81-100			20-40	5-15
	55-80	Loam, sandy loam	SC-SM, SC,	A-4, A-6	0	0-4	91-100	78-100	65-93 	46-69	22-32	7-15
90:							 	 	 	 		
Okoboji, mucky, depressional,			 	j I	İ	 	i I	i I	j I	l I	j I	j I
ponded	0-8	Mucky silty clay loam	ОН	A-7-5	0	0	100	100	91-100	80-90	55-77	12-20
-		Silty clay loam, silty clay	MH 	A-7-5	0	 0 	100	100	95-100	91-98	53-73	25-29
	20-40	Silty clay loam, silty clay	CH	A-7-6	0	0 	100	100	95-100	90-97	49-61	25-30
	40-60	Loam, silty clay loam	CL	A-7-6	0	0-4	95-100	84-100	79-100	70-93	37-49	17-25
95:			 			 						
Harps	0-8	Loam, clay loam	CL	A-7, A-6	0	0-5	95-100	95-100	80-90	65-80	30-45	10-25
	8-16	Loam	CL	A-7, A-6	0	0-5	95-100	95-100	80-90	65-80	30-45	10-25
	16-42	Loam	CL	A-7, A-6	0	0-5	95-100	95-100	80-90	65-80	30-60	15-35
	42-60	Loam	CL	A-6	0	0-5	95-100	90-100	70-80	50-75	25-40	10-25
107:				i								
Webster		Silty clay loam	CH, CL, MH	A-7, A-6	0						35-60	
	8-16	Silty clay loam	CH, CL, ML	A-7, A-6, A- 7-6	0	0-5 	94-100 	89-100 	85-100 	76-94 	35-60 	15-30
	16-32	Clay loam, loam	CL	A-7, A-6, A- 7-6	0	0-5 	95-100 	89-100 	77-96 	60-77 	39-51 	17-25
	32-60	Loam, sandy loam	SC-SM, SC,	A-4, A-6	0	0-4	91-100	78-100 	65-93 	46-69	22-32	7-15
108:						 			 	 		
Wadena	0-8	Loam	CL	A-6	0	0	95-100	84-100	72-94	53-71	33-45	11-18
j	8-13	Loam	CL	A-6	0	0	95-100	84-100	72-94	53-71	31-43	11-18
j	13-30	Loam	CL, SC	A-6	0	0	95-100	77-100	64-93	47-70	29-41	12-19
	30-80	Stratified very gravelly coarse sand to sand	SP, SP-SM	A-1-b	0-2	0-3	63-100 	19-100 	15-80	2-14	0-19	NP - 2
108B:			 	I I		 	 	[[
Wadena	0-7	Loam	ML, CL	A-6	0	0	95-100	84-100	72-94	53-71	33-45	11-18
		Loam	ML, CL	A-6	0						31-43	
		Loam	CL, SC	A-6	0	0					29-41	
		Stratified very gravelly coarse sand to sand		A-1-b	0-2	0-3		19-100			1	,

Map symbol	Depth	USDA texture	Classif	ication	Fragi	nents	Percentage passing sieve number				 Liquid	 Plas-
and soil name	j	İ			>10	3-10	i				limit 	ticity
		1	Unified	AASHTO	inches	inches	4	10	40	200		index
	In	Į.	[Pct	Pct	[Pct	
108C:	 					 						
Wadena	 0-7	Loam	 ML	 A-4	0	l I 0	 05_100	 94_100	 72-94	 52_71	25-40	2-10
wadena		Loam	ML	A-4	0				72-94			2-10
	10-25		SM, ML, CL,	A-4	0			1	64-93			5-12
		İ	sc	İ		İ	į	į	į	İ	į	ĺ
	25-80 	Stratified very gravelly coarse sand to sand	SP-SM, SP 	A-1 	0-2	0-3 	63-100 	19-100 	15-80 	2-14		NP
135:	! 	İ				! 						
Coland,	İ		İ	i	i	İ	i	i	İ	i	İ	į
occasionally	İ	İ	İ	Ì	İ	İ	İ	İ	İ	İ	İ	į
flooded	0-8	Clay loam, silty clay	ML, MH	A-7-5, A-7-6	0	0 0	100	100	95-100	84-92	4 7-59	18-24
	8-32	Silty clay loam, clay	CL	A-7, A-6, A-	0	0	100	100	95-100	84-92	35-50	15-25
	İ	loam	İ	7-6	i	İ	i	i	İ	i	İ	i
	32-40	Clay loam	ML, MH	A-7, A-7-5	0	0	100	100	91-94	76-79	45-53	18-21
	40-44	Sandy loam, loam	SC-SM, SC	A-2-4, A-2-6,	0	0	95-100	87-100	65-85	35-50	23-36	7-15
	İ		İ	A-4	İ	İ	i	İ	İ	İ	İ	İ
	44-52	Sandy clay loam, loam, sandy loam	CL	A-6	0	0	100	95-100	79-97	59-75	25-41	9-19
	52-60	Sandy loam Sandy loam	SC-SM, SC	A-2-4, A-2-6,	0	0	95-100	87-100	65-85	35-50	23-36	7-15
	 		 -	A-4	į	 	į	į	į	į	İ	İ
136:	 											
Ankeny, rarely												
flooded	0-7	Fine sandy loam	SC-SM, SC	A-6, A-4, A-	0	0-4	95-100	90-100	80-97	35-47	25-34	6-11
				2-4								
	7-30	Fine sandy loam	SC-SM, SC	A-6, A-2-4,	0	0-4	95-100	90-100	80-97	35-47	25-34	6-11
				A-4								
	30-44	Fine sandy loam, sandy	SC, SC-SM	A-4, A-2-4	0	0-4	95-100	90-100	81-96	35-45	21-27	6-10
		loam										
	44-60	Loamy fine sand, fine	SC-SM, SM	A-2-4	0	0-4	95-100	91-100	82-98	22-32	0-21	NP-6
		sandy loam, fine sand										
138B:	 	1	 			 	 		 	 	 	
Clarion	0-7	Loam	CL-ML, CL	A-4, A-6	0	0-5	95-100	89-100	77-92	55-68	25-40	5-15
		Loam	CL-ML, CL	A-4, A-6	0				77-92		1	5-15
		Loam, clay loam	CL, CL-ML	A-4, A-6	0				69-94		25-40	5-15
		Loam, sandy loam	SC-SM, SC,	A-4, A-6	0				65-93		22-32	
	, 		CL, CL-ML									
	İ	İ		į	İ	İ	İ	İ	İ	İ		

Map symbol	Depth	USDA texture	Classi	fication	Fragi	ments	Percentage passing sieve number				 Liquid	 Plas
and soil name			Unified	AASHTO	>10 inches	3-10	 	10	40	200	limit	ticit
	In				Pct	Pct					Pct	
L38C2:		 		i I				İ		 		
Clarion,		İ	į	j	į	į	į	İ	İ	İ	į	İ
moderately												
eroded	0 - 6	Loam	CL, CL-ML	A-6, A-4	0	0-5	95-100	89-100	77-92	55-68	25-40	5-1
		Loam	CL-ML, CL	A-6, A-4	0				77-92		25-40	5-1
	16-35	Loam	CL-ML, CL	A-6, A-4	0	0-5			77-92		25-40	5-1
	35-60	Loam, sandy loam	CL, CL-ML,	A-4, A-6 	0	0-4	91-100 	78-100 	65-93 	46-69 	22-32	7-1!
 201B:				1	[[[[
Coland	0 - 8	Clay loam, silty clay	ML, MH	A-7-5, A-7-6	i o	, 0 	100	100	95-100	84-92	47-59	 18-24
	8-32	Silty clay loam, clay loam	CL	A-7, A-6, A-	0	0	100	100	95-100	84-92	35-50	15-25
	32-40	Clay loam	ML, MH	A-7, A-7-5	0	0	100	100	91-94	76-79	45-53	18-21
	40-44	Sandy loam, loam	SC-SM, SC	A-2-4, A-2-6, A-4	0 	0 	95-100 	87-100 	65-85 	35-50 	23-36 	7-15
	44-52	Sandy clay loam, loam, sandy loam	CL	A-6 	0 	0 	100 	95-100 	79-97 	59-75 	25-41 	9-19
	52-60	Sandy loam, loam	SC-SM, SC	A-2-4, A-2-6, A-4	0	0	95-100	87-100 	65-85 	35-50	23-36	7-15
Terril	0 - 9	 Loam	 CL	A-6	 0	 0-5					 33-47	
	9-36	Clay loam, loam	CL	A-6	0	0-5			75-99			12-22
	36-50	Loam, clay loam	CL	A-7, A-6	0	0-5			74-94			16-21
	50-60	Loam, sandy loam	SC-SM, SC,	A-4, A-6	0	0-4	91-100 	78-100	65-93 	46-69 	22-32	7-15
203:					 	 	 			 		
Cylinder	0 - 8	Loam	ML	A-7-6	0	0	100	89-100	75-92	55-70	37-47	12-18
	8-18	Loam, clay loam	CL	A-6	0	0			75-92			12-18
		Clay loam, loam	SC, CL	A-6	0	0					29-43	
	28-80	Very gravelly loamy sand, loamy sand, coarse sand	SM, SP-SM,	A-1-b, A-3, A-2	0 	0-7 	72-97 	49-97 	35-80	7-24 	0-23	NP - 7
227: Wadena, loamy		 			 	 	 	 	 	 	 	
substratum	0-7	Loam	ML	A-4	0	0	95-100	84-100	 72-94	53-71	25-40	 2-10
		Loam	ML	A-4	0	0			72-94			2-10
		Loam	SM, ML, CL,	A-4	0	0			64-93			5-12
	23-30	Loam, sandy loam	SM, ML, CL,	A-4	 0 	, 0 	95-100 	77-100 	64-93	47-70 	25-40	5-12
	30-62	Gravelly coarse sand	GP, GP-GM,	A-1	0-2	0-3	63-100 	19-100 	j I	j I	 	NP
i	62-80	Loam, clay loam	CL	A-7, A-6	0	0	100	100	100	90-100	27-45	12-25

Map symbol	Depth	Depth USDA texture _	Classi	fication	Fragments		Percentage passing sieve number					 Plas-
and soil name			Unified	AASHTO	>10	3-10		10	40	200	limit	ticity
	In			AASIITO	Pct	Pct	1	10		200	Pct	Index
227B:		 			 	 	 					İ
Wadena, loamy		i	i	i	İ	İ	i	i	i	i	i	i
substratum	0-7	Loam	ML	A-4	0	0	95-100	84-100	72-94	53-71	25-40	2-10
i	7-16	Loam	ML	A-4	0	0	95-100	84-100	72-94	53-71	25-40	2-10
	16-23	Loam	SM, ML, CL,	A-4	0	0 0	95-100	77-100	64-93	47-70	25-40	5-12
	23-30	Loam, sandy loam	SM, ML, CL,	A-4	, 0 	0	95-100	77-100	64-93	47-70	25-40	5-12
	30-62	Gravelly coarse sand	GP, GP-GM, SP, SP-SM	A-1	0-2	0-3	63-100	 19-100 	i	j		NP
	62-80	Loam, clay loam	CL	A-7, A-6	0	0 	100	100	100	90-100	27-45	12-25
228:		i	i		İ	! 	i		i			i
Cylinder, loamy		i	i		i	İ	i	i	i	i	İ	i
substratum	0-12	Loam	CL	A-6	0	0	100	89-100	78-92	58-70	30-40	10-20
j	12-20	Loam, clay loam	CL	A-6	0	0	100	89-100	78-92	58-70	30-40	10-20
j	20-34	Loam, clay loam	SC, CL	A-6	0	0	95-100	78-100	66-93	49-71	30-40	10-20
	34-63	Very gravelly loamy sand, loamy sand, coarse sand	SM, SP-SM	A-1, A-3, A-2	0	0-7 	72-97 	49-97 	35-80	7-24	0-14	NP
	63-80	Loam	CL	A-7, A-6	0	0	100	100	100	90-100	27-45	12-25
i		i	i		i	İ	i	i	i	i	İ	i
236D:		İ	į	i	į	İ	i	i	i	i	į	i
Lester	0-7	Loam	CL	A-4, A-6	0	0-5	94-100	83-100	72-93	53-71	30-40	5-15
j	7-38	Clay loam, loam	CL	A-6, A-7-6	0-1	0-4	95-100	85-100	73-94	56-75	35-45	16-23
	38-60	Loam, clay loam	CL	A-6	0	0-4	95-100	84-100	72-95	53-73	29-39	12-18
	60-80	Loam, sandy loam	SC-SM, SC,	A-4, A-6	0	0-4	91-100	78-100 	65-93 	46-69	22-32	7-15
236E:		1	l I		 	 		 		l i	1	
Lester	0-7	Loam	CL	A-4, A-6	0	 0-5	 94_100	 83_100	 72_93	53-71	30-40	5-15
nescer		Clay loam, loam	CL	A-6, A-7-6	0-1					56-75		
		Loam, clay loam	CL	A-6	0 0					53-73		
		Loam, sandy loam	SC-SM, SC,	A-4, A-6	0					46-69		7-15
236F:					[
Lester		Loam	CL	A-4, A-6	0					53-71		5-15
	7-38	Clay loam, loam	CL	A-6, A-7-6	0-1					56-75	35-45	16-23
		Loam, clay loam	CL	A-6	0	•	95-100				29-39	
	60-80	Loam, sandy loam	SC-SM, SC,	A-4, A-6	0	0-4	91-100	78-100 	65-93	46-69	22-32	7-15

Map symbol	Depth	USDA texture	Classif	ication	Frag	ments	Percentage passing sieve number				 Liquid	 Plas-
and soil name			Unified	AASHTO	>10 inches	3-10		10	40	200	limit 	ticit
	In				Pct	Pct					Pct	
259:						 	 		 	 	 	
Biscay	0-7	Clay loam, loam	CL, ML, MH	A-6, A-7	0	0	94-100	88-100	77-93	60-73	35-50	10-25
	7-20	Loam, clay loam	CL, ML	A-6, A-7, A-	0	, 0 	94-100	88-100	79-9 4	60-73	37-53	 17-21
	20-28	Loam, clay loam, sandy clay loam	CL	A-6, A-7	0	0	94-100	83-100	70-96	51-73	30-43	12-21
	28-38	Gravelly loam, sandy loam, gravelly sandy loam	SC-SM, SC	A-4, A-6	0	0-4	95-100	64-100	51-98	35-73 	20-38	6-19
	38-80	Very gravelly coarse sand	SP, SP-SM,	A-1-b	0	0-3	63-95	23-95	10-47	2-15	0-20	NP - 3
262G:												
Lester	0-7	Loam	CL	A-4, A-6	0	0-5	94-100	83-100	72-93	53-71	30-40	5-15
		Clay loam, loam	CL	A-6, A-7-6	0-1	0-4	95-100					16-23
		Loam, clay loam	CL	A-6	0	0-4		84-100				12-18
	60-80	Loam, sandy loam	SC-SM, SC,	A-4, A-6	0	0-4	91-100	78-100 	65-93 	46-69 	22-32	7-15
Belview	0-9	Loam	ML, CL	A-6	0	0-5	94-100	89-100	76-94	 56-71	33-47	 11-18
		Loam, clay loam	CL	A-6	0	0-4					29-39	
	50-60	Loam, sandy loam	SC-SM, SC,	A-4, A-6	0	0-4	91-100	78-100 	65-93	46-69	22-32	7-15
274: Rolfe, depressional,		 		 		 	 	 	 	 	 	
ponded	0-10	Silt loam	OL, CL, ML	A-6, A-4	0	0	100	94-100	88-98	75-84	30-40	5-15
İ	10-21	Silt loam	OL, CL, ML	A-6, A-4	0	0	100	94-100	84-100	71-92	30-40	5-15
	21-55	Clay, silty clay, clay loam	CH 	A-7-6	0	0 	100 	95-100 	90-100 	86-98 	49-57 	27-33
	55-80	Clay loam, loam	CL	A-6, A-7	0	0 	95-100	86-100 	73-97 	57-78 	34-46 	16-25
278: Biscay, loamy		i I	į į		į į	i I	į I	j I	į I	j I		j
substratum	0-7	Loam, clay loam	ML, CL	A-6, A-7	0	0	94-100	88-100	74-97	56-76	35-50	10-25
	7-22	Loam, clay loam, sandy clay loam	CL, ML	A-7	0	0	95-100 	90-100 	70-90 	50-75 	42-54	17-22
	22-36	Loam, clay loam, sandy clay loam	CL	A-6, A-7	0	0	95-100 	90-100	70-90 	50-75 	35-44	17-22
İ	36-56	Gravelly loamy sand	SP-SM, GP-GM	A-1	0	0-4	63-95	23-95	17-77	6-30		NP
	56-74	Gravelly coarse sand	SP, GP, SP-	A-1 	0	0-5 	45-95 	35-95 	20-45 	2-10 	0-20 	NP-3
	74-80	Loam, clay loam	CL	A-7, A-6	0	0 	100	100	100	90-100 	27-45 	12-25

W		USDA texture	Classif	ication	Fragi	ments		rcentag	-	ng		
Map symbol and soil name	Depth	USDA texture		T.		3-10		sieve n	umber			Plas- ticity
and soll name	 		Unified	AASHTO		inches	4	10	40	200		index
	In				Pct	Pct	<u>. </u>				Pct	
307:			 			 	 		 	 	 	
Dundas		Silt loam	CL, ML	A-4, A-6	0	0		94-100			26-47	6-19
		Loam Clay loam, silty clay	CL	A-6 A-6, A-7	0 0	0-5		84-100 86-100			26-34 31-47	9-15 13-25
	13-40	loam, sandy clay loam		A-0, A-7	0	U-1	97-100		72-96 	55-79	31-47	13-25
	40-80	Loam, sandy loam	SC-SM, SC,	A-4, A-6	0	0-4	91-100	78-100	65-93	46-69	22-32	7-15
315B: Udifluvents, occasionally		 	 	 		 	 	 	 	 	 	
flooded		Variable	SC-SM, CL-ML		0 0	0 0	100		81-98 67-84		,	2-12
	8-60 	Stratified sandy loam to silt loam	SC-SM, CL-ML	A-4 	0	0	100	95-100	67-84	40-55	16-30	2-12
323B:						 						
Fort Dodge		Loam	CL	A-4, A-6	0	0-5		94-100			25-40	8-15
		Loam, clay loam Loamy coarse sand, sand,	CL	A-4, A-6 A-2-4	0 0	0-4	100	81-100	77-94		1	8-15 8-15
	36-60	coarse sand, gravelly sand	DM 			0-8	 	 			23-40	
325:			 			 	 			 		
Le Sueur		Loam	CL-ML, CL	A-6, A-4	0	1		90-100			25-40	5-15
	17-37	Clay loam	CL, CL-ML	A-6, A-4	0			95-100			20-40	5-15
	37-46 46-80		CL CL-ML, CL	A-7, A-6 A-6, A-4	0 0-1	1		95-100 90-100			35-50	15-25 5-20
					-							
338:		ļ.										
Garmore	0-6 6-17	Loam	CL, CL-ML, ML CL, CL-ML	A-6, A-4 A-6, A-4	0 0			84-100 84-100			25-40	5-20
		Loam, clay loam, silt	CL-ML, CL	A-6, A-4	0	1		84-100				5-20
		loam										
		Loam, clay loam	CL	A-6	0	1		85-100			1 -	16-21
	49-80	Loam	CL, CL-ML	A-4, A-6	0	0-4	95-100	85-100	74-92	55-70	25-40	5-15
342: Estherville, loamy		 	 	 		 	 	 	 	 	 	
substratum	0-7	Sandy loam	SM, SC, SC-SM	A-2, A-4	0	0-5	89-100	70-100	51-82	24-45	20-30	2-10
	7-15 	Sandy loam, loam, coarse sandy loam	SM, SC-SM, SC	A-4, A-2 	0	0-4	87-100 	70-100 	51-81 	25-43 	20-30	2-8
	15-75	Gravelly sand, loamy sand, gravelly coarse	SP, SM, SP-SM	A-1	0	0-7	66-92	35-92	16-48	2-13	 	NP
	 75-80 	sand, loamy coarse sand Loam	 CL 	 A-7, A-6 	0	 0 	 100 	 100 	 100 	 90-100 	 27-45 	 12-25

Map symbol	Depth	USDA texture	Classi	fication	Fragi	ments		rcentago sieve n	-	ng	 Liquid	 Plas-
and soil name					>10	3-10	i					ticity
į		İ	Unified	AASHTO	inches	inches	4	10	40	200	į	index
	In				Pct	Pct		[[Pct	
342B:						 		 	 			
Estherville, loamy			 			 	 	 	 	[[
substratum	0-7	Sandy loam	SM, SC, SC-Si	M A-2, A-4	0	0-5	89-100	70-100	51-82	24-45	20-30	2-10
	7-15	Sandy loam, loam, coarse sandy loam	SM, SC-SM, S	C A-4, A-2	0	0-4	87-100 	70-100 	51-81 	25-43 	20-30	2-8
İ	15-75	Gravelly sand, loamy	SP, SM, SP-S	M A-1	0	0-7	66-92	35-92	16-48	2-13		NP
		sand, gravelly coarse										
		sand, loamy coarse sand										
	75-80	Loam	CL	A-7, A-6	0	0 	100	100	100	90-100	27-45	12-25
344B:					İ							
Copaston	0-7	Loam	SC	A-6, A-7-6	0	0-4		71-100			28-49	9-20
		Fine sandy loam	SC	A-2, A-4, A-6		0-4		73-100			25-33	9-13
		Sandy loam	SC	A-4, A-2-6	0-1	0-4		69-100			24-40	9-21
	18-80	Unweathered bedrock	 			 		 	 			
345:		İ			İ		İ	İ		İ		
Copaston	0-7	Loam	SC	A-7-6, A-6	0	0-4		71-100			28-49	9-20
		Fine sandy loam	SC	A-6, A-2, A-4	1	0-4		73-100			25-33	9-13
		Sandy loam	SC	A-2-6, A-4	0-1	0-4		69-100			24-40	9-21
	18-80	Unweathered bedrock	 			 		 	 			
Jacwin	0-7	Silty clay loam, loam, silt loam	MH, ML	A-7-6, A-7-5	0	 0 	100	100	88-98	72-82	41-53	14-22
	7-13	Loam, silty clay loam, silt loam	MH, ML	A-7-5, A-7-6	0	0	100	100	89-99	72-82	41-53	15-22
	13-24	Sandy clay loam, loam, clay loam	CL	A-6, A-7-6	0	1-4	95-100	85-100	71-95	54-75 	31-46	13-22
j	24-37	Clay, silty clay	CH	A-7-6	0	0	100	100	88-100	86-100	51-73	29-45
	37-80	Weathered bedrock										
355:												
Luther	0 - 9	Silt loam	CL, ML	A-4, A-6	0	0	100	94-100	80-100	65-86	26-47	6-19
	9-15	Loam	CL	A-6	0	0-5	95-100	84-100	72-92	51-68	26-34	9-15
	15-40	Clay loam, silty clay loam, sandy clay loam	CL	A-6, A-7 	0	0-1 	97-100 	86-100 	72-98 	55-79 	31-47 	13-25
	40-80	Loam, sandy loam	SC-SM, SC,	A-4, A-6	0	0-4	91-100	78-100 	65-93 	46-69	22-32	7-15
383:												
Marna	0-20	Silty clay loam	MH	A-7, A-7-5	0	0	94-100	83-100	78-100	75-100	53-76	25-35
	20-32	Clay, silty clay, silty clay loam	CH 	A-7, A-7-6	0	0	95-100 	84-100 	66-100 	56-92 	46-70	25-44
	32-41	Silty clay loam, clay loam	CL	A-7, A-7-6	0	0 	90-100	80-100	70-94	54-74 	38-47	 19-25
	41-80	Clay loam, loam	CL	A-6	0	0-4	95-100	84-100	72-95	53-73	29-39	12-18
l l			1									l

Map symbol	Depth	USDA texture	Classi	fication	Fragi	ments	Percentage passing sieve number				 Liquid	 Plas-
and soil name		į I	Unified	AASHTO	>10 inches	3-10	 	10	40	200	limit	ticity
	In	İ			Pct	Pct	İ	İ	İ	İ	Pct	<u> </u>
		İ	İ	j	į	į	į	İ	j	į	İ	j
385:												
Guckeen	0-15	Silty clay loam	MH	A-7, A-7-5	0	0	100	94-100	90-100	86-96	53-63	25-28
	15-24	Silty clay, silty clay	CH	A-7, A-7-6	0	0	100	94-100	87-100	83-100	46-63	25-36
		loam, clay										
	24-30	Clay loam, loam	CL	A-6, A-7, A-	0	0-4	90-100	81-100	68-100	52-89	35-59	17-36
			CL	7-6 A-6	0	0-4	 0F 100		 72-95			
	30-80 	Clay loam, loam	CT	A-0	0	0-4	 95-T00	84-100	12-95	53-73	29-39 	1 12-18
386:					1	 	 	 	l l	 	 	l I
Cordova	 0-18	Clay loam	MH, ML, CL,	A-7, A-7-5	0	0	 94-100	 89-100	80-93	62-73	45-55	18-21
			OH OH		i							
	18-38	Silty clay loam, clay	CL	A-6, A-7-6	0	0	90-100	80-100	70-94	54-74	39-53	19-25
		loam		j	Ì	ĺ	ĺ	ĺ		ĺ	ĺ	
	38-80	Clay loam, loam	CL	A-6	0	0-4	95-100	84-100	72-95	53-73	29-39	12-18
387B:												
Kamrar	015	Clay loam, silty clay	CH	 A-7-6	0	 0	 04 100	 00 100	 84-100	01 06	 EO EO	124 20
Kallitat	0-15	loam	Ch	A-7-6	0	0	34-100	 00-100	04-100	01-90	50-56	24-20
	15-32	Silty clay loam, clay,	CH, CL	A-7-6	0	0	 89-100	 78-100	72-100	 64-97	 45-64	 25-36
		clay loam			i							
	32-54	Clay loam, clay, silty	CH, CL	A-7, A-7-6	0	0	89-100	78-100	65-99	49-79	36-55	16-28
		clay	İ	İ	j	į	į	İ	İ	į	j	j
	54-80	Clay loam, loam	CL	A-6, A-7	0	0-4	90-100	76-100	65-95	48-73	31-42	13-21
		!			ļ							
413G: Gosport	 0-7	 Silt loam, loam, silty	CL	 A-7-6	0	 0	 100		 82-98			
Gosport	0-7	clay loam	CT	A-7-6	0	0	1 100	 89-100	84-98	/U-84 	37-45	12-19
	 7-27	Clay, silty clay, silty	CH	A-7-6	0	0	100	 90-100	79-100	 76-100	 46-69	26-44
		clay loam					====					
	27-80	Weathered bedrock			j	i	i	i	i	i	i	i
Emeline	0-9	Silt loam, clay loam,	CL	A-6	0	0-11	81-100	62-100	50-96	35-72	27-44	7-18
		loam						!	ļ	!		
	9-80	Bedrock										
Ridgeton	 0-29	Loam	ML	 A-7-6	0	 0-5	 94 – 100	 89-100	 75-93	 55-70	 33-53	 11-17
	29-38		ML	A-7-6	0				75-93		33-53	1
		Clay loam, loam	CL	A-7, A-6	0				74-94			1
		Clay loam, loam	CL	A-6	0				72-95		1	
			İ	İ	i	į	İ	i	İ	İ	İ	İ

Map symbol	Depth	USDA texture	Classif	ication	Frag	ments		rcentage	_	ng	 Liquid	 Plas-
and soil name				1	>10	3-10	i					ticity
	İ	İ	Unified	AASHTO		inches	4	10	40	200		index
	In		Ì	İ	Pct	Pct	İ	İ	Ī	İ	Pct	İ
	j	İ	İ	İ	į	į	j	İ	į	j	į	j
457:												
Du Page,		!		!			ļ	!				
occasionally												
flooded		Silt loam	CL, ML	A-6, A-7-6	0	0	95-100					
	30-35 	Sandy loam, loam, gravelly sandy clay	CL, ML	A-6, A-7-6	0	0	90-100	61-100	53-95 	39-/3 	28-43	12-18
	 	loam, silt loam	1			 	l l	 	 	 	 	
	35-80	Stratified silt loam to	CL, CL-ML,	A-4, A-6	0	0	86-100	55-100	 47-100	 36-83	17-36	3-16
		gravelly sandy clay	ML, SC, SC-		i	-						
	j	loam	SM	İ	j	į	į	į	į	j	į	j
		ļ		!				ļ	ļ			ļ
485:				ļ								
Spillville, occasionally	 -		1		ļ			 	 	 		
flooded	 0-20		ML	 A-7-6	0	0	100	 95-100	 80_93	 58_70	 36-48	 11_17
1100464	20-54		CL	A-6	0	0		95-100				
		Sandy clay loam, loam,	SC-SM, CL	A-4, A-6	0	0		95-100				9-16
		sandy loam							ĺ	İ		
		I										
485B:		!			ļ		ļ	!				
Spillville,												
rarely flooded	0-20	· ·	ML CL	A-7-6	0 0	0		95-100 95-100				
		Sandy clay loam, loam,	SC-SM, CL	A-4, A-6	0	0		95-100				9-16
	34-80	sandy loam		A-1, A-0			100				23-36	
506:	 	l I				 	 	 	l I	 	 	l l
Wacousta,	İ	İ		İ	i	İ	İ	i	İ	İ	i	İ
depressional,	İ	İ	İ	İ	j	İ	İ	į	į	į	į	İ
ponded	0-9	Silty clay loam	MH	A-7-5	0	0	100	100	95-100	91-99	54-66	18-24
	9-14	Silty clay loam	MH	A-7-5	0	0	100		95-100			
	14-16	Silty clay loam, silt	CH, CL	A-7-6	0	0	100	100	93-100	89-100	38-53	16-25
		loam										
	16-80	Silt loam, silty clay loam	CL	A-6	0	0-5	94-100	89-100	83-100	78-100	27-42	12-21
	 	IOam	1			 	 	 	 	 	 	l
507:	! 	İ			İ		İ	İ	İ	! 	<u> </u>	İ
Canisteo	0-10	Clay loam	ML, OL, MH	A-7-5	0	0	94-100	88-100	77-95	59-75	47-59	18-24
		Clay loam	ML, OL, CL	A-7	0	0		88-100				
	18-39	Clay loam, loam, silty	CL	A-7-6, A-6	0	0	98-100	88-100	75-100	57-80	35-53	13-25
		clay loam	lag av ss						 CE 00	146.60		
	39-80 	Loam, sandy loam	SC-SM, SC,	A-4, A-6	0	0-4	 AT-T00	78-100	65-93 	46-69 	22-32 	7-15
	!		Сп, Сп-мп	1	!	1	!	!	1	!	1	1

Map symbol	Depth	USDA texture	Classif	ication	Fragi	nents		rcentage	_	ng	Liquid	 Plas-
and soil name		SSELL SOMEGIC			>10	3-10	İ					ticity
			Unified	AASHTO		inches	4	10	40	200		index
	In		 		Pct	Pct		 	 		Pct	
511: Blue Earth, depressional,		 	 	 	 	 	 	 	 	 	 	
ponded	0-10	 Mucky silt loam	OH	 A-7-5	0	0	87-100	75-100	 69-100	66-100	50-95	11-21
		Mucky silty clay loam, mucky silt loam	ОН	A-7-5	0	0	1	54-100				1
	68-80	Mucky silty clay loam, mucky silt loam	 CT	A-7, A-6 	0	0	95-100	85-100 	75-100 	71-98 	29-44	12-23
526: Wacousta, mucky, depressional,			 	 	 	 	 	 	 	 	 	
ponded	0-7	Mucky silt loam	мн	A-7-5	0	0	100	100		91-99	1	
		Silty clay loam	МН	A-7-5	0	0	100	100		91-99		1
		Silty clay loam, silt loam	CH, CL	A-7-6 	0	0	100 	100		89-100 		İ
	27-80	Silt loam, silty clay loam	CL	A-6 	0	0-5	94-100	89-100	83-100	78-100 	28-41	12-21
536: Hanlon, occasionally		 	 	 	 		 	 		 	 	
flooded	0-7	Fine sandy loam	SC, SM, SC-SM	A-4	0	0	100	100	90-96	41-47	26-35	7-12
	7-50	Sandy loam, fine sandy loam	SC-SM, SC	A-4	0	0 	100	100	90-96	41-47	24-33	7-12
	50-69	Loamy fine sand, fine sandy loam	SC-SM, SC	A-4, A-2	0	0	100	100	75-80	25-40	15-25	5-10
	69-80	Loamy sand, loam, sandy loam	SC-SM, SC	A-4, A-2, A-6	0	0	100	100	70-86 	32-48	0-31	NP-12
541C:		 	 	 	 	 	 	 	 		 	
Estherville	0-7	Sandy loam	SM, SC, SC-SM	A-2, A-4, A- 2-4	0	0-5	89-100	70-100	51-82	24-45	19-32	2-10
	7-18	Sandy loam, loam, coarse sandy loam	SC-SM, SC	A-4, A-2, A- 2-4	0	0-4	87-100	70-100	51-81	25-43	21-31	6-12
	18-80	Gravelly coarse sand, very gravelly sand, loamy coarse sand	SP, SM, SP-SM 	A-1-b 	0	0-7 	66-92 	35-92 	16-48 	2-13 	0-21	NP - 4
Hawick	0-7	 Coarse sandy loam, gravelly loamy sand	 SM, SC-SM 	 A-2-4 	0-1	0-4	 85-100 	 68-100 	 49-82 	20-40	 18-35 	2-10
	7-11	Gravelly loamy coarse sand, gravelly coarse sand, loamy sand	SP-SC, SP-SM	A-1-b, A-2, A-3	0-1 	0-4	 80-95 	 52-95 	 24-52 	 5-18 	0-23	NP-6
	11-80	Gravelly coarse sand, gravelly sand, coarse sand, sand	SW-SM, SP,	A-1-b, A-3, A-2	0-1 	0-3	 60-95 	50-95 	30-65 	2-10 	0-19 	NP-2

