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*\*County specific computer generated reports.*

## ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Ellis County, Kansas: Published

Map symbol	Soil name	Acres	Percent
141HM	Harney-Mento Complex, 3 To 7 Percent Slopes-----	5	*
163AU	Armo-Bogue Complex, 7 To 15 Percent Slopes-----	426	*
163HE	Harney-Mento Silt Loams, 3 To 7 Percent Slopes-----	100	*
163IC	Inavale Fine Sand, Channeled, Occasionally Flooded-----	67	*
163WX	Wakeen Silt Loam, 7 To 20 Percent Slopes-----	559	*
163WY	Wakeen-Harney Silt Loams, 1 To 3 Percent Slopes-----	342	*
165BO	Bogue Clay, 3 To 15 Percent Slopes-----	148	*
165NW	Nibson-Wakeen Silt Loams, 3 To 20 Percent Slopes-----	366	*
165PE	Penden Clay Loam, 3 To 6 Percent Slopes-----	15	*
165UB	Uly Silt Loam, 1 To 3 Percent Slopes-----	152	*
165UR	Uly-Roxbury Silt Loams, 0 To 15 Percent Slopes-----	17	*
167CR	Crete Silt Loam, 0 To 1 Percent Slopes-----	3,672	0.6
167DR	Dorrance Gravelly Sandy Loam, 4 To 15 Percent Slopes-----	457	*
167RC	Roxbury Silt Loam, Channeled-----	3,526	0.6
195BD	Badland-Manvel Complex, 3 To 20 Percent Slopes-----	296	*
195CC	Campus-Canlon Loams, 6 To 30 Percent Slopes-----	1,529	0.3
195CF	Carlson Silt Loam, 1 To 3 Percent Slopes-----	3,233	0.6
195HU	Humbarger Loam, Channeled-----	812	0.1
195IF	Inavale Loamy Sand, Channeled-----	56	*
195PF	Penden Clay Loam, 3 To 7 Percent Slopes-----	270	*
195PO	Penden Loam, 7 To 15 Percent Slopes-----	64	*
Ab	Fluvents, Frequently Flooded-----	273	*
Ac	New Cambria Silty Clay, Frequently Flooded-----	2,428	0.4
Ad	Fluvaquents, Occasionally Flooded-----	676	0.1
Ae	Anselmo Fine Sandy Loam, 2 To 6 Percent Slopes-----	922	0.2
Am	Armo Loam, 1 To 3 Percent Slopes-----	6,061	1.1
An	Armo Loam, 3 To 7 Percent Slopes-----	32,404	5.6
Ao	Armo Loam, 3 To 7 Percent Slopes, Eroded-----	2,077	0.4
Ar	Armo Loam, 7 To 15 Percent Slopes-----	26,671	4.6
Bf	Boel Fine Sandy Loam, Occasionally Flooded-----	846	0.1
Bg	Bogue Clay, 3 To 8 Percent Slopes-----	6,844	1.2
Bo	Bogue-Armo Complex, 5 To 25 Percent Slopes-----	18,397	3.2
BOP	Borrow Pits-----	120	*
Br	Brownell Gravelly Loam, 2 To 10 Percent Slopes-----	34,422	6.0
Cc	Campus-Carlson Complex, 3 To 7 Percent Slopes-----	11,309	2.0
Cd	Campus-Penden Complex, 5 To 15 Percent Slopes-----	8,773	1.5
Ce	Canlon Complex, 5 To 25 Percent Slopes-----	1,670	0.3
Cm	Corinth Silty Clay Loam, 1 To 3 Percent Slopes-----	273	*
Cn	Corinth Silty Clay Loam, 3 To 7 Percent Slopes-----	4,806	0.8
Co	Corinth Silty Clay Loam, 7 To 15 Percent Slopes-----	11,305	2.0
Cr	Crete Silty Clay Loam, 0 To 1 Percent Slopes-----	4,283	0.7
De	Detroit Silt Loam, Rarely Flooded-----	3,826	0.7
Ee	Eltree Silt Loam, 0 To 1 Percent Slopes-----	2,107	0.4
Ef	Eltree Silt Loam, 1 To 3 Percent Slopes-----	6,330	1.1
Eg	Eltree Silt Loam, 3 To 7 Percent Slopes-----	5,222	0.9
Eh	Eltree Silt Loam, 7 To 15 Percent Slopes-----	704	0.1
GRP	Gravel Pits-----	164	*
Ha	Harney Silt Loam, 0 To 1 Percent Slopes-----	42,553	7.4
Hb	Harney Silt Loam, 1 To 3 Percent Slopes-----	35,258	6.1
Hc	Harney Silt Loam, 3 To 7 Percent Slopes-----	9,453	1.6
Hd	Harney Silty Clay Loam, 2 To 5 Percent Slopes, Eroded-----	17,992	3.1
He	Harney-Armo Complex, 3 To 7 Percent Slopes, Eroded-----	22,893	4.0
Hf	Harney-Carlson Silt Loams, 0 To 1 Percent Slopes-----	4,481	0.8
Hg	Harney-Carlson Silt Loams, 1 To 3 Percent Slopes-----	45,317	7.9
HGG	Harney-Mento Silt Loams, 1 To 3 Percent Slopes-----	1,029	0.2
Hh	Harney-Wakeen Silt Loams, 0 To 1 Percent Slopes-----	1,838	0.3
Hk	Harney-Wakeen Silt Loams, 1 To 3 Percent Slopes-----	16,279	2.8
Hl	Heizer-Armo Complex, 8 To 25 Percent Slopes-----	16,432	2.9
HMM	Heizer-Brownell Gravelly Loams, 5 To 30 Percent Slopes-----	1,532	0.3
Hn	Dorrance Sandy Loam, 5 To 20 Percent Slopes-----	6,044	1.0
Ho	Holdrege Silt Loam, 0 To 1 Percent Slopes-----	878	0.2
Hp	Holdrege Silt Loam, 1 To 3 Percent Slopes-----	2,847	0.5
Hr	Hord Silt Loam, Rarely Flooded-----	7,480	1.3
In	Inavale Loamy Sand, Occasionally Flooded-----	3,092	0.5
Mc	Mccook Fine Sandy Loam, Rarely Flooded-----	1,015	0.2
Md	Mccook Silt Loam, Rarely Flooded-----	6,554	1.1
Me	Mento Silt Loam, 0 To 1 Percent Slopes-----	525	*
Mf	Mento Silt Loam, 1 To 3 Percent Slopes-----	20,373	3.5
Mg	Mento Silty Clay Loam, 1 To 3 Percent Slopes, Eroded-----	2,439	0.4
Mo	Mento Soils, 3 To 7 Percent Slopes, Eroded-----	15,529	2.7
Mu	Munjor Sandy Loam, Frequently Flooded-----	3,401	0.6
Nc	New Cambria Silty Clay, Rarely Flooded-----	1,813	0.3
Nn	Nibson Silt Loam, 5 To 12 Percent Slopes-----	5,089	0.9
Rb	Roxbury Silt Loam, Rarely Flooded-----	17,411	3.0
Rf	Roxbury Silt Loam, Frequently Flooded-----	25,952	4.5
RIV	Rivers-----	2,758	0.5
Ro	Heizer-Brownell Complex, 7 To 30 Percent Slopes-----	3,804	0.7
ROO	Roxbury Silt Loam, Occasionally Flooded-----	2,981	0.5
UCC	Uly Silt Loam, 3 To 6 Percent Slopes-----	215	*
W	Water-----	52	*
Wa	Wakeen Silt Loam, 1 To 3 Percent Slopes-----	5,730	1.0
We	Wakeen Silt Loam, 1 To 3 Percent Slopes, Eroded-----	372	*
Wh	Wakeen Silt Loam, 3 To 7 Percent Slopes-----	11,063	1.9
Wk	Wakeen Silt Loam, 5 To 15 Percent Slopes, Eroded-----	1,897	0.3
Wn	Wann Loam, Occasionally Flooded-----	2,892	0.5
	Total-----	576,288	100.0

\* Less than 0.1 percent.

Nontechnical Soil Descriptions  
Ellis County, Kansas

Nontechnical soil descriptions describe soil properties or management considerations specific to a soil map unit or group of map units, shown in the NonTechnical Descriptions report. These descriptions are written in terminology that Non-technical users of soil survey information can understand. Nontechnical soil descriptions are a powerful tool for creating reports. These high quality, easy to read reports can be generated by conservation planners and other NRCS employees for distribution to land users. Soil map unit descriptions and National Soil Information System records are the basis for these descriptions.

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141HM Harney-Mento Complex, 3 To 7 Percent Slopes

Harney soil makes up 50 percent of the map unit. This map unit is in the Rolling Plains and Breaks Major Land Resource Area. This soil occurs on a moderately sloping hillslope on upland. The runoff class is medium. The parent material consists of loess. This soil is well drained. The slowest permeability is moderately slow. It has a high available water capacity and a moderate shrink swell potential. This soil is not flooded and is not ponded. The seasonal high water table is at a depth of more than 6 feet. The soil contains a maximum amount of 10 percent calcium carbonate. This soil is in the Loamy Upland (pe20-26) range site. It is in the nonirrigated land capability classification 3e.

Mento soil makes up 50 percent of the map unit. This map unit is in the Rolling Plains and Breaks Major Land Resource Area. This soil occurs on a moderately sloping hillslope on upland. The runoff class is high. The parent material consists of loess over residuum weathered from limestone. The soil is greater than 60 inches deep to bedrock. This soil is well drained. The slowest permeability is slow. It has a moderate available water capacity and a high shrink swell potential. This soil is not flooded and is not ponded. The seasonal high water table is at a depth of more than 6 feet. The soil contains a maximum amount of 10 percent calcium carbonate. This soil contains a very slightly saline horizon. This soil is in the Clay Upland (pe20-26) range site. It is in the nonirrigated land capability classification 4e.

163AU Armo-Bogue Complex, 7 To 15 Percent Slopes

Armo soil makes up 60 percent of the map unit. This map unit is in the Rolling Plains and Breaks Major Land Resource Area. This soil occurs on a strongly sloping to moderately steep hillslope on upland. The runoff class is medium. The parent material consists of calcareous loamy colluvium derived from limestone. This soil is well drained. The slowest permeability is moderate. It has a high available water capacity and a low shrink swell potential. This soil is not flooded and is not ponded. The seasonal high water table is at a depth of more than 6 feet. The soil contains a maximum amount of 15 percent calcium carbonate. This soil is in the Limy Upland (pe20-26) range site. It is in the nonirrigated land capability classification 6e.

Bogue soil makes up 40 percent of the map unit. This map unit is in the Rolling Plains and Breaks Major Land Resource Area. This soil occurs on a strongly sloping to moderately steep hillslope on upland. The runoff class is very high. The parent material consists of residuum weathered from shale. The soil is 20 to 40 inches deep to bedrock (paralithic). This soil is moderately well drained. The slowest permeability is very slow. It has a low available water capacity and a high shrink swell potential. This soil is not flooded and is not ponded. The seasonal high water table is at a depth of more than 6 feet. The soil contains a maximum amount of 5 percent calcium carbonate. This soil is in the Blue Shale (pe20-26) range site. It is in the nonirrigated land capability classification 6e.

163HE Harney-Mento Silt Loams, 3 To 7 Percent Slopes

Harney soil makes up 55 percent of the map unit. This map unit is in the Rolling Plains and Breaks Major Land Resource Area. This soil occurs on a moderately sloping plain on tableland. The runoff class is medium. The parent material consists of loess. This soil is well drained. The slowest permeability is moderately slow. It has a high available water capacity and a moderate shrink swell potential. This soil is not flooded and is not ponded. The seasonal high water table is at a depth of more than 6 feet. The soil contains a maximum amount of 10 percent calcium carbonate. This soil is in the Loamy Upland (pe20-26) range site. It is in the nonirrigated land capability classification 3e.

Mento soil makes up 45 percent of the map unit. This map unit is in the Rolling Plains and Breaks Major Land Resource Area. This soil occurs on a moderately sloping divide on upland. The runoff class is medium. The parent material consists of loess over residuum weathered from limestone. This soil is well drained. The slowest permeability is slow. It has a high available water capacity and a high shrink swell potential. This soil is not flooded and is not ponded. The seasonal high water table is at a depth of more than 6 feet. The soil contains a maximum amount of 10 percent calcium carbonate. This soil contains a very slightly saline horizon. This soil is in the Clay Upland (pe20-26) range site. It is in the nonirrigated land capability classification 4e.