Map symbol	Depth	USDA texture	Classif	ication	Fragi	Fragments		Percentage passing _ sieve number				 Plas-
and soil name	į	į			>10	3-10	ļ				limit	
	<u> </u>		Unified	AASHTO	<u> </u>	inches	4	10	40	200	<u> </u>	index
	In				Pct	Pct	 		 		Pct	
551B:	 			I I	1	 	 	 	l l	 	 	l I
Calamine	0-8	Silty clay loam, silt	ML	A-7-5, A-7-6	0	0	100	100	96-100	85-94	45-56	17-24
		loam, loam					İ					İ
	8-20	Silty clay loam, silt	ML	A-7-5, A-7-6	0	0	100	100	96-100	85-94	45-56	17-24
	į	loam, loam	j	İ	İ	į	İ	į	İ	į	į	İ
	20-27	Clay loam, silty clay	CL	A-6, A-7-6	0	0	100	100	97-100	86-94	38-48	19-25
		loam										
	27-34	Silty clay, silty clay	CH, CL	A-7-6	0	0	100	100	93-100	88-100	46-62	25-37
		loam										
		Silty clay	CH	A-7-6	0	0	100	100	1		50-62	
	46-60	Weathered bedrock										
551D:												
Calamine	0-8		ML	 A-7-5, A-7-6	0	 0	100	100	 96-100	 85_94	 45-56	 17_24
Calamine	0-0	loam, loam			0	0	1	100	50-100		43-30	17-21
	8-20	Silty clay loam, silt	ML	A-7-5, A-7-6	0	0	100	100	96-100	85-94	45-56	 17-24
		loam, loam			1							
	20-27	Clay loam, silty clay	CL	A-6, A-7-6	0	0	100	100	97-100	86-94	38-48	19-25
	į	loam	İ	Ì	İ	į	İ	i	İ	į	į	İ
	27-34	Silty clay, silty clay	CH, CL	A-7-6	0	0	100	100	93-100	88-100	46-62	25-37
		loam										
	1	Silty clay	CH	A-7-6	0	0	100	100	97-100	92-100	50-62	29-37
	46-60	Weathered bedrock										
559:												
Talcot	0-10		MH	 A-7, A-7-5	0	 0	100	100	 07_100	 07_0/	 48-60	 10_2/
Talcot	0-10	loam	MII	A-7, A-7-3	0	0	1 100	1 100	37-100	07-34	40-00	19-24
	10-26	Silty clay loam, clay	CL	A-7, A-7-6	0	0	100	100	96-100	85-90	43-53	21-25
		loam					İ					ĺ
	26-30	Silty clay loam, clay	CL	A-7, A-7-6	0	0	95-100	78-100	65-94	50-74	37-49	17-25
	ĺ	loam		Ì	İ	İ	İ	İ	İ	İ	İ	ĺ
	30-60	Loamy coarse sand,	SP-SM	A-1-b	0	0	74-90	44-90	33-72	3-10	0-21	NP-3
		gravelly sand		!			ļ		ļ			
F.61												
561: Talcot, loamy	I			I	1	 	I	I	1	1	1	l I
substratum	0-21	Clay loam	 CL	 A-7	0	 0	100	100	 80_90	 60-85	 40-50	 15_25
Sanstratum		Sandy clay loam, clay	CL	A-6	0	0	1				40-50	
	21 3/	loam										
	37-75	Sand, loamy sand,	SP, SP-SM, SW	/A-1	0	0	65-90	50-85	20-50	2-10	0-14	NP
	i	gravelly coarse sand		į	į į	i				i		İ
	75-80	Loam, clay loam	CL	A-7, A-6	0	0	100	100	100	90-100	27-45	12-25

Map symbol	Depth	USDA texture	Classi	fication	Fragi			rcentag sieve n	e passi umber	ng	 Liquid	
and soil name			 Unified	AASHTO	>10 inches	3-10 inches	 4	10	40	200	limit 	ticity index
	In				Pct	Pct			<u> </u>	<u> </u>	Pct	İ
566C:			 				 	 				
Moingona	0-16	Loam	CL	A-4, A-6	0	0-1	95-100	89-100	78-90	57-65	25-40	8-15
	16-40	Sandy clay loam, loam, clay loam	CL	A-6	0	0-1	95-100	90-100	75-92 	56-71	31-41	14-21
	40-60	Stratified sandy loam to clay loam, loam, clay loam, sandy loam	 CT	A-6, A-4 	0 	0-1 	 95-100 	91-100 	75-98 	56-77 	24-40	9-21
568D:			İ	j	İ		İ	İ	İ	İ	İ	İ
Cokato	0-16	Loam	ML	A-6, A-7-6	0	0-1	95-100	84-100	73-92	55-70	37-47	14-18
	16-41	Clay loam, loam, sandy clay loam	CL	A-6, A-7, A- 7-6	0	0-4	95-100 	84-100 	70-96 	54-77 	34-49 	15-25
	41-60	Loam	CL	A-6	0	0-4	95-100	85-100	72-95	53-73	31-43	13-21
	60-80	Loam, sandy loam	SC-SM, SC,	A-4, A-6	0	0-4	91-100	78-100 	65-93 	46-69	22-32	7-15
568E:			 				 	 				
Cokato	0-16	Loam	ML	A-6, A-7-6	0	0-1	95-100	84-100	73-92	55-70	37-47	14-18
	16-41	Clay loam, loam, sandy clay loam	CL	A-6, A-7, A- 7-6	0	0-4	95-100 	84-100 	70-96 	54-77 	34-49 	15-25
	41-60	Loam	CL	A-6	0	0-4	95-100	85-100	72-95	53-73	31-43	13-21
	60-80	Loam, sandy loam	SC-SM, SC,	A-4, A-6	0	0-4	91-100	78-100 	65-93 	46-69	22-32	7-15
583:			 				 	 	 			
Minnetonka	0-13	Silty clay loam	MH, CL	A-7	0	0	94-100	88-100	85-100	76-94	45-62	18-24
	13-35	Silty clay, silty clay loam	CH, CL	A-7	0	0	94-100	88-100	79-100 	75-100 	46-70	25-44
	35-60	Silty clay loam, silt loam, clay loam	CL	A-6, A-7	0	0	95-100	81-100 	74-100 	64-94	35-50	17-29
606: Lanyon, depressional,		 	 		 	 	 	 	 	 	 	
ponded	0-13		 MH	 A-7, A-7-5	0	l l 0	100	100	98-100	93-95	62-67	28-30
ponueu			MH, CH	A-7, A-7-6	0	0 0	100		1	1	49-76	1
	20-52	Silty clay, silty clay loam	CH, MH	A-7, A-7-6	0	 0 	100	95-100	82-100	79-100	49-76	25-43
	52-60	Clay loam	CL	A-7, A-6, A-	0	 0 	96-100	87-100	72-96	 55-76 	36-50	17-27

			Classi	fication	Fragi	ments	Per	rcentag	e passi	ng	Ī	I
Map symbol	Depth	USDA texture						sieve n	umber		Liquid	Plas
and soil name					>10	3-10					limit	ticit
			Unified	AASHTO	inches	inches	4	10	40	200		index
	In				Pct	Pct					Pct	
625:						 			 			
Lerdal	0-7	Silt loam, silty clay	CL	A-6, A-7, A-	0	0	94-100	82-100	73-98	62-85	33-47	12-19
		loam		7 - 6								
	7-9	Silty clay loam	CL	A-6, A-7, A-	0	0	94-100	82-100	78-100	69-91	35-46	17-23
				7-6		I	l	l	I	I		

W	 B	TIGDS to set see	Classii	icacion	rragi	mencs		. centag	-	.19	 	-
Map symbol	Depth	USDA texture		1			! !	sieve n	umber		Liquid	
and soil name	l I		 Unified	AASHTO	>10	3-10 inches	 4	10	40	200	limit 	ticity index
	l In	<u> </u>	01111100	1	Pct	Pct	-	1	1	1	Pct	I
	1 111		 	l I	PCL	PCL	l I	l I	l I	l I	PCL	
625:	l I			 	1	l I	l I	l I	l I	 	l I	
Lerdal	0-7		CL	 A-6, A-7, A-	0	 0	94-100	 82-100	 73_98	 62-85	 33_47	 12_19
Doldal	, <i>,</i>	loam		7-6			31 100	02 100	/ 3 3	02 03	33 17	
	 7-9	Silty clay loam	CL	A-6, A-7, A-	0	0	94-100	82-100	 78-100	 69-91	35-46	17-23
				7-6								
	9-47	Silty clay loam, clay	CL, CH	A-7, A-7-6	0	0	94-100	83-100	77-100	68-100	46-65	25-40
		loam			İ	İ	İ	İ	İ			
	47-60	Clay loam, loam	CL	A-6	0	0-4	95-100	84-100	70-93	53-73	29-39	12-18
	İ	<u> </u>	İ	İ	İ	İ	į	i	į	į	İ	İ
636:	İ		İ	İ	İ	İ	į	İ	į	j	İ	İ
Buckney, rarely				ĺ	İ	ĺ	ĺ	ĺ	ĺ	ĺ	ĺ	ĺ
flooded	0-14	Fine sandy loam	SC-SM, SC	A-4	0	0	100	100	90-96	39-45	23-32	6-10
	14-22	Fine sandy loam, loamy	SM, SC-SM,	A-4	0	0	100	100	86-98	40-52	15-29	1-10
		very fine sand	ML, CL-ML									
	22-60	Sand, loamy fine sand,	SM, SC-SM	A-2-4	0	0	100	100	89-99	23-33	16-27	2-10
		loamy sand										
636B:												
Buckney, rarely								!				
flooded		Fine sandy loam	SC, SC-SM	A-4	0	0	100		90-96		1	6-10
	14-22	Fine sandy loam, loamy	SM, SC-SM,	A-4	0	0	100	100	86-98	40-52	15-29	1-10
		very fine sand	ML, CL-ML									
	22-60	Sand, loamy fine sand,	SC-SM, SM	A-2-4	0	0	100	100	89-99	23-33	16-27	2-10
		loamy sand										
638C2:		l I		l I		 	 		 	 	 	
Clarion,				 		 	 	l I	 	l I	 	
moderately	l I		 	l I	1	l I	l I	l I	l I	l I	l I	
eroded	l l 0-6	Loam	CL, CL-ML	 A-6, A-4	0	0-5	 95-100	 89_100	 77_92	 55-68	 25_40	 5-15
eroded		Loam	CL-ML, CL	A-6, A-4	0	1	95-100				1	5-15
		Loam	CL-ML, CL	A-6, A-4	0		95-100					5-15
		Loam, sandy loam	CL, CL-ML,	A-4, A-6	0		91-100					7-15
			SC, SC-SM									
	i			İ	İ	İ	İ	i	İ	İ	İ	İ
Storden,				İ	İ	İ	İ	İ	İ	İ	İ	İ
moderately	İ	İ	İ	İ	İ	İ	į	i	į	į	İ	İ
eroded	0-5	Loam	CL, ML	A-4, A-6	0	0-5	94-100	89-100	76-94	56-71	30-40	5-15
	5-55	Loam, clay loam	CL, CL-ML	A-4, A-6	0-1	0-4	95-100	81-100	68-96	50-73	20-40	5-15
	55-80	Loam, sandy loam	SC-SM, SC,	A-4, A-6	0	0-4	91-100	78-100	65-93	46-69	22-32	7-15
			CL, CL-ML									
650:												
Joliet		Silt loam	ML	A-7-6	0-1		87-100					
	15-19	Loam, clay loam, silty	CL	A-7-6, A-6	0-1	0-4	89-100	69-100	63-100	56-91	34-48	16-23
		clay loam						[
	19-80	Unweathered bedrock										
							1	1	1			

Map symbol	 Depth	USDA texture	Classif	ication	Fragi			rcentage sieve n	_	_	_	 Plas-
and soil name	 	 	Unified	AASHTO	>10 inches	3-10 inches	 4	10	40	200	limit 	ticity
	In				Pct	Pct					Pct	
650:	 						 	 	 			
Faxon		Clay loam, loam	ML	A-6, A-7-6	0						39-53	
	15-34	Loam, fine sandy loam	CL, SC	A-6, A-7	0	0-8	95-100	68-100	57-96	42-73	29-45	12-21
	34-80	Unweathered bedrock										
715:	 											
Fluvaquents, frequently	 			 			 	 				
flooded	0-9	Variable	SM	A-2-4	0	0	90-100	81-100	60-82	17-28	0-26	NP-6
	9-80	Sand, loamy sand	SP-SM	A-2-4	0	0	91-100	82-100	62-84	7-17	0-23	NP-6
735:	 			 			 	 	 			
Havelock, occasionally	 		j I				i I	 	 	İ İ	İ	İ İ
flooded	0-9	Clay loam	MH	A-7-5	0	0	100	100	87-95	67-75	49-61	19-25
	9-40	Clay loam	CL	A-7-6	0	0	100	100	87-95	67-75	40-55	19-25
	40-60	Sandy loam, loam	sc	A-6	0	0	100	90-100	63-86	29-48	22-38	7-19
740D:	 	 		 			 	l I	 		l I	
Hawick	0-7	Coarse sandy loam,	SM, SC-SM	A-2-4	0-1	0 - 4	85-100	68-100	49-82	20-40	18-35	2-10
		gravelly loamy sand										
	7-11	Gravelly loamy coarse	SP-SC, SP-SM		0-1	0 - 4	80-95	52-95	24-52	5-18	0-23	NP-6
	 	sand, gravelly coarse sand, loamy sand		A-3			 	 	 			
	11-80	Gravelly coarse sand,	SW-SM, SP,	A-1-b, A-3,	0-1	0-3	60-95	50-95	30-65	2-10	0-19	NP-2
	== 00	gravelly sand, coarse	SP-SM	A-2	• -						0 25	
	İ	sand, sand		į			į	ĺ		į	į	
775B:	 			 	 		 	l I	 			
Billett	0-8	Fine sandy loam, sandy loam	SM, SC-SM, SC	A-2-4, A-4	0	0	100	95-100	69-82	33-45	18-29	2-9
	8-13	Fine sandy loam, sandy loam	SC-SM, SC	A-2-4, A-4,	0	0	100	95-100	69-81	33-43	21-29	6-12
	13-28	Fine sandy loam, sandy	SC-SM, SC	A-2-4, A-4,	0	0	100	95-100	69-81	33-43	20-28	6-12
		loam		A-6			İ				İ	İ
	28-41	Loamy sand, sandy loam	SC-SM, SC	A-2-4, A-4, A-6	0	0	96-100 	81-100 	57-81 	27-43	18-28	4-12
	41-47	Sandy loam, loamy sand	SC-SM, SC	A-2-4, A-4,	0	0	96-100	81-100	64-89	20-45	18-28	4-12
	47-52	Loamy sand, fine sand, loamy fine sand, sand	SM, SC-SM,	A-2-4, A-1-b,	0	0 - 4	86-100	68-100	20-75	5-30	0-19	NP-3
	52-60	Gravelly sand, sand,	SM, SP-SM	A-3 A-2-4, A-1-b,	0	0-3	 86-100	 64-100	49-82	5-30	0-19	NP-3
	32 - 00	loamy sand, gravelly		A-3		0 3				3=30		
		loamy sand										

Map symbol	Depth	USDA texture	Classif	ication	Fragi			rcentag sieve n	_	_	Liquid	1
and soil name					>10	3-10				1	limit	
	<u> </u>		Unified	AASHTO		inches	4	10	40	200	1	index
	In			 	Pct	Pct					Pct	
775C:	 			! 			 	İ				
Billett	0-8	Fine sandy loam, sandy loam	SM, SC-SM, SC	A-2-4, A-4	, 0 	0	100	95-100	69-82	33-45	18-29	2-9
	8-13 	Fine sandy loam, sandy loam	SC-SM, SC	A-2-4, A-4, A-6	0 	0 	100 	95-100 	69-81 	33-43	21-29	6-12
	13-28 	Fine sandy loam, sandy loam	SC-SM, SC	A-2-4, A-4,	0 	0 	100 	95-100 	69-81 	33-43	20-28	6-12
	28-41	Loamy sand, sandy loam	SC-SM, SC	A-2-4, A-4, A-6	 0 	0	96-100	 81-100 	 57-81 	27-43	18-28	4-12
	 41-47 	Sandy loam, loamy sand	SC-SM, SC	A-2-4, A-4,	0 	0	96-100	81-100	64-89	20-45	18-28	4-12
	47-52	Loamy sand, fine sand, loamy fine sand, sand	SM, SC-SM,	A-2-4, A-1-b, A-3	0	0-4	86-100	68-100	20-75	5-30	0-19	NP - 3
	52-60 	Gravelly sand, sand, loamy sand, gravelly loamy sand	SM, SP-SM	A-2-4, A-1-b, A-3	0 	0-3	86-100 	64-100 	49-82 	5-30	0-19	NP-3
777B:	 				 		 	 	 			
Wapsie	0-8 	Sandy clay loam, sandy loam, loam	CL, ML, CL-ML	A-4 	0 	0 	100 	88-100 	74-93 	53-68	28-38	7-13
	8-13 	Sandy clay loam, sandy loam, loam	CL, CL-ML	A-4 	0 	0 	100 	88-100 	74-93 	53-68 	23-31	7-13
	13-17	Loam	CL, SC-SM	A-4, A-6	0	0		65-90				9-15
	17-27	Sandy clay loam	SC, SC-SM	A-4, A-6	0	0	85-95	65-90	52-81	27-46	24-35	9-17
	27-29	Loam, sandy loam	SC, SC-SM	A-2-6, A-6	0	0	85-95	65-90	48-72	23-38	24-32	9-15
	29-38 	Gravelly loamy sand, sand, gravelly sand	SM	A-1-b, A-2-4 	0 	0	86-95 	67-91 	50-74 	14-26 	0-21	NP - 6
	38-60	Sand, gravelly loamy sand, gravelly sand	SW, SM, SP,	A-1-b, A-2-4 	0 	0	67-97 	34-89	26-75	3-15	0-21	NP - 6
35D2: Storden, moderately	 			 	 		 	 	 			
eroded	 0-5	Loam	CL, ML	 A-4, A-6	 0	 0-5	 94-100	 00_100	 76-94	 56_71	30-40	 5-15
C10464		Loam, clay loam	CL, CL-ML	A-4, A-6	0-1		95-100					5-15
		Loam, sandy loam	SC-SM, SC,	A-4, A-6	0		91-100					7-15
Omsrud, moderately	 	 		 	 		 	 	 	 	 	
eroded	0-6	Loam	CL	 A-6	0	0-5	 95-100	84-100	73-93	54-70	33-44	13-18
		Loam, clay loam	CL	A-6	0	0-3					32-43	
		Clay loam, loam	CL	A-6	0						29-39	
		Loam, sandy loam	SC-SM, SC,	A-4, A-6	0 0 						22-32	

Map symbol	 Depth	USDA texture	Classi	lfication	Fragi	ments		rcentag sieve n	_	ng	 Liquid	 Plas
and soil name			Unified	AASHTO	>10	3-10	4	10	40	200	limit	ticity
	In				Pct	Pct	<u> </u>				Pct	
835E2:		 										
Storden, moderately						 			 			
eroded	0-5	Loam	CL, ML	A-4, A-6	0	0-5	94-100	89-100	76-94	56-71	30-40	5-15
	5-55	Loam, clay loam	CL, CL-ML	A-4, A-6	0-1	0-4	95-100	81-100	68-96	50-73	20-40	5-15
	55-80 	Loam, sandy loam	SC-SM, SC, CL, CL-ML	A-4, A-6	0	0-4	91-100	78-100 	65-93 	46-69	22-32	7-15
Omsrud,						 						
moderately		ļ				!	ļ			ļ		
eroded		Loam	CL	A-6	0		95-100		,		33-44	
		Loam, clay loam	CL	A-6	0		90-100		1			
	20-30	Clay loam, loam	CL	A-6	0		95-100 91-100		1		29-39	7-15
	30-80	Loam, sandy loam	SC-SM, SC,	A-4, A-6	0	U-4 	91-100	/8-100 	65-93	46-69	22-32	/-15
836B:												
Kilkenny	0-9 	Silt loam, loam	ML, CL	A-6, A-7, A- 7-6	0	0 	94-100 	88-100 	75-96 	56-74 	39-53 	17-25
	9-53	Clay loam, clay, silty clay loam	CH, CL	A-7, A-7-6 	0	0 	94-100 	83-100 	74-99 	59-81 	44-56 	25-32
	53-80	Clay loam, loam	CL	A-6	0	0-4	95-100	84-100	72-95	53-73	29-39	12-18
854D:	İ		İ		İ							
Fens, Aquolls		Muck	PT	A-8	0	0						
	35-80	Clay loam	CL, CL-ML	A-4, A-6	0	0 	100	100	95-100	84-92 	19-57 	3-29
855:	İ	i	i		i	İ	İ	i	İ	İ	i	İ
Shorewood	0-17	Silty clay loam	CL, ML, MH	A-7, A-7-5	0	0	100	100	94-100	84-94	47-66	21-28
	17-39 	Silty clay, silty clay loam	CH, MH	A-7, A-7-6	0	0 	100 	100 	90-100 	86-100 	48-72 	26-40
	39-60	Clay loam, loam	CL	A - 6	0	0-4	95-100	84-100	72-95	53-73	29-39	12-18
956:	l I				i i	l I	l I	l I	 	l I	l I	l I
Harps	0-8	Loam, clay loam	CL	A-7, A-6	0	0-5	95-100	95-100	80-90	65-80	30-45	10-25
	8-16	Loam	CL	A-7, A-6	0		95-100		,		30-45	
	16-42	Loam	CL	A-7, A-6	0	0-5	95-100	95-100	80-90	65-80	30-60	15-35
	42-60	Loam	CL	A-6	0	0-5	95-100	90-100	70-80	50-75	25-40	10-25
Okoboji,												
depressional,			ļ			[
ponded			1.5	1	1			!	1		64-76	
			1	1	-	-	1			1	1	1
	32-56	Silty clay loam, silty clay	CH	A-7-6	0	U 	100	100	 95-100	90-97 	46-59 	25-30
	56-60	Loam, silty clay loam	CL	A-6	0	0-4	95-100	84-100	79-100	70-93	35-46	17-25
-	6-32 32-56 		OH MH CH	A - 7 - 6 A - 7 - 5 A - 7 - 6 A - 6	0 0 0	 0 0 0 0	 100 100 100 100 	 100 100 100 84-100	95-100	91-96 90-97	51-69 46-59 	

Man numbal	 Danth	USDA texture	Classi	fication	Fragi	ments		rcentag sieve n	-	ng	 Liquid	
Map symbol and soil name	Depth	USDA texture		1	_ >10	3-10		sieve n	umber			
and soll name			Unified	AASHTO		3-10 inches	4	10	40	200	limit	ticity index
	l In		01111100	12151110	Pct	Pct	1	1	1	1	Pct	l
					100	100		İ		İ		i I
1007:		<u> </u>	i		i	İ	İ	i	İ	i	<u> </u>	İ
Cosmos, bouldery	0-7	Clay loam	CH, MH	A-7-5	0-1	0-1	98-100	96-100	88-100	84-100	53-76	25-36
	7-20	Silty clay	CH, MH	A-7-5	0-1	0-1	98-100	96-100	88-100	84-100	53-76	25-36
	20-30	Silty clay, silty clay loam, clay	CH	A-7-6	0-1	0-1	98-100	96-100	84-100	81-100	46-75	25-44
	30-36	Silty clay, silty clay loam, clay	CH	A-7-6	0-1	0-1	98-100	96-100	84-100	81-100	46-75	25-44
	36-60	Clay, clay loam, silty clay	CH, CL	A-7-6	0-1	0-2	95-100	91-100	76-100	61-92	40-67	21-41
1055B:												
Kandiyohi,												
bouldery		Clay loam	MH, CH	A-7-5	0-1		95-100				1	
	10-23 	Silty clay, silty clay loam, clay	CH 	A-7-6 	0	0-1 	95-100 	90-100 	71-100 	60-92 	46-75 	25-44
	23-64 	Clay loam, silty clay, clay	CH	A-7-6 	0-1	1-3 	95-100 	90-100 	76-100 	61-92 	40-68 	21-41
	64-80	Clay loam, clay	CH, CL	A-7-6	0-1	1-4 	95-100	91-100	76-100 	61-92 	40-68 	21-41
1138B:		İ	i				İ	i	İ	i	<u> </u>	!
Clarion	0-7	Clay loam, loam	CL	A-7-6, A-6	0	0-5	95-100	89-100	74-93	53-69	39-51	17-24
j	7-18	Loam	CL-ML, CL	A-4, A-6	0	0-5	95-100	89-100	77-92	55-68	25-40	5-15
	18-36	Loam, clay loam	CL, CL-ML	A-4, A-6	0	0-4	91-100	78-100	69-94	52-73	25-40	5-15
	36-60	Loam, sandy loam	SC-SM, SC,	A-4, A-6	0	0-4	91-100	78-100 	65-93 	46-69	22-32	7-15
1236B:						 						
Angus	0-8	Loam	CL	A-6	0	0-5	94-100	83-100	72-93	53-71	33-45	13-18
		Clay loam, loam	CL	A-7-6	0-1	0-4	95-100					
		Loam, clay loam	CL	A-6	0-1		95-100		1			
	40-80	Loam, sandy loam	SC-SM, SC,	A-4, A-6	0	0-4	91-100	78-100 	65-93 	46-69	22-32	7-15
1236C:		 				 		[[
Angus	0-8	Loam	CL	A-6	0	0-5	94-100	83-100	72-93	53-71	33-45	13-18
j	8-35	Clay loam, loam	CL	A-7-6	0-1	0-4	95-100	85-100	73-97	56-78	35-47	16-25
	35-40	Loam, clay loam	CL	A-6	0-1	0-4	95-100	86-100	74-97	57-78	32-43	16-23
	40-80 	Loam, sandy loam	SC-SM, SC,	A-4, A-6	0	0-4	91-100 	78-100 	65-93 	46-69 	22-32 	7-15

Map symbol	Depth	USDA texture	Classif	ication	Fragi	nents		rcentag	_	ng	 Liquid	 Plas-
and soil name	 	 	Unified	AASHTO	>10	3-10	 4	10	40	200	limit	ticity
	In	<u> </u>			Pct	Pct	<u> </u>				Pct	
1259:		 		 			 					
Biscay,												
depressional,												
ponded	0-7	Clay loam, loam	CL, MH	A-7, A-7-5	0	0	94-100	88-100	77-93	60-73	48-62	17-20
	7-20	Loam, clay loam	CL, ML	A-6, A-7, A- 7-6	0	0 	94-100 	88-100 	79-94 	60-73 	37-53 	17-21
	20-28	Loam, clay loam, sandy clay loam	CL	A-6, A-7	0	0	94-100	83-100	70-96	51-73	30-43	12-21
	28-38	Gravelly loam, sandy loam, gravelly sandy loam	SC-SM, SC	A-6 	0	0-4	95-100 	64-100 	51-98 	35-73 	20-38	6-19
	38-80	Very gravelly coarse sand	SP, SP-SM,	A-1-b	0	0-3	63-95	23-95	10-47	2-15	0-20	NP-3
1507:	 			 		 	 	 	 		 	
Brownton	0-22	Silty clay loam	CH, MH	A-7-5	0	0	100	94-100	90-100	86-96	53-67	25-28
	22-38	Silty clay, clay, silty clay loam	СН	A-7-6 	0	0 	100 	94-100 	82-100 	78-100 	46-70 	25-44
	38-60	Clay loam, loam	CL	A-6	0	0-4	95-100	84-100	73-96	57-77	33-47	16-22
1555:					i							
Nicollet	0-10	Loam, clay loam	ML	A-7-6	0	0-5	94-100	82-100	68-93	50-70	39-49	11-18
	10-17	Clay loam, loam	CL	A-7-6	0	0-5	94-100	82-100	68-93	52-73	36-50	13-21
	17-36	Clay loam, loam	CL	A-6	0	0-5	94-100	83-100	66-93	50-73	27-44	11-21
	36-60	Loam, sandy loam	CL-ML, SC-SM,	A-4, A-6	0	0-4	91-100	78-100	65-93	46-69	22-32	7-15
Guckeen	l l 0-15		MH	 A-7, A-7-5	0	 0	100	 94-100	 90-100	 86-96	53-63	 25-28
Guckeen		Silty clay, silty clay	CH	A-7, A-7-6	0	0 0			1		46-63	
	13-24	loam, clay	CII	A-7, A-7-0	0	0	1 100		07 - 1 00	05-100	10-05	25-50
	24-30	Clay loam, loam	CL	A-6, A-7, A-	0	0-4	 90-100 	81-100	 68-100 	52-89	 35-59 	 17-36
	30-80	Clay loam, loam	CL	A-6	0	0-4	95-100	84-100	72-95	53-73	29-39	12-18
1836B:						 	l I	 	 	l l		
Kilkenny	0-9	Silt loam, loam	ML, CL	A-6, A-7, A-	0	 0 	94-100	88-100	75-96	56-74	39-53	17-25
	9-53	Clay loam, clay, silty	CH, CL	A-7, A-7-6	0	0	94-100	83-100	74-99	59-81	44-56	25-32
	53-80	Clay loam, loam	CL	 A-6	0	0-4	95-100	84-100	72-95	53-73	29-39	12-18
Shorewood		Silty clay loam	CL, ML, MH	A-7, A-7-5	0	0	100	100			47-66	
	17-39 	Silty clay, silty clay loam	CH, MH	A-7, A-7-6 	0	0 	100 	100 	į	İ	48-72 	į
	39-60 	Clay loam, loam	CL	A-6 	0	0-4	95-100 	84-100 	72-95 	53-73 	29-39 	12-18

|94-100|82-100|68-93 |50-70 |39-49 |11-18

|94-100|82-100|68-93 |52-73 |36-50 |13-21

|94-100|83-100|66-93 |50-73 |27-44 |11-21

|91-100|78-100|65-93 |46-69 |22-32 | 7-15

|94-100|89-100|85-100|76-94 |35-60 |15-30

94-100|89-100|85-100|76-94 |35-60 |15-30

|95-100|89-100|77-96 |60-77 |39-51 |17-25

|91-100|78-100|65-93 |46-69 |22-32 | 7-15

55-68 25-40

52-73 | 25-40 |

46-69 22-32

95-100 89-100 77-92 55-68 25-40

|95-100|89-100|77-92

| 91-100 | 78-100 | 69-94

|91-100|78-100|65-93

5-15

5-15

7-15

			Classi	fication	Frag	ments	Pe	rcentag	e passi	.ng		
Map symbol	Depth	USDA texture	İ		i		1	sieve n	umber		Liquid	Plas-
and soil name					>10	3-10					limit	ticity
			Unified	AASHTO	inches	inches	4	10	40	200		index
	In				Pct	Pct					Pct	
2700C:			l I			 		 	 			
Ridgeton	0-29	Loam	ML	A-7-6	0	0-5	94-100	89-100	75-93	55-70	33-53	11-17
	29-38	Loam	ML	A-7-6	0	0-5	94-100	89-100	75-93	55-70	33-53	11-17
	38-50	Clay loam, loam	CL	A-7, A-6	0	0-4	95-100	85-100	74-94	55-72	30-41	15-21
	50-80	Clay loam, loam	CL	A-6	0	0-4	95-100	84-100	72-95	53-73	29-39	12-18
2700D:								 				
Ridgeton	0-29	Loam	ML	A-7-6	0	0-5	94-100	89-100	75-93	55-70	33-53	11-17
	29-38	Loam	ML	A-7-6	0	0-5	94-100	89-100	75-93	55-70	33-53	11-17
	38-50	Clay loam, loam	CL	A-7, A-6	0	0-4	95-100	85-100	74-94	55-72	30-41	15-21
	50-80	Clay loam, loam	CL	A-6	0	0-4	95-100	84-100	72-95	53-73	29-39	12-18
4000.							 	 	 			
Urban land			İ	İ	į	İ	Ì	İ	ĺ	İ	İ	Ì
İ												
4055:												

A-7-6

A-7-6

A-7, A-6

A-4, A-6

A-4, A-6

A-4, A-6

A-4, A-6

A-4, A-6

7-6

7-6

A-7, A-6, A-

A-7, A-6, A-

0-5

0-5

0

0

0

0

0

0

A-6

CL-ML, SC-SM, A-4, A-6

ML

CL

CL

CL

SC, CL

CH, CL, MH

CH, CL, ML

SC-SM, SC,

CL-ML, CL

CL-ML, CL

CL, CL-ML

SC-SM, SC,

CL, CL-ML

CL, CL-ML

Nicollet-----

Urban land.

Urban land.

Urban land.

Clarion-----

4138B:

Webster-----

4107:

0-10 | Loam, clay loam

10-17 | Clay loam, loam

17-36 | Clay loam, loam

36-60 | Loam, sandy loam

0-8 | Silty clay loam

8-16 |Silty clay loam

16-32 | Clay loam, loam

32-60 | Loam, sandy loam

Loam

18-36 | Loam, clay loam

36-60 Loam, sandy loam

0-7 7-18 Loam

	Depth	USDA texture	Classi	fication	Fragi	ments		rcentago sieve n	_	ng	 Liquid	 Plas-
and soil name	i	İ			>10	3-10	i				limit	ticity
			Unified	AASHTO	inches	inches	4	10	40	200		index
ļ	In				Pct	Pct				ļ	Pct	
4235B:	 					 	 	l I	 	 	 	
Angus	0-8	Loam	CL	A-6	0	0-5	94-100	83-100	72-93	53-71	33-45	13-18
	8-35	Clay loam, loam	CL	A-7-6	0-1	0-4	95-100	85-100	73-97	56-78	35-47	16-25
	35-40	Loam, clay loam	CL	A-6	0-1	0 - 4	95-100	86-100	74-97	57-78	32-43	16-23
	40-80	Loam, sandy loam	SC-SM, SC,	A-4, A-6	0	0-4	91-100	78-100 	65-93 	46-69	22-32	7-15
Urban land.												
4236D:	 						 		 			
Lester	0-7	Loam	CL	A-4, A-6	0	0-5	94-100	83-100	72-93	53-71	30-40	5-15
İ	7-38	Clay loam, loam	CL	A-6, A-7-6	0-1	0-4	95-100	85-100	73-94	56-75	35-45	16-23
	38-60	Loam, clay loam	CL	A-6	0	0-4	95-100	84-100	72-95	53-73	29-39	12-18
	60-80 	Loam, sandy loam	SC-SM, SC,	A-4, A-6	0	0-4	91-100	78-100 	65-93 	46-69 	22-32	7-15
Urban land.							 		 			
4325:	 						 	 	 	[
Le Sueur	0-17	Loam	CL-ML, CL	A-6, A-4	0	0-5	95-100	90-100	80-95	50-65	25-40	5-15
	17-37	Clay loam	CL, CL-ML	A-6, A-4	0	0	95-100	95-100	90-100	70-85	20-40	5-15
	37-46	·	CL	A-7, A-6	0	0		95-100			35-50	
ļ	46-80	Loam	CL-ML, CL	A-6, A-4	0-1	0-5	95-100	90-100	80-95	55-75	20-40	5-20
Urban land.		 				 	 	 	 	 	 	
4444:								İ				
Jacwin	0-7 	Silty clay loam, loam, silt loam	MH, ML	A-7-5, A-7-6	0	0 	100 	100 	88-98 	72-82 	41-53 	14-22
	7-13	Loam, silty clay loam,	MH, ML	A-7-5, A-7-6	0	0	100	100	89-99 	72-82	41-53	15-22
	13-24	Sandy clay loam, loam, clay loam	CL	A-6, A-7-6	0	1-4	95-100	85-100	71-95	54-75	31-46	13-22
	24-37	Clay, silty clay	CH	A-7-6	0	0	100	100	88-100	86-100	51-73	29-45
İ		Weathered bedrock		j		ļ	ļ	ļ	ļ	ļ	ļ	ļ
Urban land.							 		 			
4507:							 		 	 		
Canisteo	0-10	Clay loam	ML, OL, MH	A-7-5	0	0	94-100	88-100	77-95	59-75	47-59	18-24
İ	10-18	Clay loam	ML, OL, CL	A-7	0	0	94-100	88-100	77-95	59-75	40-50	15-20
ļ	18-39 	Clay loam, loam, silty clay loam	CL 	A-7-6, A-6	0	0 	98-100 	88-100 	75-100 	57-80 	35-53 	13-25
	39-80	Loam, sandy loam	SC-SM, SC,	A-4, A-6	0	0-4	91-100 	78-100	65-93 	46-69 	22-32	7-15

Map symbol	 Depth	USDA texture	Classi	fication	Frag	ments		rcentag sieve n	_	_	 Liquid	
and soil name			 Unified	AASHTO	>10	3-10	 4	10	40	200	limit	ticity index
	l -		Unified	AASHTO	Pct	<u> </u>	4	1 10	1 40	200	 D = t	Index
	In			ļ	PCt	Pct	 				Pct	
4635B:	 		1			 	 					
Buckney	0-14	 Fine sandy loam	SC-SM, SC	A-4	0	0	100	100	90-96	39-45	23-32	6-10
24007		Fine sandy loam, loamy	SM, SC-SM,	A-4	0	0	100	100		40-52		1-10
	 	very fine sand	ML, CL-ML		i							
	22-60	Sand, loamy fine sand,	SM, SC-SM	A-2-4	o	0	100	100	89-99	23-33	16-27	2-10
	İ	loamy sand		į	į	į		į	į	į	į	į
Urban land.	 	 				 	 	 	 	 	 	
4946B.	 					 	 	I I	i i	l I		i
Udorthents-	! 	İ		i	i		! 	i	i	i		i
Highway	! 	İ		i	i		! 	i	i	i		i
52	! 	İ		i	i		i I	İ	i	ì	i	i
5010.	İ		i	i	i	İ	İ	İ	i	i	i	i
Pits, sand and	İ	İ	İ	į	i	İ	İ	İ	i	i	İ	i
gravel	İ		į	i	i	İ	İ	i	i	i	i	i
	İ	İ	İ	į	j	į	į	İ	į	İ	į	İ
5030.	ĺ		İ	j	İ	İ	ĺ	İ	ĺ	İ	İ	ĺ
Pits, limestone												
quarries												
5035.												
Pits, gypsum												
quarries												
5040.					ļ					!		!
Udorthents,			!	ļ	!					!	!	!
loamy					ļ				ļ	!		!
=040					!							!
5049.				ļ	!							
Aquolls, ponded-	 				-							
Udorthents,	 				-							
loamy	 						 			1		
5060.	 	1				 	 	1	1	1		1
Pits, clay	l I	 	1	I I		 	l I	I I	1	I	1	1
FICS, CLAY	l I	 	1	1	I I	 	l I	1		1	1	
5080.	l I	 	I I	I I		 	l I	1		1	1	1
Udorthents	 		1			 	l I					
	! 						ı İ			i		<u> </u>
	1		1	1	1	1	1	1	1	1	1	1

 Map symbol	Depth	USDA texture	Classif	ication	Fragi	nents		rcentag	e passi: umber	_	 Liquid	Plag
and soil name	рерсп	USDA CEXCUIE			_ >10	3-10		sieve ii	miner		limit	
			Unified	AASHTO		inches	4	10	40	200		index
	In				Pct	Pct					Pct	
5457:						 	 	 	 			
Du Page,												
channeled,												
frequently												
flooded	0-30	Silt loam	CL, ML	A-6, A-7-6	0	0	95-100	83-100	76-100	68-91	33-47	11-18
	30-35	Sandy loam, loam,	CL, ML	A-6, A-7-6	0	0	90-100	61-100	53-95	39-73	28-43	12-18
		gravelly sandy clay										
		loam, silt loam										
	35-80	Stratified silt loam to		A-4, A-6	0	0	86-100	55-100	47-100	36-83	17-36	3-16
		gravelly sandy clay	ML, SC, SC-									
		loam	SM	ļ								
		ļ		ļ	ļ		!	!	!	!	ļ	
5507:												
Corvuso	0-20	Silty clay loam, clay	MH	A-7-5	0-1	0-1	100	94-100	86-100	76-100	53-78	25-39
	20 20	loam Clay, silty clay, silty		 A-7-6	0-1	 1	100		 75 100		 45-70	105 44
l I	20-30	clay loam	CH	A-7-6	0-1	1	100	192-100	1/2-100	04-92	45-70	25-44
l I	20 00	Clay loam, clay, silty	CH, CL	 A-7-6	0-1	 1-3	 0E 100	 01 100	 77 100	61 02	41-65	121 40
l I	30-60	clay clay, sirty	CH, CL	A-7-6	0-1	1-3	193-100	91-100	/ / - 100	01-33	41-02	21-40
		Clay				 		 		 	 	
Brownton	0-22	 Silty clay loam	CH, MH	 A-7-5	0	l 0	100	94-100	90-100	86-96	53-67	25-28
		Silty clay, clay, silty	1	A-7-6	0	0	100				46-70	
i		clay loam		İ	i	İ	i	İ	i	i	i	i
İ	38-60	Clay loam, loam	CL	A-6	0	0-4	95-100	84-100	73-96	57-77	33-47	16-22
j		į	j	j	į	İ	į	İ	į	į	į	j
AW.												
Animal waste												
lagoon												
		Į.										
SL.		ļ		ļ								
Sewage lagoon												
W.] 	 	I I		 	 	[[
Water						 		! 		1		

Physical Properties

The table described in this section shows estimates of some physical characteristics and features that affect soil behavior. These estimates are given for the 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.

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

The amount and kind of clay affect the fertility and physical condition of the soil and the ability of the soil to adsorb cations and to retain moisture. They influence shrinkswell 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 earthmoving 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- or ¹/₁₀-bar (33kPa or 10kPa) moisture tension. Weight is determined after the soil is dried at 105 degrees C. In the table, the estimated moist bulk density of each soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute linear extensibility, shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. Depending on soil texture, a bulk density of more than 1.4 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

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

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

Linear extensibility refers to the change in length of an unconfined clod as moisture content is decreased from a moist to a dry state. It is an expression of the volume change between the water content of the clod at $^{1}/_{3}$ - or $^{1}/_{10}$ -bar tension (33kPa or 10kPa tension) and oven dryness. The volume change is reported in the table as percent change for the whole soil. Volume change is influenced by the amount and type of clay minerals in the soil.

Linear extensibility is used to determine the shrink-swell potential of soils. The shrink-swell potential is low if the soil has a linear extensibility of less than 3 percent; moderate if 3 to 6 percent; high if 6 to 9 percent; and very high if more than 9 percent. If the linear extensibility is more than 3, shrinking and swelling can cause damage to buildings, roads, and other structures and to plant roots. Special design commonly is needed.

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

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

Erosion factors are shown in the table as the K factor (Kw and Kf) and the T factor. Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) and the Revised Universal Soil Loss Equation (RUSLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter and on soil structure and permeability. Values of K range from 0.02 to 0.69. Other factors being equal, the higher the value, the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor Kw indicates the erodibility of the whole soil. The estimates are modified by the presence of rock fragments.

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 annual 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 susceptibility to wind erosion in cultivated areas. The soils assigned to group 1 are the most susceptible to wind erosion, and those assigned to group 8 are the least susceptible. The groups are described in the "National Soil Survey Handbook," which is available in local offices of the Natural Resources Conservation Service or on the Internet.

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

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	 Depth	 Clay	Moist	Permea-	 Available		Organic	Erosi	on fac	tors	erodi-	
and soil name		 	bulk density	bility	water capacity	extensi- bility	matter	 Kw	 Kf	 T	bility group	
	In	Pct	g/cc	In/hr	In/in	Pct	Pct	İ	 	i –		
_												
6: Okoboji, depressional,		 	 			 			l I		 	l I
ponded	 0-6	35-40	1.30-1.40	0.2-0.6	0.21-0.23	6.0-8.9	9.0-12	.32	.32	5	4	86
F	6-32		1.30-1.40		0.21-0.23		3.0-9.0	.32	.32	i	i -	İ
	32-56	35-42	1.30-1.40	0.2-0.6	0.18-0.20	6.0-8.9	0.5-3.0	.32	.32	į	į	İ
	56-60	25-35	1.40-1.50	0.6-2	0.18-0.20	2.6-5.8	0.0-0.5	.28	.28	ĺ		
27B:		 				 						l I
Terril	 0-9	18-30	1 1.35-1.40	0.6-2	0.20-0.22	0.0-2.9	3.0-4.0	.24	.24	5	6	48
İ	9-36		1.35-1.40	0.6-2	0.20-0.22	0.0-2.9	1.0-3.0	.24	.24	i	İ	İ
	36-50	24-30	1.40-1.45	0.6-2	0.17-0.19	2.3-4.2	0.5-1.0	.28	.28	į	į	İ
	50-60	12-22	1.50-1.70	0.6-2	0.17-0.19	0.0-1.6	0.0-0.5	.37	.37			
34:		 	 			 					 	l I
Estherville	0-7	5-15	1.25-1.35	2-6	0.13-0.18	0.0-2.9	1.5-2.5	.20	.20	4	3	86
İ	7-18	10-18	1.35-1.60	2-6	0.12-0.19	0.0-2.9	0.5-1.0	.20	.20	İ	İ	İ
	18-80	0-8	1.50-1.65	6-20	0.02-0.04	0.0-2.9	0.0-0.5	.10	.10	ĺ		į
34B:						 -			l I			
Estherville	 0-7	 5-15	 1.25-1.35	2-6	0.13-0.18	0.0-2.9	1.5-2.5	.20	.20	3	3	 86
	7-18		1.35-1.60		0.12-0.19		0.5-1.0	.20	.20			
	18-80		1.50-1.65	6-20	0.02-0.04		0.0-0.5	.10	.10	İ	İ	İ
55: Nicollet	 0-10	10 27	 1.15-1.25	0.6-2	0.17-0.22	1222	5.0-6.0	.24	.24	 5	 6	 48
Nicollet	10-10		1.15-1.25		0.17-0.22		3.0-5.0	.24	.24	5	0	40
	17-36		1.25-1.35		0.15-0.19		0.5-2.0	.37	.37	i	 	l I
	36-60		1.50-1.70		0.17-0.19		0.0-0.5	.37	.37			
62F: Storden	 0-7	10 27	 1.35-1.45	0.6-2	0.20-0.22		2.5-3.5	.28	.28	 5	 4L	 86
Btorden	0-7 7-55		1.35-1.45		0.17-0.19		0.5-1.0	.37	.37]	411	00
	55-80		1.50-1.70	0.6-2	0.17-0.19		0.0-0.5	.37	.37	i		
		į					İ	į	İ	ĺ		
90: Okoboji, mucky,						l I						
depressional, ponded	 0-8	20-30	 1.20-1.25	0.6-2	0.22-0.25	0.1-4.2	12-18	.32	.32	5	 6	48
depressionar, ponded	8-20		1.30-1.40		0.18-0.20		4.0-10	.32	.32			10
	20-40		1.30-1.40		0.18-0.20		2.0-4.0	.32	.32	i		
	40-60	25-35	1.40-1.50	0.6-2	0.18-0.20	2.6-5.8	1.0-2.0	.28	.28	į	İ	İ
95:												
Harps	 0-8	 25-27	 1.35-1.40	0.6-2	0.19-0.21	 3.0-5.9	4.5-5.5	.24	.24	5	 4L	 86
narps			1.35-1.40		0.19-0.21		1				411	00
	16-42		1.40-1.50		0.17-0.19	•				i	İ	İ
	42-60		1.50-1.70		0.17-0.19			.32		į	İ	İ
107.						l I						
107: Webster	 0-8	27-35	 1.35-1.40	0.6-2	0.19-0.21	3.2-5.8	6.0-7.0	.28	.28	 5	 7	38
	8-16		1.35-1.40		0.19-0.21	•			.28		<u> </u>	
	16-32		1.40-1.50		0.16-0.18			.32	.32	i		İ
İ	32-60		1.50-1.70		0.17-0.19			.37	:	į	İ	į
100.						 -						
108: Wadena	 0-8	 18-27	 1.30-1.50	0.6-2	0.20-0.22	0.0-2.9	3.0-4.0	.24	.24	4	 6	48
	8-13		1.30-1.50		0.20-0.22					į -	<u> </u>	İ
i	13-30		1.35-1.50		0.14-0.19			.32	.32	į	İ	İ
į	30-80	1-5	1.55-1.65	20-101	0.02-0.04	0.0-2.9	0.0-0.5	.10	.10			

Physical Properties of the Soils--Continued

Map symbol	Depth	 Clay	Moist	Permea-	Available		Organic	Erosi	on fac	tors	erodi-	Wind erodi-
and soil name		 	bulk density	bility	water capacity	extensi- bility	matter	Kw	 Kf	 T	bility group	
	In	Pct	g/cc	In/hr	In/in	Pct	Pct			Ì		1
1000												
108B: Wadena	 0-7	 18-27	 1.30-1.50	0.6-2	0.20-0.22	 0.0-2.9	3.0-4.0	.24	.24	 4	 6	48
Wadena	7-10		1.30-1.50	0.6-2	0.20-0.22		2.0-3.0	.24	.24	*		40
	10-25		1.35-1.50	0.6-2	0.14-0.19		1.0-2.0	.32	.32	ĺ	İ	İ
	25-80	1-5	1.55-1.65	20-101	0.02-0.04	0.0-2.9	0.0-0.5	.10	.10	ĺ	İ	ĺ
108C:												
Wadena	 0-7	 18-27	 1.30-1.50	0.6-2	0.20-0.22	 0 0-2 9	3.0-4.0	.24	.24	 4	 6	 48
Madella	7-10		1.30-1.50	0.6-2	0.20-0.22		2.0-3.0	.24	.24	-		10
	10-25		1.35-1.50	0.6-2	0.14-0.19	0.0-2.9	1.0-2.0	.32	.32	ĺ	İ	İ
	25-80	1-5	1.55-1.65	20-101	0.02-0.04	0.0-2.9	0.0-0.5	.10	.10	ĺ	į	İ
			į į									ļ
135: Coland, occasionally		 			l I	 				 		
flooded	 0-8	27-35	1.40-1.50	0.6-2	0.20-0.22	3.2-5.8	5.0-7.0	.24	.24	 5	6	48
2200404	8-32		1.40-1.50	0.6-2	0.20-0.22		4.0-5.0	.24	.24			
	32-40		1.40-1.50	0.6-2	0.15-0.19	3.2-4.2	4.0-6.5	.32	.32	İ	İ	İ
	40-44	12-22	1.45-1.60	0.6-2	0.11-0.17	0.0-1.6	0.5-2.0	.24	.24	ĺ	İ	ĺ
	44-52		1.50-1.60	0.6-2	0.13-0.19		0.5-2.0	.28	.28			
	52-60	12-22	1.45-1.60	0.6-2	0.11-0.17	0.0-1.6	0.5-2.0	.24	.24			
136:		 				 		l I	 	l I		l I
Ankeny, rarely flooded	0-7	10-18	 1.50-1.55	2-6	0.16-0.18	0.0-0.4	2.0-3.0	.20	.20	4	3	86
,,	7-30		1.50-1.55	2-6	0.16-0.18		2.0-3.0	.20	.20	i -		
	30-44	10-16	1.55-1.65	2-6	0.15-0.17	0.0-0.0	0.5-1.0	.20	.20	į	İ	į
	44-60	2-10	1.65-1.75	6-20	0.12-0.14	0.0-0.0	0.0-0.5	.20	.20	ļ		ļ
138B:						 						
Clarion	 0-7	 18-24	1.40-1.45	0.6-2	0.20-0.22	0.0-2.3	3.0-4.0	.24	.24	 5	6	48
0242201	7-18		1.40-1.45	0.6-2	0.20-0.22		2.0-3.0	.24	.24			
	18-36		1.50-1.70	0.6-2	0.17-0.19	0.0-2.3	0.5-2.0	.37	.37	į	İ	į
	36-60	12-22	1.50-1.70	0.6-2	0.17-0.19	0.0-1.6	0.0-0.5	.37	.37			
138C2:			!!!		1							
Clarion, moderately		 			-	 		l I	 	l I	 	
eroded	0-6	18-24	11.40-1.45	0.6-2	0.20-0.22	0.0-2.3	2.2-3.2	.28	.28	5	6	48
	6-16		1.40-1.45	0.6-2	0.20-0.22		1.0-2.0	.32	.32			İ
	16-35	18-24	1.40-1.45	0.6-2	0.20-0.22	0.0-2.3	0.5-1.0	.32	.32	ĺ	į	į
	35-60	12-22	1.50-1.70	0.6-2	0.17-0.19	0.0-1.6	0.1-0.5	.37	.37			ļ
201B:						 						
Coland	 0-8	 27-35	 1.40-1.50	0.6-2	0.20-0.22	 3 2-5 8	5.0-7.0	.24	.24	 5	 6	 48
coruma	8-32		11.40-1.50	0.6-2	0.20-0.22		4.0-5.0	.24	1]		10
	32-40		1.40-1.50	0.6-2	0.15-0.19		4.0-6.5	.32	:	ĺ	İ	İ
	40-44	12-22	1.45-1.60	0.6-2	0.11-0.17	0.0-1.6	0.5-2.0	.24		j	į	į
	44-52		1.50-1.60	0.6-2	0.13-0.19			.28	.28			
	52-60	12-22	1.45-1.60	0.6-2	0.11-0.17	0.0-1.6	0.5-2.0	.24	.24			ļ
Terril	 0-9	 18_30	 1.35-1.40	0.6-2	0.20-0.22	 0 0-2 9	3 0-4 0	24	.24	 5	 6	48
161111	0-9 9-36		1.35-1.40	0.6-2	0.20-0.22				1	5 	3	**0
			1.40-1.45		0.17-0.19				.28	i		İ
	50-60		1.50-1.70	0.6-2	0.17-0.19	0.0-1.6	0.0-0.5		.37	İ	İ	İ
												ļ
203:	 0.0	10 27	1 40-1 45	0.6.2	0 20 0 22	1 6 2 2	4050		24		 6	
Cylinder	0-8 8-18		1.40-1.45 1.40-1.45	0.6-2 0.6-2	0.20-0.22	•			.24	4	o	48
	18-28		1.45-1.60	0.6-2	0.17-0.19	•			.32	İ		İ
	28-80		1.60-1.70	20-101		0.0-0.0	1	1.10	'	i	İ	i
		İ	i i		İ	İ	İ	İ	İ	İ	İ	İ

Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	 Clay 	Moist bulk	Permea- bility	Available water	 Linear extensi-	Organic matter	LECSIO	on fac			Wind erodi
and soll name			density	DIIICY	capacity	bility	Maccel	Kw	Kf	T		index
	In	Pct	g/cc	In/hr	In/in	Pct	Pct	İ	İ	İ		İ
227:		 	 			 		l I	 	 		
Wadena, loamy		i	i i		i	İ		i	i	i	İ	i
substratum	0-7	18-27	1.30-1.50	0.6-2	0.20-0.22	0.0-2.9	3.0-4.0	.24	.24	4	6	48
	7-16		1.30-1.50	0.6-2	0.20-0.22	1	2.0-3.0	.24	.24	i		i
i	16-23		1.35-1.50	0.6-2	0.14-0.19		1.0-2.0	.32	.32	i	İ	İ
i	23-30		1.35-1.50	0.6-2	0.14-0.19	0.0-2.9	1.0-2.0	.32	.32	i	İ	i
i	30-62	1-5	1.55-1.65	20-101	0.02-0.04	0.0-2.9	0.0-0.5	.10	.10	İ	İ	İ
	62-80	18-35	1.30-1.40	0.6-2	0.16-0.22	0.0-2.9	0.1-0.8	.37	.37	į	į	į
227B:		 	 			 			 	 	 	
Wadena, loamy		i	i i		į	İ	İ	i	į	i	İ	i
substratum	0 - 7	18-27	1.30-1.50	0.6-2	0.20-0.22	0.0-2.9	3.0-4.0	.24	.24	4	6	48
i	7-16	18-27	1.30-1.50	0.6-2	0.20-0.22	0.0-2.9	2.0-3.0	.24	.24	i	İ	İ
i	16-23	18-27	1.35-1.50	0.6-2	0.14-0.19	0.0-2.9	1.0-2.0	.32	.32	İ	İ	İ
i	23-30	16-20	1.35-1.50	0.6-2	0.14-0.19	0.0-2.9	1.0-2.0	.32	.32	İ	İ	İ
İ	30-62	1-5	1.55-1.65	20-101	0.02-0.04	0.0-2.9	0.0-0.5	.10	.10	İ	İ	İ
	62-80	18-35	1.30-1.40	0.6-2	0.16-0.22	0.0-2.9	0.1-0.8	.37	.37	į	į	į
228:		 	 			 			 	 		
Cylinder, loamy		i	į į		i		İ	İ	İ	i	İ	İ
substratum	0-12	22-27	1.40-1.45	0.6-2	0.20-0.22	1.6-3.2	4.0-5.0	.24	.24	4	6	48
i	12-20		1.40-1.45	0.6-2	0.20-0.22	1.6-3.2	2.0-3.0	.24	.24	i	İ	İ
i	20-34		1.45-1.60	0.6-2	0.17-0.19	1.6-3.2	0.5-2.0	.32	.32	i	İ	İ
i	34-63	2-12	1.60-1.70	20-101	0.02-0.04	0.0-0.0	0.0-0.5	.10	.15	i	İ	i
	63-80	22-27	1.30-1.40	0.6-2	0.16-0.22	0.0-2.9	0.1-0.8	.37	.37	į	į	į
236D:		 	 			 			 	 		
Lester	0-7	20-27	1.30-1.40	0.6-2	0.20-0.22	0.0-2.9	3.0-5.0	.28	.28	5	6	48
	7-38		1.45-1.55	0.6-2	0.15-0.19		0.5-1.0	.28	.28			
	38-60		1.35-1.55	0.6-2	0.15-0.19		0.1-0.5	.32	.37	İ		i
İ	60-80		1.50-1.70	0.6-2	0.17-0.19		0.0-0.5	.37	.37	İ	İ	İ
236E:						 			 			
Lester	0-7	20-27	1.30-1.40	0.6-2	0.20-0.22	0.0-2.9	3.0-5.0	.28	.28	 5	6	48
Leg cer	7-38		11.45-1.55	0.6-2	0.15-0.19		0.5-1.0	.28	.28	5	0	1 40
	38-60		1.35-1.55	0.6-2	0.15-0.19		0.1-0.5	.32	.37	 	 	İ
	60-80		1.50-1.70	0.6-2	0.17-0.19		0.0-0.5	.37	.37			
2268												
236F: Lester	0-7	20-27	 1.30-1.40	0.6-2	0.20-0.22	0.0-2.9	3.0-5.0	.28	 .28	 5	 6	48
i	7-38	24-32	1.45-1.55	0.6-2	0.15-0.19	3.0-5.9	0.5-1.0	.28	.28	i	İ	i
i	38-60	20-30	1.35-1.55	0.6-2	0.15-0.19	1.0-4.2	0.1-0.5	.32	.37	i	İ	i
	60-80	12-22	1.50-1.70	0.6-2	0.17-0.19	0.0-1.6	0.0-0.5	.37	.37	į	į	į
259 :		 				 			 	 		
Biscay	0-7	25-30	1.20-1.30	0.6-2	0.20-0.22	 3.0-5.9	5.5-6.5	.28	.28	4	6	48
	7-20		1.20-1.30	0.6-2	0.20-0.22		1.0-6.0	.28	.28	i -		
	20-28		1.25-1.35	0.6-2	0.17-0.19		0.5-1.0	.28	.28	İ		i
	28-38		1.35-1.55	2-6	0.11-0.17	!	0.0-0.5	.28	.32	i	İ	i
İ	38-80		1.55-1.65	6-20	0.02-0.04	!	0.0-0.5	.05	.10	İ	İ	İ
 262 G:						 			 			
zozg: Lester	0-7	 20-27	 1.30-1.40	0.6-2	0.20-0.22	n n-2 a	3 0-5 0	.28	.28	 5	 6	48
	7-38		1.45-1.55	0.6-2	0.15-0.19	!	,	.28	.28]		40
	38-60		1.35-1.55	0.6-2	0.15-0.19	!	0.1-0.5	.32	.37	I I	 	1
	60-80		1.50-1.70	0.6-2	0.13-0.19	!	0.0-0.5	.37	37			
Dellast see				0.55								
Belview	0-9		1.35-1.45	0.6-2	0.20-0.22	!	,	.28	.28	5	4L	86
	9-50		1.35-1.55	0.6-2	0.15-0.19	!	,	.32	.37			
	50-60	177-77	1.50-1.70	0.6-2	0.17-0.19	. n n_1 6	0.0-0.5	.37	.37	1	1	1

Physical Properties of the Soils--Continued

Map symbol	Depth	 Clay	Moist	Permea-	Available		Organic	Erosi	on fac	tors	erodi-	Wind erodi
and soil name		 	bulk density	bility	water capacity	extensi- bility	matter	Kw	 Kf	 T	bility group	
	In	Pct	g/cc	In/hr	In/in	Pct	Pct	i i	İ	İ		İ
0.07.4												
274: Rolfe, depressional,		 	 			 			l I	l I	 	
ponded	0-10	22-27	1.35-1.40	0.6-2	0.22-0.24	0.0-2.9	4.0-6.0	.37	.37	 5	6	48
P000	10-21		1.35-1.40		0.22-0.24		1.0-2.0	.37	.37			
	21-55	38-45	1.40-1.50	0.06-0.2	0.11-0.13	6.0-8.9	0.5-1.0	.28	.28	į	İ	į
	55-80	24-35	1.50-1.60	0.6-2	0.14-0.16	2.3-5.9	0.0-0.5	.28	.28	ĺ	İ	İ
278:		 	 			 			 			
Biscay, loamy			i		i	! 		i	İ	i		i
substratum	0-7	18-30	1.20-1.30	0.6-2	0.20-0.22	1.3-3.2	5.5-6.5	.28	.28	4	6	48
j	7-22	25-32	1.25-1.35	0.6-2	0.17-0.19	1.0-4.2	4.0-6.0	.28	.28	ĺ		ĺ
	22-36		1.25-1.35	0.6-2	0.17-0.19	1.0-4.2	0.5-1.0	.28	.28			
	36-56		1.55-1.65		0.02-0.04		0.0-0.5	.05	.10			
	56-74		1.55-1.65		0.02-0.04		0.0-0.5	.05	.10	ļ		ļ
	74-80	18-35	1.30-1.40	0.6-2	0.16-0.22	0.0-2.9	0.1-0.8	.37	.37			
307:						! 						
Dundas	0-9	10-27	1.30-1.45	0.6-2	0.22-0.24	3.0-5.9	2.0-4.0	.28	.28	5	6	48
	9-15		1.35-1.45		0.15-0.19		0.5-1.0	.28	.28			
	15-40		1.40-1.55	0.2-0.6	0.15-0.19		0.2-1.0	.28	.28	ļ		ļ
	40-80	12-22	1.50-1.70	0.6-2	0.17-0.19	0.0-1.6	0.0-0.5	.37	.37			
315B:						! 						
Udifluvents,		İ	į į		İ	ĺ	İ	İ	ĺ	ĺ	İ	ĺ
occasionally flooded	0-8	5-18	1.50-1.60	2-6		0.0-2.9		.20	.20	5	3	86
	8-60	5-18	1.50-1.60	2-6		0.0-2.9		.20	.20			
323B:		 	 		l I	 			 	 		
Fort Dodge	0-39	20-26	1.35-1.40	0.6-2	0.20-0.22	0.0-2.9	3.0-4.0	.24	.24	4	6	48
	39-58	22-30	1.40-1.65	0.6-2	0.16-0.18	0.0-2.9	2.0-3.0	.28	.28	ĺ	į	į
	58-80	2-8	1.65-1.75	6-20	0.05-0.07	0.0-2.9	0.0-1.0	.10	.17			
325:		 				 	 		 		 	
Le Sueur	0-17	16-22	1.40-1.45	0.6-2	0.21-0.23	3.0-5.9	2.5-3.5	.37	.37	5	6	48
	17-37	25-35	1.30-1.40	0.6-2	0.20-0.24	0.0-2.9	3.0-4.0	.24	.24	ĺ	į	į
	37-46	24-35	1.30-1.45	0.6-2	0.15-0.19	3.0-5.9	0.5-2.0	.32	.32			
	46-80	20-30	1.45-1.60	0.6-2	0.15-0.19	3.0-5.9	0.0-0.5	.32	.32			
338:		 	 		l I	 			 	 		
Garmore	0-6	22-27	1.40-1.45	0.6-2	0.19-0.21	1.6-3.2	3.5-4.5	.24	.24	5	6	48
	6-17	22-27	1.40-1.45	0.6-2	0.19-0.21	1.6-3.2	3.0-4.0	.24	.24			
	17-21		1.40-1.45	0.6-2	0.19-0.21		1.0-2.0	.24	.24			
	21-49	!	1.45-1.70		0.16-0.18	!	0.0-1.0	.37	.37	ļ	ļ	ļ
	49-80	22-27 	1.45-1.60	0.6-2	0.16-0.18	1.6-3.2 	0.0-0.5	.37	.37 	l I	 	
342:										İ		
Estherville, loamy			I i		1							
substratum	0 - 7		1.25-1.35		0.13-0.18		1.5-2.5	.20	.20	3	3	86
	7-15		1.35-1.60		0.12-0.19		0.5-1.0	.20	.20	ļ		ļ
	15-75 75-80		1.50-1.65 1.30-1.40			0.0-2.9		1.10	.10 .37			
	/3-00	22-27		0.0-2		0.0-2.9		.37	.37			
342B:		į	į		į	İ	į		İ	į		
Estherville, loamy				0.5								
substratum			1.25-1.35 1.35-1.60		0.13-0.18			1	.20	3	3	86
	7-15 15-75		1.35-1.60 1.50-1.65		0.12-0.19		0.5-1.0	.20	.20	l I	 	I
	75-80		1.30-1.65		0.16-0.22		0.1-0.8	.10	.10	I I	 	
	13-00	22-21		0.0-2	0.10-0.22	0.0-2.9	0.1-0.0	.37	.31	1	I I	1

Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	 Clay	 Moist bulk	Permea- bility	 Available water	 Linear extensi-	Organic matter		on fac		erodi- bility	
and soll name			density	DITTLY	capacity	bility	Macter	Kw	 Kf	 T		index
	In	Pct	g/cc	In/hr	In/in	Pct	Pct					
 344B:				 				l i	 	 	 	
Copaston	0-7	14-30	1.30-1.45	0.6-2	0.18-0.20	 0.0-2.9	2.0-5.0	.28	.24	 1	 4L	86
	7-11		1.40-1.60		0.15-0.17		0.5-1.0	.28	.28	-		
i	11-18	14-30	1.45-1.65	2-6	0.12-0.14	0.0-2.9	0.0-0.5	.28	.28	İ	İ	i
į	18-80	ļ	j	2-20	i					į	į	į
Copaston	0 - 7	14-30	1.30-1.45	0.6-2	0.18-0.20	0.0-2.9	2.0-5.0	.28	.24	1	4L	86
i	7-11	14-20	1.40-1.60	2-6	0.15-0.17	0.0-2.9	0.5-1.0	.28	.28	İ	İ	i
į	11-18	14-30	1.45-1.65	2-6	0.12-0.14	0.0-2.9	0.0-0.5	.28	.28	İ	j	į
į	18-80			2-20								
 Jacwin	0-7	 22-32	 1.35-1.45	 0.6-2	0.20-0.22	 1.0-4.8	4.5-5.5	.28	 .28	 4	 6	 48
	7-13		1.35-1.45		0.20-0.22		4.5-5.5	.28	.28	-		
i	13-24		1.50-1.60	'	0.17-0.19		1.0-2.0	.28	.28	i		i
i	24-37			0.0015-0.06	1			.28	.28	İ	İ	i
į	37-80	j	i	0.0015-0.06		i i				İ	İ	į
 55:			 	 	 	 			 	 	 	
Luther	0-9	10-27	1.30-1.45	0.6-2	0.22-0.24	 3.0-5.9	2.0-4.0	.28	.28	 5	 6	48
	9-15		1.35-1.45	'	0.15-0.19		0.5-1.0	.28	.28			
i	15-40		1.40-1.55	'	0.15-0.19		0.2-1.0	.28	.28	İ	İ	i
į	40-80	12-22	1.50-1.70	0.6-2	0.17-0.19	0.0-1.6	0.0-0.5	.37	.37	İ	İ	į
 				 				l i	 	 	 	
Marna	0-20	 35-50	1.20-1.30	0.06-0.2	0.18-0.22	 6 0-8 9	4.0-8.0	.28	.28	 5	 4	 86
	20-32		1.25-1.40		0.13-0.16		0.5-1.0	.32	.32		-	
i	32-41		1.35-1.50	'	0.15-0.19		0.2-0.8	.28	.28	i		i
į	41-80		1.35-1.55	'	0.15-0.19	1.0-4.2	0.1-0.5	.32	.37	ĺ	İ	İ
 85:				 					 	 	 	
Guckeen	0-15	35-40	1.20-1.30	0.2-0.6	0.16-0.19	 6.0-8.9	4.0-6.0	.28	.28	 5	 4	86
	15-24		1.25-1.35	'	0.13-0.16		0.5-1.5	.28	.28		 !	
i	24-30		1.35-1.80	'	0.15-0.17		0.2-0.8	.37	.37	İ	İ	i
į	30-80	20-30	1.35-1.55	0.6-2	0.15-0.19	1.0-4.2	0.1-0.5	.32	.37	į	į	į
Cordova	0-18	27-30	1.25-1.45	0.2-0.6	0.18-0.22	 3.0-5.9	4.0-7.0	.28	.28	 5	 6	38
i	18-38		1.35-1.50	'	0.15-0.19		1.0-4.0	.28	.28		İ	i
į	38-80	20-30	1.35-1.55	0.6-2	0.15-0.19	1.0-4.2	0.1-0.5	.32	.37	į	į	į
 887B:		 		 					 	 	 	
Kamrar	0-15	35-40	1.20-1.30	0.6-2	0.17-0.19	 3.0-5.9	3.0-4.0	.28	.28	 5	4	86
	15-32		1.25-1.35		0.15-0.19		1.0-3.0	.28	.28	-	-	
i	32-54		1.25-1.35		0.15-0.19	'	1.0-3.0	.28	.28	İ	İ	i
į	54-80	20-30	1.35-1.55	0.6-2	0.14-0.16	3.0-5.9	0.0-0.5	.37	.37	ĺ	į	į
413G:		 	 	 	 				 	 	 	
Gosport	0-7	22-27	1.30-1.40	0.2-0.6	0.14-0.16	 3.0-5.9	2.5-4.5	.43	.43	 3	6	48
	7-27			0.0015-0.06			0.0-0.5	.32	.32	i	İ	i
į	27-80	j	i	0.0015-0.06		i i				İ	İ	į
 Emeline	0-9	 12-27	 1.15-1.20	 0.6-2	 0 17-0 22	 0.0-3.2	2.5-3.5	.28	 .28	 1	 6	 48
	9-80	12-27		0.8-2		0.0-3.2			.20	1		40
į												
Ridgeton	0-29		1.35-1.40		1	0.0-2.9		.24	'	5	6	48
	29-38		1.35-1.40 1.45-1.70			0.0-2.9		.24	.24 .32	l I	 	1
ļ	38-50 50-80		1.45-1.70			0.0-2.9 1.0-4.2		.32	32	l I	l I	1
!	20-00	_ 20-30	1	U.U-Z	10.13-0.13	1.0-4.2	0.1-0.5	.34			1	1