163IC Inavale Fine Sand, Channeled, Occasionally Flooded

Inavale soil makes up 100 percent of the map unit. This map unit is in the Rolling Plains and Breaks Major Land Resource Area. This soil occurs on a nearly level to moderately sloping flood plain on river valley. The runoff class is very low. The parent material consists of sandy alluvium. This soil is somewhat excessively drained. The slowest permeability is rapid. It has a low available water capacity and a low shrink swell potential. This soil is occasionally flooded and is not ponded. The seasonal high water table is at a depth of more than 6 feet. The soil contains a maximum amount of 5 percent calcium carbonate. This soil is in the Sandy Lowland (pe20-26) range site. This soil is in the irrigated land capability class 4e. It is in the nonirrigated land capability classification 6e.

Nontechnical Soil Descriptions--Continued  
Ellis County, Kansas

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163WX Wakeen Silt Loam, 7 To 20 Percent Slopes

Wakeen soil makes up 100 percent of the map unit. This map unit is in the Rolling Plains and Breaks Major Land Resource Area. This soil occurs on a strongly sloping to moderately steep hillslope on upland. The runoff class is medium. The parent material consists of calcareous fine-silty residuum weathered from chalk. The soil is 20 to 40 inches deep to bedrock (paralithic). This soil is well drained. The slowest permeability is moderate. It has a low available water capacity and a moderate shrink swell potential. This soil is not flooded and is not ponded. The seasonal high water table is at a depth of more than 6 feet. The soil contains a maximum amount of 40 percent calcium carbonate. This soil is in the Limy Upland (pe20-26) range site. It is in the nonirrigated land capability classification 6e.

163WY Wakeen-Harney Silt Loams, 1 To 3 Percent Slopes

Wakeen soil makes up 55 percent of the map unit. This map unit is in the Rolling Plains and Breaks Major Land Resource Area. This soil occurs on a gently sloping hillslope on upland. The runoff class is low. The parent material consists of calcareous fine-silty residuum weathered from chalk. The soil is 20 to 40 inches deep to bedrock (paralithic). This soil is well drained. The slowest permeability is moderate. It has a moderate available water capacity and a moderate shrink swell potential. This soil is not flooded and is not ponded. The seasonal high water table is at a depth of more than 6 feet. The soil contains a maximum amount of 40 percent calcium carbonate. This soil is in the Limy Upland (pe20-26) range site. It is in the nonirrigated land capability classification 3e.

Harney soil makes up 45 percent of the map unit. This map unit is in the Rolling Plains and Breaks Major Land Resource Area. This soil occurs on a gently sloping plain on tableland. The runoff class is low. The parent material consists of loess. This soil is well drained. The slowest permeability is moderately slow. It has a high available water capacity and a moderate shrink swell potential. This soil is not flooded and is not ponded. The seasonal high water table is at a depth of more than 6 feet. The soil contains a maximum amount of 10 percent calcium carbonate. This soil is in the Loamy Upland (pe20-26) range site. This soil is in the irrigated land capability class 2e. It is in the nonirrigated land capability classification 2e.

165BO Bogue Clay, 3 To 15 Percent Slopes

Bogue soil makes up 100 percent of the map unit. This map unit is in the Rolling Plains and Breaks Major Land Resource Area. This soil occurs on a moderately sloping to moderately steep hillslope on upland. The runoff class is very high. The parent material consists of residuum weathered from shale. The soil is 20 to 40 inches deep to bedrock (paralithic). This soil is moderately well drained. The slowest permeability is very slow. It has a very low available water capacity and a high shrink swell potential. This soil is not flooded and is not ponded. The seasonal high water table is at a depth of more than 6 feet. This soil is in the Blue Shale (pe20-26) range site. It is in the nonirrigated land capability classification 6e.

165NW Nibson-Wakeen Silt Loams, 3 To 20 Percent Slopes

Nibson soil makes up 55 percent of the map unit. This map unit is in the Rolling Plains and Breaks Major Land Resource Area. This soil occurs on a moderately sloping to moderately steep hillslope on upland. The runoff class is medium. The parent material consists of limestone and shale and/or silty residuum weathered from chalk. The soil is 10 to 20 inches deep to bedrock (paralithic). This soil is well drained. The slowest permeability is moderate. It has a low available water capacity and a moderate shrink swell potential. This soil is not flooded and is not ponded. The seasonal high water table is at a depth of more than 6 feet. The soil contains a maximum amount of 40 percent calcium carbonate. This soil is in the Limy Upland (pe20-26) range site. It is in the nonirrigated land capability classification 6e.

Wakeen soil makes up 45 percent of the map unit. This map unit is in the Rolling Plains and Breaks Major Land Resource Area. This soil occurs on a moderately sloping to moderately steep hillslope on upland. The runoff class is medium. The parent material consists of limestone and shale and/or silty residuum weathered from chalk. The soil is 20 to 40 inches deep to bedrock (paralithic). This soil is well drained. The slowest permeability is moderate. It has a moderate available water capacity and a moderate shrink swell potential. This soil is not flooded and is not ponded. The seasonal high water table is at a depth of more than 6 feet. The soil contains a maximum amount of 40 percent calcium carbonate. This soil is in the Limy Upland (pe20-26) range site. It is in the nonirrigated land capability classification 6e.

165PE Penden Clay Loam, 3 To 6 Percent Slopes

Penden soil makes up 100 percent of the map unit. This map unit is in the Rolling Plains and Breaks Major Land Resource Area. This soil occurs on a moderately sloping plain on tableland. The runoff class is medium. The parent material consists of residuum. This soil is well drained. The slowest permeability is moderate. It has a high available water capacity and a moderate shrink swell potential. This soil is not flooded and is not ponded. The seasonal high water table is at a depth of more than 6 feet. The soil contains a maximum amount of 30 percent calcium carbonate. This soil is in the Limy Upland (pe20-26) range site. It is in the nonirrigated land capability classification 3e.

165UB Uly Silt Loam, 1 To 3 Percent Slopes

Uly soil makes up 100 percent of the map unit. This map unit is in the Rolling Plains and Breaks Major Land Resource Area. This soil occurs on a gently sloping hillslope on upland. The runoff class is medium. The parent material consists of loess. This soil is well drained. The slowest permeability is moderate. It has a very high available water capacity and a low shrink swell potential. This soil is not flooded and is not ponded. The seasonal high water table is at a depth of more than 6 feet. This soil is in the Loamy Upland (pe20-26) range site. This soil is in the irrigated land capability class 2e. It is in the nonirrigated land capability classification 2e.

Nontechnical Soil Descriptions--Continued  
Ellis County, Kansas

165UR Uly-Roxbury Silt Loams, 0 To 15 Percent Slopes

Uly soil makes up 65 percent of the map unit. This map unit is in the Rolling Plains and Breaks Major Land Resource Area. This soil occurs on a moderately sloping to moderately steep drainage way on upland. The runoff class is medium. The parent material consists of loess. This soil is well drained. The slowest permeability is moderate. It has a very high available water capacity and a low shrink swell potential. This soil is not flooded and is not ponded. The seasonal high water table is at a depth of more than 6 feet. This soil is in the Loamy Upland (pe20-26) range site. This soil is in the irrigated land capability class 4e. It is in the nonirrigated land capability classification 4e.

Roxbury soil makes up 35 percent of the map unit. This map unit is in the Rolling Plains and Breaks Major Land Resource Area. This soil occurs on a nearly level to gently sloping flood plain. The runoff class is low. The parent material consists of calcareous fine-silty alluvium. This soil is well drained. The slowest permeability is moderate. It has a very high available water capacity and a moderate shrink swell potential. This soil is occasionally flooded and is not ponded. The seasonal high water table is at a depth of more than 6 feet. The soil contains a maximum amount of 10 percent calcium carbonate. This soil is in the Loamy Lowland (pe20-26) range site. This soil is in the irrigated land capability class 2w. It is in the nonirrigated land capability classification 2w.

167CR Crete Silt Loam, 0 To 1 Percent Slopes

Crete soil makes up 100 percent of the map unit. This map unit is in the Rolling Plains and Breaks Major Land Resource Area. This soil occurs on a nearly level plain on upland. The runoff class is low. The parent material consists of loess. This soil is moderately well drained. The slowest permeability is impermeable. It has a high available water capacity and a high shrink swell potential. This soil is not flooded and is not ponded. The seasonal high water table is at a depth of more than 6 feet. The soil contains a maximum amount of 5 percent calcium carbonate. This soil is in the Clay Upland (pe20-26) range site. This soil is in the irrigated land capability class 2s. It is in the nonirrigated land capability classification 2s.

167DR Dorrance Gravelly Sandy Loam, 4 To 15 Percent Slopes

Dorrance soil makes up 100 percent of the map unit. This map unit is in the Rolling Plains and Breaks Major Land Resource Area. This soil occurs on a moderately sloping to moderately steep hillslope on upland. The runoff class is low. The parent material consists of loamy material over sandy alluvium. This soil is excessively drained. The slowest permeability is moderately rapid. It has a low available water capacity and a low shrink swell potential. This soil is not flooded and is not ponded. The seasonal high water table is at a depth of more than 6 feet. The soil contains a maximum amount of 15 percent calcium carbonate. This soil is in the Gravelly Hills (pe20-26) range site. This soil is in the irrigated land capability class 6s. It is in the nonirrigated land capability classification 6s.

167RC Roxbury Silt Loam, Channeled

Roxbury soil makes up 100 percent of the map unit. This map unit is in the Rolling Plains and Breaks Major Land Resource Area. This soil occurs on a nearly level flood plain on river valley. The runoff class is low. The parent material consists of calcareous fine-silty alluvium. This soil is well drained. The slowest permeability is moderate. It has a very high available water capacity and a moderate shrink swell potential. This soil is frequently flooded and is not ponded. The seasonal high water table is at a depth of more than 6 feet. The soil contains a maximum amount of 10 percent calcium carbonate. This soil is in the Loamy Lowland (pe20-26) range site. It is in the nonirrigated land capability classification 5w.

195BD Badland-Manvel Complex, 3 To 20 Percent Slopes

Manvel soil makes up 30 percent of the map unit. This map unit is in the Rolling Plains and Breaks Major Land Resource Area. This soil occurs on a moderately sloping to strongly sloping fan on upland. The runoff class is medium. The parent material consists of calcareous fine-silty colluvium derived from chalk. This soil is well drained. The slowest permeability is moderately slow. It has a high available water capacity and a moderate shrink swell potential. This soil is not flooded and is not ponded. The seasonal high water table is at a depth of more than 6 feet. The soil contains a maximum amount of 20 percent calcium carbonate. This soil contains a very slightly saline horizon. This soil is in the Chalk Flats (pe20-26) range site. This soil is in the irrigated land capability class 4e. It is in the nonirrigated land capability classification 6.

195CC Campus-Canlon Loams, 6 To 30 Percent Slopes

Campus soil makes up 70 percent of the map unit. This map unit is in the Rolling Plains and Breaks Major Land Resource Area. This soil occurs on a moderately sloping to moderately steep hillslope on upland. The runoff class is medium. The parent material consists of old calcareous fine-loamy alluvium and/or calcareous fine-loamy residuum. The soil is 20 to 40 inches deep to bedrock (lithic). This soil is well drained. The slowest permeability is moderate. It has a moderate available water capacity and a low shrink swell potential. This soil is not flooded and is not ponded. The seasonal high water table is at a depth of more than 6 feet. The soil contains a maximum amount of 45 percent calcium carbonate. This soil is in the Limy Upland (pe20-26) range site. It is in the nonirrigated land capability classification 6e.

Canlon soil makes up 30 percent of the map unit. This map unit is in the Rolling Plains and Breaks Major Land Resource Area. This soil occurs on a moderately sloping to steep escarpment on upland. The runoff class is medium. The parent material consists of calcareous loamy residuum weathered from sandstone. The soil is 10 to 20 inches deep to bedrock (lithic). This soil is somewhat excessively drained. The slowest permeability is moderate. It has a low available water capacity and a low shrink swell potential. This soil is not flooded and is not ponded. The seasonal high water table is at a depth of more than 6 feet. The soil contains a maximum amount of 25 percent calcium carbonate. This soil is in the Shallow Limy (pe20-26) range site. It is in the nonirrigated land capability classification 7s.