Physical Properties of the Soils--Continued

0-30 30-35 35-80	18-26 18-26 18-26 14-24	bulk density g/cc	0.6-2 0.6-2 0.6-2 0.6-2	water capacity In/in	0.0-2.9	matter Pct	Kw	Kf .32 .32 .32	 T 	bility group 6	
0-30 30-35 35-80 0-20 20-54 54-80 0-20 20-54	18-27 18-27 6-24 18-26 18-26	1.35-1.55 1.45-1.65 1.50-1.70 1.45-1.55 1.45-1.55	0.6-2 0.6-2 0.6-2	0.22-0.24	 0.0-2.9 0.0-2.9 0.0-2.9	 3.0-5.0 0.5-3.0	.32	.32	 	 6	 48
30-35 35-80 0-20 20-54 54-80 0-20 20-54	18-26 18-26 18-26 14-24	1.45-1.65 1.50-1.70	0.6-2 0.6-2 0.6-2	0.10-0.20	0.0-2.9	0.5-3.0	.32	.32	 5 	 6 	 48
30-35 35-80 0-20 20-54 54-80 0-20 20-54	18-26 18-26 18-26 14-24	1.45-1.65 1.50-1.70	0.6-2 0.6-2 0.6-2	0.10-0.20	0.0-2.9	0.5-3.0	.32	.32	 5 	 6 	 48
30-35 35-80 0-20 20-54 54-80 0-20 20-54	18-26 18-26 18-26 14-24	1.45-1.65 1.50-1.70	0.6-2 0.6-2 0.6-2	0.10-0.20	0.0-2.9	0.5-3.0	.32	.32	5 	6 	48
35-80	18-26 18-26 14-24	1.50-1.70 1.45-1.55 1.45-1.55	0.6-2 0.6-2 0.6-2	0.08-0.20	0.0-2.9				 	 	
0-20 20-54 54-80 .6-2 0.6-2	0.19-0.21	 	0.2-1.0	.32 	.32 	 	 				
20-54 54-80 .6-2			 	 	 						
20-54 54-80 .6-2			i								
20-54 54-80 .6-2			1			İ	į	İ			
54-80 		0.0-2.9	4.0-6.0	.24	.24	5	6	48			
0-20 20-54		1.55-1.70	0.6-2	0.19-0.21		1.0-4.0	.24	.24			
20-54				0.15-0.18	0.0-2.3	0.5-2.0	.28	.28	 		
20-54											
20-54		l İ									
		1.45-1.55	0.6-2	0.19-0.21		4.0-6.0	.24	.24	5	6	48
		1.45-1.55	0.6-2	0.19-0.21		1.0-4.0	.24	.24			
54-80	14-24	1.55-1.70	0.6-2	0.15-0.18	0.0-2.3	0.5-2.0	.28	.28	 		
0-9	27-35	1.20-1.25	0.6-2	0.21-0.23	3.2-5.8	8.0-10	.28	.28	5	7	38
9-14			0.6-2				.28	.28			
14-16								1			ļ
16-80	7-35	1.30-1.40	0.6-2	0.20-0.22	0.4-4.2	0.0-1.0	.43	.43	 	 	
i											
0-10	27-35	1.25-1.35	0.6-2	0.18-0.22	3.2-5.8	5.0-7.0	.24	.24	5	4L	86
10-18			0.6-2			3.0-5.0	.24	.24			
18-39											
39-80	12-22	1.50-1.70	0.6-2	0.17-0.19	0.0-1.6	0.1-0.5	.37	.37	 		
0-10	18-32	0.20-0.80	0.6-2	0.18-0.24	3.0-5.9	10-25	.28	.28	5	6	48
10-68	18-32	0.20-0.80	0.6-2	0.18-0.24	0.0-2.9	10-25	.28	.28			
68-80	18-32	1.30-1.60	0.2-0.6	0.14-0.16	3.0-5.9	0.0-0.5	.37	.37			
				1		[
0 - 7	20-35	1.20-1.25	0.6-2	0.21-0.23	3.2-5.8	12-18	.28	.28	5	7	38
			0.6-2			7.0-9.0	.28	.28			
14-27								1			
27-80	18-30	1.30-1.40	0.6-2	0.20-0.22	1.3-3.2 	0.0-1.0	.43	.43	 	 	
i	j	i i		i		İ	İ	<u> </u>	İ	İ	İ
0-7			2-6					1	5	3	86
								1			ļ
								1	 	 	
	2-10	55 1.75	2-0				•23	•23			
0.7	F 1-		2.6	0 12 0 12							
								1	4± 	3 	86
								!	I I	 	
_0 00	5-0		5-20						<u> </u>		İ
0-7	5-15	1.35-1.55	2-6	0.13-0.15	0.0-2.9	1.0-2.0	.17	.17	3	3	86
7-11			6-20				.10	.15	į	İ	İ
11-80			20-40	1		0.0-0.5	.10	!	i	i	i
11 1 2 5 6	9-14	9-14 27-35 14-16 24-35 16-80 7-35 0-10 27-35 10-18 27-35 18-39 20-35 39-80 12-22 0-10 18-32 10-68 18-32 58-80 18-32 0-7 20-35 7-14 27-35 14-27 24-35 27-80 18-30 0-7 12-18 7-50 12-18 50-69 5-10 59-80 2-18 0-7 5-15 7-18 10-18 18-80 0-8 0-7 5-15 7-11 1-10	9-14 27-35 1.20-1.25 14-16 24-35 1.25-1.30 16-80 7-35 1.30-1.40	9-14 27-35 1.20-1.25 0.6-2 14-16 24-35 1.25-1.30 0.6-2 16-80 7-35 1.30-1.40 0.6-2 10-10 27-35 1.25-1.35 0.6-2 10-18 27-35 1.25-1.35 0.6-2 18-39 20-35 1.35-1.50 0.6-2 18-39 20-35 1.35-1.50 0.6-2 19-80 12-22 1.50-1.70 0.6-2 10-68 18-32 0.20-0.80 0.6-2 10-68 18-32 0.20-0.80 0.6-2 18-80 18-32 1.30-1.60 0.2-0.6 10-7 20-35 1.20-1.25 0.6-2 14-27 24-35 1.25-1.30 0.6-2 127-80 18-30 1.30-1.40 0.6-2 10-7 12-18 1.45-1.55 2-6 150-69 5-10 1.55-1.70 2-6 159-80 2-18 1.55-1.70 2-6 10-7 5-15 1.25-1.35 2-6 10-7 5-15 1.35-1.60 2-6 10-7 5-15 1.35-1.65 6-20 10-7 5-15 1.35-1.55 2-6 10-7 5-15 1.35-1.65 6-20	9-14 27-35 1.20-1.25 0.6-2 0.21-0.23 14-16 24-35 1.25-1.30 0.6-2 0.18-0.20 16-80 7-35 1.25-1.35 0.6-2 0.18-0.22 10-10 27-35 1.25-1.35 0.6-2 0.18-0.22 10-18 27-35 1.25-1.35 0.6-2 0.18-0.22 18-39 20-35 1.35-1.50 0.6-2 0.15-0.19 18-32 0.20-0.80 0.6-2 0.17-0.19 10-10 18-32 0.20-0.80 0.6-2 0.18-0.24 10-68 18-32 0.20-0.80 0.6-2 0.18-0.24 10-68 18-32 1.30-1.60 0.2-0.6 0.14-0.16 10-7 20-35 1.20-1.25 0.6-2 0.21-0.23 14-27 24-35 1.25-1.30 0.6-2 0.21-0.23 14-27 24-35 1.25-1.30 0.6-2 0.20-0.22 12-80 18-30 1.30-1.40 0.6-2 0.20-0.22 13-80 2-18 1.45-1.55 2-6 0.16-0.18 15-9-80 2-18 1.55-1.70 2-6 0.11-0.13 15-9-80 2-18 1.55-1.70 2-6 0.12-0.19 16-80 0-8 1.50-1.65 6-20 0.02-0.04 16-7 5-15 1.35-1.55 2-6 0.13-0.15 17-11 1-10 1.50-1.65 6-20 0.03-0.10	9-14 27-35 1.20-1.25 0.6-2 0.21-0.23 3.2-5.8 14-16 24-35 1.25-1.30 0.6-2 0.18-0.20 2.3-5.8 16-80 7-35 1.30-1.40 0.6-2 0.20-0.22 0.4-4.2	9-14 27-35 1.20-1.25 0.6-2 0.21-0.23 3.2-5.8 7.0-9.0 14-16 24-35 1.25-1.30 0.6-2 0.18-0.20 2.3-5.8 2.0-4.0 16-80 7-35 1.30-1.40 0.6-2 0.20-0.22 0.4-4.2 0.0-1.0	9-14 27-35 1.20-1.25 0.6-2 0.21-0.23 3.2-5.8 7.0-9.0 .28 14-16 24-35 1.25-1.30 0.6-2 0.18-0.20 2.3-5.8 2.0-4.0 .28 16-80 7-35 1.30-1.40 0.6-2 0.20-0.22 0.4-4.2 0.0-1.0 .43 0-10 27-35 1.25-1.35 0.6-2 0.18-0.22 3.2-5.8 5.0-7.0 .24 10-18 27-35 1.25-1.35 0.6-2 0.18-0.22 3.2-5.8 3.0-5.0 .24 10-18 27-35 1.25-1.35 0.6-2 0.18-0.22 3.2-5.8 3.0-5.0 .24 10-18 27-35 1.35-1.50 0.6-2 0.18-0.22 3.2-5.8 2.0-4.0 .32 10-10 18-32 0.20-0.80 0.6-2 0.17-0.19 0.0-1.6 0.1-0.5 .37 10-10 18-32 0.20-0.80 0.6-2 0.18-0.24 3.0-5.9 10-25 .28 10-68 18-32 0.20-0.80 0.6-2 0.18-0.24 0.0-2.9 10-25 .28 10-68 18-32 1.30-1.60 0.2-0.6 0.14-0.16 3.0-5.9 0.0-0.5 .37 10-7 20-35 1.20-1.25 0.6-2 0.21-0.23 3.2-5.8 12-18 .28 14-27 24-35 1.25-1.30 0.6-2 0.18-0.20 2.3-5.8 2.0-4.0 .28 12-780 18-30 1.30-1.40 0.6-2 0.18-0.20 2.3-5.8 2.0-4.0 .28 12-780 18-80 1.45-1.55 2-6 0.16-0.18 0.0-2.9 1.0-2.0 .20 10-7 12-18 1.45-1.55 2-6 0.16-0.18 0.0-2.9 1.0-2.0 .20 10-7 5-15 1.25-1.35 2-6 0.11-0.13 0.0-2.9 1.0-2.0 .20 10-7 5-15 1.25-1.35 2-6 0.12-0.19 0.0-2.9 0.5-1.0 .20 10-7 5-15 1.35-1.60 2-6 0.12-0.19 0.0-2.9 0.5-1.0 .20 10-7 5-15 1.35-1.55 2-6 0.13-0.15 0.0-2.9 1.0-2.0 .17 10-7 5-15 1.35-1.55 2-6 0.13-0.15 0.0-2.9 0.0-0.5 .10 10-7 5-15 1.35-1.55 2-6 0.13-0.15 0.0-2.9 0.0-0.5 .10 10-7 5-15 1.35-1.55 2-6 0.13-0.15 0.0-2.9 0.0-0.5 .10 10-7 5-15 1.35-1.55 2-6 0.13-0.15 0.0-2.9 0.0-0.5 .10 10-7 5-15 1.35-1.55 2-6 0.13-0.15 0.0-2.9 0.0-0.5 .10 10-7 5-15 1.35-1.55 2-6 0.13-0.15 0.0-2.9 0.0-0.5 .10 10-7 5-15 1.35-1.55 2-6 0.13-0.15 0.0-2.9 0.0-0.5 .10 10-10 10-10 1.0-10 1.0-10 1.0-10 1.0-	9-14 27-35 1.20-1.25 0.6-2 0.21-0.23 3.2-5.8 7.0-9.0 .28 .28 14-16 24-35 1.25-1.30 0.6-2 0.18-0.20 2.3-5.8 2.0-4.0 .28 .28 16-80 7-35 1.30-1.40 0.6-2 0.20-0.22 0.4-4.2 0.0-1.0 .43 .43 0-10 27-35 1.25-1.35 0.6-2 0.18-0.22 3.2-5.8 5.0-7.0 .24 .24 10-18 27-35 1.25-1.35 0.6-2 0.18-0.22 3.2-5.8 3.0-5.0 .24 .24 10-18 27-35 1.25-1.35 0.6-2 0.18-0.22 3.2-5.8 3.0-5.0 .24 .24 10-18 27-35 1.25-1.35 0.6-2 0.18-0.22 3.2-5.8 3.0-5.0 .24 .24 10-18 27-35 1.25-1.35 0.6-2 0.17-0.19 0.0-1.6 0.1-0.5 .37 .37 13-80 12-22 1.50-1.70 0.6-2 0.17-0.19 0.0-1.6 0.1-0.5 .37 .37 10-10 18-32 0.20-0.80 0.6-2 0.18-0.24 3.0-5.9 10-25 .28 .28 10-68 18-32 1.30-1.60 0.2-0.6 0.14-0.16 3.0-5.9 0.0-0.5 .37 .37 10-7 20-35 1.20-1.25 0.6-2 0.21-0.23 3.2-5.8 12-18 .28 .28 12-7-80 18-30 1.30-1.40 0.6-2 0.18-0.20 2.3-5.8 2.0-4.0 .28 .28 12-7-80 18-30 1.30-1.40 0.6-2 0.20-0.22 1.3-3.2 0.0-1.0 .43 .43 0-7 12-18 1.45-1.55 2-6 0.16-0.18 0.0-2.9 1.0-2.0 .20 .20 10-7 5-15 1.25-1.35 2-6 0.16-0.18 0.0-2.9 1.0-2.0 .20 .20 10-7 5-15 1.25-1.35 2-6 0.11-0.13 0.0-2.9 1.0-2.0 .20 .20 10-7 5-15 1.25-1.35 2-6 0.11-0.13 0.0-2.9 1.0-2.0 .20 .20 10-7 5-15 1.25-1.35 2-6 0.12-0.19 0.0-2.9 0.0-1.0 .24 .24 0-7 5-15 1.25-1.35 2-6 0.13-0.18 0.0-2.9 1.5-2.5 .20 .20 10-7 5-15 1.35-1.55 2-6 0.13-0.18 0.0-2.9 1.0-2.0 .20 .20 10-7 5-15 1.35-1.55 2-6 0.13-0.15 0.0-2.9 0.0-0.5 .10 .10 0-7 5-15 1.35-1.55 2-6 0.13-0.15 0.0-2.9 0.0-0.5 .10 .10 0-7 5-15 1.35-1.55 2-6 0.13-0.15 0.0-2.9 0.0-0.5 .10 .15 0-7 5-15 1.35-1.55 2-6 0.13-0.15 0.0-2.9 0.0-0.5 .10 .15 0-7 5-15 1.35-1.55 2-6 0.13-0.15 0	9-14 27-35 1.20-1.25 0.6-2 0.21-0.23 3.2-5.8 7.0-9.0 .28 .28 .4-16 24-35 1.25-1.30 0.6-2 0.18-0.20 2.3-5.8 2.0-4.0 .28 .28 .28 .26-80 7-35 1.30-1.40 0.6-2 0.20-0.22 0.4-4.2 0.0-1.0 .43 .44 .	9-14 27-35 1.20-1.25 0.6-2 0.21-0.23 3.2-5.8 7.0-9.0 .28 .28

Physical Properties of the Soils--Continued

Map symbol	Depth	 Clay	 Moist	Permea-	 Available		Organic	Erosi	on fac	tors	erodi-	Wind erodi-
and soil name		 	bulk density	bility	water	extensi-	matter	Kw	 Kf	 T	bility group	
	In	 Pct	density g/cc	 In/hr	capacity In/in	Pct	Pct	vw	1.1	T	group	Tugex
	ın	PCt 	g/cc	In/nr	In/in	PCT	PCt		 	 	 	l I
551B:			i I	İ					 	İ		
Calamine	0 - 8	26-35	1.20-1.35	0.6-2	0.17-0.24	0.4-3.2	5.0-6.0	.28	.28	4	7	38
İ	8-20	26-35	1.20-1.35	0.6-2	0.17-0.24	0.4-3.2	5.0-6.0	.28	.28	ĺ	İ	
I	20-27	1	1.50-1.60		0.18-0.22		0.5-1.5	.43	.43			
	27-34			0.0015-0.06				.32	.32			
	34-46		1	0.0015-0.06	1			.32	.32			
	46-60			0.0015-0.06			0.0-0.5					
551D:		 	l I	I I	 	 	 		l I	 	 	l I
Calamine	0-8	26-35	1.20-1.35	0.6-2	0.17-0.24	0.4-3.2	5.0-6.0	.28	.28	 4	 7	38
	8-20		1.20-1.35		0.17-0.24		5.0-6.0	.28	.28	-	,	30
	20-27		1.50-1.60		0.18-0.22		0.5-1.5	.43	.43	i		i
i	27-34		1	0.0015-0.06	1			.32	.32	İ	i	İ
i	34-46	40-50	1.60-1.70	0.0015-0.06	0.08-0.12	7.3-10.5	0.0-0.5	.32	.32	i	į	İ
İ	46-60		i	0.0015-0.06	j	i	0.0-0.5		i	İ	į	j
İ												
559:												
Talcot	0-10		1.20-1.30		0.18-0.22		5.0-7.0	.28	.28	4	4L	86
	10-26		1.20-1.30		0.18-0.22		2.0-4.0	.28	.28			
	26-30		1.25-1.35		0.17-0.20		1.0-2.0	.28	.28			
	30-60	1-6	1.55-1.65	6-20	0.02-0.04	0.0-2.9	0.5-1.0	.15	.15	 		
561:		 	l I	 	 				 	l I	 	l l
Talcot, loamy		! 	l I	i I	 		 	i	 	 	! 	İ
substratum	0-21	28-35	1.20-1.30	0.6-2	0.18-0.22	3.0-5.9	5.0-7.0	.28	.28	4	4L	86
	21-37		1.25-1.35		0.17-0.20		2.0-6.0	.28	.28	i -	i	
i	37-75		1.55-1.65		0.02-0.04	0.0-2.9	0.5-1.0	.15	.15	i	i	İ
İ	75-80	18-35	1.30-1.40	0.6-2	0.16-0.22	0.0-2.9	0.1-0.8	.37	.37	İ	į	j
I												
566C:												
Moingona	0-16		1.40-1.45		0.20-0.22		3.0-4.0	.24	.24	5	5	56
	16-40		1.45-1.65		0.16-0.18		0.5-1.0	.28	.28			ļ
	40-60	15-30	1.65-1.75	0.6-2	0.16-0.18	0.0-2.9	0.0-0.5	.28	.28			
568D:		 	l I	I I	 	 	l I		 	 	 	l I
Cokato	0-16	22-27	1.30-1.40	0.6-2	0.20-0.22	0.0-2.9	3.0-5.0	.28	.28	 5	6	48
33.1433	16-41		1.40-1.50		0.15-0.19		1.0-2.0	.37	.37			
i	41-60		1.50-1.70		0.14-0.18		0.0-1.0	.37	.37	İ	i	İ
i	60-80		1.50-1.70		0.17-0.19	0.0-1.6	0.0-0.5	.37	.37	i	i	İ
I												
568E:												
Cokato	0-16	1	1.30-1.40		0.20-0.22		3.0-5.0	.28	.28	5	6	48
	16-41		1.40-1.50		0.15-0.19		1.0-2.0	.37	.37	ļ		ļ
	41-60		1.50-1.70		0.14-0.18		0.0-1.0	.37	.37			
	60-80	12-22	1.50-1.70	0.6-2	0.17-0.19	0.0-1.6	0.0-0.5	.37	.37	 		
583:		 	l I	l I	 	 	 		l I	 	 	l I
Minnetonka	0-13	27-35	1.20-1.40	0.2-0.6	0.18-0.22	3.0-5.9	4.0-8.0	.28	.28	 5	 7	38
	13-35				0.13-0.19		0.2-1.0	.28	.28	-		
	35-60		1.25-1.55		0.16-0.21		0.0-0.2	.28	.28	i	į	İ
İ		į	İ	İ		İ		İ	İ	İ	į	Ì
606:												
Lanyon, depressional,		[1			[
ponded	0-13		1		0.14-0.16		6.0-7.0	.28	.28	5	4	86
	13-20		1.40-1.60		0.12-0.14		2.0-4.0	.28	.28	ļ		ļ
	20-52		1.40-1.60		0.12-0.14		2.0-4.0	.28	.28	ļ		ļ
	52-60	25-38	1.60-1.75	0.6-2	0.13-0.15	3.0-5.9	0.5-1.0	.37	.37		1	I

Physical Properties of the Soils--Continued

Map symbol	 Depth	 Clay	 Moist	Permea-	Available	Linear	Organic		on fac		wind erodi-	Wind erodi
and soil name	- 	 	bulk density	bility	water capacity	extensi- bility	matter	Kw	 Kf	 T	bility	bilit
	In	Pct	g/cc	In/hr	In/in	Pct	Pct	Ī	<u> </u>	Ī	<u> </u>	İ
625:						l I						
Lerdal	 0-7	 18-27	 1.15-1.25	0.2-0.6	0.18-0.22	3.0-5.9	2.0-4.0	.37	.37	5	 7	38
	7-9		1.15-1.25	0.2-0.6	0.18-0.22		0.2-1.5	.37	.37		İ	İ
	9-47	35-55	1.25-1.35	0.2-0.6	0.13-0.19	6.0-8.9	0.2-0.8	.32	.32	į	į	j
	47-60	20-30	1.35-1.55	0.6-2	0.15-0.19	1.0-4.2	0.1-0.5	.32	.37			
636:		 							 	 		
Buckney, rarely		į	j i		j		İ	į	į	į	į	j
flooded			1.20-1.50		0.08-0.12		1.5-2.5	.20	.20	4	3	86
	14-22		1.20-1.50	2-6	0.04-0.12		0.0-1.0	.20	.20	!		
	22-60	5-15 	1.20-1.40	6-20	0.02-0.06	0.0-2.9 	0.0-0.5	.17	.17 	 		
636B:		İ					İ			İ	İ	İ
Buckney, rarely			!		!		!			ļ		
flooded			1.20-1.50		0.08-0.12		1.5-2.5	.20	.20	4	3	86
	14-22		1.20-1.50	2-6 6-20	0.04-0.12		0.0-1.0	.20	.20 .17			
	22-60 	5-15	1.20-1.40	6-20	0.02-0.06	0.0-2.9 	0.0-0.5	.17	•1/ 		 	
638C2:										İ		
Clarion, moderately												
eroded	0-6		1.40-1.45		0.20-0.22		2.2-3.2	.28	.28	5	6	48
	6-16 16-35		1.40-1.45	0.6-2	0.20-0.22		1.0-2.0	.32	.32			
	35-60		1.40-1.45 1.50-1.70	0.6-2 0.6-2	0.20-0.22		0.5-1.0	32	32		 	l I
	33-00	12-22	1.50-1.70	0.0-2		0.0-1.0		.57	.57	i		
Storden, moderately	İ	į	j		j		İ	į	İ	į	į	İ
eroded			1.35-1.45		0.20-0.22		2.5-3.5	.28	.28	5	4L	86
	5-55		1.35-1.65	0.6-2	0.17-0.19		0.5-1.0	.37	.37			
	55-80 	12-22 	1.50-1.70	0.6-2	0.17-0.19	0.0-1.6	0.0-0.5	.37	.37			l I
650:												
Joliet	0-15		1.15-1.35	0.6-2	0.17-0.23		4.0-5.0	.24	.24	2	6	48
	15-19		1.35-1.55	0.6-2	0.14-0.20		0.5-2.0	.32	.32	!		
	19-80			0.06-0.6								
Faxon	 0-15	25-30	 1.30-1.45	0.6-2	0.20-0.24	3.0-5.9	2.0-6.0	.28	.28	2	6	48
	15-34	18-30	1.40-1.60	0.6-2	0.12-0.19	3.0-5.9	0.0-2.0	.28	.28	i	İ	İ
	34-80			2-20						į	İ	į
715:		 	 			 		 	 	 	 	
Fluvaquents,					İ		İ	İ		i		İ
frequently flooded	0-9	2-10	1.50-1.55	6-20		0.0-2.9		.17	.17	5	2	134
	9-80	2-10	1.50-1.75	6-20		0.0-2.9		.15	.15			
735:		 	 						 	 		
Havelock, occasionally		į	j i		İ	İ	İ	į	į	į	į	İ
flooded			1.40-1.50		0.20-0.22					5	4L	86
			1.40-1.50		0.20-0.22					ļ		
	40-60	12-28	1.50-1.65	2-6	0.13-0.17	0.0-2.9	0.0-0.5	.28	.28			l I
740D:						! 						
Hawick	0-7		1.35-1.55		0.13-0.15				.17	3	3	86
	7-11		1.50-1.65		0.03-0.10				.15			
	11-80	1-5 	1.55-1.65	20-40	0.02-0.06	0.0-2.9	0.0-0.5	.10	1.15	 		
775B:						! 						
Billett	0-8	5-15	1.40-1.70	2-6	0.13-0.18	0.0-0.0	1.0-2.0	.20	.20	4	3	86
	8-13		1.40-1.70		0.10-0.15							
			1.40-1.70		0.10-0.15					ļ		ļ
	28-41		1.50-1.80		0.05-0.12							
	41-47 47-52		1.50-1.80		0.05-0.12			1.15	.15 .10			1
	47-52 52-60		1.60-1.90 1.60-1.90		0.02-0.10		0.0-0.5	1	.10	I I	 	I I

Physical Properties of the Soils--Continued

Map symbol and soil name	 Depth	 Clay	Moist bulk	Permea- bility	Available water	Linear	Organic matter		on fac		wind erodi- bility	
and soll name		 	bulk density	ртттсА	capacity	extensi- bility	matter	Kw	 Kf	 T	group	
	 In	Pct	g/cc	In/hr	In/in	Pct	Pct			 -	group	
			i	•	,			i	i	į	İ	İ
775C:		İ	į į		İ	İ	İ	İ	ĺ	ĺ	ĺ	ĺ
Billett	0-8	,	1.40-1.70	2 - 6	0.13-0.18	1	1.0-2.0	.20	.20	4	3	86
	8-13	,	1.40-1.70	2 - 6	0.10-0.15	1	0.5-1.0	.20	.20	ļ		ļ
	13-28 28-41	1	1.40-1.70	2-6 2-6	0.10-0.15		0.0-0.5	.15	.15			
	28-41 41-47	,	1.50-1.80 1.50-1.80	2-6	0.05-0.12	1	0.0-0.5	1.15	1.15		 	l I
	47-52	,	1.60-1.90	6-20	0.02-0.10	1	0.0-0.5	1.10	1.10		 	İ
	52-60		1.60-1.90	6-20	0.02-0.10	1	0.0-0.5	.10	.10	i	<u> </u>	İ
		İ	į į		İ	İ	İ	İ	ĺ	ĺ	ĺ	
777B:												
Wapsie	0-8	,	1.40-1.45	0.6-2	0.18-0.20	1	3.0-4.0	.24	.24	4	5	56
	8-13 13-17		1.40-1.45 1.45-1.50	0.6-2 0.6-2	0.18-0.20	1	0.5-1.0	.24	.24			
	17-27	,	1.45-1.50	0.6-2	0.15-0.17	1	0.0-0.5	.28	.28	 	 	
	27-29	,	1.45-1.50	0.6-2	0.15-0.17		0.0-0.5	.28	.28	i		i
	29-38		1.50-1.75	20-101	0.02-0.06	1	0.0-0.5	.10	.10	i	i	İ
	38-60	2-10	1.50-1.75	20-101	0.02-0.06	0.0-0.0	0.0-0.5	.10	.10	į	İ	j
			! !		İ			!		ļ	[
835D2:												
Storden, moderately eroded	 0-5	10_27	 1.35-1.45	0.6-2	0.20-0.22	0 0-2 9	2.5-3.5	.28	.28	 5	 4L	 86
eroded	0-3 5-55		1.35-1.45	0.6-2	0.17-0.19	1	0.5-1.0	.37	.37]	411	00
	55-80	,	1.50-1.70	0.6-2	0.17-0.19	1	0.0-0.5	.37	.37	i	! 	i
		į	j j		j	İ	į	į	į	į	į	j
Omsrud, moderately												
eroded	0-6	,	1.35-1.45	0.6-2	0.20-0.22	1	2.0-4.0	.24	.24	5	4L	48
	6-20		1.35-1.50	0.6-2 0.6-2	0.17-0.19	1	0.5-2.0	.32	.32			
	20-30		1.35-1.55 1.50-1.70	0.6-2	0.15-0.19	1	0.1-0.5	.32	37		 	l I
	30-80	12-22	1.30-1.70	0.0-2	0.17-0.19	0.0-1.0	0.0-0.5	.37	.37		 	l I
835E2:		İ	i i		i	İ	İ	i	i	i	İ	İ
Storden, moderately												
eroded	0-5		1.35-1.45	0.6-2	0.20-0.22	1	2.5-3.5	.28	.28	5	4L	86
	5-55	,	1.35-1.65	0.6-2	0.17-0.19		0.5-1.0	.37	.37			ļ
	55-80	12-22	1.50-1.70	0.6-2	0.17-0.19	0.0-1.6	0.0-0.5	.37	.37			
Omsrud, moderately		 				 			 		 	
eroded	0-6	20-26	1.35-1.45	0.6-2	0.20-0.22	0.0-2.9	2.0-4.0	.24	.24	5	6	48
	6-20	22-30	1.35-1.50	0.6-2	0.17-0.19	0.0-2.9	0.5-2.0	.32	.32	į	į	j
	20-30	20-30	1.35-1.55	0.6-2	0.15-0.19	1.0-4.2	0.1-0.5	.32	.37			
	30-80	12-22	1.50-1.70	0.6-2	0.17-0.19	0.0-1.6	0.0-0.5	.37	.37			
836B:			!!!									
Kilkenny	 0-9	 20-35	 1.15-1.25	0.6-2	17_0 22	3.0-5.9	2.0-4.0	.28	.28	 5	 6	48
Kiikeimy	9-53		1.25-1.35	0.0-2	0.17-0.22		•	.28	.28]	0	40
	53-80	,	1.35-1.55	0.6-2	'	1.0-4.2	!	1	.37	i		İ
		į	i i		j	į	į	į	į	į	į	j
854D:												
Fens, Aquolls		,	0.30-0.50	0.2-6	0.35-0.45		55-75	1		5	2	134
	35-80	27-30	1.50-1.80	0.2-2	0.14-0.22	0.0-2.9	0.5-4.0	.43	.43			
855:		 				 			 		 	
Shorewood	0-17	30-40	1.20-1.40	0.2-0.6	0.18-0.22	3.0-5.9	4.0-8.0	.28	.28	5	7	38
	17-39	,	1.20-1.35	0.2-0.6	0.13-0.16		•	.32	.32	į	į	j
	39-60	20-30	1.35-1.55	0.6-2	0.15-0.19	1.0-4.2	0.1-0.5	.32	.37			
								ļ		ļ		
956:	0.0		1 25 1 40	0.60								
Harps	0-8 8-16	,	1.35-1.40 1.35-1.40	0.6-2 0.6-2	0.19-0.21		•	.24	.24	5	4L	86
	8-16 16-42	,	1.40-1.50	0.6-2	0.19-0.21		•	.32			 	1
	42-60	,	1.50-1.70	0.6-2	,	3.0-5.9	•	.32	1	i		
			,	· -	i	i	i	i	i	i	i	i

Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	 Clay 	 Moist bulk	Permea- bility	Available water	 Linear extensi-	Organic matter		on fac		wind erodi- bility	
and soll name			density	DITICY	capacity	bility	maccer	Kw	Kf	T	group	
	In	Pct	g/cc	In/hr	In/in	Pct	Pct	ļ				<u> </u>
)56 :			 			 			 	 		
Okoboji, depressional,												
ponded	0 - 6	35-40	1.30-1.40	0.2-0.6	0.21-0.23	6.0-8.9	9.0-12	.32	.32	5	4	86
İ	6-32	35-40	1.30-1.40	0.2-0.6	0.21-0.23	6.0-8.9	3.0-9.0	.32	.32	ĺ	İ	ĺ
İ	32-56	35-42	1.30-1.40	0.2-0.6	0.18-0.20	6.0-8.9	0.5-3.0	.32	.32	ĺ	İ	ĺ
	56-60	25-35	1.40-1.50	0.6-2	0.18-0.20	2.6-5.8	0.0-0.5	.28	.28			
007:			 			 			 			
Cosmos, bouldery	0 - 7	35-50	1.40-1.50	0.06-0.2	0.16-0.22	5.8-10.5	4.0-8.0	.28	.28	5	4	86
Ī	7-20	35-50	1.40-1.50	0.06-0.2	0.16-0.22	5.8-10.5	4.0-8.0	.28	.28	İ	į	İ
i	20-30	35-60	1.40-1.60	0.06-0.2	0.14-0.19	5.8-13.7	0.5-2.0	.32	.32	İ	į	İ
i	30-36	35-60	1.40-1.60	0.06-0.2	0.14-0.19	5.8-13.7	0.5-2.0	.32	.32	İ	į	İ
	36-60	30-55	1.90-2.00	0.06-0.2	0.11-0.15	4.2-12.1	0.1-0.5	.32	.32	į	į	į
.055B:		 	 			 		 	 		 	
Kandiyohi, bouldery	0-10		1.30-1.50	0.2-0.6	0.16-0.22	7.3-10.5	4.0-7.0	.28	.28	5	4	86
İ	10-23	35-60	1.40-1.60	0.2-0.6	0.14-0.19	5.8-13.7	0.5-2.0	.32	.32			
İ	23-64	30-55	1.50-1.70	0.06-0.2	0.13-0.19	4.2-12.1	0.1-1.0	.37	.37			
	64-80	30-55	1.80-2.00	0.06-0.2	0.11-0.15	4.2-12.1	0.1-1.0	.37	.37	į	į	İ
138B:		 	 			 		 	 	 	 	
Clarion	0-7	25-35	1.40-1.45	0.6-2	0.20-0.22	0.0-2.3	3.0-4.0	.24	.24	5	6	48
	7-18		1.40-1.45	0.6-2	0.20-0.22		2.0-3.0	.24	.24	-		
	18-36		1.50-1.70	0.6-2	0.17-0.19		0.5-2.0	.37	.37	i	 	i
	36-60		1.50-1.70	0.6-2	0.17-0.19		0.0-0.5	.37	.37	İ	İ	İ
236B:												
Angus	0-8	20-27	 1.30-1.40	0.6-2	0.20-0.22	 0.0-2.9	2.0-4.0	.28	.28	 5	 6	48
	8-35		1.45-1.55	0.6-2	0.15-0.19	3.0-5.9	0.5-1.0	.28	.28	i	i	i
i	35-40		1.55-1.75	0.6-2	0.14-0.19		0.0-0.5	.37	.37	i	i	i
į	40-80		1.50-1.70	0.6-2	0.17-0.19	0.0-1.6	0.0-0.5	.37	.37	į	į	į
236C:		 	 					 	 		 	l
Angus	0 - 8	20-27	1.30-1.40	0.6-2	0.20-0.22	0.0-2.9	2.0-4.0	.28	.28	5	6	48
i	8-35	24-35	1.45-1.55	0.6-2	0.15-0.19	3.0-5.9	0.5-1.0	.28	.28	i	i	i
i	35-40	24-35	1.55-1.75	0.6-2	0.14-0.19	0.0-2.9	0.0-0.5	.37	.37	i	i	i
	40-80	12-22	1.50-1.70	0.6-2	0.17-0.19	0.0-1.6	0.0-0.5	.37	.37	į	į	į
259 :		 	 					 	 		 	l
Biscay, depressional,										İ		
ponded	0 - 7	25-30	1.20-1.30	0.6-2	0.20-0.22	3.0-5.9	5.5-6.5	.28	.28	4	6	48
İ	7-20	25-30	1.20-1.30	0.6-2	0.20-0.22	3.0-5.9	1.0-6.0	.28	.28	ĺ	İ	ĺ
	20-28	18-30	1.25-1.35	0.6-2	0.17-0.19	3.0-5.9	0.5-1.0	.28	.28			
	28-38	10-28	1.35-1.55	2-6	0.11-0.17	0.0-2.9	0.0-0.5	.28	.32			
	38-80	1-6	1.55-1.65	6-20	0.02-0.04	0.0-2.9	0.0-0.5	.05	.10			
507:		 	 			 			 	 	 	
Brownton	0-22	35-40	1.20-1.30	0.06-0.2	0.18-0.22	6.0-8.9	4.0-8.0	.28	.28	5	4	86
İ	22-38	35-60	1.20-1.30	0.06-0.2	0.13-0.16	6.0-8.9	0.2-1.0	.28	.28	ĺ	İ	ĺ
	38-60	25-35	1.35-1.55	0.6-2	0.15-0.19	1.0-4.2	0.0-2.0	.32	.37	į	į	į
555 :		 	 					 	 	 	 	l I
Nicollet	0-10	18-27	 1.15-1.25	0.6-2	0.17-0.22	1.3-3.2	5.0-6.0	.24	.24	5	6	48
			1.15-1.25		0.17-0.22				.24	i	i	i
			1.25-1.35		0.15-0.19				.37	i	i	i
	36-60		1.50-1.70		0.17-0.19			.37	.37	į		İ
Guckeen	0.15	35 40	1 20.1 20	0206	0 16 0 10		10.60		20			 86
Guckeen	0-15		1.20-1.30		0.16-0.19				.28	5	4	86
			1.25-1.35		0.13-0.16				.28	I I	1	1
			1.35-1.80		0.15-0.17				.37			1
	30-80	∠0-30	1.35-1.55	0.6-2	0.15-0.19	1 1.U-4.2	0.1-0.5	.32	.37	1	1	I

Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	 Clay	 Moist bulk	Permea- bility	 Available water	 Linear extensi-	Organic	Erosi	on fac	tors		Wind erodi-
and soil name		 	bulk density	рттт	water capacity	extens:-	matter	Kw	 Kf	 T	group	
	In	Pct	g/cc	In/hr	In/in	Pct	Pct			 		
102CD			ļ									
1836B: Kilkenny	0-9	 20-35	 1.15-1.25	0.6-2	0.17-0.22	 3.0-5.9	2.0-4.0	.28	1.28	 5	 6	 48
Kirkemy	9-53	,	1.25-1.35	0.2-0.6	0.15-0.19		0.2-1.0	.28	.28		0	40
	53-80	,	1.35-1.55	0.6-2	0.15-0.19		0.1-0.5	.32	.37	İ		İ
				0.2-0.6						_		
Shorewood	0-17 17-39	,	1.20-1.40 1.20-1.35	0.2-0.6	0.18-0.22		1.0-4.0	.28	.28	5	7	38
	39-60	,	1.35-1.55	0.6-2	0.15-0.19		0.1-0.5	.32	.37			
2700C: Ridgeton	0-29	 18-26	 1.35-1.40	0.6-2	0.20-0.22	0.0-2.9	2.0-4.0	.24	.24	 5	 6	 48
	29-38	,	1.35-1.40	0.6-2	0.20-0.22		2.0-4.0	.24	.24	i		
i	38-50	,	1.45-1.70	0.6-2	0.16-0.18	0.0-2.9	0.0-1.0	.32	.32	i	İ	i
	50-80	20-30	1.35-1.55	0.6-2	0.15-0.19	1.0-4.2	0.1-0.5	.32	.37			
2700D:		 	 			 					 	
Ridgeton	0-29	18-26	1.35-1.40	0.6-2	0.20-0.22	0.0-2.9	2.0-4.0	.24	.24	5	6	48
I	29-38	,	1.35-1.40	0.6-2	0.20-0.22		2.0-4.0	.24	.24			
	38-50	,	1.45-1.70	0.6-2	0.16-0.18	1	0.0-1.0	.32	.32			
	50-80	20-30	1.35-1.55	0.6-2	0.15-0.19	1.0-4.2	0.1-0.5	.32	.37			
4000.			 									
Urban land		İ	į į		į			į	į	į	İ	İ
4055:			 			 		1				
Nicollet	0-10	18-27	 1.15-1.25	0.6-2	0.17-0.22	1.3-3.2	5.0-6.0	.24	.24	5	6	48
i	10-17	,	1.15-1.25	0.6-2	0.17-0.22	1.3-3.2	3.0-5.0	.24	.24	į	İ	i
I	17-36	,	1.25-1.35	0.6-2	0.15-0.19		0.5-2.0	.37	.37			
	36-60	12-22	1.50-1.70	0.6-2	0.17-0.19	0.0-1.6	0.0-0.5	.37	.37			
Urban land.		 	 			 	 		 	 	 	
4107:			i i							İ		
Webster	0-8	,	1.35-1.40	0.6-2	0.19-0.21		6.0-7.0	.28	.28	5	7	38
	8-16	,	1.35-1.40	0.6-2	0.19-0.21		4.0-5.0	.28	.28			
	16-32 32-60	,	1.40-1.50 1.50-1.70	0.6-2 0.6-2	0.16-0.18		2.0-3.0	.32	32			
	32 00											
Urban land.												
4138B:			 									
Clarion	0-7	,	1.40-1.45	0.6-2	0.20-0.22	1	3.0-4.0	.24	.24	5	6	48
	7-18	1	1.40-1.45	0.6-2	0.20-0.22		2.0-3.0	.24	.24	!		
	18-36 36-60		1.50-1.70 1.50-1.70		0.17-0.19		•		37			
	30 00			0.0 2				.37	.37			
Urban land.												
4235B:												
Angus	0-8	20-27	1.30-1.40	0.6-2	0.20-0.22	0.0-2.9	2.0-4.0	.28	.28	5	6	48
I		1	1.45-1.55		0.15-0.19				.28			
	35-40 40-80	,	1.55-1.75 1.50-1.70		0.14-0.19	1	1		37			
	40-80	12-22	1.30-1.70	0.0-2			0.0-0.3	.37	.37			
Urban land.			ļļ							ļ		
4236D:		 	 			 		1	 	 	 	
Lester	0-7	20-27	1.30-1.40	0.6-2	0.20-0.22	0.0-2.9	3.0-5.0	.28	.28	5	6	48
İ	7-38	,	1.45-1.55		0.15-0.19	3.0-5.9	0.5-1.0	.28	.28			
	38-60	,	1.35-1.55		0.15-0.19				.37			
	60-80	12-22 	1.50-1.70 	0.6-2	0.17-0.19	U.U-1.6 	0.0-0.5	.37	.37	 		
Urban land.		į	j j		j	<u> </u>		İ		İ	į	<u>.</u>
İ			ĺ									

Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	 Clay 	 Moist bulk	 Permea- bility	 Available water	 Linear extensi-	Organic matter	Erosi	on fac	cors	Wind erodi- bility	
i		į	density	į -	capacity	bility		Kw	Kf	т	group	index
	In	Pct	g/cc	In/hr	In/in	Pct	Pct	1				
4005												
4325: Le Sueur	0-17	 16-22	 1.40-1.45	 0.6-2	0.21-0.23	3 0 - 5 9	2.5-3.5	.37	 .37	 5	 6	 48
He Bueur	17-37	!	1.30-1.40		0.21-0.23		3.0-4.0	.24	.24]	0	40
	37-46	!	1.30-1.45		0.15-0.19		0.5-2.0	.32	.32	 	! 	İ
	46-80		1.45-1.60	'	0.15-0.19		0.0-0.5	.32	.32	İ		İ
Urban land.		 		 						 		
1444:		 	 	 	 	 			 	 	 	
Jacwin	0 - 7	22-32	1.35-1.45	0.6-2	0.20-0.22	1.0-4.8	4.5-5.5	.28	.28	4	6	48
	7-13	22-32	1.35-1.45	0.6-2	0.20-0.22	2.3-4.8	4.5-5.5	.28	.28			
I	13-24	20-32	1.50-1.60	0.6-2	0.17-0.19	1.0-4.8	1.0-2.0	.28	.28			
	24-37	40-60	1.50-1.60	0.0015-0.06	0.12-0.14	8.9-13.7	0.0-1.0	.28	.28			
	37-80		 	0.0015-0.06						 	 	
Urban land.		 	 	 	 	 			 	 	 	
1507:			! 	! 								
Canisteo	0-10	27-35	1.25-1.35	0.6-2	0.18-0.22	3.2-5.8	5.0-7.0	.24	.24	5	4L	86
I	10-18	27-35	1.25-1.35		0.18-0.22		3.0-5.0	.24	.24			
	18-39	1	1.35-1.50		0.15-0.19		2.0-4.0	.32	.32			
	39-80	12-22	1.50-1.70	0.6-2	0.17-0.19	0.0-1.6	0.1-0.5	.37	.37	 		l I
Urban land.		 	 	 	 				 	 	 	
1551B:			 	 								
Calamine	0 - 8	26-35	1.20-1.35	0.6-2	0.17-0.24	0.4-3.2	5.0-6.0	.28	.28	4	7	38
	8-20	26-35	1.20-1.35	0.6-2	0.17-0.24	0.4-3.2	5.0-6.0	.28	.28			
I	20-27	27-35	1.50-1.60	0.2-0.6	0.18-0.22	3.2-5.8	0.5-1.5	.43	.43			
	27-34	35-50	1.55-1.65	0.0015-0.06	0.08-0.12	7.3-10.5	0.0-0.5	.32	.32			
	34-46	!		0.0015-0.06	1			.32	.32			ļ
	46-60	 	 	0.0015-0.06	 		0.0-0.5			 	 	
Urban land.		 	 	 	 			į	 	 	 	
4551D:			 	! 								
Calamine	0 - 8	26-35	1.20-1.35	0.6-2	0.17-0.24	0.4-3.2	5.0-6.0	.28	.28	4	7	38
	8-20		1.20-1.35		0.17-0.24		5.0-6.0	.28	.28			
	20-27	!	1.50-1.60			3.2-5.8		.43	.43			
	27-34			0.0015-0.06				.32	.32			
	34-46	40-50	1.60-1.70 	0.0015-0.06				.32	.32			
	46-60	 	 	0.0015-0.06 		 	0.0-0.5			 	 	
Urban land.		 	 	 	i I			į į	: 	 	 	į į
4635:		İ	İ	İ	İ	İ		İ	İ	İ	į	j
Buckney			1.20-1.50	'		0.0-2.9			.20	4	3	86
	14-22		1.20-1.50			0.0-2.9			.20			
	22-60	5-15	1.20-1.40	6-20	0.02-0.06	0.0-2.9	0.0-0.5	.17	.17	 	 	
Urban land.		 	 	 						 		
1635B:		 	 	 	 	 			 	 	 	
Buckney	0-14	10-16	1.20-1.50	2-6	0.08-0.12	0.0-2.9	1.5-2.5	.20	.20	4	3	86
•	14-22		1.20-1.50	'	0.04-0.12		0.0-1.0	.20	.20	i	İ	İ
İ	22-60		1.20-1.40		0.02-0.06		0.0-0.5	.17	.17	İ	İ	İ
Urban land.		 	 	 	 	 			 	 	 	
104CP												
4946B.			l		Į.	I		1	!	ļ.	1	Į.
Udorthents-Highway												

Physical Properties of the Soils--Continued

Map symbol	Depth	 Clay	Moist	Permea-	Available	1	 Organic	Erosi	on fac	tors	erodi-	Wind erodi-
and soil name			bulk	bility	water	extensi-	matter				bility	
	l In	Pct	density g/cc	In/hr	capacity In/in	bility Pct	Pct	Kw	Kf	T	group	Index
		į				į	į	İ	į	į		
5010. Pits, sand and gravel	 	 	 			 	 	 	 		 	
5030. Pits, limestone quarries		 	 			 	 	 	 		 	
5035. Pits, gypsum quarries		 	 		 	 	 	 	 	 	 	
5040. Udorthents, loamy		 	 			 	 	 	 	 	 	 - -
5049. Aquolls, ponded- Udorthents, loamy		 	 			 	 	 	 	 	 	
5060. Pits, clay		 	 			 	 	 	 	 	 	
5080. Udorthents		 	 			 	 	 	 	 	 	
5457:		 	 			 			 			
Du Page, channeled,												
frequently flooded		,	1.35-1.55		0.22-0.24	1	3.0-5.0	.32	.32	5	6	48
	30-35	,	1.45-1.65	0.6-2	0.10-0.20		0.5-3.0	.32	.32	!		
	35-80 	6-24	1.50-1.70	0.6-2	0.08-0.20	0.0-2.9	0.2-1.0	.32	.32		 	
5507:		İ	İ				i	İ	i	i	! 	İ
Corvuso	0-20	35-55	1.30-1.45	0.06-0.6	0.14-0.22	6.0-8.9	4.0-7.0	.24	.24	5	4L	86
I	20-30	35-60	1.40-1.60	0.06-0.6	0.13-0.19	6.0-8.9	0.0-1.0	.32	.32			
	30-80	30-55	1.60-1.80	0.06-0.2	0.11-0.15	6.0-8.9	0.0-0.5	.37	.37			
Brownton	0-22	35-40	1.20-1.30	0.06-0.2	0.18-0.22	6.0-8.9	4.0-8.0	.28	.28	5	 4	 86
	22-38	,	1.20-1.30		0.13-0.16	6.0-8.9	0.2-1.0	.28	.28			
	38-60	25-35	1.35-1.55	0.6-2	0.15-0.19	1.0-4.2	0.0-2.0	.32	.37			
AW. Animal waste lagoon			 			 	 	 	 	 		
SL.	 		 			 	 		 			
Sewage lagoon		į					į	į	į	į		
w.		 	 			 	 		 			
Water		İ	İ		İ	İ	İ	į	İ	İ		ĺ
					1							

Chemical Properties

The table described in this section shows estimates of some chemical characteristics and features that affect soil behavior. These estimates are given for the 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.

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

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

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

Calcium carbonate equivalent is the percent of carbonates, by weight, in the fraction of the soil less than 2 millimeters in size. The availability of plant nutrients is influenced by the amount of carbonates in the soil. Incorporating nitrogen fertilizer into calcareous soils helps to prevent nitrite accumulation and ammonium-N volatilization.

Gypsum is expressed as a percent, by weight, of hydrated calcium sulfates in the fraction of the soil less than 20 millimeters in size. Gypsum is partially soluble in water. Soils that have a high content of gypsum may collapse if the gypsum is removed by percolating water.

Chemical Properties of the Soils

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

Map symbol and soil name	Depth		Effective cation- exchange capacity	'	Calcium carbon- ate	Gypsun
	In	meq/100 g	meq/100 g	рн	Pct	Pct
6:			 	 		
Okoboji,			 	 	 	
depressional, ponded	0-6	41-41		6.6-7.8	0-15	0
i	6-32	41-41		6.6-7.8	0-15	0
į	32-56	41-45	i	6.6-7.8	0-15	0
	56-60	30-36		7.6-8.4	5-30	0
27B:			 	 		
Terril	0 - 9	20-25		6.1-7.3	0	0
į	9-36	20-25	i	6.1-7.3	0	0
I	36-50	20-25		6.1-7.3	0	0
	50-60	20-25		7.6-8.4	5-30	0
34:			 	 		
Estherville	0-7	15-20		5.6-7.3	0	0
i	7-18	5.0-20		5.6-7.3	0	0
į	18-80	0.0-10		6.6-8.4	0-20	0
34B:			 	 		
Estherville	0 - 7	15-20	 	5.6-7.3	0	0
	7-18	5.0-20		5.6-7.3	0	0
	18-80	0.0-10		6.6-8.4	0-20	0
		!				
55: Nicollet	0-10	20-25	 	 6.1-7.3	 0	0
NICOITEC	10-17	20-25	 	6.1-7.3	0 1	0
i	17-36	15-25	 	5.6-7.8	0-15	0
į	36-60	20-25		7.6-8.4	5-30	0
62F:			 	 		
Storden	0 - 7	15-20		7.6-8.4	5-30	0
İ	7-55	15-20		7.6-8.4	5-30	0
	55-80	20-25		7.6-8.4	5-30	0
90:			 	 	 	
Okoboji, mucky,		i	! 	!		
depressional, ponded	0 - 8	41-41	i	6.1-7.8	0-15	0
I	8-20	41-45		6.6-7.8	0-15	0
I	20-40	41-45		6.6-7.8	0-15	0
	40-60	30-36	 	7.6-8.4	5-30	0
95:			 	 	 	
Harps	0 - 8	36-41	i	7.9-8.4	20-30	0
I	8-16	36-41		7.9-8.4	20-30	0
I	16-42	25-30		7.9-8.4	20-30	0
	42-60	20-25		7.4-8.4	20-30	0
107:			 	 		
Webster	0 - 8	36-41		6.6-7.3	0	0
į	8-16	36-41	i	6.6-7.3	0	0
į	16-32	35-41		7.6-7.8	5-10	0
	32-60	20-25		7.6-8.4	5-30	0
108:			 	 	 	
Wadena	0 - 8	5.0-25		6.1-7.3	0	0
i	8-13	5.0-25	i	6.1-7.3	0	0
į	13-30	5.0-20	i	5.6-7.3	0	0
I	30-80	0.0-5.0		6.6-8.4	0-15	0

Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth		Effective cation- exchange capacity		Calcium carbon- ate	Gypsum
	In	meq/100 g	meq/100 g	pН	Pct	Pct
108B:			 	 		
Wadena	0-7	5.0-25	l 	6.1-7.3	0	0
	7-10	5.0-25		6.1-7.3	0	0
i	10-25	5.0-20		5.6-7.3	0	0
İ	25-80	0.0-5.0	i	6.6-8.4	0-15	0
I						
108C:						
Wadena	0-7	5.0-25		6.1-7.3	0	0
	7-10 10-25	5.0-25	 	6.1-7.3	0	0
	25-80	0.0-5.0	 	6.6-8.4	0-15	0
	25 00		İ			•
135:		į			į į	
Coland, occasionally					l İ	
flooded	8 - 0	23-30		6.1-7.3	0	0
	8-32	30-36		6.1-7.3	0	0
	32-40	29-41		6.1-7.3	0	0
	40-44 44-52	9.0-19	 	6.1-7.3	0	0
	44-52 52-60	11-23	 	5.6-7.3	0	0
	32-00	9.0-19	 	0.1-7.3		O
136:			İ	! 	i i	
Ankeny, rarely		j	İ	İ	i i	
flooded	0-7	10-17		6.1-7.3	0	0
I	7-30	10-17		6.1-7.3	0	0
	30-44	8.5-13		6.1-7.3	0	0
	44-60	1.6-7.2		6.1-7.3	0	0
138B:			l I	 		
Clarion	0-7	20-25	l 	5.6-7.3	0 1	0
	7-18	20-25		5.6-7.3	0	0
i	18-36	20-25		5.6-7.8	0-15	0
İ	36-60	20-25	i	7.6-8.4	5-30	0
I						
138C2:						
Clarion, moderately						•
eroded	0-6	20-25		5.6-7.3	0	0
	6-16 16-35	20-25	 	5.6-7.3	0	0
	35-60	20-25	 	7.6-8.4	5-30	0
		20 20	İ			•
201B:		j	j	j	i i	
Coland	0 - 8	23-30		6.1-7.3	0	0
	8-32	30-36		6.1-7.3	0	0
	32-40	29-41		6.1-7.3		0
	40-44	9.0-19		6.1-7.3		0
	44-52 52-60	11-23	 	5.6-7.3	0	0
	34-0U	3.0-13	 	0.1-/.3 	0	0
Terril	0 - 9	20-25		6.1-7.3	0	0
	9-36	20-25		6.1-7.3		0
İ	36-50	20-25		6.1-7.3	j 0 j	0
İ	50-60	20-25		7.6-8.4	5-30	0
		!				
203:	0 0					•
Cylinder	0-8	20-25		5.6-7.3		0
	8-18 18-28	20-25	 	5.6-7.3		0
	28-80	5.0-10	 	6.6-8.4	0-25	0
	20-00	1 3.3-10	i	0.0-0. 1	0-23	J

Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	'		Soil reaction	Calcium carbon- ate	Gypsum
	In	meq/100 g	meq/100 g	рН	Pct	Pct
227:			 	 	 	
Wadena, loamy			! 			
substratum	0 - 7	5.0-25		6.1-7.3	0	0
i	7-16	5.0-25	i	6.1-7.3	0	0
İ	16-23	5.0-20		5.6-7.3	0	0
I	23-30	5.0-20		5.6-7.3	0	0
	30-62	0.0-5.0		7.4-8.4	0-15	0
	62-80	15-28		7.4-8.4	5-20	0
227B:			 	 		
Wadena, loamy		 	l I	l I		
substratum	0 - 7	5.0-25	l 	6.1-7.3	0	0
Subscracum	7-16	5.0-25	l	6.1-7.3	0	0
	16-23	5.0-20	! 	5.6-7.3	0	0
	23-30	5.0-20		5.6-7.3	0	0
	30-62	0.0-5.0		7.4-8.4	0-15	0
i	62-80	15-28		7.4-8.4	5-20	0
İ		İ	j	j	į i	
228:						
Cylinder, loamy						
substratum	0-12	20-25		5.6-7.3	0	0
	12-20	20-25		5.6-7.3	0	0
	20-34	20-25		6.1-7.3	0	0
	34-63	5.0-10		6.6-8.4	0-25	0
	63-80	15-28		7.4-8.4	5-20	0
236D:		1	 	 		
Lester	0 - 7	10-24	 	5.6-7.3	0	0
Hebter	7-38	10-23	l	6.1-7.6	0-5	0
	38-60	10-20	! 	7.4-8.4	15-25	0-1
	60-80	20-25		7.6-8.4	5-30	0
i		İ	İ	İ	į i	
236E:		j	j	İ	į į	
Lester	0 - 7	10-24		5.6-7.3	0	0
I	7-38	10-23		6.1-7.6	0-5	0
I	38-60	10-20		7.4-8.4	15-25	0-1
	60-80	20-25		7.6-8.4	5-30	0
0368						
236F:	0 - 7	10.24	 		1 0	0
Lester	7-38	10-24	 	5.6-7.3	0 0 0 0	0
	38-60	10-23	 	7.4-8.4	15-25	0-1
	60-80	20-25		7.4-8.4	5-30	0
		20 20	i I			·
259:		i	İ	İ	į i	
Biscay	0 - 7	30-36	i	6.1-7.8	0-15	0
Ī	7-20	30-36		6.1-7.8	0-15	0
	20-28	12-25		6.6-7.8	0-15	0
I	28-38	5.0-20		6.6-7.8	0-15	0
	38-80	1.0-5.0		7.6-8.4	5-30	0
262G:						_
Lester	0-7	10-24		5.6-7.3	1	0
	7-38	10-23		6.1-7.6		0
	38-60 60-80	10-20	 	7.4-8.4		0-1 0
	00-80	20-25	 	/.0-8.4 	5-30 	U
Belview	0-9	11-18	 	7.4-8.4	5-30	0
	9-50	10-20	 	7.4-8.4		0-1
	50-60	20-25	l	7.6-8.4		0
			!		. 550	•

Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	exchange capacity	Effective cation- exchange capacity		Calcium carbon- ate	Gypsum
	In	meq/100 g	meq/100 g	рН	Pct	Pct
274:			 	 	 	
Rolfe, depressional,		i	<u> </u>		i i	
ponded	0-10	20-25		5.1-7.3	0	0
	10-21	20-25		5.1-7.3	0	0
	21-55 55-80	20-30	 	6.1-7.3	0	0
278:			 			
Biscay, loamy		i	 	 		
substratum	0 - 7	30-36		6.1-7.4	0-15	0
	7-22	12-25		6.1-7.4	0	0
	22-36	12-25		6.6-7.3	0	0
	36-56	1.0-5.0		7.6-8.4	5-30	0
	56-74 74-80	1.0-5.0	 	7.6-8.4	5-30	0
			<u> </u>			-
307:						
Dundas	0 - 9	9.1-23		5.6-7.3	0	0
	9-15 15-40	12-18	 	5.6-7.3	0	0
	40-80	16-27 20-25		7.6-8.4	0 5-30	0
315B:			 			
Udifluvents,			 	 		
occasionally flooded	0-8	10-15		6.6-7.2	0	0
-	8-60	10-15		6.1-7.3	0	0
323B:			 	 	 	
Fort Dodge	0-39	20-25		5.6-7.3	0	0
	39-58	20-25		6.1-7.3	0	0
	58-80	4.0-10	 	6.1-8.4	0-30	0
325:		i	 	 		
Le Sueur	0-17	15-20	i	5.1-7.3	0	0
	17-37	20-25		5.6-7.3	0	0
	37-46	11-25		5.1-7.3	0	0
	46-80	8.0-18	 	7.4-8.4	5-30	0
338:		j			i i	
Garmore	0 - 6	20-25		5.1-7.3	0	0
	6-17	20-25		5.1-7.3	0	0
	17-21 21-49	20-25	 	5.1-7.3	0	0 0
	49-80	20-25		6.6-7.8		0
342:		İ			ļ İ	
Estherville, loamy						
substratum	0-7 7-15	15-20 5.0-20	 	5.6-7.3		0 0
	15-75	0.0-10	 	6.6-8.4		0
	75-80	15-28		7.4-8.4		0
342B: Estherville, loamy			 	 	 	
substratum	0-7	15-20		5.6-7.3	0	0
	7-15	5.0-20		5.6-7.3		0
	15-75	0.0-10		6.6-8.4	0-20	0
	75-80	15-28		7.4-8.4	5-20	0

Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Cation- exchange capacity	!	Soil reaction	Calcium carbon- ate	Gypsum
	In	meq/100 g	meq/100 g	pН	Pct	Pct
2445						
344B: Copaston	0-7	10-25	 	5.6-7.3	0	0
copascon	7-11	5.0-15		5.6-7.3	0 1	0
	11-18	5.0-15		5.6-7.8	0-15	0
	18-80	j		i	j j	0
345:						
Copaston	0-7 7-11	10-25		5.6-7.3	0	0
	11-18	5.0-15	 	5.6-7.3	0	0
	18-80					0
		i		! 	i i	
Jacwin	0-7	18-27		6.1-7.3	0	0
	7-13	21-27		6.1-7.3	0	0
	13-24	17-26		6.1-7.3	0	0
	24-37	29-45		7.4-8.4	5-30	0
	37-80			7.4-8.4		0
355:			 	 		
Luther	0 - 9	9.1-23	 	5.6-7.3	0	0
	9-15	12-18		5.6-7.3	0	0
	15-40	16-28		5.1-7.3	0	0
	40-80	20-25		7.6-8.4	5-30	0
383:						
Marna	0-20 20-32	26-48	 	6.1-7.3	0	
	32-41	15-25	 	6.6-7.4	0	0
	41-80	10-20		7.4-8.4	15-25	0-1
385: Guckeen	0-15	36-46	 	 5.6-7.3		0
Guckeen	15-24	18-35	 	5.6-7.3	0 1	0
	24-30	10-23	 	6.1-7.3	0 1	0
	30-80	10-20		7.4-8.4	10-20	0-1
		İ	ĺ		į į	
386:						
Cordova	0-18	20-30		6.1-7.3	0	0
	18-38 38-80	15-25	 	5.1-6.5	0	0 0-1
	30-00	10-20	 	/.4-0.4	10-20	0-1
387B:				! 	i i	
Kamrar	0-15	30-36		5.6-7.3	0	0
	15-32	30-45		5.6-7.3	0	0
	32-54	30-45		5.6-7.3		0
	54-80	30-36		7.4-8.4	5-30	0
413G:			l I	 		
Gosport	0-7	15-20	 	 5.1-7.3	0	0
# ====	7-27		30-50	3.6-5.5		0
	27-80				0	0
		Ţ				
Emeline	0-9	20-25		6.1-8.4	0-25	0
	9-80					0
Ridgeton	0-29	20-25	 	 6.1-7.3	0	0
		'	!			
	29-38	20-25		0.1-/.3	0	0
	29-38 38-50	20-25 15-25	 	6.1-7.3		0

Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Cation- exchange capacity		Soil reaction 	Calcium carbon- ate	Gypsum
	In	meq/100 g	meq/100 g	pH	Pct	Pct
457:			 	 		
Du Page, occasionally						
flooded	0-30	17-26		6.6-8.4	0-15	0
	30-35	11-22		7.4-8.4	5-40	0
	35-80	4.0-17		7.4-8.4	5-40	0
485:						
Spillville,						
occasionally flooded	0-20	20-25		5.6-7.3	0	0
	20-54 54-80	20-25	 	5.6-7.3	0	0
	31 00	20 23		3.0 7.3		
485B:		j	İ	j	į į	İ
Spillville, rarely						
flooded	0-20 20-54	20-25	 	5.6-7.3	0	0
	54-80	20-25		5.6-7.3	0	0
506:]				
Wacousta,					0.15	
depressional, ponded	0-9 9-14	41-41	 	6.6-7.8	0-15	0
	14-16	30-35		6.6-7.8	0-15	0
	16-80	25-30		7.6-8.4	5-30	0
		İ		<u> </u>		
507: Canisteo	0-10	36-41	 	 7.6-8.4	 5-15	0
Canisteo	10-18	36-41		7.6-8.4	5-15	0
	18-39	12-29		7.6-8.4	12-18	0
	39-80	20-25		7.6-8.4	5-30	0
F11.				 		
511: Blue Earth,			 	 		
depressional, ponded	0-10	30-70		7.6-8.4	5-20	0
	10-68	30-70		7.6-8.4	5-40	0
	68-80	10-25		7.6-8.4	5-20	0
526:				 		
Wacousta, mucky,		1		 		
depressional, ponded	0-7	41-41		6.6-7.8	0-15	0
	7-14	41-41		6.6-7.8	0-15	0
	14-27 27-80	30-35		6.6-7.8	0-15	0
	27-80	25-30	 	7.4-8.4	5-30	0
536:		i		<u> </u>		
Hanlon, occasionally						
flooded	0-7	15-41		5.6-7.8	:	0
	7-50 50-69	10-15 5.0-10		6.1-7.3	0	0
	69-80	5.0-10		5.6-7.8		0
		İ	İ	İ	İ	İ
541C:						
Estherville	0-7 7-18	15-20 5.0-20		5.6-7.3	0	0
	18-80	0.0-10		6.6-8.4	1	0
			<u> </u>			_
Hawick	0-7	1.0-10		6.1-7.8		0
	7-11	1.0-5.0		6.1-7.8		0
	11-80	1.0-5.0		7.6-8.4	5-15	0

Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth		Effective cation-exchange capacity	!	Calcium carbon- ate	Gypsum
	In	meq/100 g	meq/100 g	pН	Pct	Pct
551B: Calamine	0-8	30-36	 	 6.1-7.8		0
Caramine	8-20	30-36	l	6.1-7.8	0 1	0
	20-27	30-36		6.1-7.8	0-30	0
	27-34	36-41	i	7.6-8.6	5-30	0
	34-46	36-41		7.6-8.6	5-30	0
	46-60					0
5510						
551D: Calamine	0-8	30-36	 	 6.1-7.8	1 0 1	0
Caramine	8-20	30-36	 	6.1-7.8	0 1	0
	20-27	30-36		6.1-7.8	0-30	0
	27-34	36-41		7.6-8.6	5-30	0
	34-46	36-41		7.6-8.6	5-30	0
	46-60					0
		ļ				
559:	0.10					•
Talcot	0-10 10-26	30-36	 	7.6-8.4	5-30	0
	26-30	30-36	 	7.6-8.4	5-30	0
	30-60	1.0-5.0	l	7.6-8.4	5-30	0
		İ	İ		i i	
561:		j	İ	j	į į	
Talcot, loamy						
substratum	0-21	24-31		7.6-8.6	5-30	0
	21-37	24-30		7.6-8.6	5-30	0
	37-75	1.5-5.0		7.6-8.4	5-30	0
	75-80	15-28	 	7.6-8.2	5-20	0
566C:			 	 		
Moingona	0-16	20-25	i	5.6-7.3	0	0
	16-40	20-25		5.6-7.3	0	0
	40-60	20-25		5.6-8.4	0-25	0
5.00						
568D: Cokato	0-16	15-25	 	 5.6-7.3	1 0 1	0
CORACO	16-41	15-20	 	5.6-7.3	0 1	0
	41-60	10-15		7.4-7.8	10-20	0
	60-80	20-25	i	7.6-8.4	5-30	0
568E:		ļ	!	!		
Cokato	0-16	15-25		5.6-7.3	0	0
	16-41	15-20		5.6-7.3	0 10-20	0
	41-60 60-80	10-15	 	7.4-7.8	5-30	0
	00-00	20-25	 	7.0-0.4	3-30	Ü
583:		i			j j	
Minnetonka	0-13	24-43		5.6-7.3	0	0
	13-35	21-47		5.6-7.3	0	0
	35-60	15-32		7.6-8.2	5-20	0
606:			 	 		
Lanyon, depressional, ponded	0-13	41-41	l I .	 6.6-7.8	0-15	0
Ponded	13-20	41-41	 	7.9-8.4	20-30	0
	20-52	41-45		7.9-8.4	20-30	0
	52-60	30-35		7.9-8.4	20-30	0
		1	I	I	ı i	