Nontechnical Soil Descriptions--Continued  
Ellis County, Kansas

195CF Carlson Silt Loam, 1 To 3 Percent Slopes

Carlson soil makes up 100 percent of the map unit. This map unit is in the Rolling Plains and Breaks Major Land Resource Area. This soil occurs on a gently sloping ridge on upland. The runoff class is low. The parent material consists of loess over old loamy alluvium. This soil is well drained. The slowest permeability is moderately slow. It has a high available water capacity and a moderate shrink swell potential. This soil is not flooded and is not ponded. The seasonal high water table is at a depth of more than 6 feet. The soil contains a maximum amount of 15 percent calcium carbonate. This soil is in the Loamy Upland (pe20-26) range site. This soil is in the irrigated land capability class 2e. It is in the nonirrigated land capability classification 2e.

195HU Humbarger Loam, Channeled

Humbarger soil makes up 100 percent of the map unit. This map unit is in the Rolling Plains and Breaks Major Land Resource Area. This soil occurs on a nearly level to gently sloping flood plain on river valley. The runoff class is low. The parent material consists of calcareous loamy alluvium. This soil is well drained. The slowest permeability is moderate. It has a high available water capacity and a moderate shrink swell potential. This soil is frequently flooded and is not ponded. The seasonal high water table is at a depth of more than 6 feet. The soil contains a maximum amount of 5 percent calcium carbonate. This soil is in the Loamy Lowland (pe20-26) range site. It is in the nonirrigated land capability classification 5w.

195IF Inavale Loamy Sand, Channeled

Inavale soil makes up 100 percent of the map unit. This map unit is in the Rolling Plains and Breaks Major Land Resource Area. This soil occurs on a nearly level to gently sloping flood plain on river valley. The runoff class is negligible. The parent material consists of sandy alluvium. This soil is excessively drained. The slowest permeability is rapid. It has a low available water capacity and a low shrink swell potential. This soil is frequently flooded and is not ponded. The seasonal high water table is at a depth of more than 6 feet. The soil contains a maximum amount of 5 percent calcium carbonate. This soil is in the Sandy Lowland (pe20-26) range site. It is in the nonirrigated land capability classification 6w.

195PF Penden Clay Loam, 3 To 7 Percent Slopes

Penden soil makes up 100 percent of the map unit. This map unit is in the Rolling Plains and Breaks Major Land Resource Area. This soil occurs on a moderately sloping hillslope on upland. The runoff class is medium. The parent material consists of fine-loamy residuum weathered from calcareous sandstone. This soil is well drained. The slowest permeability is moderate. It has a high available water capacity and a moderate shrink swell potential. This soil is not flooded and is not ponded. The seasonal high water table is at a depth of more than 6 feet. The soil contains a maximum amount of 30 percent calcium carbonate. This soil is in the Limy Upland (pe20-26) range site. It is in the nonirrigated land capability classification 3e.

195PO Penden Loam, 7 To 15 Percent Slopes

Penden soil makes up 100 percent of the map unit. This map unit is in the Rolling Plains and Breaks Major Land Resource Area. This soil occurs on a strongly sloping to moderately steep hillslope on upland. The runoff class is medium. The parent material consists of fine-loamy residuum weathered from calcareous sandstone. This soil is well drained. The slowest permeability is moderate. It has a high available water capacity and a moderate shrink swell potential. This soil is not flooded and is not ponded. The seasonal high water table is at a depth of more than 6 feet. The soil contains a maximum amount of 30 percent calcium carbonate. This soil is in the Limy Upland (pe20-26) range site. It is in the nonirrigated land capability classification 6e.

Ab Fluvents, Frequently Flooded

Fluvents soil makes up 100 percent of the map unit. This map unit is in the Rolling Plains and Breaks Major Land Resource Area. This soil occurs on a nearly level to strongly sloping flood plain on river valley. The runoff class is negligible. The parent material consists of loamy alluvium. This soil is well drained. The slowest permeability is moderate. It has a very high available water capacity and a moderate shrink swell potential. This soil is frequently flooded and is not ponded. The seasonal high water table is at a depth of more than 6 feet. It is in the nonirrigated land capability classification 6w.

Ac New Cambria Silty Clay, Frequently Flooded

New Cambria soil makes up 100 percent of the map unit. This map unit is in the Rolling Plains and Breaks Major Land Resource Area. This soil occurs on a nearly level to gently sloping terrace on river valley. The runoff class is medium. The parent material consists of clayey alluvium. This soil is moderately well drained. The slowest permeability is impermeable. It has a moderate available water capacity and a high shrink swell potential. This soil is frequently flooded and is not ponded. The seasonal high water table is at a depth of more than 6 feet. The soil contains a maximum amount of 15 percent calcium carbonate. This soil is in the Clay Lowland (pe20-26) range site. It is in the nonirrigated land capability classification 5w.

Ad Fluvaquents, Occasionally Flooded

Fluvaquents soil makes up 100 percent of the map unit. This map unit is in the Rolling Plains and Breaks Major Land Resource Area. This soil occurs on a nearly level terrace on river valley. The runoff class is very low. The parent material consists of sandy alluvium and/or loamy alluvium and/or clayey alluvium. This soil is somewhat poorly drained. The slowest permeability is moderately slow. It has a high available water capacity and a moderate shrink swell potential. This soil is occasionally flooded and is not ponded. The top of the seasonal high water table is at 30 inches. The soil contains a maximum amount of 5 percent calcium carbonate. This soil contains a very slightly saline horizon. This soil is in the Subirrigated (pe20-26) range site. This soil is in the irrigated land capability class 2w. It is in the nonirrigated land capability classification 2w.

Nontechnical Soil Descriptions--Continued  
Ellis County, Kansas

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**Ae Anselmo Fine Sandy Loam, 2 To 6 Percent Slopes**

Anselmo soil makes up 100 percent of the map unit. This map unit is in the Rolling Plains and Breaks Major Land Resource Area. This soil occurs on a gently sloping to moderately sloping valley side on upland. The runoff class is very low. The parent material consists of coarse-loamy eolian deposits. This soil is well drained. The slowest permeability is moderate. It has a moderate available water capacity and a low shrink swell potential. This soil is not flooded and is not ponded. The seasonal high water table is at a depth of more than 6 feet. The soil contains a maximum amount of 3 percent calcium carbonate. This soil is in the Sandy (pe20-26) range site. This soil is in the irrigated land capability class 3e. It is in the nonirrigated land capability classification 3e.

**Am Armo Loam, 1 To 3 Percent Slopes**

Armo soil makes up 100 percent of the map unit. This map unit is in the Rolling Plains and Breaks Major Land Resource Area. This soil occurs on a gently sloping hillslope on upland. The runoff class is low. The parent material consists of calcareous loamy colluvium derived from limestone. This soil is well drained. The slowest permeability is moderate. It has a high available water capacity and a low shrink swell potential. This soil is not flooded and is not ponded. The seasonal high water table is at a depth of more than 6 feet. The soil contains a maximum amount of 10 percent calcium carbonate. This soil is in the Limy Upland (pe20-26) range site. It is in the nonirrigated land capability classification 2e.

**An Armo Loam, 3 To 7 Percent Slopes**

Armo soil makes up 100 percent of the map unit. This map unit is in the Rolling Plains and Breaks Major Land Resource Area. This soil occurs on a moderately sloping hillslope on upland. The runoff class is medium. The parent material consists of calcareous loamy colluvium derived from limestone. This soil is well drained. The slowest permeability is moderate. It has a very high available water capacity and a low shrink swell potential. This soil is not flooded and is not ponded. The seasonal high water table is at a depth of more than 6 feet. The soil contains a maximum amount of 10 percent calcium carbonate. This soil is in the Limy Upland (pe20-26) range site. It is in the nonirrigated land capability classification 3e.

**Ao Armo Loam, 3 To 7 Percent Slopes, Eroded**

Armo soil makes up 100 percent of the map unit. This map unit is in the Rolling Plains and Breaks Major Land Resource Area. This soil occurs on a moderately sloping hillslope on upland. The runoff class is medium. The parent material consists of calcareous loamy colluvium derived from limestone. This soil is well drained. The slowest permeability is moderate. It has a high available water capacity and a low shrink swell potential. This soil is not flooded and is not ponded. The seasonal high water table is at a depth of more than 6 feet. The soil contains a maximum amount of 10 percent calcium carbonate. This soil is in the Limy Upland (pe20-26) range site. It is in the nonirrigated land capability classification 4e.

**Ar Armo Loam, 7 To 15 Percent Slopes**

Armo soil makes up 100 percent of the map unit. This map unit is in the Rolling Plains and Breaks Major Land Resource Area. This soil occurs on a strongly sloping to moderately steep hillslope on upland. The runoff class is medium. The parent material consists of calcareous loamy colluvium derived from limestone. This soil is well drained. The slowest permeability is moderate. It has a high available water capacity and a low shrink swell potential. This soil is not flooded and is not ponded. The seasonal high water table is at a depth of more than 6 feet. The soil contains a maximum amount of 10 percent calcium carbonate. This soil is in the Limy Upland (pe20-26) range site. It is in the nonirrigated land capability classification 6e.

**Bf Boel Fine Sandy Loam, Occasionally Flooded**

Boel soil makes up 100 percent of the map unit. This map unit is in the Rolling Plains and Breaks Major Land Resource Area. This soil occurs on a nearly level to gently sloping flood plain on river valley. The runoff class is negligible. The parent material consists of sandy alluvium. This soil is somewhat poorly drained. The slowest permeability is moderately rapid. It has a low available water capacity and a low shrink swell potential. This soil is occasionally flooded and is not ponded. The top of the seasonal high water table is at 30 inches. The soil contains a maximum amount of 5 percent calcium carbonate. This soil is in the Subirrigated (pe20-26) range site. This soil is in the irrigated land capability class 3w. It is in the nonirrigated land capability classification 3w.

**Bg Bogue Clay, 3 To 8 Percent Slopes**

Bogue soil makes up 100 percent of the map unit. This map unit is in the Rolling Plains and Breaks Major Land Resource Area. This soil occurs on a moderately sloping to strongly sloping hillslope on upland. The runoff class is very high. The parent material consists of residuum weathered from shale. The soil is 20 to 40 inches deep to bedrock (paralithic). This soil is moderately well drained. The slowest permeability is very slow. It has a low available water capacity and a high shrink swell potential. This soil is not flooded and is not ponded. The seasonal high water table is at a depth of more than 6 feet. The soil contains a maximum amount of 5 percent calcium carbonate. This soil is in the Blue Shale (pe20-26) range site. It is in the nonirrigated land capability classification 6e.

**Bo Bogue-Armo Complex, 5 To 25 Percent Slopes**

Bogue soil makes up 60 percent of the map unit. This map unit is in the Rolling Plains and Breaks Major Land Resource Area. This soil occurs on a moderately sloping to steep hillslope on upland. The runoff class is very high. The parent material consists of residuum weathered from shale. The soil is 20 to 40 inches deep to bedrock (paralithic). This soil is moderately well drained. The slowest permeability is very slow. It has a very low available water capacity and a high shrink swell potential. This soil is not flooded and is not ponded. The seasonal high water table is at a depth of more than 6 feet. The soil contains a maximum amount of 5 percent calcium carbonate. This soil is in the Blue Shale (pe20-26) range site. It is in the nonirrigated land capability classification 6e.



Nontechnical Soil Descriptions--Continued  
Ellis County, Kansas

Armo soil makes up 40 percent of the map unit. This map unit is in the Rolling Plains and Breaks Major Land Resource Area. This soil occurs on a moderately sloping to moderately steep hillslope on upland. The runoff class is medium. The parent material consists of calcareous loamy colluvium derived from limestone. This soil is well drained. The slowest permeability is moderate. It has a high available water capacity and a low shrink swell potential. This soil is not flooded and is not ponded. The seasonal high water table is at a depth of more than 6 feet. The soil contains a maximum amount of 10 percent calcium carbonate. This soil is in the Limy Upland (pe20-26) range site. It is in the nonirrigated land capability classification 6e.

Br Brownell Gravelly Loam, 2 To 10 Percent Slopes

Brownell soil makes up 100 percent of the map unit. This map unit is in the Rolling Plains and Breaks Major Land Resource Area. This soil occurs on a gently sloping to strongly sloping hillslope on upland. The runoff class is medium. The parent material consists of calcareous residuum weathered from limestone. The soil is 20 to 40 inches deep to bedrock (lithic). This soil is well drained. The slowest permeability is moderate. It has a low available water capacity and a low shrink swell potential. This soil is not flooded and is not ponded. The seasonal high water table is at a depth of more than 6 feet. The soil contains a maximum amount of 65 percent calcium carbonate. This soil is in the Limy Upland (pe20-26) range site. It is in the nonirrigated land capability classification 6e.

Cc Campus-Carlson Complex, 3 To 7 Percent Slopes

Campus soil makes up 65 percent of the map unit. This map unit is in the Rolling Plains and Breaks Major Land Resource Area. This soil occurs on a moderately sloping hillslope on upland. The runoff class is low. The parent material consists of old calcareous fine-loamy alluvium and/or calcareous fine-loamy residuum. The soil is 20 to 40 inches deep to bedrock (lithic). This soil is well drained. The slowest permeability is moderate. It has a moderate available water capacity and a low shrink swell potential. This soil is not flooded and is not ponded. The seasonal high water table is at a depth of more than 6 feet. The soil contains a maximum amount of 45 percent calcium carbonate. This soil is in the Limy Upland (pe20-26) range site. It is in the nonirrigated land capability classification 4e.

Carlson soil makes up 35 percent of the map unit. This map unit is in the Rolling Plains and Breaks Major Land Resource Area. This soil occurs on a moderately sloping ridge on upland. The runoff class is low. The parent material consists of loess over old loamy alluvium. This soil is well drained. The slowest permeability is moderately slow. It has a high available water capacity and a moderate shrink swell potential. This soil is not flooded and is not ponded. The seasonal high water table is at a depth of more than 6 feet. The soil contains a maximum amount of 15 percent calcium carbonate. This soil is in the Loamy Upland (pe20-26) range site. It is in the nonirrigated land capability classification 3e.

Cd Campus-Penden Complex, 5 To 15 Percent Slopes

Campus soil makes up 55 percent of the map unit. This map unit is in the Rolling Plains and Breaks Major Land Resource Area. This soil occurs on a moderately sloping to moderately steep hillslope on upland. The runoff class is medium. The parent material consists of old calcareous fine-loamy alluvium and/or calcareous fine-loamy residuum. The soil is 20 to 40 inches deep to bedrock (lithic). This soil is well drained. The slowest permeability is moderate. It has a moderate available water capacity and a low shrink swell potential. This soil is not flooded and is not ponded. The seasonal high water table is at a depth of more than 6 feet. The soil contains a maximum amount of 45 percent calcium carbonate. This soil is in the Limy Upland (pe20-26) range site. It is in the nonirrigated land capability classification 6e.

Penden soil makes up 45 percent of the map unit. This map unit is in the Rolling Plains and Breaks Major Land Resource Area. This soil occurs on a moderately sloping to moderately steep hillslope on upland. The runoff class is medium. The parent material consists of fine-loamy residuum weathered from calcareous sandstone. This soil is well drained. The slowest permeability is moderate. It has a high available water capacity and a moderate shrink swell potential. This soil is not flooded and is not ponded. The seasonal high water table is at a depth of more than 6 feet. The soil contains a maximum amount of 30 percent calcium carbonate. This soil is in the Shallow Limy (pe20-26) range site. It is in the nonirrigated land capability classification 6e.

Ce Canlon Complex, 5 To 25 Percent Slopes

Canlon soil makes up 60 percent of the map unit. This map unit is in the Rolling Plains and Breaks Major Land Resource Area. This soil occurs on a moderately sloping to steep escarpment on upland. The runoff class is medium. The parent material consists of calcareous loamy residuum weathered from sandstone. The soil is 10 to 20 inches deep to bedrock (lithic). This soil is well drained. The slowest permeability is moderate. It has a very low available water capacity and a low shrink swell potential. This soil is not flooded and is not ponded. The seasonal high water table is at a depth of more than 6 feet. The soil contains a maximum amount of 25 percent calcium carbonate. This soil is in the Shallow Limy (pe20-26) range site. It is in the nonirrigated land capability classification 7s.

Campus soil makes up 40 percent of the map unit. This map unit is in the Rolling Plains and Breaks Major Land Resource Area. This soil occurs on a moderately sloping to moderately steep hillslope on upland. The runoff class is medium. The parent material consists of old calcareous fine-loamy alluvium and/or calcareous fine-loamy residuum. The soil is 20 to 40 inches deep to bedrock (lithic). This soil is well drained. The slowest permeability is moderate. It has a moderate available water capacity and a low shrink swell potential. This soil is not flooded and is not ponded. The seasonal high water table is at a depth of more than 6 feet. The soil contains a maximum amount of 45 percent calcium carbonate. This soil is in the Limy Upland (pe20-26) range site. It is in the nonirrigated land capability classification 6e.

NONTECHNICAL SOIL DESCRIPTIONS--Continued  
Ellis County, Kansas

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Cm Corinth Silty Clay Loam, 1 To 3 Percent Slopes

Corinth soil makes up 100 percent of the map unit. This map unit is in the Rolling Plains and Breaks Major Land Resource Area. This soil occurs on a gently sloping hillslope on upland. The runoff class is medium. The parent material consists of residuum weathered from calcareous shale. The soil is 20 to 40 inches deep to bedrock (paralithic). This soil is well drained. The slowest permeability is impermeable. It has a low available water capacity and a high shrink swell potential. This soil is not flooded and is not ponded. The seasonal high water table is at a depth of more than 6 feet. The soil contains a maximum amount of 10 percent calcium carbonate. This soil is in the Limy Upland (pe20-26) range site. It is in the nonirrigated land capability classification 3e.

Cn Corinth Silty Clay Loam, 3 To 7 Percent Slopes

Corinth soil makes up 100 percent of the map unit. This map unit is in the Rolling Plains and Breaks Major Land Resource Area. This soil occurs on a moderately sloping hillslope on upland. The runoff class is medium. The parent material consists of residuum weathered from calcareous shale. The soil is 20 to 40 inches deep to bedrock (paralithic). This soil is well drained. The slowest permeability is impermeable. It has a low available water capacity and a high shrink swell potential. This soil is not flooded and is not ponded. The seasonal high water table is at a depth of more than 6 feet. The soil contains a maximum amount of 10 percent calcium carbonate. This soil is in the Limy Upland (pe20-26) range site. It is in the nonirrigated land capability classification 4e.

Co Corinth Silty Clay Loam, 7 To 15 Percent Slopes

Corinth soil makes up 100 percent of the map unit. This map unit is in the Rolling Plains and Breaks Major Land Resource Area. This soil occurs on a strongly sloping to moderately steep hillslope on upland. The runoff class is high. The parent material consists of residuum weathered from calcareous shale. The soil is 20 to 40 inches deep to bedrock (paralithic). This soil is well drained. The slowest permeability is impermeable. It has a low available water capacity and a high shrink swell potential. This soil is not flooded and is not ponded. The seasonal high water table is at a depth of more than 6 feet. The soil contains a maximum amount of 10 percent calcium carbonate. This soil is in the Limy Upland (pe20-26) range site. It is in the nonirrigated land capability classification 6e.

Cr Crete Silty Clay Loam, 0 To 1 Percent Slopes

Crete soil makes up 100 percent of the map unit. This map unit is in the Rolling Plains and Breaks Major Land Resource Area. This soil occurs on a nearly level plain on upland. The runoff class is medium. The parent material consists of loess. This soil is moderately well drained. The slowest permeability is impermeable. It has a very high available water capacity and a high shrink swell potential. This soil is not flooded and is not ponded. The seasonal high water table is at a depth of more than 6 feet. The soil contains a maximum amount of 5 percent calcium carbonate. This soil is in the Clay Upland (pe20-26) range site. This soil is in the irrigated land capability class 2s. It is in the nonirrigated land capability classification 2s.

De Detroit Silt Loam, Rarely Flooded

Detroit soil makes up 100 percent of the map unit. This map unit is in the Rolling Plains and Breaks Major Land Resource Area. This soil occurs on a nearly level to gently sloping stream terrace on river valley. The runoff class is medium. The parent material consists of alluvium. This soil is moderately well drained. The slowest permeability is slow. It has a high available water capacity and a high shrink swell potential. This soil is rarely flooded and is not ponded. The seasonal high water table is at a depth of more than 6 feet. The soil contains a maximum amount of 10 percent calcium carbonate. This soil is in the Loamy Terrace (pe20-26) range site. This soil is in the irrigated land capability class 1. It is in the nonirrigated land capability classification 2c.

Ee Eltree Silt Loam, 0 To 1 Percent Slopes

Eltree soil makes up 100 percent of the map unit. This map unit is in the Rolling Plains and Breaks Major Land Resource Area. This soil occurs on a nearly level terrace on river valley. The runoff class is low. The parent material consists of calcareous silty alluvium and/or calcareous silty colluvium. This soil is well drained. The slowest permeability is moderate. It has a very high available water capacity and a low shrink swell potential. This soil is not flooded and is not ponded. The seasonal high water table is at a depth of more than 6 feet. The soil contains a maximum amount of 15 percent calcium carbonate. This soil is in the Limy Upland (pe20-26) range site. This soil is in the irrigated land capability class 1. It is in the nonirrigated land capability classification 2c.

Ef Eltree Silt Loam, 1 To 3 Percent Slopes

Eltree soil makes up 100 percent of the map unit. This map unit is in the Rolling Plains and Breaks Major Land Resource Area. This soil occurs on a gently sloping terrace on river valley. The runoff class is low. The parent material consists of calcareous silty alluvium and/or calcareous silty colluvium. This soil is well drained. The slowest permeability is moderate. It has a very high available water capacity and a low shrink swell potential. This soil is not flooded and is not ponded. The seasonal high water table is at a depth of more than 6 feet. The soil contains a maximum amount of 15 percent calcium carbonate. This soil is in the Limy Upland (pe20-26) range site. This soil is in the irrigated land capability class 2e. It is in the nonirrigated land capability classification 2e.

Nontechnical Soil Descriptions--Continued  
Ellis County, Kansas

Eg Eltree Silt Loam, 3 To 7 Percent Slopes

Eltree soil makes up 100 percent of the map unit. This map unit is in the Rolling Plains and Breaks Major Land Resource Area. This soil occurs on a moderately sloping terrace on river valley. The runoff class is medium. The parent material consists of calcareous silty alluvium and/or calcareous silty colluvium. This soil is well drained. The slowest permeability is moderate. It has a very high available water capacity and a low shrink swell potential. This soil is not flooded and is not ponded. The seasonal high water table is at a depth of more than 6 feet. The soil contains a maximum amount of 15 percent calcium carbonate. This soil is in the Limy Upland (pe20-26) range site. This soil is in the irrigated land capability class 3e. It is in the nonirrigated land capability classification 3e.

Eh Eltree Silt Loam, 7 To 15 Percent Slopes

Eltree soil makes up 100 percent of the map unit. This map unit is in the Rolling Plains and Breaks Major Land Resource Area. This soil occurs on a strongly sloping to moderately steep terrace on river valley. The runoff class is medium. The parent material consists of calcareous silty alluvium and/or calcareous silty colluvium. This soil is well drained. The slowest permeability is moderate. It has a very high available water capacity and a low shrink swell potential. This soil is not flooded and is not ponded. The seasonal high water table is at a depth of more than 6 feet. The soil contains a maximum amount of 15 percent calcium carbonate. This soil is in the Limy Upland (pe20-26) range site. It is in the nonirrigated land capability classification 6e.

Ha Harney Silt Loam, 0 To 1 Percent Slopes

Harney soil makes up 100 percent of the map unit. This map unit is in the Rolling Plains and Breaks Major Land Resource Area. This soil occurs on a nearly level divide on tableland. The runoff class is low. The parent material consists of loess. This soil is well drained. The slowest permeability is moderately slow. It has a high available water capacity and a moderate shrink swell potential. This soil is not flooded and is not ponded. The seasonal high water table is at a depth of more than 6 feet. The soil contains a maximum amount of 10 percent calcium carbonate. This soil is in the Loamy Upland (pe20-26) range site. This soil is in the irrigated land capability class 1. It is in the nonirrigated land capability classification 2c.