Chemical Properties of the Soils--Continued

Map symbol and soil name	 Depth 	1	 Effective cation- exchange capacity		 Calcium carbon- ate	Gypsum
	In	meq/100 g	meq/100 g	pН	Pct	Pct
	j	j	İ	į -	į į	
625:						
Lerdal	0-7	18-24		5.6-6.5	0	0
	7-9 9-47	18-24		5.6-6.5	0	0
	9-47	19-30	 	4.5-6.0 7.4-8.4	0 15-25	0
	17-00	10-20	 	7.1-0.1	13-23	O
636:	! 	İ			i i	
Buckney, rarely	İ	j	j	j	j j	
flooded	0-14	10-15		6.6-7.8	0-15	0
	14-22	5.0-15		6.6-7.8	0-15	0
	22-60	5.0-10		7.4-8.4	5-30	0
63 CB :	 					
636B: Buckney, rarely	 	1	l I	l I		
flooded	 0-14	10-15	l 	6.6-7.8	0-15	0
1100404	14-22	5.0-15		6.6-7.8	0-15	0
	22-60	5.0-10	i	7.4-8.4	5-30	0
		İ	ĺ	ĺ	į į	
638C2:						
Clarion, moderately		!				
eroded	0-6	20-25		5.6-7.3	0	0
	6-16	20-25		5.6-7.3	0	0
	16-35 35-60	20-25	 	7.6-8.4	0-15 5-30	0
	33-00	20-25	 	7.0-0.1	5-30	Ü
Storden, moderately	İ	İ	İ	İ	i i	
eroded	0-5	15-20	i	7.6-8.4	5-30	0
	5-55	15-20		7.6-8.4	5-30	0
	55-80	20-25		7.6-8.4	5-30	0
650: Joliet	 0-15	19-27	 	 6.1-8.4	0 20	0
DOI161	15-19	14-24	 	6.1-8.4	0-20 0-20	0
	19-80		 			0
		İ	İ	İ	i i	
Faxon	0-15	10-25	i	6.6-7.2	, 0 j	0
	15-34	5.0-15		6.6-7.2	0	0
	34-80					
715:	 		 	l I		
Fluvaquents, frequently flooded	 0-9	5.0-10	l 	5.6-7.3		0
rrequencry rreduce	9-80	5.0-10	 	5.6-7.3	0	0
			İ	İ	i i	
735:		İ	ĺ	ĺ	į į	
Havelock,						
occasionally flooded	•	30-36		7.6-8.4		0
	9-40	30-36		7.6-8.4	:	0
	40-60	10-20		7.6-8.4	5-30	0
740D:	 	1	 	 		
Hawick	 0-7	1.0-10	 	6.1-7.8	0-10	0
	7-11	1.0-5.0		6.1-7.8		0
	11-80	1.0-5.0		7.6-8.4		0
					l i	

Chemical Properties of the Soils--Continued

Map symbol and soil name						1 1	
In		Depth	exchange	cation- exchange		carbon-	Gypsum
775B: Billett		T			===	Dat	Dat
Billett		ın	meq/100 g	med/100 g	pn	PCT	PCt
	775B:		i		! 	i i	
13-28 7.6-15	Billett	0 - 8	4.8-13	i	5.1-7.3	0	0
28.41		8-13	8.6-15		5.1-6.5	0	0
41-47 6.2-15 5.6-7.3 0 0 0 47-52 1.8-6.3 5.1-7.8 0-20 0 0 52-60 1.8-6.3 5.1-7.8 0-20 0 0 0 0 0 0 0 0 0			1	!		! !	
47-52			1	1		! !	
775C: Billett				!		! !	
775C: Billett			1	1		: :	
Billett	j	32 00	1.0 0.3	! 	3.1 7.0	0 20	Ü
8-13	775C:		i	İ	İ	i i	
13-28	Billett	0-8	4.8-13		5.1-7.3	0	0
28-41		8-13	8.6-15		5.1-6.5	0	0
41-47			1			! !	0
47-52			1	!		! !	
			1	1	1		
777B: Wapsie			1	1		1 1	
Wapsie		52-60	1.0-0.3	 	5.1-7.6	0-20	U
8-13 15-20 5.6-7.3 0 0 13-17 5.0-10 5.6-6.0 0 0 0 17-27 5.0-10 5.6-6.0 0 0 0 27-29 5.0-10 5.6-6.0 0 0 0 29-38 5.0-10 5.6-6.0 0 0 0 29-38 5.0-10 5.1-7.3 0 0 0 0 0 0 0 0 0	777B:			! [
13-17	Wapsie	0-8	20-25		5.6-7.3	0	0
17-27 5.0-10 5.6-6.0 0 0 27-29 5.0-10 5.6-6.0 0 0 0 27-29 5.0-10 5.6-6.0 0 0 0 0 29-38 5.0-10 5.1-7.3 0 0 0 0 0 0 0 0 0	Ī	8-13	15-20	i	5.6-7.3	0	0
27-29 5.0-10 5.6-6.0 0 0 0 29-38 5.0-10 5.1-7.3 0 0 0 0 38-60 5.0-10 5.1-7.3 0 0 0 0 0 0 0 0 0	İ	13-17	5.0-10		5.6-6.0	0	0
29-38 5.0-10 5.1-7.3 0 0		17-27	5.0-10		1	0	0
835D2: Storden, moderately eroded			1			! !	0
835D2: Storden, moderately eroded			1	1		! !	
Storden, moderately eroded		38-60	5.0-10		5.1-7.3	0	0
Storden, moderately eroded	835D2:			 	 		
eroded			i	İ		i i	
Omsrud, moderately eroded	eroded	0-5	15-20	i	7.6-8.4	5-30	0
Omsrud, moderately eroded	j	5-55	15-20		7.6-8.4	5-30	0
eroded		55-80	20-25		7.6-8.4	5-30	0
eroded							
6-20 9.0-22 5.6-7.3 0 0 20-30 10-20 7.4-8.4 15-25 0-1 30-80 20-25 7.6-8.4 5-30 0 835E2:		0.6	14.25				•
20-30	eroded		1	!		: :	
835E2: Storden, moderately eroded			1	!			
835E2: Storden, moderately eroded	i		1	1			
Storden, moderately eroded			İ	İ		į i	
eroded	835E2:		İ	ĺ		į į	
S-55	- '						
Omsrud, moderately	eroded		1			: :	
Omsrud, moderately eroded			1	!			
eroded		55-80	20-25		7.6-8.4	5-30	0
eroded	Omsrud moderately			 	 		
6-20 9.0-22 5.6-7.3 0 0 20-30 10-20 7.4-8.4 15-25 0-1 30-80 20-25 7.6-8.4 5-30 0 836B:		0-6	14-35		5.6-7.3	0	0
30-80 20-25 7.6-8.4 5-30 0						: :	
836B: Kilkenny		20-30	10-20	i	7.4-8.4	15-25	0-1
Kilkenny 0-9 20-30 5.6-7.3 0 0 0 9-53 25-35 6.1-7.6 0-5 0 53-80 10-20 7.4-8.4 10-20 0-1 854D: Fens, Aquolls 0-35 125-200 5.1-7.8 0-20 0	İ	30-80	20-25		7.6-8.4	5-30	0
Kilkenny 0-9 20-30 5.6-7.3 0 0 0 9-53 25-35 6.1-7.6 0-5 0 53-80 10-20 7.4-8.4 10-20 0-1 854D: Fens, Aquolls 0-35 125-200 5.1-7.8 0-20 0			İ				
9-53 25-35 6.1-7.6 0-5 0 53-80 10-20 7.4-8.4 10-20 0-1 854D: Fens, Aquolls 0-35 125-200 5.1-7.8 0-20 0		0.0					
53-80 10-20 7.4-8.4 10-20 0-1	Kilkenny		'	!			
854D:			1	!			
Fens, Aquolls 0-35 125-200 5.1-7.8 0-20 0		33-00	10-20	 	/•=-0.4 	10-20	0-1
Fens, Aquolls 0-35 125-200 5.1-7.8 0-20 0	854D:			! 	! 		
		0-35	125-200		5.1-7.8	0-20	0
	-		'			10-30	0
						l i	

Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Cation- exchange capacity			Calcium carbon- ate	Gypsum
	In	meq/100 g	meq/100 g	pН	Pct	Pct
855:						
Shorewood	0-17	30-45		5.6-7.3	0	0
I	17-39	25-45		5.1-7.3	0	0
	39-60	10-20	 	7.4-8.4	10-20	0-1
956:			 	 		
Harps	0 - 8	36-41		7.9-8.4	20-30	0
I	8-16	36-41		7.9-8.4	20-30	0
	16-42	25-30		7.9-8.4	20-30	0
	42-60	20-25	 	7.4-8.4	20-30	0
Okoboji,						
depressional, ponded	0 - 6	41-41		6.6-7.8	0-15	0
	6-32	41-41		6.6-7.8	0-15	0
ļ	32-56 56-60	41-45 30-36	 	6.6-7.8 7.6-8.4	0-15	0
	30 00	30 30		7.0 0.1		ŭ
1007:					[
Cosmos, bouldery	0-7 7-20	30-50	 	6.1-7.3	0	0
	20-30	25-45	 	6.1-7.3	0	0
	30-36	25-45		7.4-8.4	15-25	0-1
į	36-60	15-30		7.4-8.4	15-25	0-1
10555						
1055B: Kandiyohi, bouldery	0-10	30-50	 	 6.1-7.3	0	0
	10-23	25-45		6.1-7.3	0	0
į	23-64	20-40		7.4-8.4	15-30	0-1
	64-80	20-40		7.4-8.4	10-20	0-1
1138B:			 	 		
Clarion	0 - 7	20-25		5.6-7.3	0	0
I	7-18	20-25		5.6-7.3	0	0
	18-36	20-25		5.6-7.8	0-15	0
	36-60	20-25	 	7.6-8.4	5-30	0
1236B:				 		
Angus	8 - 0	10-24		5.6-7.3	0	
	8-35	10-23		5.1-7.3	0	
ļ	35-40 40-80	8.0-18	 	7.4-8.4	5-20	0
	10 00	20 23		7.0 0.1		ŭ
1236C:					[
Angus	0-8	10-24		5.6-7.3	0	
ļ	8-35 35-40	10-23	 	5.1-7.3	0 5-20	
Ï	40-80	20-25		7.6-8.4	5-30	0
1259: Biscay, depressional,			 	 		
ponded	0 - 7	30-36	 	6.1-7.8	0-15	0
-	7-20	30-36		6.1-7.8	0-15	0
į	20-28	12-25		6.6-7.8	0-15	0
	28-38	5.0-20		6.6-7.8	0-15	0
	38-80	1.0-5.0	 	7.6-8.4	5-30	0
1507:						
Brownton	0-22	21-28		7.4-8.4	10-20	0-1
	22-38	18-31		7.4-8.4	10-25	0-1
I	38-60	10-20		7.4-8.4	10-20	0-1

Chemical Properties of the Soils--Continued

exchange cathon capacity	Map symbol	Depth	Cation-	 Effective	Soil	Calcium	Gypsum
	and soil name		exchange	cation-	reaction	carbon-	
In			capacity			ate	
1555: Nicollet		In	 meg/100 g	·	Hg	Pct	Pct
Nicollet					į -		
10-17 20-25 6.1-7.3 0 0 17-36 15-25 5.6-7.8 0-15 0 36-60 20-25 7.6-8.4 5-30 0 0 15-24 18-36 5.6-7.3 0 0 0 0 15-24 18-36 5.6-7.3 0 0 0 0 0 0 0 0 0	· ·	0-10	20-25	 	 6.1-7.3		0
Guckeen			1	i		0	0
Guckeen	i	17-36	15-25		5.6-7.8	0-15	0
15-24 18-36 5.6-7.3 0 0 24-30 10-23 6.1-7.3 0 0 0 0 0 0 0 0 0		36-60	20-25		7.6-8.4	5-30	0
1836B:	Guckeen	0-15	36-46		5.6-7.3	0	0
1836B: Kilkenny	İ	15-24	18-36		5.6-7.3	0	0
1836B: Kilkenny	I	24-30	10-23		6.1-7.3	0	0
Rilkenny		30-80	10-20		7.4-8.4	10-20	0-1
9-53	1836B:				 		
Shorewood	Kilkenny	0 - 9	20-30		5.6-7.3	0	0
Shorewood	I	9-53	25-35		6.1-7.6	0-5	0
17-39		53-80	10-20		7.4-8.4	10-20	0-1
39-60 10-20	Shorewood	0-17	30-45		5.6-7.3	0	0
2700C: Ridgeton		17-39	25-45		5.1-7.3	0	0
Ridgeton		39-60	10-20		7.4-8.4	10-20	0-1
29-38 20-25 6.1-7.3 0 0 0 38-50 15-25 6.1-7.3 0-5 0 0 0 0 0 0 0 0 0	2700C:				 		
38-50 15-25 6.1-7.3 0-5 0	Ridgeton	0-29	20-25		6.1-7.3	0	0
2700D: Ridgeton	I	29-38	20-25		6.1-7.3	0	0
2700D: Ridgeton	I	38-50	15-25		6.1-7.3	0-5	0
Ridgeton		50-80	10-20		7.4-8.4	10-20	0
29-38 20-25 6.1-7.3 0 0 38-50 15-25 6.1-7.3 0-5 0 0 50-80 10-20 7.4-8.4 10-20 0 0 0 0 0 0 0 0 0	2700D:				 		
38-50	Ridgeton		1				0
S0-80 10-20			'	!			
4000. Urban land 4055: Nicollet			1	!		1 1	
Urban land 4055: Nicollet				į			
4055: Nicollet					 		
Nicollet						i i	
10-17 20-25 6.1-7.3 0 0		0-10	20-25	 	6 1 - 7 3		0
17-36	NICOITet		1	!		! !	
Urban land. 4107: Webster				!	1	! !	
### Additional Color of the col			1				
Webster	Urban land.			 	 		
Webster	4107•				 		
16-32 35-41 7.6-7.8 5-10 0		0 - 8	36-41		6.6-7.3	0	0
32-60 20-25 7.6-8.4 5-30 0		8-16	36-41		6.6-7.3	0	0
Urban land. 4138B: Clarion		16-32	35-41		7.6-7.8	5-10	0
4138B: Clarion		32-60	20-25		7.6-8.4	5-30	0
Clarion	Urban land.			 	 		
7-18 20-25 5.6-7.3 0 0 18-36 20-25 5.6-7.8 0-15 0 36-60 20-25 7.6-8.4 5-30 0	4138B:				! 		
18-36 20-25 5.6-7.8 0-15 0 36-60 20-25 7.6-8.4 5-30 0	Clarion	0-7	20-25		5.6-7.3	0	0
36-60 20-25 7.6-8.4 5-30 0	İ	7-18	20-25		5.6-7.3	0	0
i i i i i			20-25			1 1	0
		36-60	20-25		7.6-8.4	5-30	0
712un 1unu.	Urban land.				! 		

Chemical Properties of the Soils--Continued

	 	capacity	capacity	 	carbon-	
	In	meq/100 g	meq/100 g	рH	Pct	Pct
4235B:	 		 	 		
Angus	0-8	10-24		5.6-7.3	0	
	8-35	10-23		5.1-7.3	0	
	35-40 40-80	8.0-18	 	7.4-8.4		0
Urban land.			 			
	İ			İ	i	
4236D:		10.04	l I			
Lester	0-7 7-38	10-24	 	5.6-7.3		0
	38-60	10-20		7.4-8.4		0-1
	60-80	20-25		7.6-8.4	5-30	0
Urban land.	 		 	 		
4325:			 	 		
Le Sueur	0-17	15-20	 	5.1-7.3	0	0
	17-37	20-25		5.6-7.3	0	0
	37-46	11-25		5.1-7.3		0
	46-80	8.0-18	 	7.4-8.4	5-30	0
Urban land.			 	 		
4444:	 		 	 		
Jacwin	0-7	18-27		6.1-7.3	0	0
	7-13	21-27		6.1-7.3		0
	13-24	17-26 29-45	 	6.1-7.3		0
	37-80			7.4-8.4		0
Urban land.	 		 	 		
4507:			 	 		
Canisteo	0-10	36-41		7.6-8.4		0
	10-18	36-41		7.6-8.4		0
	18-39 39-80	12-29 20-25	 	7.6-8.4		0
Urban land.				 		
4551B:	 		 	 		
Calamine	0-8	30-36		6.1-7.8	0	0
	8-20	30-36		6.1-7.8		0
	20-27	30-36	 	6.1-7.8		
	27-34 34-46	36-41 36-41	ı	7.6-8.6		
	46-60					0
Urban land.	 		 	 		
4551D.						
4551D: Calamine	0-8	30-36	 	 6.1-7.8	0	0
OGTUMING	8-20	30-36	 	6.1-7.8		0
	20-27	30-36		6.1-7.8		
	27-34	36-41		7.6-8.6		0
	34-46 46-60	36-41	 	7.6-8.6	5-30	0
Urban land.	!			ļ	ļ į	

Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	exchange capacity	capacity	reaction	Calcium carbon- ate	Gypsum
	In	meq/100 g	meq/100 g	pH p	Pct	Pct
4635:			 	 		
Buckney	0-14	10-15		6.6-7.8		0
	14-22 22-60	5.0-15	 	6.6-7.8 7.4-8.4		0
	22-00	3.0-10		/.1-0.1	3-30	U
Urban land.					į į	
4635B:			 	 		
Buckney	0-14	10-15		6.6-7.8	0-15	0
	14-22	5.0-15		6.6-7.8	: :	0
	22-60	5.0-10		7.4-8.4	5-30	0
Urban land.			 	 		
4946B:			 	 		
Udorthents.		į	İ	İ	i i	
77.1 ml						
Highway.			 	 		
5010.					i i	
Pits, sand and gravel						
5030.			 	 		
Pits, limestone			 	 		
quarries		j	İ	İ	j j	
5035. Pits, gypsum quarries			 	 	 	
rreb, gypbam daarreb					i i	
5040.						
Udorthents, loamy			 	 		
5049:			 	 		
Aquolls, ponded.		į	İ	İ	i i	
77.3						
Udorthents, loamy.			 	 		
5060.					i i	
Pits, clay						
5080.			 	 		
Udorthents					i i	
5457: Du Page, channeled,			 	 		
frequently flooded	0-30	17-26	 	6.6-8.4	0-15	0
	30-35	11-22		7.4-8.4		0
	35-80	4.0-17		7.4-8.4	5-40	0
5507:			 	 		
Corvuso	0-20	25-40	 	7.4-8.4	3-20	0
	20-30	15-30	i	7.4-8.4	15-25	0-2
	30-80	15-30		7.4-8.4	10-20	0
Brownton	0-22	21-28	 	 7.4-8.4	 10-20	0-1
·-··	22-38	18-31		7.4-8.4	10-25	0-1
	38-60	10-20		7.4-8.4	10-20	0-1
314			 	 		
AW. Animal waste lagoon			 	 		
		i	i	i	i i	

Chemical Properties of the Soils--Continued

Map symbol	Depth	Cation-	Effective	Soil	Calcium	Gypsur
and soil name		exchange	cation-	reaction	carbon-	
		capacity	exchange		ate	
			capacity			
	In	meq/100 g	meq/100 g	pН	Pct	Pct
SL.						
Sewage lagoon						
W.						
Water						
	İ	İ		ĺ	į į	

Water Features

The table described in this section gives estimates of various water features. The estimates are used in land use planning that involves engineering considerations.

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

The four hydrologic soil groups are:

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

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

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

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

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

Surface runoff refers to the loss of water from an area by flow over the land surface. Surface runoff classes are based on slope, climate, and vegetative cover. It is assumed that the surface of the soil is bare and that the retention of surface water resulting from irregularities in the ground surface is minimal. The classes are negligible, very low, low, medium, high, and very high.

The *months* in the table indicate the portion of the year in which the feature is most likely to be a concern.

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

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

Flooding is the temporary inundation of an area caused by overflowing streams, by runoff from adjacent slopes, or by tides. Water standing for short periods after rainfall

or snowmelt is not considered flooding, and water standing in swamps and marshes is considered ponding rather than flooding.

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

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

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

Water Features

(See text for definitions of terms used in this table. Estimates of the frequency of ponding and flooding apply to the whole year rather than to individual months. Absence of an entry indicates that the feature is not a concern or that data were not estimated)

				Water	table		Ponding	.	Floo	ding
Map symbol and soil name	 Hydro- logic group	Surface runoff	 Month 	Upper	Lower	Surface water depth	Duration	Frequency 	Duration	Frequenc
	J	1	1	Ft	 Ft	Ft		1 1		1
		 	I I	FC	FC	FC				
:		 		i	 					
Okoboji, depressional,		 	i	i	! 	i i		i i		i
ponded	B/D	 Negligible	i	i	! 	i i		i i		i
•	i '		January	2.0-3.5	>6.0	i i		None		None
	i i		February	1.5-3.0		0.0-1.0	Long	Frequent		None
	i i		March	0.5-2.0	>6.0	0.0-1.0	Long	Frequent		None
	į i		April	0.0-1.0	>6.0	0.0-1.0	Long	Frequent		None
	į į		May	0.5-2.0	>6.0	0.0-1.0	Long	Frequent		None
	i i		June	1.0-2.0	>6.0	0.0-1.0	Long	Frequent		None
	i i		July	2.0-3.5	>6.0	0.0-1.0	Long	Frequent		None
	i i		August	2.5-3.5	>6.0	0.0-1.0	Long	Frequent		None
	i i		September	3.0-4.0	>6.0	0.0-1.0	Long	Frequent		None
	į i	ĺ	October	2.5-3.5	>6.0	0.0-1.0	Long	Frequent		None
	į i	ĺ	November	1.5-3.0	>6.0	0.0-1.0	Long	Frequent		None
	į		December	2.0-3.5	>6.0	ļ ļ		None		None
7B:					 					
Terril	В	Low	İ	İ		į į		į į		İ
			January	6.0-6.7	>6.0			None		None
			February	5.5-6.7	>6.0			None		None
			March	4.5-6.5	>6.0			None		None
			April	4.0-6.0	>6.0			None		None
			May	4.5-6.5	>6.0			None		None
			June	5.0-6.7	>6.0			None		None
			July	6.0-6.7	>6.0			None		None
			August	6.5-6.7	>6.0			None		None
			September	6.5-6.7	>6.0			None		None
			October	6.5-6.7	>6.0			None		None
			November	5.5-6.7	>6.0			None		None
	1	1	December	6.0-6.7	>6.0			None		None

				Water table		Ponding			Flooding	
Map symbol and soil name	Hydro- logic group	Surface runoff	Month 	Upper	Lower limit	Surface water depth	Duration	Frequency 	Duration	Frequency
				Ft	Ft	Ft				1
34: Estherville	 B	77 1								
Estnerville	B	Very low	 Tames and		 			Name		77
			January			! !		None		None
			February March		 			None None		None None
			1							None
			April					None None		1
			May					None		None None
			June	! !		! !		1		1
			July		 			None None		None
			August		 	1				None
			September					None		None
			October					None		None
			November					None		None
	 		December					None		None
34B:	i i			i		i i		i i		
Estherville	B	Very low	İ	į į		į į		į į		İ
	į į		January			j j		None		None
	į į		February			j j		None		None
	į į		March			j j		None		None
	į į		April	j j		j j		None		None
	i i		May	j i		j j		None		None
	i i		June	j i		j j		None		None
	i i		July	j i		j j		None		None
	i i		August	j i		j j		None		None
	i i		September	j i		j j		None		None
	i i		October	j j		i i		None		None
	i i		November	j j		i i		None		None
	i i		December	j j		i i		None		None
55:										
Nicollet	B	Low								
	i i		January	3.0-5.5	>6.0	i i		None		None
	i i			2.5-5.0	>6.0	i i		None		None
	i i		March	1.5-4.0		i i		None		None
	į į		April	1.0-3.5		i i		None		None
	i i		May	1.5-4.0		i i		None		None
	į į		June	2.0-4.5		i i		None		None
	i i		July	3.0-5.5		i i		None		None
			August	3.5-6.0				None		None
			September					None		None
			October	3.5-6.0		i i		None		None
			November	2.5-5.0				None		None
			12.0.01	12.0 0.0		1 1				1,0116

		 		Water	table	Ponding			Flooding	
Map symbol	 Hydro-	Surface	Month	Upper	Lower	Surface	Duration	Frequency	Duration	Frequency
and soil name	logic	runoff	İ	limit	limit	water		į į		į -
	group	İ	İ	į į		depth		į i		İ
	i i	İ	İ	Ft	Ft	Ft		İ		İ
	İ	İ	İ	į į		į į				İ
52F:										
Storden	В	High								
			January					None		None
			February					None		None
			March					None		None
			April					None		None
			May					None		None
			June					None		None
			July					None		None
			August					None		None
		!	September					None		None
			October					None		None
			November					None		None
			December					None		None
00:		 		 						1
Okoboji, mucky,		 	i							
depressional, ponded	B/D	Negligible	İ	į i		i i		į i		i
• • •	i ·	İ	January	2.0-3.5	>6.0	i i		None		None
	i	İ	February	1.5-3.0		0.0-1.0	Long	Frequent		None
	i	İ	March	0.5-2.0	>6.0	0.0-1.0	Long	Frequent		None
	i	İ	April	0.0-1.0	>6.0	0.0-1.0	Long	Frequent		None
	i	İ	May	0.5-2.0	>6.0	0.0-1.0	Long	Frequent		None
	i	İ	June	1.0-2.0	>6.0	0.0-1.0	Long	Frequent		None
	i	İ	July	2.0-3.5	>6.0	0.0-1.0	Long	Frequent		None
	i	İ	August	2.5-3.5	>6.0	0.0-1.0	Long	Frequent		None
	i	İ	September	3.0-4.0	>6.0	0.0-1.0	Long	Frequent		None
	i	İ	October	2.5-3.5	>6.0	0.0-1.0	Long	Frequent		None
	i	İ	November	1.5-3.0	>6.0	0.0-1.0	Long	Frequent		None
	İ	İ	December	2.0-3.5	>6.0	i i		None		None
95:		 								
75: Harps	 B/D	Low		 						
-	i ·	İ	January	2.0-3.5	>6.0	i i		None		None
	i	İ	February	1.5-3.0		i i		None		None
	i	İ	March	0.5-2.0		i i		None		None
	i	İ	April	0.0-1.0		i i		None		None
	i	İ	May	0.5-1.5		i i		None		None
	i	İ	June	1.0-2.0		i i		None		None
	i	İ	July	2.0-3.0		i i		None		None
	i	İ	August	2.5-3.5	>6.0	i i		None		None
	i	İ		3.0-4.0		i i		None		None
	i	i İ	October	2.5-3.5		i i		None		None
	i	i İ	November	1.5-3.0		i i		None		None

Flooding

Frequency

Duration

Water Features -- Continued

Water table

limit

Upper

limit

Map symbol

and soil name

Hydro-

logic

Surface

runoff

Month

Ponding

Lower | Surface | Duration | Frequency

water

				Water	table	Ponding			Flooding	
Map symbol and soil name	 Hydro- logic group	Surface runoff	Month	Upper limit	Lower	Surface water depth	Duration	Frequency	 Duration 	Frequency
	group		1	l =				1	1	1
				Ft	Ft	Ft			l I	
080:									l I	1
Wadena	 - B	Medium	I	 				I I	l I	
wadena	-	Medium	January					None	 	 None
			February					None		None
			March					None		None
			April					None		None
			May					None	 	None
	i i		June					None	i	None
	i i		July			i i		None	i	None
	i i		August			i i		None		None
	j ;		September			i i		None		None
	i i		October			i i		None		None
	i i		November			i i		None		None
	i i		December			i i		None	i	None
	i i					i i			İ	
.35:	i i		i			i i		i	i	i
Coland, occasionally	i i		i			i i		i	İ	i
flooded	- B/D	Low	i	i		i i		i	i	i
	i i		January	2.0-3.5	>6.0	i i		None	i	None
	i i		February	1.5-3.0		i i		None	Brief	Occasion
	i i		March	0.5-2.0		i i		None	Brief	Occasion
	i i		April	0.0-1.0		i i		None	Brief	Occasion
	i i		May	0.5-1.5		i i		None	Brief	Occasion
	i i		June	1.0-2.0		i i		None	Brief	Occasion
	i i		July	2.0-3.0		i i		None	Brief	Occasion
	i i		August	2.5-3.5	>6.0	i i		None	Brief	Occasion
	i i			3.0-4.0		i i		None	Brief	Occasion
	i i		October	2.5-3.5		i i		None	Brief	Occasion
	i i		November	1.5-3.0		i i		None	Brief	Occasion
	i i		December	2.0-3.5	>6.0	i i		None	i	None
	i i		i	i		i i		i	İ	i
36:	i i		i	İ		i i		i	İ	i
Ankeny, rarely flooded	- В	Very low	i	i		i i		i	İ	į
-	i i	-	January			i i		None	i	None
	i i		February			i i		None	Very brief	Rare
	i i		March			i i		None	Very brief	Rare
	i i		April			i i		None	Very brief	Rare
	j i		May			i i		None	Very brief	Rare
	j i		June			i i		None	Very brief	Rare
	j i		July			i i		None	Very brief	Rare
	j i		August			i i		None	Very brief	Rare
	j i		September			i i		None	Very brief	Rare
	j i		October			i i		None	Very brief	Rare
	j i		November			i i		None	Very brief	Rare

				Water	table	Ponding			Flooding	
Map symbol and soil name	Hydro- logic group	Surface runoff	Month	Upper limit	Lower	Surface water depth	Duration	Frequency 	Duration	Frequency
	!!!		ļ	Ft	Ft	Ft				!
201B:										
:VIB: Terril	B	Low								I I
Telli		HOW	January	6.0-6.7	>6.0			None		None
			February	5.5-6.7				None		None
			March	4.5-6.5				None		None
			April	4.0-6.0				None		None
	1 1		May	4.5-6.5				None		None
			June	5.0-6.7				None		None
	1 1		July	6.0-6.7				None		None
	1 1		August	6.5-6.7				None		None
			, -	6.5-6.7				None		None
			October	6.5-6.7				None		None
			November	5.5-6.7				None		None
			December	6.0-6.7				None		None
			December	6.0-6.7	>0.0			None		None
03:										I I
os: Cylinder	B	Low						1 1		I I
Cylinder		TOW	January	3.0-5.5				None		None
			February	2.5-5.0				None		None
			March	1.5-4.0				None		None
			'					None		None
			April	1.0-3.5				None		None
			May June							
			'	2.0-4.5				None		None
			July	3.0-5.5		1		None		None
			August	3.5-6.0				None		None
				4.0-6.5				None		None
			October	3.5-6.0				None		None
			November	2.5-5.0				None		None
	!!!		December	3.0-5.5	>6.0			None		None
	!!!					!!!				
27:		_								
Wadena, loamy substratum	В	Low				!!!				
	!!!		January					None		None
	!!!		February					None		None
			March					None		None
	!!!		April					None		None
			May					None		None
			June					None		None
	[[July					None		None
	[[August					None		None
	[[September					None		None
	ļ l		October					None		None
			November					None		None
	1 1		December			I I		None		None

				Water	table	Ponding			Flooding	
Map symbol and soil name	 Hydro- logic	Surface runoff	 Month	Upper limit	Lower limit	Surface water	Duration	Frequency	Duration	Frequency
	group					depth				
				Ft	Ft	Ft				
27B:										
Wadena, loamy substratum	B	Low								
			January					None		None
			February					None		None
			March					None		None
			April					None		None
			May					None		None
			June					None		None
			July					None		None
			August					None		None
			September					None		None
			October					None		None
			November					None		None
			December					None		None
28: Cylinder, loamy substratum	 1 B	Low								
			January	3.0-5.5	>6.0			None		None
			February	2.5-5.0	>6.0			None		None
			March	1.5-4.0	>6.0			None		None
			April	1.0-3.5	>6.0			None		None
			May	1.5-4.0	>6.0			None		None
			June	2.0-4.5	>6.0			None		None
			July	3.0-5.5	>6.0			None		None
			August	3.5-6.0	>6.0			None		None
			September	4.0-6.5	>6.0			None		None
			October	3.5-6.0	>6.0			None		None
			November	2.5-5.0	>6.0			None		None
			December	3.0-5.5	>6.0			None		None
36D:										
Lester	В	Medium								
			January					None		None
			February					None		None
			March					None		None
			April					None		None
			May					None		None
			June					None		None
			July					None		None
			August					None		None
			September					None		None
			October					None		None
			November					None		None
	1 1		December			I I		None		None

				Water	table		Ponding	· 	Floo	ding
Map symbol and soil name	Hydro- logic group	Surface runoff	Month	Upper limit	limit	Surface water depth	Duration	Frequency 	Duration	Frequency
	!!!		Ţ	Ft	Ft	Ft				!
236E:										
Lester	B	Medium	l I	1						1
Lester		Medium	January					None		None
			February					None		None
			March					None		None
			April					None		None
	1 1		May					None		None
			June					None		None
			July					None		None
	1 1		August					None		None
			September					None		None
			October					None		None
			November					None		None
			December					None		None
			December					None		None
36F:			l I	1						I I
Lester	B	High		l		1 1				
Hescel		HIGH	January					None		None
			February					None		None
			March					None		None
			April					None		None
			May					None		None
			June					None		None
			July					None		None
			August					None		None
			September					None		None
			October					None		None
			November					None		None
			December					None		None
			December					None		None
259:			l I	l I						I I
259: Biscay	B/D	T 0**	l I	l I						l I
Biscay	B/D	Low	January	2.0-3.5	>6.0			None		None
								None		None
			February	1.5-3.0		!		1 1		
			March					None None		None None
			April	0.0-1.0		! !		1 1		
			May	0.5-1.5				None		None None
			June	1.0-2.0				None		
			July	2.0-3.0		1 1		None		None
			August	2.5-3.5				None		None
				3.0-4.0				None		None
			October	2.5-3.5		1		None		None
			November	1.5-3.0				None		None
	1		December	2.0-3.5	>6.0			None		None

				Water	table		Ponding	·	Floo	ding
Map symbol and soil name	 Hydro- logic group	Surface runoff	Month 	Upper limit	Lower limit	Surface water depth	Duration	Frequency 	Duration	Frequency
				Ft	Ft	Ft				
										!
262G:						!!!				
Lester	В	High		!!!		!!!				
	!!!		January					None		None
	!!!		February					None		None
	!!!		March					None		None
			April					None		None
			May					None		None
			June					None		None
			July					None		None
			August					None		None
			September					None		None
			October					None		None
			November					None		None
			December					None		None
Belview	 B	High								
Deiview		mign	January					None		None
	i i		February	i i		i i		None		None
	i i		March	i i		i i		None		None
	i i		April	i i		i i		None		None
	i i		May	i i		i i		None		None
	i i		June	i i		i i		None		None
	i i		July	i i		i i		None		None
	i i		August	i i		i i		None		None
	i i		September	i i		i i		None		None
	i i		October	i i		i i		None		None
	i i		November	i i		i i		None		None
	i i		December	i i		i i		None		None
				į į		į į				
74:										
Rolfe, depressional, ponded		Waaliaibla	1	! !						
ponded	c	Negligible	 					None		None
			January	2.0-3.5		1 1		1		
			February	1.5-3.0		0.0-1.0	Long -	Frequent		None
			March	0.5-2.0		0.0-1.0	Long	Frequent		None
			April	0.0-1.0		0.0-1.0	Long	Frequent		None
			May	0.5-2.0		0.0-1.0	Long	Frequent		None
			June	1.0-2.0		0.0-1.0	Long	Frequent		None
			July	2.0-3.5		0.0-1.0	Long	Frequent		None
			August	2.5-3.5		0.0-1.0	Long	Frequent		None
				3.0-4.0		0.0-1.0	Long	Frequent		None
			October	2.5-3.5		0.0-1.0	Long	Frequent		None
			November	1.5-3.0		0.0-1.0	Long	Frequent		None
			December	2.0-3.5	>6.0			None		None

				Water	table		Ponding	•	Floo	ding
Map symbol and soil name	 Hydro- logic group	Surface runoff	Month	Upper limit	Lower	Surface water depth	Duration	Frequency	 Duration 	Frequency
	group		1	 Ft	Ft	Geptin		1	1	1
				FC	FL	10			 	
278:			i						 	
Biscay, loamy substratum	 B/D	Low	i	i		iii		İ		i
Discul, Idami, Sassoladam	2/2	20	January	2.0-3.5	>6.0	i i		None		None
	i i		February	1.5-3.0		i i		None		None
	i i		March	0.3-2.0		i i		None		None
	i i		April	0.0-1.0		i i		None		None
	i i		May	0.3-1.5		i i		None		None
	i i		June	0.7-2.0		i i		None		None
	i i		July	2.0-3.0		i i		None		None
	i i		August	2.5-3.5	>6.0	i i		None		None
	i i		, -	3.0-4.0	>6.0	i i		None		None
	i i		October	2.5-3.5		i i		None		None
	i i		November	1.5-3.0		i i		None		None
	i i		December	2.0-3.5	>6.0	i i		None		None
	i i		i	i		i i		İ		i
07:	i i		i	i		i i		i		i
Dundas	. В/р і	Medium	i	i		i i		İ		i
	i i		January	2.0-3.5	>6.0	i i		None		None
	i i		February	1.5-3.0	>6.0	i i		None		None
	i i		March	0.5-2.0	>6.0	i i		None		None
	i i		April	0.0-1.0		i i		None		None
	i i		May	0.5-1.5		i i		None		None
	i i		June	1.0-2.0		i i		None		None
	i i		July	2.0-3.0		i i		None		None
	i i		August	2.5-3.5		i i		None		None
	i i		September	3.0-4.0	>6.0	i i		None		None
	i i		October	2.5-3.5		i i		None		None
	i i		November	1.5-3.0		i i		None		None
	i i		December	2.0-3.5		i i		None		None
	i i					i i				
15B:	i i		i	i		i i		İ		i
Udifluvents, occasionally	i i		i	i		i i		İ		i
flooded		Very low	i	i		i i		İ		i
	i i	-	January			i i		None		None
	i i		February			i i		None	Brief	Occasion
	i i		March			i i		None	Brief	Occasion
	i i		April			i i		None	Brief	Occasion
	i i		May			i i		None	Brief	Occasion
	i i		June			i i		None	Brief	Occasion
	j i		July			i i		None	Brief	Occasion
	j i		August			i i		None	Brief	Occasion
	j i		September			i i		None	Brief	Occasion
	j i		October			i i		None	Brief	Occasion
	j i		November			i i		None	Brief	Occasion
			December			i i		None		None

				Water	table		Ponding		Floo	ding
Map symbol and soil name	 Hydro- logic group	Surface runoff	Month	 Upper limit 	Lower limit	 Surface water depth	Duration	Frequency 	Duration	Frequency
			İ	Ft	Ft	Ft		i i		İ
	İ		İ	ĺ		į į		į į		İ
342:										
Estherville, loamy										
substratum	B	Very low								
			January					None		None
			February					None		None
			March					None		None
			April					None		None
			May					None		None
			June					None		None
	<u> </u>		July					None		None
			August					None		None
			September					None		None
			October					None		None
			November					None		None
			December					None		None
342B:			ļ							ļ
Estherville, loamy										
substratum	В	Very low								
			January					None		None
			February					None		None
			March					None		None
			April					None		None
			May					None		None
			June					None		None
			July					None		None
			August					None		None
			September					None		None
			October					None		None
			November					None		None
			December					None		None
			ļ							!
344B:	!!!									
Copaston	D	Low				!!!		! !		
	!!!		January					None		None
	!!!		February					None		None
	!!		March					None		None
	!!		April					None		None
	ļ ļ		May					None		None
	!!		June					None		None
	ļ ļ		July					None		None
	ļ ļ		August					None		None
	ļ ļ		September					None		None
			October					None		None
			November					None		None
			December					None		None

				Water	table		Ponding	·	Floo	ding
Map symbol and soil name	Hydro- logic group	Surface runoff	Month	Upper limit	Lower	Surface water depth	Duration	Frequency 	Duration	Frequency
				Ft	Ft	Ft				
83: Marna	C/D	High								
Mariia	C/D	HIGH	January	2.0-3.5	>6.0		 	None		None
			February	1.5-3.0			 	None		None
			March	0.5-2.0			 	None		None
			April	0.0-1.0			 	None		None
			May	0.5-1.5			 	None		None
			May June	1.0-2.0			 	None		None
			1			!		1		
			July	2.0-3.0			 	None		None None
			August	2.5-3.5		!		None		
				3.0-4.0				None		None
	!!		October	2.5-3.5				None		None
			November	1.5-3.0				None		None
	!!!		December	2.0-3.5	>6.0			None		None
	!!!			!!!						
885:				!!!						
Guckeen	C	Medium		! !		!				
	!!!		January	3.0-5.5				None		None
	!!!		February	2.5-5.0				None		None
	!!!		March	1.5-4.0				None		None
	!!!		April	1.0-3.5				None		None
			May	1.5-4.0				None		None
			June	2.0-4.5				None		None
			July	3.0-5.5				None		None
			August	3.5-6.0				None		None
				4.0-6.5				None		None
			October	3.5-6.0				None		None
			November	2.5-5.0				None		None
			December	3.0-5.5	>6.0			None		None
86:										
Cordova	C/D	Low								
			January	2.0-3.5	>6.0			None		None
			February	1.5-3.0	>6.0			None		None
			March	0.5-2.0	>6.0			None		None
			April	0.0-1.0	>6.0			None		None
			May	0.5-1.5	>6.0			None		None
			June	1.0-2.0	>6.0			None		None
	1 1		July	2.0-3.0	>6.0	i i		None		None
	j j		August	2.5-3.5	>6.0	i i		None		None
	į į		September	3.0-4.0	>6.0	j i		None		None
	į į		October	2.5-3.5	>6.0	j j		None		None
	į į		November	1.5-3.0	>6.0	j i		None		None
				2.0-3.5	>6.0					

		 		Water	table		Ponding		Floo	ding
Map symbol and soil name	Hydro- logic group	Surface runoff	Month 	Upper	Lower limit	Surface water depth	Duration	Frequency 	Duration	Frequenc
	ļ			Ft	Ft	Ft		!!!		İ
387B:		 								
Kamrar	 B	 Medium	I I			1 1				
Kami ai	5	Medium	January	4.0-6.0	>6 O			None		None
		 	February	3.5-5.5				None		None
		 	March	2.5-4.5				None		None
		 	April	2.0-4.0				None		None
	1	 	May	2.5-4.5				None		None
		 	June	3.0-5.0				None		None
		 	July	4.0-6.0				None		None
		 	August	4.5-6.5				None		None
		 	September					None		None
		 	October	4.5-6.5				None		None
		 	November	3.5-5.5				None		None
		 	December	4.0-6.0				None		None
		 	December	4.0-6.0	>0.0			None		None
13G:	 	 	l I							
Gosport	l C	 Very high	I I			1 1				
Gosport	-	very migh	January	4.0-6.0				None		None
		 		3.5-5.5				None		None
		l I	February	2.5-4.5				None		None
		l I	March			! !				
		 	April	2.0-4.0				None None		None
		l I	May June	2.5-4.5				None		None
		 	1	3.0-5.0		! !		None		None
		 	July	4.0-6.0						1
		 	August	4.5-6.5				None		None
		 	September					None		None
		 	October	4.5-6.5				None		None
			November	3.5-5.5				None		None
		 	December	4.0-6.0	>6.0			None		None
Emeline	 D	 Medium								
Emeline	ען	Medium	 Tames and					Name		l Mana
		 	January	!				None		None
		 	February					None		None
		l I	March					None		None
		l I	April					None		None
		l I	May					None		None
	1	 -	June					None		None
			July					None		None
			August					None		None
			September					None		None
			October					None		None
	1		November					None		None
	1	1	December					None		None

				Water	table		Ponding	·	Floo	ding
Map symbol and soil name	 Hydro- logic group	Surface runoff	Month	Upper	Lower	Surface water depth	Duration	Frequency 	Duration	Frequency
	ī i			Ft	Ft	Ft		l i		
	!!!		ļ					! !		ļ
413G:										
Ridgeton	B	Medium				!!!				
			January					None		None
			February					None		None
			March					None		None
			April					None None		None None
			May	!		! !		None		None
			June					None		None
			July August					None		None
			September					None		None
			October					None		None
			November					None		None
			December					None		None
			December					None		None
157:										
Du Page, occasionally	1 1									
flooded	B	Low				1 1				
1100404	-	20#	January	6.0-6.7	>6.0			None		None
	1 1		February	5.5-6.7		i i		None	Brief	Occasion
	i i		March	4.5-6.5		i i		None	Brief	Occasion
	i i		April	4.0-6.0		i i		None	Brief	Occasiona
	i i		May	4.5-6.5		i i		None	Brief	Occasiona
	i i		June	5.0-6.7		i i		None	Brief	Occasiona
	i i		July	6.0-6.7		i i		None	Brief	Occasiona
	i i		August	6.5-6.7		i i		None	Brief	Occasiona
	i i			6.5-6.7		i i		None	Brief	Occasiona
	i i		October	6.5-6.7	>6.0	i i		None	Brief	Occasiona
	i i		November	5.5-6.7	>6.0	i i		None	Brief	Occasiona
	i i		December	6.0-6.7	>6.0	i i		None		None
	į į		İ	į į		į į		į i		İ
485:	i i			į į		į į		į į		
Spillville, occasionally	I į			l i		į į		ı i		
flooded	B	Low								
			January	3.0-5.5	>6.0			None		None
			February	2.5-5.0	>6.0			None	Brief	Occasiona
			March	1.5-4.0	>6.0			None	Brief	Occasiona
			April	1.0-3.5				None	Brief	Occasiona
			May	1.5-4.0	>6.0			None	Brief	Occasiona
			June	2.0-4.5				None	Brief	Occasiona
			July	3.0-5.5				None	Brief	Occasiona
			August	3.5-6.0				None	Brief	Occasiona
				4.0-6.5				None	Brief	Occasiona
			October	3.5-6.0				None	Brief	Occasiona
			November	2.5-5.0				None	Brief	Occasiona
			December	3.0-5.5	>6.0			None		None

				Water	table		Ponding	·	Floo	ding
	Hydro- logic group	Surface runoff	 Month 	Upper	Lower limit	Surface water depth	Duration	Frequency 	Duration	Frequency
				Ft	Ft	Ft				
			!					! !		!
85B:	_	_						!!!		
Spillville, rarely flooded	В	Low	! _			!!!				
			January	6.0-6.7				None		None
			February	5.5-6.7				None None	Brief Brief	Rare
			March April	4.5-6.5				None	Brief	Rare
			May	4.5-6.5				None	Brief	Rare
			June	5.0-6.7				None	Brief	Rare
			July	6.0-6.7				None	Brief	Rare
			August	6.5-6.7				None	Brief	Rare
				6.5-6.7				None	Brief	Rare
			October	6.5-6.7				None	Brief	Rare
			November	5.5-6.7				None	Brief	Rare
			December	6.0-6.7				None	Prier	None
			December	0.0-0.7	20.0			None		None
Wacousta, depressional,										
ponded	B/D	Negligible	1							1
ponded	5/5	Hegilgible	January	2.0-3.5	 >6.0			None		None
			February	1.5-3.0		0.0-1.0	Long	Frequent		None
			March	0.5-2.0		0.0-1.0	Long	Frequent		None
			April	0.0-1.0		0.0-1.0	Long	Frequent		None
			May	0.5-2.0		0.0-1.0	Long	Frequent		None
			June	1.0-2.0		0.0-1.0	Long	Frequent		None
			July	2.0-3.5		0.0-1.0	Long	Frequent		None
			August	2.5-3.5		0.0-1.0	Long	Frequent		None
			September			0.0-1.0	Long	Frequent		None
			October	2.5-3.5		0.0-1.0	Long	Frequent		None
			November	1.5-3.0		0.0-1.0	Long	Frequent		None
			December	2.0-3.5				None		None
			December	2.0-3.5	20.0			None		None
07:			1							1
Canisteo	l B/D	Low	1							1
canib ceo	5/5	10**	January	2.0-3.5	 >6 0			None		None
			February	1.5-3.0				None		None
			March	0.5-2.0				None		None
			April	0.0-1.0				None		None
			May	0.5-1.5				None		None
			June	1.0-2.0				None		None
			July	2.0-3.0				None		None
			August	2.5-3.5				None		None
				3.0-4.0				None		None
			October	2.5-3.5				None		None
] 	November	1.5-3.0				None		None

				Water	table		Ponding		Floo	ding
Map symbol and soil name	 Hydro- logic group	Surface runoff	Month 	Upper	Lower limit	Surface water depth	Duration	Frequency 	Duration	Frequency
			1	Ft	Ft	Ft				
	į į		İ	į į		į į		j j		j
511:										
Blue Earth, depressional,										
ponded	B/D	Negligible								
			January	2.0-3.5				None		None
			February	1.5-3.0	>6.0	0.0-1.0	Long	Frequent		None
			March	0.5-2.0	>6.0	0.0-1.0	Long	Frequent		None
			April	0.0-1.0	>6.0	0.0-1.0	Long	Frequent		None
			May	0.5-2.0	>6.0	0.0-1.0	Long	Frequent		None
			June	1.0-2.0	>6.0	0.0-1.0	Long	Frequent		None
			July	2.0-3.5	>6.0	0.0-1.0	Long	Frequent		None
			August	2.5-3.5	>6.0	0.0-1.0	Long	Frequent		None
			September	3.0-4.0	>6.0	0.0-1.0	Long	Frequent		None
			October	2.5-3.5	>6.0	0.0-1.0	Long	Frequent		None
			November	1.5-3.0	>6.0	0.0-1.0	Long	Frequent		None
			December	2.0-3.5	>6.0			None		None
526:										
Wacousta, mucky,	į i		İ	į i		i i		i i		İ
depressional, ponded	B/D	Negligible	İ	j i		i i		i i		İ
			January	2.0-3.5	>6.0			None		None
			February	1.5-3.0	>6.0	0.0-1.0	Long	Frequent		None
			March	0.5-2.0	>6.0	0.0-1.0	Long	Frequent		None
			April	0.0-1.0	>6.0	0.0-1.0	Long	Frequent		None
			May	0.5-2.0	>6.0	0.0-1.0	Long	Frequent		None
			June	1.0-2.0	>6.0	0.0-1.0	Long	Frequent		None
			July	2.0-3.5	>6.0	0.0-1.0	Long	Frequent		None
			August	2.5-3.5	>6.0	0.0-1.0	Long	Frequent		None
	į į		September	3.0-4.0	>6.0	0.0-1.0	Long	Frequent		None
	į į		October	2.5-3.5	>6.0	0.0-1.0	Long	Frequent		None
	į į		November	1.5-3.0	>6.0	0.0-1.0	Long	Frequent		None
	į i		December	2.0-3.5	>6.0	i i		None		None

				Water	table		Ponding	•	Floo	ding
Map symbol and soil name	Hydro- logic group	Surface runoff	 Month 	Upper limit	Lower limit	Surface water depth	Duration	Frequency 	Duration	Frequency
			T	Ft	Ft	Ft				
536:				!!!		!!!				
Hanlon, occasionally				!!!		!!!				
flooded	B	Very low	!_			!!!				
			January	6.0-6.7				None		None Occasiona
			February	5.5-6.7				None None	Very brief	Occasion
			March	4.5-6.5					Very brief	Occasion
			April	4.0-6.0				None	Very brief	
			May	4.5-6.5		!!!		None	Very brief	Occasion
			June	5.0-6.7				None	Very brief	Occasion
			July	6.0-6.7				None None	Very brief	Occasion
			August	6.5-6.7		1 1			Very brief	Occasion
				6.5-6.7				None	Very brief	Occasion
			October	6.5-6.7				None	Very brief	Occasion
			November	5.5-6.7				None	Very brief	Occasion
			December	6.0-6.7	>6.0			None		None
41C:									 	
Estherville	B	Low	i						 	İ
	i i		January	i i		i i		None	i	None
	i i		February	i i		i i		None		None
	i i		March			i i		None	! 	None
	i i		April	i i		i i		None		None
	i i		May	i i		i i		None		None
	i i		June	i i		i i		None	! 	None
	i i		July	i i		i i		None		None
	i i		August	i i		i i		None	! 	None
	i i		September	i i		i i		None	! 	None
	i i		October	i i		i i		None		None
	i i		November	i i		i i		None		None
	i i		December	i i		i i		None		None
	i i		i	j i		i i		į	j	j
Hawick	A	Low								
			January					None		None
			February					None		None
			March					None		None
			April					None		None
			May					None		None
			June					None		None
			July					None		None
			August					None		None
	i i		September	j j		i i		None		None
	į į		October	i i				None		None
	į į		November	j j		i i		None	i	None
	ı i		December	i i		i i		None	i	None

				Water	table		Ponding	·	Floc	ding
Map symbol and soil name	 Hydro- logic group	Surface runoff	Month	Upper limit	Lower	Surface water depth	Duration	Frequency 	Duration	Frequency
			ļ	Ft	Ft	Ft		!!!		
551B:			ļ							
Calamine	D	Low		1		1				
Caramine	0	HOW	January	2.0-3.5	>6.0			None		None
			February	1.5-3.0				None		None
			March	0.5-2.0				None		None
			April	0.0-1.0				None		None
			May	0.5-1.5				None		None
			June	1.0-2.0				None		None
	1 1		July	2.0-3.0				None		None
			August	2.5-3.5				None		None
								None		None
			September October	3.0-4.0				1 1		None
								None		1
			November	1.5-3.0		1		None		None
			December	2.0-3.5	>6.0			None		None
551D:				! !						1
		_		!!!		! !		! !		!
Calamine	D	Low								
	!!!		January	2.0-3.5				None		None
	!!!		February	1.5-3.0				None		None
	!!!		March	0.5-2.0				None		None
	!!!		April	0.0-1.0				None		None
	!!!		May	0.5-1.5				None		None
	!!!		June	1.0-2.0				None		None
	!!!		July	2.0-3.0				None		None
			August	2.5-3.5				None		None
				3.0-4.0				None		None
			October	2.5-3.5				None		None
			November	1.5-3.0				None		None
			December	2.0-3.5	>6.0			None		None
			Ţ					ļ l		!
559:										
Talcot	B/D	Low	1	[[
			January	2.0-3.5				None		None
			February	1.5-3.0				None		None
			March	0.5-2.0	>6.0			None		None
			April	0.0-1.0				None		None
			May	0.5-1.5				None		None
			June	1.0-2.0	>6.0			None		None
			July	2.0-3.0	>6.0			None		None
			August	2.5-3.5	>6.0			None		None
	i i		September	3.0-4.0	>6.0	i i		None		None
			October	2.5-3.5	>6.0			None		None
	į į		November	1.5-3.0	>6.0	i i		None		None
				2.0-3.5	>6.0					

				Water	table		Ponding	r	Floo	ding
Map symbol	 Hydro-	Surface	Month	ITonon	Lower	Surface	Dunstion	Frequency	Duration	Frequenc
and soil name	logic	runoff	Month	Upper limit	limit	water	Duracion	Frequency	Duracion	Frequenc
and soll name	group	IdiloII		11111111	11111111	depth				i i
	group			Ft	 Ft	Geptin		1		1
				10	10	10				
61:					 			İ		İ
Talcot, loamy substratum-	- B/D	Low	i	i	i	i i		i		i
•	i i		January	2.0-3.5	>6.0	i i		None		None
	j j		February	1.5-3.0	>6.0	j j		None		None
	į į		March	0.3-2.0	>6.0			None		None
	į į		April	0.0-1.0	>6.0			None		None
			May	0.3-1.5	>6.0			None		None
			June	0.7-2.0	>6.0			None		None
			July	2.0-3.0	>6.0			None		None
			August	2.5-3.5	>6.0			None		None
			September	3.0-4.0	>6.0			None		None
			October	2.5-3.5				None		None
			November	1.5-3.0				None		None
			December	2.0-3.5	>6.0			None		None
										!
66C:				!		! !				!
Moingona	- B	Medium				!!!				
			January	6.0-6.7				None		None
			February	5.5-6.7				None		None
			March	4.5-6.5				None		None
			April	4.0-6.0				None		None
			May	4.5-6.5				None		None
			June	5.0-6.7				None		None
			July	6.0-6.7				None		None
			August	6.5-6.7				None None		None
			September	6.5-6.7				None		None
			November	5.5-6.7				None		None
			December	6.0-6.7				None		None
			December	0.0-0.7	20.0			None		None
68D:										
Cokato	 - B	Medium								
conuco		nourum	January		 	i i		None		None
			February			i i		None		None
			March			i i		None		None
	i i		April			i i		None		None
	i i		May			i i		None		None
	j i		June			i i		None		None
	j i		July			i i		None		None
	j i		August			i i		None		None
	j i		September			i i		None		None
	j j		October			i i		None		None
	j		November			j j		None		None
	ı i		December	i		i i		None		None

				Water table		Ponding			Flooding	
Map symbol and soil name	Hydro- logic group	Surface	 Month 	Upper limit	Lower	Surface water depth	Duration	Frequency	Duration	Frequency
	group	<u> </u>	1	l =-		 -		<u> </u>		1
		 	1	Ft	Ft	Ft				
68E:		 		 						
Cokato	B	 Medium								
CORACO	"	Medium	January					None		None
		 	February					None		None
	1		March					None		None
			April					None		None
			May			i i		None		None
			June					None		None
		 	July			i i		None		None
		 	August			i i		None		None
		 	September			i i		None		None
		 	October			i i		None		None
		 	November			i i		None		None
		 	December			i i		None		None
		 				i i				
83:	i		i			i i		i i		i
Minnetonka	D	Low	i			i i		i i		i
	-		January	2.0-3.5	>6.0	i i		None		None
	i		February	1.5-3.0		i i		None		None
	i		March	0.5-2.0		i i		None		None
	i		April	0.0-1.0		i i		None		None
	i		May	0.5-1.5		i i		None		None
	i		June	1.0-2.0		i i		None		None
	i		July	2.0-3.0		i i		None		None
	i		August	2.5-3.5		i i		None		None
	i			3.0-4.0		i i		None		None
	i		October	2.5-3.5		i i		None		None
	i		November	1.5-3.0		i i		None		None
		 	December	2.0-3.5		i i		None		None
		 				i i				
06:	i		i			i i		i i		i
Lanyon, depressional,	i		i			i i		i i		i
ponded	C/D	 Negligible	i			i i		i i		i
F	-/-		January	2.0-3.5	>6.0	i i		None		None
		 	February	1.5-3.0		0.0-1.0	Long	Occasional		None
	i		March	0.5-2.0		0.0-1.0	Long	Occasional		None
	i		April	0.0-1.0		0.0-1.0	Long	Occasional		None
	i		May	0.5-2.0		0.0-1.0	Long	Occasional		None
	i		June	1.0-2.0		0.0-1.0	Long	Occasional		None
	i		July	2.0-3.5		0.0-1.0	Long	Occasional		None
	i		August	2.5-3.5		0.0-1.0	Long	Occasional		None
				3.0-4.0		0.0-1.0	Long	Occasional		None
	i		October	2.5-3.5		0.0-1.0	Long	Occasional		None
	i		November	1.5-3.0		0.0-1.0	Long	Occasional		None

and soil name	Hydro- logic group			Water table		Ponding			Flooding	
		Surface runoff		Upper limit	Lower limit	Surface water depth	Duration	Frequency 	Duration	Frequency
				Ft	Ft	Ft				
			!					! !		
525:				!		!!!		! !		
Lerdal	C	Very high				!!!				
			January	3.0-5.5				None		None
			February	2.5-5.0				None		None
			March	1.5-4.0				None		None
			April	1.0-3.5				None		None
			May	1.5-4.0				None		None
			June	2.0-4.5				None		None
			July	3.0-5.5				None		None
			August	3.5-6.0				None		None
			September					None		None
			October	3.5-6.0				None		None
			November	2.5-5.0				None		None
			December	3.0-5.5	>6.0			None		None
36:										1
	-	T								1
Buckney, rarely flooded	В	Low						None		None
			January February					None	Brief	Rare
			March	!				None	Brief	Rare
	 								Brief Brief	
			April			!!!		None None	Brief	Rare
			May June					None	Brief	Rare
	 		July					None	Brief	Rare
	 		August					None	Brief	Rare
	 		September					None	Brief	Rare
	 		October					None	Brief	Rare
	 		November					None	Brief	Rare
	 		December					None	Prier	None
	 		December					None		None
36B:	 					1 1				I I
Buckney, rarely flooded	I в	Low								
Buckney, larely 1100ded	<i>P</i>	HOW	January					None		None
	 		February					None	Brief	Rare
	 		March					None	Brief	Rare
	 		April					None	Brief	Rare
	 		May					None	Brief	Rare
	 		June					None	Brief	Rare
	 		July					None	Brief	Rare
	 		August					None	Brief	Rare
	 		September					None	Brief	Rare
			October					None	Brief	Rare
			November					None	Brief	Rare
	l l		December					None	Prier	None

				Water	table	Ponding			Flooding		
Map symbol and soil name	 Hydro- logic group	Surface runoff	Month	Upper limit	Lower limit	Surface water depth	Duration	Frequency 	Duration	Frequency	
				Ft	Ft	Ft					
			ļ					! !			
538C2:											
Clarion, moderately eroded	1 в	Medium				!!!					
	!!!		January	6.0-6.7				None		None	
	!!!		February	5.5-6.7				None		None	
	!!!		March	4.5-6.5				None		None	
	!!!		April	4.0-6.0				None		None	
			May	4.5-6.5				None		None	
			June	5.0-6.7				None		None	
			July	6.0-6.7				None		None	
			August	6.5-6.7	>6.0			None		None	
			September	6.5-6.7	>6.0			None		None	
			October	6.5-6.7	>6.0			None		None	
			November	5.5-6.7	>6.0			None		None	
			December	6.0-6.7	>6.0			None		None	
			ļ							ļ	
Storden, moderately eroded	1 B	Medium									
	!!!		January					None		None	
			February					None		None	
			March					None		None	
			April					None		None	
			May					None		None	
			June					None		None	
			July					None		None	
			August					None		None	
			September					None		None	
			October					None		None	
			November					None		None	
			December					None		None	
			ļ							!	
550:	5	Ma 44									
Joliet	- D	Medium	 Tamusaum	10005				l Mana		1 27	
			January	2.0-3.5				None		None	
			February	1.5-3.0				None		None	
			March	0.5-2.0				None		None	
	!!		April	0.0-1.0				None		None	
	!!		May	0.5-1.5				None		None	
	!!		June	1.0-2.0				None		None	
	ļ l		July	2.0-3.0				None		None	
	<u> </u>		August	2.5-3.5				None		None	
				3.0-4.0				None		None	
			October	2.5-3.5				None		None	
			November	1.5-3.0				None		None	
			December	2.0-3.5	>6.0			None		None	

				Water	table	Ponding			Flooding	
	Hydro- logic group	Surface runoff	Month	Upper limit	Lower limit 	Surface water depth	Duration	Frequency 	Duration	Frequency
]]		Į.	Ft	Ft	Ft				Į.
'40D:					 					
/40D: Hawick	A	Low			 					
Hawler	A	LOW	 Tomuomer		 		 	None		None
			January February		 		 	None		None
			March		 		 	None		None
			1	!	!	!				1
			April		 		 	None		None
			May		!	!		None		None
	! !		June					None		None
			July					None		None
			August					None		None
			September					None		None
	!!!		October					None		None
			November					None		None
	!!!		December					None		None
				!		!		! !		!
75B:				!		!		! !		!
Billett	В	Low								
			January					None		None
			February					None		None
			March					None		None
			April					None		None
			May					None		None
			June					None		None
			July					None		None
			August					None		None
	i i		September					None		None
	i i		October			j i		None		None
	i i		November			j j		None		None
	i i		December			j j		None		None
	i i		i	i	İ	i i	İ	i i		i
75C:	i i		i	i	İ	i i	İ	i i		i
Billett	в	Low	i	i		<u> </u>		į i		i
-	i i	-	January					None		None
	ii		February					None		None
	i i		March					None		None
	i i		April		 	i i		None		None
			May		 			None		None
			June		 		 	None		None
			July		 			None		None
			August		 		 	None		None
			September		 		 			None
			October		 		 	None		1
			November	!	!	!		None		None
								None		None
	1		December					None		None

				Water table		Ponding			Flooding	
Map symbol and soil name	Hydro- logic group	Surface runoff	Month	Upper limit	Lower limit 	Surface water depth	Duration	Frequency 	Duration	Frequency
				Ft	Ft	Ft				
			ļ							
777B:	! _ !							! !		
Wapsie	В	Medium				!		! !		
	!!!		January					None		None
			February					None		None
			March					None		None
			April					None		None
			May					None		None
			June					None		None
			July					None		None
			August					None		None
			September					None		None
	1		October					None		None
	1 1		November					None		None
	į į		December			i i		None		None
35D2:										
Storden, moderately eroded	l B	Medium								
			January					None		None
			February					None		None
			March					None		None
			April					None		None
			May					None		None
			June					None		None
			July					None		None
			August					None		None
	1 1		September					None		None
	i i		October			j i		None		None
	i i		November			j i		None		None
	į į		December	j		j j		None		None
Omsrud, moderately eroded	В	Medium								
			January					None		None
			February					None		None
			March					None		None
			April					None		None
			May					None		None
			June					None		None
			July					None		None
	į į		August			i i		None		None
	į į		September			j i		None		None
	į į		October	i	i	j j		None		None
	į į		November			j j		None		None
	1 1		December	i		i i		None		None

		1		1		ding
Upper limit	Lower limit 	Surface water depth	Duration	Frequency 	Duration	Frequency
Ft	Ft	Ft				
ļ						
		!!!				
!		! !				
				None		None
				None		None
				None		None
				None		None
				None		None
				None		None
				None		None
				None		None
				None		None
				None		None
				None		None
				None		None
				None		None
				None		None
				None		None
				None		None
				None		None
				None		None
				None		None
				None		None
1		!!!		None		None
				1		1
				None		None
				None		None
				None		None
I I						
İ	İ	j i		į i		İ
6.0-6.7	7 >6.0	i i		None		None
5.5-6.7		i i		None		None
4.5-6.5		i i		None		None
4.0-6.0		i i		None		None
4.5-6.5		i i		None		None
5.0-6.7		i i		None		None
						None
				None		None
		! !		1		None
	,	! !				None
						None
	1	1 1		1 1		None
	6.5-6.7 6.5-6.7 6.5-6.7	6.0-6.7 >6.0 6.5-6.7 >6.0 6.5-6.7 >6.0 6.5-6.7 >6.0 5.5-6.7 >6.0 5.5-6.7 >6.0 6.0-6.7 >6.0	6.5-6.7 >6.0 6.5-6.7 >6.0 6.5-6.7 >6.0 5.5-6.7 >6.0	6.5-6.7 >6.0	6.5-6.7 >6.0 None	6.5-6.7 >6.0 None 6.5-6.7 >6.0 None 6.5-6.7 >6.0 None 5.5-6.7 >6.0 None

	 			Water	table		Ponding	·	Floo	ding
Map symbol and soil name	 Hydro- logic group	Surface runoff	 Month 	Upper limit	Lower	Surface water depth	Duration	Frequency	Duration	Frequency
				Ft	Ft	Ft				
			!					! !		
854D:										
Fens, Aquolls	A/D	Negligible	! _			!!!				
		 	January	2.0-3.5				None		None
		 	February	1.5-3.0				None		None
		 	March	0.5-2.0				None		None
	 	 	April	0.0-1.0				None		None
	 	 	May	0.5-1.5				None		None None
	 	 	June	1.0-2.0				None		None
	 		July	2.0-3.0				None		
		 	August	2.5-3.5		1 1		None		None
			September					None		None
			October	2.5-3.5				None		None
			November	1.5-3.0				None		None
		 	December	2.0-3.5	>6.0			None		None
55:	 	 	I I							
Shorewood	C	Medium		İ		i i		i i		İ
	İ	ĺ	January	3.0-5.5	>6.0	i i		None		None
	i		February	2.5-5.0	>6.0	i i		None		None
	i		March	1.5-4.0	>6.0	i i		None		None
	i		April	1.0-3.5	>6.0	i i		None		None
	i		May	1.5-4.0	>6.0	i i		None		None
	i		June	2.0-4.5	>6.0	i i		None		None
	i		July	3.0-5.5	>6.0	i i		None		None
	i i		August	3.5-6.0	>6.0	i i		None		None
				4.0-6.5		i i		None		None
			October	3.5-6.0	>6.0	i i		None		None
			November	2.5-5.0		i i		None		None
			December	3.0-5.5		i i		None		None
								! !		
56: Harps	 B/D	Low	1							
narps	ן ע/ם ן ו	l TOM	January	2.0-3.5	>6 N			None		None
	 	 	February	1.5-3.0				None		None
	 	 	March	0.5-2.0				None		None
	 	 	April	0.0-1.0				None		None
	 	 	May	0.5-1.5				None		None
	 	 	June	1.0-2.0				None		None
	 	 	July	2.0-3.0				None		None
	 	 		2.5-3.5				None		None
		 -	August					None		None
		 -		3.0-4.0		1 1				
		 -	October	2.5-3.5				None		None
			November	1.5-3.0				None		None
			December	2.0-3.5	>6.0			None		None

		 		Water	table		Ponding	'	Floo	ding
Map symbol and soil name	 Hydro- logic group	Surface	Month	Upper limit	Lower limit	Surface water depth	Duration	Frequency	Duration	Frequency
	group	<u> </u>	1	Ft	Ft	Gepth		1		1
]	I I	FC	Ft	FC				I I
56:		 	1							
Okoboji, depressional,	i i		l I			i i				i
ponded	B/D	 Negligible	i			i i		i		i
F	-/-		January	2.0-3.5	>6.0	i i		None		None
	i i		February	1.5-3.0		0.0-1.0	Long	Frequent		None
	i i		March	0.5-2.0		0.0-1.0	Long	Frequent		None
	i i		April	0.0-1.0	>6.0	0.0-1.0	Long	Frequent		None
	i i		May	0.5-2.0	>6.0	0.0-1.0	Long	Frequent		None
	i i		June	1.0-2.0		0.0-1.0	Long	Frequent		None
	i i		July	2.0-3.5		0.0-1.0	Long	Frequent		None
	i i		August	2.5-3.5	>6.0	0.0-1.0	Long	Frequent		None
	i i			3.0-4.0	>6.0	0.0-1.0	Long	Frequent		None
	i i		October	2.5-3.5		0.0-1.0	Long	Frequent		None
	i i		November	1.5-3.0	>6.0	0.0-1.0	Long	Frequent		None
	i i		December	2.0-3.5	>6.0	i i		None		None
	i i					i i		i		
007:	i i		İ	į i		i i		į i		i
Cosmos, bouldery	C/D	Low	İ	į i		i i		į i		i
<u>-</u>	i i		January	2.0-3.5	>6.0	i i		None		None
	i i		February	1.5-3.0		i i		None		None
	i i		March	0.5-2.0	>6.0	i i		None		None
	i i		April	0.0-1.0	>6.0	i i		None		None
	i i		May	0.5-1.5	>6.0	i i		None		None
	i i		June	1.0-2.0	>6.0	i i		None		None
	i i		July	2.0-3.0	>6.0	i i		None		None
	i i		August	2.5-3.5	>6.0	i i		None		None
	i i		September	3.0-4.0	>6.0	i i		None		None
	i i		October	2.5-3.5	>6.0	i i		None		None
	i i		November	1.5-3.0	>6.0	i i		None		None
	i i		December	2.0-3.5	>6.0	i i		None		None
	i i		İ	į i		i i		į i		i
.055B:	i i		İ	į i		i i		į i		i
Kandiyohi, bouldery	C/D	Medium	İ	į i		į i		į i		i
	į i		January	3.0-5.5	>6.0	i i		None		None
	į i		February	2.5-5.0	>6.0	i i		None		None
	į i		March	1.5-4.0		i i		None		None
	į i		April	1.0-3.5		i i		None		None
	į i		May	1.5-4.0	>6.0	i i		None		None
	į i		June	2.0-4.5	>6.0	i i		None		None
	į i		July	3.0-5.5		i i		None		None
	į i		August	3.5-6.0		i i		None		None
	į i			4.0-6.5		i i		None		None
	į i		October	3.5-6.0		i i		None		None
	į i		November	2.5-5.0		i i		None		None