Hb Harney Silt Loam, 1 To 3 Percent Slopes

Harney soil makes up 100 percent of the map unit. This map unit is in the Rolling Plains and Breaks Major Land Resource Area. This soil occurs on a gently sloping plain on tableland. The runoff class is low. The parent material consists of loess. This soil is well drained. The slowest permeability is moderately slow. It has a high available water capacity and a moderate shrink swell potential. This soil is not flooded and is not ponded. The seasonal high water table is at a depth of more than 6 feet. The soil contains a maximum amount of 10 percent calcium carbonate. This soil is in the Loamy Upland (pe20-26) range site. This soil is in the irrigated land capability class 2e. It is in the nonirrigated land capability classification 2e.

Hc Harney Silt Loam, 3 To 7 Percent Slopes

Harney soil makes up 100 percent of the map unit. This map unit is in the Rolling Plains and Breaks Major Land Resource Area. This soil occurs on a moderately sloping plain on tableland. The runoff class is medium. The parent material consists of loess. This soil is well drained. The slowest permeability is moderately slow. It has a high available water capacity and a moderate shrink swell potential. This soil is not flooded and is not ponded. The seasonal high water table is at a depth of more than 6 feet. The soil contains a maximum amount of 10 percent calcium carbonate. This soil is in the Loamy Upland (pe20-26) range site. It is in the nonirrigated land capability classification 3e.

Hd Harney Silty Clay Loam, 2 To 5 Percent Slopes, Eroded

Harney soil makes up 100 percent of the map unit. This map unit is in the Rolling Plains and Breaks Major Land Resource Area. This soil occurs on a gently sloping to moderately sloping plain on tableland. The runoff class is low. The parent material consists of loess. This soil is well drained. The slowest permeability is moderately slow. It has a high available water capacity and a moderate shrink swell potential. This soil is not flooded and is not ponded. The seasonal high water table is at a depth of more than 6 feet. The soil contains a maximum amount of 10 percent calcium carbonate. This soil is in the Loamy Upland (pe20-26) range site. It is in the nonirrigated land capability classification 4e.

He Harney-Armo Complex, 3 To 7 Percent Slopes, Eroded

Harney soil makes up 50 percent of the map unit. This map unit is in the Rolling Plains and Breaks Major Land Resource Area. This soil occurs on a moderately sloping plain on tableland. The runoff class is medium. The parent material consists of loess. This soil is well drained. The slowest permeability is moderately slow. It has a high available water capacity and a moderate shrink swell potential. This soil is not flooded and is not ponded. The seasonal high water table is at a depth of more than 6 feet. The soil contains a maximum amount of 10 percent calcium carbonate. This soil is in the Loamy Upland (pe20-26) range site. It is in the nonirrigated land capability classification 4e.

Armo soil makes up 50 percent of the map unit. This map unit is in the Rolling Plains and Breaks Major Land Resource Area. This soil occurs on a moderately sloping hillslope on upland. The runoff class is medium. The parent material consists of calcareous loamy colluvium derived from limestone. This soil is well drained. The slowest permeability is moderate. It has a high available water capacity and a low shrink swell potential. This soil is not flooded and is not ponded. The seasonal high water table is at a depth of more than 6 feet. The soil contains a maximum amount of 10 percent calcium carbonate. This soil is in the Limy Upland (pe20-26) range site. It is in the nonirrigated land capability classification 4e.

Nontechnical Soil Descriptions--Continued  
Ellis County, Kansas

Hf Harney-Carlson Silt Loams, 0 To 1 Percent Slopes

Harney soil makes up 50 percent of the map unit. This map unit is in the Rolling Plains and Breaks Major Land Resource Area. This soil occurs on a nearly level plain on tableland. The runoff class is low. The parent material consists of loess. This soil is well drained. The slowest permeability is moderately slow. It has a high available water capacity and a moderate shrink swell potential. This soil is not flooded and is not ponded. The seasonal high water table is at a depth of more than 6 feet. The soil contains a maximum amount of 10 percent calcium carbonate. This soil is in the Loamy Upland (pe20-26) range site. This soil is in the irrigated land capability class 1 It is in the nonirrigated land capability classification 2c.

Carlson soil makes up 50 percent of the map unit. This map unit is in the Rolling Plains and Breaks Major Land Resource Area. This soil occurs on a nearly level ridge on upland. The runoff class is low. The parent material consists of loess over old loamy alluvium. This soil is well drained. The slowest permeability is moderately slow. It has a high available water capacity and a moderate shrink swell potential. This soil is not flooded and is not ponded. The seasonal high water table is at a depth of more than 6 feet. The soil contains a maximum amount of 15 percent calcium carbonate. This soil is in the Loamy Upland (pe20-26) range site. This soil is in the irrigated land capability class 1 It is in the nonirrigated land capability classification 2c.

Hg Harney-Carlson Silt Loams, 1 To 3 Percent Slopes

Harney soil makes up 50 percent of the map unit. This map unit is in the Rolling Plains and Breaks Major Land Resource Area. This soil occurs on a gently sloping plain on tableland. The runoff class is low. The parent material consists of loess. This soil is well drained. The slowest permeability is moderately slow. It has a high available water capacity and a moderate shrink swell potential. This soil is not flooded and is not ponded. The seasonal high water table is at a depth of more than 6 feet. The soil contains a maximum amount of 10 percent calcium carbonate. This soil is in the Loamy Upland (pe20-26) range site. This soil is in the irrigated land capability class 2e. It is in the nonirrigated land capability classification 2e.

Carlson soil makes up 50 percent of the map unit. This map unit is in the Rolling Plains and Breaks Major Land Resource Area. This soil occurs on a gently sloping ridge on upland. The runoff class is low. The parent material consists of loess over old loamy alluvium. This soil is well drained. The slowest permeability is moderately slow. It has a high available water capacity and a moderate shrink swell potential. This soil is not flooded and is not ponded. The seasonal high water table is at a depth of more than 6 feet. The soil contains a maximum amount of 15 percent calcium carbonate. This soil is in the Loamy Upland (pe20-26) range site. This soil is in the irrigated land capability class 2e. It is in the nonirrigated land capability classification 2e.

HGG Harney-Mento Silt Loams, 1 To 3 Percent Slopes

Harney soil makes up 70 percent of the map unit. This map unit is in the Rolling Plains and Breaks Major Land Resource Area. This soil occurs on a gently sloping plain on tableland. The runoff class is low. The parent material consists of loess. This soil is well drained. The slowest permeability is moderately slow. It has a high available water capacity and a moderate shrink swell potential. This soil is not flooded and is not ponded. The seasonal high water table is at a depth of more than 6 feet. The soil contains a maximum amount of 10 percent calcium carbonate. This soil is in the Loamy Upland (pe20-26) range site. This soil is in the irrigated land capability class 2e. It is in the nonirrigated land capability classification 2e.

Mento soil makes up 30 percent of the map unit. This map unit is in the Rolling Plains and Breaks Major Land Resource Area. This soil occurs on a gently sloping divide on upland. The runoff class is low. The parent material consists of loess over residuum weathered from limestone. This soil is well drained. The slowest permeability is slow. It has a high available water capacity and a high shrink swell potential. This soil is not flooded and is not ponded. The seasonal high water table is at a depth of more than 6 feet. The soil contains a maximum amount of 10 percent calcium carbonate. This soil contains a slightly saline horizon. This soil is in the Clay Upland (pe20-26) range site. It is in the nonirrigated land capability classification 3e.

Hh Harney-Wakeen Silt Loams, 0 To 1 Percent Slopes

Harney soil makes up 70 percent of the map unit. This map unit is in the Rolling Plains and Breaks Major Land Resource Area. This soil occurs on a nearly level plain on tableland. The runoff class is low. The parent material consists of loess. This soil is well drained. The slowest permeability is moderately slow. It has a high available water capacity and a moderate shrink swell potential. This soil is not flooded and is not ponded. The seasonal high water table is at a depth of more than 6 feet. The soil contains a maximum amount of 10 percent calcium carbonate. This soil is in the Loamy Upland (pe20-26) range site. This soil is in the irrigated land capability class 1 It is in the nonirrigated land capability classification 2c.

Wakeen soil makes up 30 percent of the map unit. This map unit is in the Rolling Plains and Breaks Major Land Resource Area. This soil occurs on a nearly level hillslope on upland. The runoff class is low. The parent material consists of calcareous fine-silty residuum weathered from chalk. The soil is 20 to 40 inches deep to bedrock (paralithic). This soil is well drained. The slowest permeability is moderate. It has a moderate available water capacity and a moderate shrink swell potential. This soil is not flooded and is not ponded. The seasonal high water table is at a depth of more than 6 feet. The soil contains a maximum amount of 40 percent calcium carbonate. This soil is in the Limy Upland (pe20-26) range site. It is in the nonirrigated land capability classification 3e.

Hk Harney-Wakeen Silt Loams, 1 To 3 Percent Slopes

Harney soil makes up 60 percent of the map unit. This map unit is in the Rolling Plains and Breaks Major Land Resource Area. This soil occurs on a gently sloping plain on tableland. The runoff class is low. The parent material consists of loess. This soil is well drained. The slowest permeability is moderately slow. It has a high available water capacity and a moderate shrink swell potential. This soil is not flooded and is not ponded. The seasonal high water table is at a depth of more than 6 feet. The soil contains a maximum amount of 10 percent calcium carbonate. This soil is in the Loamy Upland (pe20-26) range site. This soil is in the irrigated land capability class 2e. It is in the nonirrigated land capability classification 2e.

Nontechnical Soil Descriptions--Continued  
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Waken soil makes up 40 percent of the map unit. This map unit is in the Rolling Plains and Breaks Major Land Resource Area. This soil occurs on a gently sloping hillslope on upland. The runoff class is low. The parent material consists of calcareous fine-silty residuum weathered from chalk. The soil is 20 to 40 inches deep to bedrock (paralithic). This soil is well drained. The slowest permeability is moderate. It has a moderate available water capacity and a moderate shrink swell potential. This soil is not flooded and is not ponded. The seasonal high water table is at a depth of more than 6 feet. The soil contains a maximum amount of 40 percent calcium carbonate. This soil is in the Limy Upland (pe20-26) range site. It is in the nonirrigated land capability classification 3e.

H1 Heizer-Armo Complex, 8 To 25 Percent Slopes

Heizer soil makes up 50 percent of the map unit. This map unit is in the Rolling Plains and Breaks Major Land Resource Area. This soil occurs on a strongly sloping to steep hillslope on upland. The runoff class is medium. The parent material consists of calcareous residuum weathered from limestone. The soil is 10 to 20 inches deep to bedrock (lithic). This soil is somewhat excessively drained. The slowest permeability is moderate. It has a very low available water capacity and a low shrink swell potential. This soil is not flooded and is not ponded. The seasonal high water table is at a depth of more than 6 feet. The soil contains a maximum amount of 65 percent calcium carbonate. This soil is in the Shallow Limy (pe20-26) range site. It is in the nonirrigated land capability classification 7s.

Armo soil makes up 50 percent of the map unit. This map unit is in the Rolling Plains and Breaks Major Land Resource Area. This soil occurs on a strongly sloping to moderately steep hillslope on upland. The runoff class is medium. The parent material consists of calcareous loamy colluvium derived from limestone. This soil is well drained. The slowest permeability is moderate. It has a high available water capacity and a low shrink swell potential. This soil is not flooded and is not ponded. The seasonal high water table is at a depth of more than 6 feet. The soil contains a maximum amount of 10 percent calcium carbonate. This soil is in the Limy Upland (pe20-26) range site. It is in the nonirrigated land capability classification 6e.

HMM Heizer-Brownell Gravelly Loams, 5 To 30 Percent Slopes

Heizer soil makes up 60 percent of the map unit. This map unit is in the Rolling Plains and Breaks Major Land Resource Area. This soil occurs on a strongly sloping to steep hillslope on upland. The runoff class is medium. The parent material consists of calcareous residuum weathered from limestone. The soil is 10 to 20 inches deep to bedrock (lithic). This soil is somewhat excessively drained. The slowest permeability is moderate. It has a very low available water capacity and a low shrink swell potential. This soil is not flooded and is not ponded. The seasonal high water table is at a depth of more than 6 feet. The soil contains a maximum amount of 65 percent calcium carbonate. This soil is in the Shallow Limy (pe20-26) range site. It is in the nonirrigated land capability classification 7s.