				Water	table		Ponding		Floo	ding
Map symbol and soil name	Hydro- logic group	Surface runoff	Month	Upper limit	Lower	Surface water depth	Duration	Frequency 	Duration	Frequenc
			Ţ.	Ft	Ft	Ft				
1138B:										
.138B: Clarion	 B	Low								l I
Clarion	•	TOW	January	6.0-6.7				None		None
			February	5.5-6.7				None		None
			March	4.5-6.5				None		None
			April	4.0-6.0				None		None
			May	4.5-6.5				None		None
			June	5.0-6.7				None		None
			July	6.0-6.7				None		None
			August	6.5-6.7				None		None
				6.5-6.7				None		None
			October	6.5-6.7				None		None
			November	5.5-6.7						None
								None None		None
			December	6.0-6.7	>6.0			None		None
236B:										1
230B: Angus	 B	Low	l I							1
Angus	B	LOW						Name		l Mana
			January					None None		None
			February March					None		None
				: :				None		None
			April					None		None
			May			1				
			June					None		None
			July	! !		! !		None		None
			August					None		None
	! !		September					None		None
			October					None		None
			November					None		None
			December					None		None
00.57						!!!		!!!		
236C:		_				!!!		!!!		
Angus	B	Low				!!!				
			January					None		None
			February					None		None
			March					None		None
			April					None		None
			May					None		None
			June					None		None
	!!!		July					None		None
			August					None		None
			September					None		None
			October					None		None
			November					None		None
	1 1		December					None		None

				Water	table		Ponding	·	Floo	ding
Map symbol and soil name	Hydro- logic group	Surface runoff	Month	Upper limit	Lower limit	Surface water depth	Duration	Frequency	Duration	Frequency
				Ft	Ft	Ft				
			ļ							
1259:	!!			! !		!!!				
Biscay, depressional,				!!!		!!!				
ponded	B/D	Low								
	!!!		January	2.0-3.5				None		None
	!!!		February	1.5-3.0		0.0-1.0	Long	Frequent		None
	!!!		March	0.5-2.0		0.0-1.0	Long	Frequent		None
	!!!		April	0.0-1.0		0.0-1.0	Long	Frequent		None
	!!!		May	0.5-2.0		0.0-1.0	Long	Frequent		None
	!!!		June	1.0-2.0		0.0-1.0	Long	Frequent		None
	!!!		July	2.0-3.5		0.0-1.0	Long	Frequent		None
	!!!		August	2.5-3.5		0.0-1.0	Long	Frequent		None
	!!!			3.0-4.0		0.0-1.0	Long	Frequent		None
	!!!		October	2.5-3.5		0.0-1.0	Long	Frequent		None
	!!!		November	1.5-3.0		0.0-1.0	Long	Frequent		None
	!!!		December	2.0-3.5	>6.0			None		None
	!!!			!!!		!!!				
507:		_				!!!				
Brownton	C/D	Low				!!!				
	!!!		January	2.0-3.5				None		None
	!!!		February	1.5-3.0				None		None
	!!!		March	0.5-2.0				None		None
	!!!		April	0.0-1.0				None		None
	!!!		May	0.5-1.5				None		None
	!!!		June	1.0-2.0				None		None
	!!!		July	2.0-3.0				None		None
	!!!		August	2.5-3.5				None		None
	!!!			3.0-4.0				None		None
	!!!		October	2.5-3.5				None		None
	!!!		November	1.5-3.0				None		None
	!!!		December	2.0-3.5	>6.0			None		None
	!!!									
.555:		_				!!!				
Nicollet	B	Low				!!!				
	!!!		January	3.0-5.5				None		None
	!!!		February	2.5-5.0				None		None
	!!!		March	1.5-4.0				None		None
	!!!		April	1.0-3.5				None		None
	!!		May	1.5-4.0				None		None
			June	2.0-4.5				None		None
			July	3.0-5.5				None		None
			August	3.5-6.0				None		None
	!!			4.0-6.5				None		None
	!!		October	3.5-6.0				None		None
	!!		November	2.5-5.0				None		None
	1		December	3.0-5.5	>6.0			None		None

				Water	table		Ponding	·	Floo	ding
Map symbol and soil name	Hydro- logic group	Surface runoff	Month	Upper limit	Lower limit	Surface water depth	Duration	Frequency 	Duration	Frequency
				Ft	Ft	Ft				
										ļ
1555:		_	ļ			!!!				
Guckeen	- C	Low	!							
	!!!		January	3.0-5.5				None		None
	!!!		February	2.5-5.0				None		None
	!!!		March	1.5-4.0				None		None
	!!!		April	1.0-3.5				None		None
	!!!		May	1.5-4.0				None		None
			June	2.0-4.5				None		None
			July	3.0-5.5				None		None
			August	3.5-6.0				None		None
			September	4.0-6.5	>6.0			None		None
			October	3.5-6.0	>6.0			None		None
			November	2.5-5.0	>6.0			None		None
			December	3.0-5.5	>6.0			None		None
1836B:										
Kilkenny	- B	Low								
	i i		January	6.0-6.7	>6.0	j j		None		None
	i i		February	5.5-6.7	>6.0	j j		None		None
	i i		March	4.5-6.5	>6.0	j j		None		None
	i i		April	4.0-6.0	>6.0	i i		None		None
	i i		May	4.5-6.5	>6.0	i i		None		None
	i i		June	5.0-6.7		i i		None		None
	i i		July	6.0-6.7	>6.0	i i		None		None
	i i		August	6.5-6.7		i i		None		None
	i i		, ,	6.5-6.7		i i		None		None
	i i		October	6.5-6.7		i i		None		None
	i i		November	5.5-6.7		i i		None		None
			December	6.0-6.7				None		None
			December	0.0 0.7	70.0	1 1		110110		110110
Shorewood	- c	Medium	1	1		1 1				
Bhorewood	- -	Medium	January	3.0-5.5	>6.0			None		None
			February	2.5-5.0				None		None
			March	1.5-4.0				None		None
			April	1.0-3.5				None		None
								None		1
			May	1.5-4.0						None
			June	2.0-4.5				None		None
			July	3.0-5.5				None		None
			August	3.5-6.0				None		None
	[]			4.0-6.5				None		None
			October	3.5-6.0				None		None
			November	2.5-5.0				None		None
	1 1		December	3.0-5.5	- C O			None		None

				Water	table		Ponding	'	Floc	ding
Map symbol and soil name	 Hydro- logic group	Surface runoff	Month	 Upper limit 	Lower limit 	Surface water depth	Duration	Frequency 	Duration	Frequency
	i i		i	Ft	Ft	Ft		i		i
	i i		i	İ		i i		i i		i
700C:	į į		j	j	į	į į		į į		İ
Ridgeton	B	Medium								
			January					None		None
			February					None		None
			March					None		None
			April					None		None
			May					None		None
			June					None		None
	į į		July			j j		None		None
	į į		August			j j		None		None
	i i		September			i i		None		None
	i i		October			i i		None		None
	i i		November			i i		None		None
	į į		December			ļ ļ		None		None
700D:				 						
Ridgeton	B	Medium								
			January					None		None
			February					None		None
			March					None		None
			April					None		None
			May					None		None
	į į		June			j j		None		None
	į į		July			j j		None		None
	į į		August			j j		None		None
	į į		September			j j		None		None
	į į		October			j j		None		None
	į į		November			j j		None		None
	į į		December	ļ		į į		None		None
000.				 	 	 		 		1
000.	1									

				Water	table		Ponding		Floc	ding
Map symbol and soil name	 Hydro- logic group	Surface runoff	Month	Upper limit	Lower	Surface water depth	Duration	Frequency 	Duration	Frequency
!			ļ	Ft	Ft	Ft				Į.
4055:										
Nicollet	B	Low				1 1				
NICOILEC	5	HOW.	January	3.0-5.5	>6.0	i i		None		None
	 			2.5-5.0		i i		None		None
			March	1.5-4.0		i i		None		None
			April	1.0-3.5		i i		None		None
			May	1.5-4.0		i i		None		None
	i i		June	2.0-4.5		i i		None		None
	i i		July	3.0-5.5		i i		None		None
	i i		August	3.5-6.0		i i		None		None
	i i		September			i i		None		None
·	i i		October	3.5-6.0		i i		None		None
·	i i		November	2.5-5.0		i i		None		None
	į į		December	3.0-5.5		i i		None		None
Urban land.										
4107:	 									
Webster	B/D	Low	i	j i		i i		i i		İ
į	į į		January	2.0-3.5	>6.0	j j		None		None
į	į į		February	1.5-3.0	>6.0	j j		None		None
į	į į		March	0.5-2.0	>6.0	j j		None		None
į	į į		April	0.0-1.0	>6.0	j j		None		None
į	į į		May	0.5-1.5	>6.0	j j		None		None
!			June	1.0-2.0	>6.0			None		None
!			July	2.0-3.0	>6.0			None		None
!			August	2.5-3.5	>6.0			None		None
į	ĺ		September	3.0-4.0	>6.0	i i		None		None
į	ĺ		October	2.5-3.5	>6.0	i i		None		None
į	ĺ		November	1.5-3.0	>6.0	i i		None		None
ļ	ļ į		December	2.0-3.5	>6.0			None		None
i de la companya de la companya de la companya de la companya de la companya de la companya de la companya de										

				Water	table		Ponding	r	Floo	ding
Map symbol and soil name	 Hydro- logic group	Surface runoff	 Month 	Upper limit	Lower limit	Surface water depth	Duration	Frequency	Duration	Frequency
			Ī	Ft	Ft	Ft				Ī
	į į		İ	İ		į į		İ		İ
4138B:										
Clarion	B	Low								
			January	6.0-6.7				None		None
			February	5.5-6.7				None		None
			March	4.5-6.5	>6.0			None		None
			April	4.0-6.0	>6.0			None		None
			May	4.5-6.5	>6.0			None		None
			June	5.0-6.7	>6.0			None		None
			July	6.0-6.7	>6.0			None		None
	į į		August	6.5-6.7	>6.0	j i		None		None
	į į		September	6.5-6.7	>6.0	j i		None		None
	į į		October	6.5-6.7	>6.0	j i		None		None
	i i		November	5.5-6.7	>6.0	j i		None		None
	į į		December	6.0-6.7	>6.0	ļ i		None		None
Urban land.					 					
4235B:			l I		 					
Angus	В	Low	i	i	İ	i i		i i		i
5	i i		January	i		i i		None		None
	i i		February	i		i i		None		None
	i i		March	i		i i		None		None
	i		April			i i		None		None
	i i		May		 	i		None		None
	1 1		June		 	i		None		None
	1 1		July		 	i		None		None
	1 1		August		 	i i		None		None
			September		 			None		None
			October		 		 	None		None
			November		 		 	None		None
			December		 			None		None
Urban land.					 					
ordan fand.					 					
	1		1	1	1	1		1		1

				Water	table		Ponding	r	Floo	ding
	Hydro- logic group	Surface runoff	Month	Upper limit	Lower limit	Surface water depth	Duration		Duration	Frequency
			1	Ft	Ft	Ft				
22.5										
236D: Lester	B	Medium	ļ							1
Lester	B	Medium	 January		 			None		None
			February		 			None		None
			March		 			None		None
			April		 			None		None
			May		 			None		None
			June		 			None		None
			July		 			None		None
			August					None		None
			September					None		None
			October			i i		None		None
			November			i i		None		None
	i		December	i i		i i		None		None
	i			i		i i				
Urban land.	i		i	i i		i i		i i		İ
325:										
Le Sueur	B	Low								l I
Te Sueur		HOW	January	3.0-5.5	 			None		None
			February	2.5-5.0				None		None
			March	1.5-4.0				None		None
			April	1.0-3.5				None		None
			May	1.5-4.0				None		None
			June	2.0-4.5				None		None
			July	3.0-5.5				None		None
			August	3.5-6.0				None		None
			September					None		None
			October	3.5-6.0				None		None
i			November	2.5-5.0				None		None
	i		December	3.0-5.5		i i		None		None
	i					j j				
Urban land.	i		i	i i		i i		i i		i

				Water	table		Ponding	·	Floo	ding
Map symbol and soil name	 Hydro- logic group	Surface runoff	 Month 	Upper	Lower	Surface water depth	Duration	 Frequency 	Duration	Frequenc
			ļ	Ft	Ft	Ft				
4444:										
Jacwin	 B	Medium				1 1				I I
Uacwin	-	Medium	January	3.0-5.5	 			None		None
			February	2.5-5.0				None		None
			March	1.5-4.0				None		None
			April	1.0-3.5				None		None
			May	1.5-4.0				None		None
			June	2.0-4.5				None		None
			July	3.0-5.5				None		None
			August	3.5-6.0				None		None
			September					None		None
			October	3.5-6.0				None		None
			November	2.5-5.0				None		None
			December	3.0-5.5				None		None
Urban land.										
507:	 									
Canisteo	B/D	Low	i	i		i i		i i		i
	i i		January	2.0-3.5	>6.0	i i		None		None
	i i		February	1.5-3.0	>6.0	i i		None		None
	i i		March	0.5-2.0	>6.0	i i		None		None
	i i		April	0.0-1.0	>6.0	i i		None		None
	i i		May	0.5-1.5	>6.0	i i		None		None
	i i		June	1.0-2.0	>6.0	i i		None		None
	i i		July	2.0-3.0	>6.0	i i		None		None
	i i		August	2.5-3.5	>6.0	i i		None		None
	į į		September	3.0-4.0	>6.0	j j		None		None
	į į		October	2.5-3.5	>6.0	i i		None		None
	į į		November	1.5-3.0	>6.0	i i		None		None
	į į		December	2.0-3.5	>6.0	j j		None		None
Urban land.										
	1 1		-	!		! !		!		1

				Water	table		Ponding		Floc	ding
	 Hydro- logic group	Surface runoff	Month	Upper limit	Lower	 Surface water depth	Duration	Frequency 	Duration	Frequency
!			!	Ft	Ft	Ft				
4551B:	 									
Calamine	י ע ו	Low	i	i		i i		i i		i
1			January	2.0-3.5	>6.0	i i		None		None
i	i i		February	1.5-3.0		i i		None		None
i	i i		March	0.5-2.0		i i		None		None
i	i i		April	0.0-1.0	>6.0	i i		None		None
i	i i		May	0.5-1.5	>6.0	i i		None		None
i	i i		June	1.0-2.0	>6.0	i i		None		None
i	i i		July	2.0-3.0	>6.0	i i		None		None
j	i i		August	2.5-3.5	>6.0	i i		None		None
j	i i		September	3.0-4.0	>6.0	i i		None		None
i	į į		October	2.5-3.5	>6.0	j j		None		None
İ	į į		November	1.5-3.0	>6.0	j j		None		None
			December	2.0-3.5	>6.0			None		None
Urban land.										
4551D:	 									
Calamine	D	Low				1 1				
			January	2.0-3.5	>6.0			None		None
!			February	1.5-3.0	>6.0			None		None
!			March	0.5-2.0	>6.0			None		None
!			April	0.0-1.0	>6.0			None		None
!			May	0.5-1.5	>6.0			None		None
!			June	1.0-2.0	>6.0			None		None
!			July	2.0-3.0	>6.0			None		None
!			August	2.5-3.5				None		None
!			September	3.0-4.0	>6.0			None		None
!			October	2.5-3.5	>6.0			None		None
!			November	1.5-3.0	>6.0			None		None
!			December	2.0-3.5	>6.0			None		None
i i								1		

				Water	table		Ponding	r	Floo	ding
Map symbol and soil name	 Hydro- logic group	Surface runoff	 Month 	Upper limit	Lower limit 	Surface water depth	Duration	Frequency 	Duration	Frequency
				Ft	Ft	Ft				
635:										
Buckney	В	Low								
			January					None		None
			February					None		None
			March					None		None
			April					None		None
			May					None		None
			June					None		None
			July					None		None
			August					None		None
			September					None		None
			October					None		None
			November					None		None
			December					None		None
Urban land.										
635B:	 			 	 					
Buckney	В	Low		i	i	i i		i i		i
24007	-		January			i i		None		None
	i		February			i i		None		None
	i		March			i i		None		None
	i		April			i i		None		None
	i i		May			i i		None		None
	i i		June			i i		None		None
			July			i i		None		None
			August			i i		None		None
			September					None		None
			October					None		None
			November					None		None
			December					None		None
Urban land.										
			ļ					į į		
946B. Udorthents-Highway				 	 					
010:			I	 	 					I I
	1			1	I I					I I
Pits, sand and gravel	A		 Tan Dag	1	 			None		
			Jan-Dec					None		
020-										1
030:										1
Pits, limestone quarries	A		 					1 27		1
	1		Jan-Dec					None		

				Water	table		Ponding	·	Flooding		
Map symbol and soil name	 Hydro- logic group	Surface runoff	Month	Upper	Lower limit	Surface water depth	Duration	Frequency 	Duration	Frequency	
			ĺ	Ft	Ft	Ft	1				
	į į		İ	į į		İ	ĺ	į į			
5035:			!					! !		!	
Pits, gypsum quarries	A										
			Jan-Dec					None			
5040.			l l				 			1	
Udorthents, loamy						į	! 	į			
5049:	1 1						 				
Aquolls, ponded	· i i		İ	j i		j	İ	j j		İ	
			January	2.0-3.5	>6.0			None		None	
			February	1.5-3.0	>6.0	0.0-1.0	Very long	Frequent		None	
			March	0.5-2.0	>6.0	0.0-1.0	Very long	Frequent		None	
			April	0.0-1.0			Very long	Frequent		None	
			May	0.5-2.0			Very long	Frequent		None	
			June	1.0-2.0			Very long	Frequent		None	
			July	2.0-3.5			Very long	Frequent		None	
			August	2.5-3.5			Very long	Frequent		None	
				3.0-4.0			Very long	Frequent		None	
			October	2.5-3.5			Very long	Frequent		None	
			November December	1.5-3.0		0.0-1.0	Very long	Frequent		None None	
			December	2.0-3.5	>6.0 		 	None		None	
Udorthents, loamy.	į į		į	į į		į i	 	į į		İ	
5060.	i i		i	i				i i		i	
Pits, clay	i i		i	į i			İ	i i		İ	
-	i i		j	j j	İ	İ	İ	i i		İ	
5080.]			
Udorthents											
455								! !			
5457:										1	
Du Page, channeled, frequently flooded	 B	Low					 			1	
rrequently rlooded	B	LOW	January	6.0-6.7	 >6.0		 	None		None	
			February	5.5-6.7			 	None	Long	Frequent	
			March	4.5-6.5			 	None	Long	Frequen	
	1 1		April	4.0-6.0			 	None	Long	Frequen	
	1 1		May	4.5-6.5			 	None	Long	Frequen	
	i i		June	5.0-6.7				None	Long	Frequen	
	i i		July	6.0-6.7				None	Long	Frequen	
	i i		August	6.5-6.7				None	Long	Frequen	
	i i			6.5-6.7				None	Long	Frequen	
	i i		October	6.5-6.7	>6.0	i	i	None	Long	Frequen	
	1										
			November	5.5-6.7				None	Long	Frequent	

				Water	table		Ponding	·	Floo	ding
Map symbol and soil name	Hydro- logic group	Surface runoff	Month 	Upper limit	Lower limit	Surface water depth	Duration	Frequency 	Duration	Frequency
				Ft	Ft	Ft				
5507:										
Corvuso	C/D	Low			l I					
COI V U BO	C/D	HO#	January	2.0-3.5	 >6 0			None		None
			February	1.5-3.0		i i		None		None
			March	0.5-2.0				None		None
			April	0.0-1.0		i i		None		None
			May	0.5-1.5				None		None
			June	1.0-2.0				None		None
			July	2.0-3.0				None		None
			August	2.5-3.5		i i		None		None
			September	1				None		None
			October	2.5-3.5		i i		None		None
			November	1.5-3.0		i i		None		None
			December	2.0-3.5				None		None
					20.0			None		None
Brownton	C/D	Low								
			January	2.0-3.5	>6.0			None		None
			February	1.5-3.0	>6.0			None		None
			March	0.5-2.0	>6.0			None		None
			April	0.0-1.0	>6.0			None		None
			May	0.5-1.5	>6.0			None		None
			June	1.0-2.0	>6.0			None		None
			July	2.0-3.0	>6.0			None		None
			August	2.5-3.5	>6.0			None		None
			September	3.0-4.0	>6.0			None		None
			October	2.5-3.5	>6.0			None		None
			November	1.5-3.0	>6.0			None		None
			December	2.0-3.5	>6.0			None		None
w.										
Animal waste lagoon			į	į		į į		į į		į
L.				I I	 					1
Sewage lagoon					 					1
benuge rayour										
٧.	i i		j	į	İ	i i		i i		į
Water	i i		1	1	1	i i		ı i		1

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Soil Features

The table described in this section gives estimates of various soil features. The estimates are used in land use planning that involves engineering considerations.

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

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 shows the expected initial subsidence, which usually is a result of drainage, and total subsidence, which results from a combination of factors.

Potential for frost action is the likelihood of upward or lateral expansion of the soil caused by the formation of segregated ice lenses (frost heave) and the subsequent collapse of the soil and loss of strength on thawing. Frost action occurs when moisture moves into the freezing zone of the soil. Temperature, texture, density, 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 to pavements and other rigid structures.

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

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

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

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	Re	estrictive la	ayer	Subsid	lence	 Potential	Risk of corrosion		
and soil name	Kind	Depth to top	Hardness		Total	for frost action	Uncoated steel	Concrete	
	KIIIG	In	naruness	In	In		breer		
6: 							 		
Okoboji, depressional,		iii		i i					
ponded						High	High	Low	
27B:							 		
Terril						Moderate	Moderate	Low	
34:							 		
Estherville						Low	Low	Low	
34B:							 		
Estherville						Low	Low	Low	
55:							 		
Nicollet						High	High	Low	
62F:							 		
Storden						Moderate	Low	Low	
90:							 		
Okoboji, mucky,									
depressional, ponded						High	High 	Low	
95:		į į		į į				į.	
Harps						High 	High 	Low	
107:		į į		į į				į_	
Webster						High	High 	Low	
108:		į į		į į				į_	
Wadena						Low	Low	Low	
108B:		į į		į į				į_	
Wadena						Low	Low	Low	
108C:		į		į		į .		į.	
Wadena						Low	Low	Low	
135:		į		į					
Coland, occasionally flooded						High	 High	Low	
1							::: ::::		

Soil Features Continued	
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	Subsid	ience	Potential	Risk of corrosion			
	Depth		_¦		for	Uncoated	
Kind	to top	Hardness	Initial	Total	frost action	steel	Concrete
	In		In	In		 	
					Moderate	Low	Low
	i i		i i		İ		
					Moderate	Low	Low
	i i				[
					Moderate	Low	Low
			i				
					High	High 	Low
					Moderate	Moderate	Low
	j j		į į		High	Moderate	Low
	į į		i i		İ	ĺ	İ
					Low	Low	Low
	i i				[
					Low	Low 	Low
	į į		į į		į		į
					High	Moderate	Low
					 	Moderate 	LTOM
					Moderate	Low	Moderate
	į į		j j		į		į
					Moderate	Low 	Moderate
	į į		į				į
					Moderate	Low	Moderate
	į į		į				į
					High	Moderate 	Low
	į		į i				
					Moderate	Low	Moderate
					Moderate	Low	Low
	Kind	Depth	Nind to top Hardness In	Depth to top Hardness Initial In In In In In In In I	Depth In In In In In In In I	Depth Hardness	Depth Hardness Initial Total for Uncoated for Steel

Soil Features -- Continued

Map symbol	Res	trictive	layer	Subsid	dence	 Potential	Risk of corrosion	
and soil name	Kind	Depth	Hardness	 Initial	Total	for frost action	Uncoated steel	Concrete
	KIIIG	In	naruness	In	In		Sceen	Concrete
		į	į	į į				į
274: Rolfe, depressional,	İ		 				l I	
ponded						High	 High	Moderate
•		j	İ	j i	i	i	İ	i
278:								
Biscay, loamy	 		 			 m: _b	180-30-00-0	
substratum			 		 	High	Moderate	Low
307:		İ						
Dundas						High	High	Moderate
2150	1							
315B. Udifluvents,	İ		 			l I	l I	
occasionally flooded	 	I I	 				 	
000000000000000000000000000000000000000								
323B:	İ	j	j	į į	İ	İ	İ	İ
Fort Dodge						Moderate	Moderate	Low
25:	l		 					
Le Sueur	 		 		 	High	 High	Low
De Bueul	 							100
338:		j	İ	j i		İ	j	i
Garmore			ļ			High	Moderate	Moderate
342:	l		 					
Estherville, loamy	 		 				 	
substratum						Low	Low	Low
	İ	j	j	j i	İ	İ	j	İ
342B:			[[1
Estherville, loamy								
substratum	 		 			Low	Low	Low
344B:	 		 				 	
Copaston	Lithic bedrock	10-20	Strongly cemented	i i		Moderate	Low	Low
345: Copaston	 Tithia bodroak	10-20	 Strongly cemented		 	 Moderate	Low	Low
Copaston	Lithic bedrock	10-20	Strongly cemented			Moderace	LOW	LTOM
Jacwin	Paralithic	30-50	Strongly cemented			High	 High	Low
	bedrock	j	j	į į	İ	į	į	į
			!			!	!	
55:								
Luther						High	High	Moderate

Soil Features -- Continued

Map symbol	Res	trictive	layer	Subsid	dence	 Potential	Risk of corrosion	
and soil name		Depth				for	Uncoated	
	Kind	to top	Hardness	Initial		frost action	steel	Concrete
	 	In	 	In	In		 	
83:		İ					İ	
Marna						High	High	Low
85:	 						 	
Guckeen						High	High	Low
86:							 	
Cordova						High	High	Low
87B:				 			 	
Kamrar		ļ				Moderate	High	Low
13G:	 			 			 	
Gosport	,	20-40	Moderately			Moderate	High	High
	bedrock		cemented				 	
Emeline	Lithic bedrock	4-12	Strongly cemented			Moderate	Low	Low
Ridgeton	 			 	 	 Moderate	 Moderate	Low
-		İ						
57: Du Page, occasionally	 		l I				 	
flooded						Moderate	Low	Low
85:			1				 	
Spillville,		İ						
occasionally flooded						Moderate	High	Moderate
85B:	 						 	
Spillville, rarely flooded	 				 	Moderate	 High	 Moderate
1100ded								
06:								
Wacousta, depressional, ponded						 High	 High	Low
25								
77: Canisteo	 					 High	 High	Low
•	 -	į						į
11: Blue Earth,	 			 			 	
depressional, ponded						High	High	Low

Soil Features -- Continued

Map symbol	Re	estrictive	layer	Subsid	dence	 Potential	Risk of corrosion	
and soil name	Kind	Depth to top	Hardness	 Initial	Total	for frost action	Uncoated steel	Concrete
	KING	In	naruness	In	In		Sceel	Concrete
	İ	i		i i		İ	İ	
526:		ļ	[[
Wacousta, mucky,		ļ						
depressional, ponded	 		 			High	High	Low
536:	 	i					 	
Hanlon, occasionally	İ	j	İ	j i	İ	İ	İ	j
flooded						Moderate	Moderate	Low
541C:	 		 	 	 		l I	
Estherville	 	i				Low	Low	Low
				İ				
Hawick						Low	Low	Low
551B:	 		 	 	 		 	
Calamine	Paralithic	40-60	Strongly cemented			Moderate	 High	Moderate
	bedrock	i	İ	į į	İ	İ	İ	
551D:								
Calamine	 Daralithic	1 40-60	 Strongly cemented	 	 	Moderate	 High	Moderate
Calamine	bedrock	40-00	cemented			Moderate		Moderace
559: Talcot	 					 TT 2 1-		
Talcot	 		 	 	 	High	High 	Low
561:		i	İ	i i			İ	
Talcot, loamy								
substratum						High	High	Low
566C:	 						 	
Moingona						Moderate	High	Low
568D:	 		 	 	 		l I	
Cokato				i i		Moderate	Low	Low
568E:		ļ						
Cokato	 		 		 	Moderate	Low	Low
583:							İ	
Minnetonka	i	i	i	j j		High	High	Moderate
606: Lanyon, depressional,	 		 	[[l I	
ponded	 					High	 High	Low
p	 	1	1		l I	9	3**	1-5"

Soil Features Continued	
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Map symbol		estrictive	layer	Subsid	lence	Potential	Risk of	corrosion
and soil name	Kind	Depth	 Hardness	 Initial	Total	for frost action	Uncoated steel	Concrete
		In		In	In			
625:	 		 				 	
Lerdal				i		High	High	High
636:	 		 				 	
Buckney, rarely flooded						Low	Low	Low
636B:				į į				
Buckney, rarely flooded	 					Low	Low	Low
638C2:			į	į				
Clarion, moderately eroded	 			 		Moderate	 Low	Low
Storden, moderately			İ	į į			 	į
eroded						Moderate	 Low	Low
650:	 		l I				 	
Joliet	Lithic bedrock	10-20	Strongly cemented			High	High	Low
Faxon	Lithic bedrock	20-40	 Strongly cemented			High	 High	Low
715:			 	 			 	
Fluvaquents, frequently		į	į	į į		į_		<u> </u>
flooded	 					Low	Low 	Moderate
735: Havelock, occasionally			İ	į į			 	İ
flooded						High	 High	Low
740D:	 		 				 	
Hawick						Low	Low	Low
775B:			 					
Billett			j	j j		Moderate	Low	Moderate
775C:	 						 	
Billett						Moderate	Low	Moderate
777B:				į i				
Wapsie	 					Low	Low	Moderate
335D2:			į	į				į
Storden, moderately eroded	 					Moderate	Low	Low
		i		<u> </u>		1	İ	

Soil Features -- Continued

Map symbol	Re	strictive 1	ayer	Subsid	dence	 Potential	Risk of	corrosion
and soil name	Kind	Depth to top	Hardness	 Initial	Total	for frost action	Uncoated steel	 Concrete
		In		In	In	!	ļ.	[
835D2:					 	 Moderate	 Low	 Low
835E2: Storden, moderately eroded					 	 Moderate	 Low	 Low
					İ			
Omsrud, moderately eroded					 	 Moderate 	 Low 	 Low
836B: Kilkenny					 	 Moderate	 Moderate	 Moderate
854D:				2-4	25-32	 High	 High	 Moderate
855:					 	 High	 High	 Moderate
956:					 	 High	 High	Low
Okoboji, depressional, ponded					 	 High	 High	Low
1007:					 	 High	 High 	 - Low
1055B: Kandiyohi, bouldery					 	 High	 High	 Low
1138B: Clarion					 	 Moderate	 Low	Low
1236B:					 	 Moderate	 - Low	 Moderate
1236C: Angus					 	 Moderate	 Low	 Moderate
1259: Biscay, depressional, ponded					 	 High 	 Moderate 	 Low

Map symbol	Restrictive layer			Subsidence		Potential	Risk of corrosion	
and soil name	Depth			-		for	Uncoated	T
	Kind	to top	Hardness	Initial		frost action	steel	Concrete
		In		In	In		 	
1507:						ļ		
Brownton						High	High 	Low
1555:		iii		i				
Nicollet						High	High 	Low
Guckeen						High	 High	Low
1836B:							 	
Kilkenny						Moderate	Moderate	Moderate
Shorewood						 High	 High	Moderate
2700C:							 	
Ridgeton						Moderate	Moderate	Low
2700D:							 	
Ridgeton						Moderate	Moderate	Low
4000.							 	
Urban land								
4055:								
Nicollet						High	High	Low
Urban land.						 	 -	
4107:							 	
Webster		ļ ļ		ļ j		High	High	Low
Urban land.							 	
4138B:							 	
Clarion				ļ ļ		Moderate	Low	Low
Urban land.						 	 	
1235B:							 	
Angus		i i				Moderate	Low	Moderate
Urban land.						 	 -	
4236D:							 	
Lester						Moderate	Low	Moderate
Urban land.							 	
Janua.							1 	1

Soil Features -- Continued

Map symbol and soil name	Restrictive layer			Subsidence		 Potential	Risk of corrosion	
	Kind	Depth to top	Depth Hardness		Total	for frost action	Uncoated steel	Concrete
		In		Initial In	In		Breez	CONCIEC
	į	į	į	į į		į	İ	į
4325: Le Sueur	 			 		 High	 High	Low
Te Sueur						 	mign	LTOM
Urban land.	į	į		į į				
4444:	 	l I	 	 			 	
Jacwin	Paralithic bedrock	30-50	Strongly cemented	i i		High	High 	Low
Urban land.			 					
4507:	 	l I	l I	 				
Canisteo	j					High	High	Low
Urban land.			 				 	
4551B:	 		 				 	
Calamine	Paralithic bedrock	40-60	Strongly cemented	i i		Moderate	High 	Moderate
Urban land.			 				 	
4551D:	 		 				 	
Calamine	Paralithic bedrock	40-60	Strongly cemented	i i		Moderate	 High 	Moderate
Urban land.							 	
4635:	 		l I				 	
Buckney	i	i	i	i i		Low	Low	Low
Urban land.							 	
4635B:	 	l I	l I	 				
Buckney						Low	Low	Low
Urban land.			 	 		 	 	
1946B.	Í Í] 	[[
Udorthents-Highway				į i				
5010.							 	
Pits, sand and gravel	 		[[
	i	i				i	İ	i

Soil Features -- Continued

Map symbol and soil name	Restrictive		ayer	Subsic	lence	Potential	Risk of corrosion	
		Depth		i		for frost action	Uncoated	Ī
	Kind	to top	Hardness	Initial	Total		steel	Concrete
		In		In	In			
5030:								
Pits, limestone								
quarries	Lithic bedrock	0-4						
5035:								
Pits, gypsum quarries	Lithic bedrock	0-4						
5040.								
Udorthents, loamy								
5049.								
Aquolls, ponded-		i i		j		į į		İ
Udorthents, loamy		į į		į		į		į
5060.								
Pits, clay								
5080.								
Udorthents								
5457:								
Du Page, channeled,		i i		İ		į į		
frequently flooded						Moderate	Low	Low
5507:								
Corvuso						High	High	Low
Brownton						 High	High	Low
AW.								
Animal waste lagoon		į į		į		į		į
SL.								
Sewage lagoon		į		į		į į		į
W.								
Water		i i		i		i i		i

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