Brownell soil makes up 40 percent of the map unit. This map unit is in the Rolling Plains and Breaks Major Land Resource Area. This soil occurs on a moderately sloping to moderately steep hillslope on upland. The runoff class is medium. The parent material consists of calcareous residuum weathered from limestone. The soil is 20 to 40 inches deep to bedrock (lithic). This soil is well drained. The slowest permeability is moderate. It has a very low available water capacity and a low shrink swell potential. This soil is not flooded and is not ponded. The seasonal high water table is at a depth of more than 6 feet. The soil contains a maximum amount of 65 percent calcium carbonate. This soil is in the Limy Upland (pe20-26) range site. It is in the nonirrigated land capability classification 6e.

Hn Dorrance Sandy Loam, 5 To 20 Percent Slopes

Dorrance soil makes up 100 percent of the map unit. This map unit is in the Rolling Plains and Breaks Major Land Resource Area. This soil occurs on a moderately sloping to moderately steep terrace on river valley. The runoff class is low. The parent material consists of loamy alluvium. This soil is excessively drained. The slowest permeability is moderately rapid. It has a low available water capacity and a low shrink swell potential. This soil is not flooded and is not ponded. The seasonal high water table is at a depth of more than 6 feet. The soil contains a maximum amount of 15 percent calcium carbonate. This soil is in the Limy Upland (pe20-26) range site. This soil is in the irrigated land capability class 6s. It is in the nonirrigated land capability classification 6s.

Ho Holdrege Silt Loam, 0 To 1 Percent Slopes

Holdrege soil makes up 100 percent of the map unit. This map unit is in the Rolling Plains and Breaks Major Land Resource Area. This soil occurs on a nearly level plain on upland. The runoff class is low. The parent material consists of calcareous loess. This soil is well drained. The slowest permeability is moderate. It has a very high available water capacity and a moderate shrink swell potential. This soil is not flooded and is not ponded. The seasonal high water table is at a depth of more than 6 feet. The soil contains a maximum amount of 10 percent calcium carbonate. This soil is in the Loamy Upland (pe20-26) range site. This soil is in the irrigated land capability class 1. It is in the nonirrigated land capability classification 2c.

Hp Holdrege Silt Loam, 1 To 3 Percent Slopes

Holdrege soil makes up 100 percent of the map unit. This map unit is in the Rolling Plains and Breaks Major Land Resource Area. This soil occurs on a gently sloping plain on tableland. The runoff class is low. The parent material consists of calcareous loess. This soil is well drained. The slowest permeability is moderate. It has a very high available water capacity and a moderate shrink swell potential. This soil is not flooded and is not ponded. The seasonal high water table is at a depth of more than 6 feet. The soil contains a maximum amount of 5 percent calcium carbonate. This soil is in the Loamy Upland (pe20-26) range site. This soil is in the irrigated land capability class 2e. It is in the nonirrigated land capability classification 2e.

NONTECHNICAL SOIL DESCRIPTIONS--Continued  
Ellis County, Kansas

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Hr Hord Silt Loam, Rarely Flooded

Hord soil makes up 100 percent of the map unit. This map unit is in the Rolling Plains and Breaks Major Land Resource Area. This soil occurs on a nearly level terrace on river valley. The runoff class is low. The parent material consists of fine-silty alluvium. This soil is well drained. The slowest permeability is moderate. It has a very high available water capacity and a low shrink swell potential. This soil is rarely flooded and is not ponded. The seasonal high water table is at a depth of more than 6 feet. The soil contains a maximum amount of 5 percent calcium carbonate. This soil is in the Loamy Terrace (pe20-26) range site. This soil is in the irrigated land capability class 1 It is in the nonirrigated land capability classification 2c.

In Inavale Loamy Sand, Occasionally Flooded

Inavale soil makes up 100 percent of the map unit. This map unit is in the Rolling Plains and Breaks Major Land Resource Area. This soil occurs on a nearly level to strongly sloping flood plain on river valley. The runoff class is low. The parent material consists of sandy alluvium. This soil is somewhat excessively drained. The slowest permeability is rapid. It has a low available water capacity and a low shrink swell potential. This soil is occasionally flooded and is not ponded. The seasonal high water table is at a depth of more than 6 feet. The soil contains a maximum amount of 5 percent calcium carbonate. This soil is in the Sands (pe20-26) range site. This soil is in the irrigated land capability class 4e. It is in the nonirrigated land capability classification 6e.

Mc Mccook Fine Sandy Loam, Rarely Flooded

Mccook soil makes up 100 percent of the map unit. This map unit is in the Rolling Plains and Breaks Major Land Resource Area. This soil occurs on a nearly level to gently sloping stream terrace on river valley. The runoff class is very low. The parent material consists of weakly stratified calcareous coarse-silty alluvium. This soil is well drained. The slowest permeability is moderate. It has a high available water capacity and a low shrink swell potential. This soil is rarely flooded and is not ponded. The seasonal high water table is at a depth of more than 6 feet. The soil contains a maximum amount of 10 percent calcium carbonate. This soil is in the Sandy Terrace (pe20-26) range site. This soil is in the irrigated land capability class 2e. It is in the nonirrigated land capability classification 2e.

Md Mccook Silt Loam, Rarely Flooded

Mccook soil makes up 100 percent of the map unit. This map unit is in the Rolling Plains and Breaks Major Land Resource Area. This soil occurs on a nearly level stream terrace on river valley. The runoff class is low. The parent material consists of weakly stratified calcareous coarse-silty alluvium. This soil is well drained. The slowest permeability is moderate. It has a high available water capacity and a low shrink swell potential. This soil is rarely flooded and is not ponded. The seasonal high water table is at a depth of more than 6 feet. The soil contains a maximum amount of 10 percent calcium carbonate. This soil is in the Loamy Terrace (pe20-26) range site. This soil is in the irrigated land capability class 1 It is in the nonirrigated land capability classification 2c.

Me Mento Silt Loam, 0 To 1 Percent Slopes

Mento soil makes up 100 percent of the map unit. This map unit is in the Rolling Plains and Breaks Major Land Resource Area. This soil occurs on a nearly level divide on upland. The runoff class is low. The parent material consists of loess over residuum weathered from limestone. This soil is well drained. The slowest permeability is slow. It has a high available water capacity and a high shrink swell potential. This soil is not flooded and is not ponded. The seasonal high water table is at a depth of more than 6 feet. The soil contains a maximum amount of 10 percent calcium carbonate. This soil contains a slightly saline horizon. This soil is in the Clay Upland (pe20-26) range site. It is in the nonirrigated land capability classification 2s.

Mf Mento Silt Loam, 1 To 3 Percent Slopes

Mento soil makes up 100 percent of the map unit. This map unit is in the Rolling Plains and Breaks Major Land Resource Area. This soil occurs on a gently sloping divide on upland. The runoff class is low. The parent material consists of loess over residuum weathered from limestone. This soil is well drained. The slowest permeability is slow. It has a high available water capacity and a high shrink swell potential. This soil is not flooded and is not ponded. The seasonal high water table is at a depth of more than 6 feet. The soil contains a maximum amount of 10 percent calcium carbonate. This soil contains a slightly saline horizon. This soil is in the Clay Upland (pe20-26) range site. It is in the nonirrigated land capability classification 3e.

Mg Mento Silty Clay Loam, 1 To 3 Percent Slopes, Eroded

Mento soil makes up 100 percent of the map unit. This map unit is in the Rolling Plains and Breaks Major Land Resource Area. This soil occurs on a gently sloping divide on upland. The runoff class is medium. The parent material consists of loess over residuum weathered from limestone. This soil is well drained. The slowest permeability is slow. It has a high available water capacity and a high shrink swell potential. This soil is not flooded and is not ponded. The seasonal high water table is at a depth of more than 6 feet. The soil contains a maximum amount of 10 percent calcium carbonate. This soil contains a slightly saline horizon. This soil is in the Clay Upland (pe20-26) range site. It is in the nonirrigated land capability classification 3e.

Mo Mento Soils, 3 To 7 Percent Slopes, Eroded

Mento soil makes up 100 percent of the map unit. This map unit is in the Rolling Plains and Breaks Major Land Resource Area. This soil occurs on a moderately sloping divide on upland. The runoff class is high. The parent material consists of loess over residuum weathered from limestone. This soil is well drained. The slowest permeability is slow. It has a moderate available water capacity and a high shrink swell potential. This soil is not flooded and is not ponded. The seasonal high water table is at a depth of more than 6 feet. The soil contains a maximum amount of 10 percent calcium carbonate. This soil contains a very slightly saline horizon. This soil is in the Clay Upland (pe20-26) range site. It is in the nonirrigated land capability classification 4e.

NONTECHNICAL SOIL DESCRIPTIONS--Continued  
Ellis County, Kansas

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Mu Munjor Sandy Loam, Frequently Flooded

Munjor soil makes up 100 percent of the map unit. This map unit is in the Rolling Plains and Breaks Major Land Resource Area. This soil occurs on a nearly level to gently sloping flood plain on river valley. The runoff class is very low. The parent material consists of loamy alluvium. This soil is well drained. The slowest permeability is moderately rapid. It has a moderate available water capacity and a low shrink swell potential. This soil is frequently flooded and is not ponded. The seasonal high water table is at a depth of more than 6 feet. The soil contains a maximum amount of 10 percent calcium carbonate. This soil is in the Sandy Lowland (pe20-26) range site. It is in the nonirrigated land capability classification 3w.

Nc New Cambria Silty Clay, Rarely Flooded

New Cambria soil makes up 100 percent of the map unit. This map unit is in the Rolling Plains and Breaks Major Land Resource Area. This soil occurs on a nearly level to gently sloping stream terrace on river valley. The runoff class is high. The parent material consists of calcareous clayey alluvium. This soil is moderately well drained. The slowest permeability is impermeable. It has a moderate available water capacity and a high shrink swell potential. This soil is rarely flooded and is not ponded. The seasonal high water table is at a depth of more than 6 feet. The soil contains a maximum amount of 15 percent calcium carbonate. This soil is in the Clay Terrace (pe20-26) range site. This soil is in the irrigated land capability class 2s. It is in the nonirrigated land capability classification 2s.

Nn Nibson Silt Loam, 5 To 12 Percent Slopes

Nibson soil makes up 100 percent of the map unit. This map unit is in the Rolling Plains and Breaks Major Land Resource Area. This soil occurs on a moderately sloping to strongly sloping hillslope on upland. The runoff class is medium. The parent material consists of calcareous loamy residuum weathered from limestone and shale. The soil is 10 to 20 inches deep to bedrock (paralithic). This soil is somewhat excessively drained. The slowest permeability is moderate. It has a low available water capacity and a moderate shrink swell potential. This soil is not flooded and is not ponded. The seasonal high water table is at a depth of more than 6 feet. The soil contains a maximum amount of 40 percent calcium carbonate. This soil is in the Limy Upland (pe20-26) range site. It is in the nonirrigated land capability classification 6e.

Rb Roxbury Silt Loam, Rarely Flooded

Roxbury soil makes up 100 percent of the map unit. This map unit is in the Rolling Plains and Breaks Major Land Resource Area. This soil occurs on a nearly level stream terrace on river valley. The runoff class is low. The parent material consists of calcareous fine-silty alluvium. This soil is well drained. The slowest permeability is moderate. It has a very high available water capacity and a moderate shrink swell potential. This soil is rarely flooded and is not ponded. The seasonal high water table is at a depth of more than 6 feet. The soil contains a maximum amount of 10 percent calcium carbonate. This soil is in the Loamy Terrace (pe20-26) range site. This soil is in the irrigated land capability class 1. It is in the nonirrigated land capability classification 2c.

Rf Roxbury Silt Loam, Frequently Flooded

Roxbury soil makes up 100 percent of the map unit. This map unit is in the Rolling Plains and Breaks Major Land Resource Area. This soil occurs on a nearly level to gently sloping stream terrace on river valley. The runoff class is low. The parent material consists of calcareous fine-silty alluvium. This soil is well drained. The slowest permeability is moderate. It has a very high available water capacity and a moderate shrink swell potential. This soil is occasionally flooded and is not ponded. The seasonal high water table is at a depth of more than 6 feet. The soil contains a maximum amount of 10 percent calcium carbonate. This soil is in the Loamy Lowland (pe20-26) range site. This soil is in the irrigated land capability class 2w. It is in the nonirrigated land capability classification 2w.

Ro Heizer-Brownell Complex, 7 To 30 Percent Slopes

Heizer soil makes up 77 percent of the map unit. This map unit is in the Rolling Plains and Breaks Major Land Resource Area. This soil occurs on a strongly sloping to steep hillslope on upland. The runoff class is medium. The parent material consists of colluvium derived from chalk. The soil is 10 to 20 inches deep to bedrock (lithic). This soil is somewhat excessively drained. The slowest permeability is moderate. It has a very low available water capacity and a low shrink swell potential. This soil is not flooded and is not ponded. The seasonal high water table is at a depth of more than 6 feet. This soil is in the Shallow Limy (pe20-26) range site. It is in the nonirrigated land capability classification 7s.

Brownell soil makes up 23 percent of the map unit. This map unit is in the Rolling Plains and Breaks Major Land Resource Area. This soil occurs on a gently sloping to moderately steep hillslope on upland. The runoff class is medium. The parent material consists of calcareous residuum weathered from limestone. The soil is 20 to 40 inches deep to bedrock (lithic). This soil is well drained. The slowest permeability is moderate. It has a low available water capacity and a low shrink swell potential. This soil is not flooded and is not ponded. The seasonal high water table is at a depth of more than 6 feet. This soil is in the Limy Upland (pe20-26) range site. It is in the nonirrigated land capability classification 6e.

ROO Roxbury Silt Loam, Occasionally Flooded

Roxbury soil makes up 100 percent of the map unit. This map unit is in the Rolling Plains and Breaks Major Land Resource Area. This soil occurs on a nearly level to gently sloping flood plain on river valley. The runoff class is low. The parent material consists of calcareous fine-silty alluvium. This soil is well drained. The slowest permeability is moderate. It has a very high available water capacity and a moderate shrink swell potential. This soil is occasionally flooded and is not ponded. The seasonal high water table is at a depth of more than 6 feet. The soil contains a maximum amount of 10 percent calcium carbonate. This soil is in the Loamy Lowland (pe20-26) range site. This soil is in the irrigated land capability class 2w. It is in the nonirrigated land capability classification 2w.

NONTECHNICAL SOIL DESCRIPTIONS--Continued  
Ellis County, Kansas

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UCC Uly Silt Loam, 3 To 6 Percent Slopes

Uly soil makes up 100 percent of the map unit. This map unit is in the Rolling Plains and Breaks Major Land Resource Area. This soil occurs on a moderately sloping hillslope on upland. The runoff class is medium. The parent material consists of loess. This soil is well drained. The slowest permeability is moderate. It has a very high available water capacity and a low shrink swell potential. This soil is not flooded and is not ponded. The seasonal high water table is at a depth of more than 6 feet. This soil is in the Loamy Upland (pe20-26) range site. This soil is in the irrigated land capability class 3e. It is in the nonirrigated land capability classification 3e.

Wa Wakeen Silt Loam, 1 To 3 Percent Slopes

Wakeen soil makes up 100 percent of the map unit. This map unit is in the Rolling Plains and Breaks Major Land Resource Area. This soil occurs on a gently sloping hillslope on upland. The runoff class is low. The parent material consists of calcareous fine-silty residuum weathered from limestone. The soil is 20 to 40 inches deep to bedrock (paralithic). This soil is well drained. The slowest permeability is moderate. It has a moderate available water capacity and a moderate shrink swell potential. This soil is not flooded and is not ponded. The seasonal high water table is at a depth of more than 6 feet. The soil contains a maximum amount of 40 percent calcium carbonate. This soil is in the Limy Upland (pe20-26) range site. It is in the nonirrigated land capability classification 3e.

We Wakeen Silt Loam, 1 To 3 Percent Slopes, Eroded

Wakeen soil makes up 100 percent of the map unit. This map unit is in the Rolling Plains and Breaks Major Land Resource Area. This soil occurs on a gently sloping hillslope on upland. The runoff class is low. The parent material consists of calcareous fine-silty residuum weathered from chalk. The soil is 20 to 40 inches deep to bedrock (paralithic). This soil is well drained. The slowest permeability is moderate. It has a moderate available water capacity and a moderate shrink swell potential. This soil is not flooded and is not ponded. The seasonal high water table is at a depth of more than 6 feet. The soil contains a maximum amount of 40 percent calcium carbonate. This soil is in the Limy Upland (pe20-26) range site. It is in the nonirrigated land capability classification 4e.

Wh Wakeen Silt Loam, 3 To 7 Percent Slopes

Wakeen soil makes up 100 percent of the map unit. This map unit is in the Rolling Plains and Breaks Major Land Resource Area. This soil occurs on a moderately sloping hillslope on upland. The runoff class is medium. The parent material consists of calcareous fine-silty residuum weathered from chalk. The soil is 20 to 40 inches deep to bedrock (paralithic). This soil is well drained. The slowest permeability is moderate. It has a moderate available water capacity and a moderate shrink swell potential. This soil is not flooded and is not ponded. The seasonal high water table is at a depth of more than 6 feet. The soil contains a maximum amount of 40 percent calcium carbonate. This soil is in the Limy Upland (pe20-26) range site. It is in the nonirrigated land capability classification 4e.

Wk Wakeen Silt Loam, 5 To 15 Percent Slopes, Eroded

Wakeen soil makes up 100 percent of the map unit. This map unit is in the Rolling Plains and Breaks Major Land Resource Area. This soil occurs on a moderately sloping to moderately steep hillslope on upland. The runoff class is medium. The parent material consists of calcareous fine-silty residuum weathered from chalk. The soil is 20 to 40 inches deep to bedrock (paralithic). This soil is well drained. The slowest permeability is moderate. It has a low available water capacity and a moderate shrink swell potential. This soil is not flooded and is not ponded. The seasonal high water table is at a depth of more than 6 feet. The soil contains a maximum amount of 40 percent calcium carbonate. This soil is in the Limy Upland (pe20-26) range site. It is in the nonirrigated land capability classification 6e.

Wn Wann Loam, Occasionally Flooded

Wann soil makes up 100 percent of the map unit. This map unit is in the Rolling Plains and Breaks Major Land Resource Area. This soil occurs on a nearly level to gently sloping flood plain on river valley. The runoff class is low. The parent material consists of calcareous coarse-loamy alluvium. This soil is somewhat poorly drained. The slowest permeability is moderate. It has a moderate available water capacity and a low shrink swell potential. This soil is occasionally flooded and is not ponded. The top of the seasonal high water table is at 30 inches. The soil contains a maximum amount of 5 percent calcium carbonate. This soil is in the Subirrigated (pe20-26) range site. This soil is in the irrigated land capability class 2w. It is in the nonirrigated land capability classification 2w.



## 141HM—Harney-Mento complex, 3 to 7 percent slopes

### Map Unit Composition

Harney: 50 percent  
Mento: 50 percent

### Component Descriptions

#### Harney

*MLRA:* 73 - Rolling Plains and Breaks

*Landform:* Hillslope on upland

*Parent material:* Loess

*Slope:* 3 to 7 percent

*Drainage class:* Well drained

*Slowest permeability:* Moderately slow (About 0.20 in/hr)

*Available water capacity:* High (About 11.5 inches)

*Shrink-swell potential:* Moderate (About 4.5 LEP)

*Flooding hazard:* None

*Depth to seasonal water saturation:* More than 6 feet

*Runoff class:* Medium

*Ecological site:* Loamy Upland (pe20-26)

*Land capability (nonirrigated):* 3e

#### Typical Profile:

H1—0 to 10 inches; silt loam

H2—10 to 26 inches; silty clay loam

H3—26 to 60 inches; silt loam

#### Mento

*MLRA:* 73 - Rolling Plains and Breaks

*Landform:* Hillslope on upland

*Parent material:* Loess over residuum weathered from limestone

*Slope:* 3 to 7 percent

*Depth to restrictive feature:* More than 60 inches to bedrock

*Drainage class:* Well drained

*Slowest permeability:* Slow (About 0.06 in/hr)

*Available water capacity:* Moderate (About 8.7 inches)

*Shrink-swell potential:* High (About 7.5 LEP)

*Flooding hazard:* None

*Depth to seasonal water saturation:* More than 6 feet

*Runoff class:* High

*Ecological site:* Clay Upland (pe20-26)

*Land capability (nonirrigated):* 4e

#### Typical Profile:

H1—0 to 6 inches; silty clay loam

H2—6 to 20 inches; silty clay loam

H3—20 to 48 inches; silty clay loam

IIR—48 to 48 inches; unweathered bedrock

## 163AU—Armo-Bogue complex, 7 to 15 percent slopes

### Map Unit Composition

Armo: 60 percent  
Bogue: 40 percent

### Component Descriptions

#### Armo

*MLRA:* 73 - Rolling Plains and Breaks

*Landform:* Hillslope on upland

*Parent material:* Calcareous loamy colluvium derived from limestone

*Slope:* 7 to 15 percent

*Drainage class:* Well drained

*Slowest permeability:* Moderate (About 0.60 in/hr)

*Available water capacity:* High (About 11.6 inches)

*Shrink-swell potential:* Low (About 1.5 LEP)

*Flooding hazard:* None

*Depth to seasonal water saturation:* More than 6 feet

*Runoff class:* Medium

*Ecological site:* Limy Upland (pe20-26)

*Land capability (nonirrigated):* 6e

#### Typical Profile:

H1—0 to 12 inches; loam

H2—12 to 30 inches; loam

H3—30 to 60 inches; silt loam

#### Bogue

*MLRA:* 73 - Rolling Plains and Breaks

*Landform:* Hillslope on upland

*Parent material:* Residuum weathered from shale

*Slope:* 8 to 15 percent

*Depth to restrictive feature:* 20 to 40 inches to bedrock (paralithic)

*Drainage class:* Moderately well drained

*Slowest permeability:* Very slow (About 0.00 in/hr)

*Available water capacity:* Low (About 3.8 inches)

*Shrink-swell potential:* High (About 7.5 LEP)

*Flooding hazard:* None  
*Depth to seasonal water saturation:* More than 6 feet  
*Runoff class:* Very high  
*Ecological site:* Blue Shale (pe20-26)  
*Land capability (nonirrigated):* 6e

*Typical Profile:*

H1—0 to 7 inches; clay  
 H2—7 to 21 inches; clay  
 H3—21 to 36 inches; clay  
 Cr—36 to 36 inches; unweathered bedrock

### **163HE—Harney-Mento silt loams, 3 to 7 percent slopes**

#### **Map Unit Composition**

Harney: 55 percent  
 Mento: 45 percent

#### **Component Descriptions**

##### **Harney**

*MLRA:* 73 - Rolling Plains and Breaks  
*Landform:* Plain on tableland  
*Parent material:* Loess  
*Slope:* 3 to 7 percent  
*Drainage class:* Well drained  
*Slowest permeability:* Moderately slow (About 0.20 in/hr)  
*Available water capacity:* High (About 11.1 inches)  
*Shrink-swell potential:* Moderate (About 4.5 LEP)  
*Flooding hazard:* None  
*Depth to seasonal water saturation:* More than 6 feet  
*Runoff class:* Medium  
*Ecological site:* Loamy Upland (pe20-26)  
*Land capability (nonirrigated):* 3e

*Typical Profile:*

H1—0 to 9 inches; silt loam  
 H2—9 to 34 inches; silty clay loam  
 H3—34 to 60 inches; silt loam

##### **Mento**

*MLRA:* 73 - Rolling Plains and Breaks  
*Landform:* Divide on upland  
*Parent material:* Loess over residuum weathered from limestone  
*Slope:* 3 to 7 percent

*Drainage class:* Well drained  
*Slowest permeability:* Slow (About 0.06 in/hr)  
*Available water capacity:* High (About 9.3 inches)  
*Shrink-swell potential:* High (About 7.5 LEP)  
*Flooding hazard:* None  
*Depth to seasonal water saturation:* More than 6 feet  
*Runoff class:* Medium  
*Ecological site:* Clay Upland (pe20-26)  
*Land capability (nonirrigated):* 4e

*Typical Profile:*

H1—0 to 5 inches; silt loam  
 H2—5 to 24 inches; silty clay loam  
 H3—24 to 52 inches; silt loam  
 H4—52 to 64 inches; unweathered bedrock

### **163IC—Inavale fine sand, channeled, occasionally flooded**

#### **Map Unit Composition**

Inavale: 100 percent

#### **Component Descriptions**

##### **Inavale**

*MLRA:* 73 - Rolling Plains and Breaks  
*Landform:* Flood plain on river valley  
*Parent material:* Sandy alluvium  
*Slope:* 0 to 4 percent  
*Drainage class:* Somewhat excessively drained  
*Slowest permeability:* Rapid (About 5.95 in/hr)  
*Available water capacity:* Low (About 5.0 inches)  
*Shrink-swell potential:* Low (About 1.5 LEP)  
*Flooding hazard:* Occasional  
*Depth to seasonal water saturation:* More than 6 feet  
*Runoff class:* Very low  
*Ecological site:* Sandy Lowland (pe20-26)  
*Land capability (irrigated):* 4e  
*Land capability (nonirrigated):* 6e

*Typical Profile:*

H1—0 to 8 inches; fine sand  
 H2—8 to 40 inches; loamy fine sand  
 H3—40 to 60 inches; sand

## 163WX—Wakeen silt loam, 7 to 20 percent slopes

### Map Unit Composition

Wakeen: 100 percent

### Component Descriptions

#### Wakeen

*MLRA:* 73 - Rolling Plains and Breaks

*Landform:* Hillslope on upland

*Parent material:* Calcareous fine-silty residuum weathered from chalk

*Slope:* 7 to 20 percent

*Depth to restrictive feature:* 20 to 40 inches to bedrock (paralithic)

*Drainage class:* Well drained

*Slowest permeability:* Moderate (About 0.60 in/hr)

*Available water capacity:* Low (About 4.6 inches)

*Shrink-swell potential:* Moderate (About 4.5 LEP)

*Flooding hazard:* None

*Depth to seasonal water saturation:* More than 6 feet

*Runoff class:* Medium

*Ecological site:* Limy Upland (pe20-26)

*Land capability (nonirrigated):* 6e

#### Typical Profile:

H1—0 to 8 inches; silt loam

H2—8 to 22 inches; silty clay loam

Cr—22 to 22 inches; unweathered bedrock

#### Minor Components

#### Unnamed Hydric Soils

## 163WY—Wakeen-Harney silt loams, 1 to 3 percent slopes

### Map Unit Composition

Wakeen: 55 percent

Harney: 45 percent

### Component Descriptions

#### Wakeen

*MLRA:* 73 - Rolling Plains and Breaks

*Landform:* Hillslope on upland

*Parent material:* Calcareous fine-silty residuum weathered from chalk

*Slope:* 1 to 3 percent

*Depth to restrictive feature:* 20 to 40 inches to bedrock (paralithic)

*Drainage class:* Well drained

*Slowest permeability:* Moderate (About 0.60 in/hr)

*Available water capacity:* Moderate (About 7.8 inches)

*Shrink-swell potential:* Moderate (About 4.5 LEP)

*Flooding hazard:* None

*Depth to seasonal water saturation:* More than 6 feet

*Runoff class:* Low

*Ecological site:* Limy Upland (pe20-26)

*Land capability (nonirrigated):* 3e

#### Typical Profile:

H1—0 to 12 inches; silt loam

H2—12 to 37 inches; silty clay loam

Cr—37 to 37 inches; unweathered bedrock

#### Harney

*MLRA:* 73 - Rolling Plains and Breaks

*Landform:* Plain on tableland

*Parent material:* Loess

*Slope:* 1 to 3 percent

*Drainage class:* Well drained

*Slowest permeability:* Moderately slow (About 0.20 in/hr)

*Available water capacity:* High (About 11.0 inches)

*Shrink-swell potential:* Moderate (About 4.5 LEP)

*Flooding hazard:* None

*Depth to seasonal water saturation:* More than 6 feet

*Runoff class:* Low

*Ecological site:* Loamy Upland (pe20-26)

*Land capability (irrigated):* 2e

*Land capability (nonirrigated):* 2e

#### Typical Profile:

H1—0 to 10 inches; silt loam

H2—10 to 37 inches; silty clay loam

H3—37 to 60 inches; silt loam

## 165BO—Bogue clay, 3 to 15 percent slopes

### Map Unit Composition

Bogue: 100 percent

### Component Descriptions

#### Bogue

*MLRA:* 73 - Rolling Plains and Breaks

*Landform:* Hillslope on upland

*Parent material:* Residuum weathered from shale

*Slope:* 3 to 15 percent

*Depth to restrictive feature:* 20 to 40 inches to bedrock (paralithic)

*Drainage class:* Moderately well drained

*Slowest permeability:* Very slow (About 0.00 in/hr)

*Available water capacity:* Very low (About 2.4 inches)

*Shrink-swell potential:* High (About 7.5 LEP)

*Flooding hazard:* None

*Depth to seasonal water saturation:* More than 6 feet

*Runoff class:* Very high

*Ecological site:* Blue Shale (pe20-26)

*Land capability (nonirrigated):* 6e

#### Typical Profile:

H1—0 to 5 inches; clay

H2—5 to 10 inches; clay

H3—10 to 22 inches; clay

H4—22 to 38 inches; weathered bedrock

Cr—38 to 38 inches; unweathered bedrock

## 165NW—Nibson-Wakeen silt loams, 3 to 20 percent slopes

### Map Unit Composition

Nibson: 55 percent

Wakeen: 45 percent

### Component Descriptions

#### Nibson

*MLRA:* 73 - Rolling Plains and Breaks

*Landform:* Hillslope on upland

*Parent material:* Limestone and shale and/or silty residuum weathered from chalk

*Slope:* 5 to 20 percent

*Depth to restrictive feature:* 10 to 20 inches to bedrock (paralithic)

*Drainage class:* Well drained

*Slowest permeability:* Moderate (About 0.60 in/hr)

*Available water capacity:* Low (About 3.8 inches)

*Shrink-swell potential:* Moderate (About 4.5 LEP)

*Flooding hazard:* None

*Depth to seasonal water saturation:* More than 6 feet

*Runoff class:* Medium

*Ecological site:* Limy Upland (pe20-26)

*Land capability (nonirrigated):* 6e

#### Typical Profile:

H1—0 to 7 inches; silt loam

H2—7 to 18 inches; silty clay loam

Cr—18 to 18 inches; unweathered bedrock

#### Wakeen

*MLRA:* 73 - Rolling Plains and Breaks

*Landform:* Hillslope on upland

*Parent material:* Limestone and shale and/or silty residuum weathered from chalk

*Slope:* 3 to 20 percent

*Depth to restrictive feature:* 20 to 40 inches to bedrock (paralithic)

*Drainage class:* Well drained

*Slowest permeability:* Moderate (About 0.60 in/hr)

*Available water capacity:* Moderate (About 6.6 inches)

*Shrink-swell potential:* Moderate (About 4.5 LEP)

*Flooding hazard:* None

*Depth to seasonal water saturation:* More than 6 feet

*Runoff class:* Medium

*Ecological site:* Limy Upland (pe20-26)

*Land capability (nonirrigated):* 6e

#### Typical Profile:

H1—0 to 8 inches; silt loam

H2—8 to 32 inches; silty clay loam

Cr—32 to 32 inches; unweathered bedrock

**165PE—Penden clay loam, 3 to 6 percent slopes****Map Unit Composition**

Penden: 100 percent

**Component Descriptions****Penden**

*MLRA:* 73 - Rolling Plains and Breaks

*Landform:* Plain on tableland

*Parent material:* Residuum

*Slope:* 3 to 6 percent

*Drainage class:* Well drained

*Slowest permeability:* Moderate (About 0.60 in/hr)

*Available water capacity:* High (About 10.4 inches)

*Shrink-swell potential:* Moderate (About 4.5 LEP)

*Flooding hazard:* None

*Depth to seasonal water saturation:* More than 6 feet

*Runoff class:* Medium

*Ecological site:* Limy Upland (pe20-26)

*Land capability (nonirrigated):* 3e

*Typical Profile:*

H1—0 to 14 inches; clay loam

H2—14 to 32 inches; clay loam

H3—32 to 60 inches; clay loam

*Available water capacity:* High (About 11.9 inches)

*Shrink-swell potential:* Low (About 1.5 LEP)

*Flooding hazard:* None

*Depth to seasonal water saturation:* More than 6 feet

*Runoff class:* Medium

*Ecological site:* Loamy Upland (pe20-26)

*Land capability (irrigated):* 2e

*Land capability (nonirrigated):* 2e

*Typical Profile:*

H1—0 to 6 inches; silt loam

H2—6 to 28 inches; silt loam

H3—28 to 60 inches; silt loam

**165UR—Uly-Roxbury silt loams, 0 to 15 percent slopes****Map Unit Composition**

Uly: 65 percent

Roxbury: 35 percent

**Component Descriptions****Uly**

*MLRA:* 73 - Rolling Plains and Breaks

*Landform:* Drainageway on upland

*Parent material:* Loess

*Slope:* 3 to 15 percent

*Drainage class:* Well drained

*Slowest permeability:* Moderate (About 0.60 in/hr)

*Available water capacity:* High (About 11.9 inches)

*Shrink-swell potential:* Low (About 1.5 LEP)

*Flooding hazard:* None

*Depth to seasonal water saturation:* More than 6 feet

*Runoff class:* Medium

*Ecological site:* Loamy Upland (pe20-26)

*Land capability (irrigated):* 4e

*Land capability (nonirrigated):* 4e

*Typical Profile:*

H1—0 to 6 inches; silt loam

H2—6 to 28 inches; silt loam

H3—28 to 60 inches; silt loam

**Roxbury**

*MLRA:* 73 - Rolling Plains and Breaks

*Landform:* Flood plain

**165UB—Uly silt loam, 1 to 3 percent slopes****Map Unit Composition**

Uly: 100 percent

**Component Descriptions****Uly**

*MLRA:* 73 - Rolling Plains and Breaks

*Landform:* Hillslope on upland

*Parent material:* Loess

*Slope:* 1 to 3 percent

*Drainage class:* Well drained

*Slowest permeability:* Moderate (About 0.60 in/hr)

*Parent material:* Calcareous fine-silty alluvium  
*Slope:* 0 to 2 percent  
*Drainage class:* Well drained  
*Slowest permeability:* Moderate (About 0.60 in/hr)  
*Available water capacity:* Very high (About 12.3 inches)  
*Shrink-swell potential:* Moderate (About 4.5 LEP)  
*Flooding hazard:* Occasional  
*Depth to seasonal water saturation:* More than 6 feet  
*Runoff class:* Low  
*Ecological site:* Loamy Lowland (pe20-26)  
*Land capability (irrigated):* 2w  
*Land capability (nonirrigated):* 2w

*Typical Profile:*

H1—0 to 16 inches; silt loam  
 H2—16 to 44 inches; silt loam  
 H3—44 to 60 inches; silt loam

## 167CR—Crete silt loam, 0 to 1 percent slopes

### Map Unit Composition

Crete: 100 percent

### Component Descriptions

#### Crete

*MLRA:* 73 - Rolling Plains and Breaks  
*Landform:* Plain on upland  
*Parent material:* Loess  
*Slope:* 0 to 1 percent  
*Drainage class:* Moderately well drained  
*Slowest permeability:* Impermeable (About 0.00 in/hr)  
*Available water capacity:* High (About 11.6 inches)  
*Shrink-swell potential:* High (About 7.5 LEP)  
*Flooding hazard:* None  
*Depth to seasonal water saturation:* More than 6 feet  
*Runoff class:* Low  
*Ecological site:* Clay Upland (pe20-26)  
*Land capability (irrigated):* 2s  
*Land capability (nonirrigated):* 2s

*Typical Profile:*

H1—0 to 6 inches; silt loam  
 H2—6 to 14 inches; silty clay loam

H3—14 to 27 inches; silty clay  
 H4—27 to 60 inches; silty clay loam

### Minor Components Ness

## 167DR—Dorrance gravelly sandy loam, 4 to 15 percent slopes

### Map Unit Composition

Dorrance: 100 percent

### Component Descriptions

#### Dorrance

*MLRA:* 73 - Rolling Plains and Breaks  
*Landform:* Hillslope on upland  
*Parent material:* Loamy material over sandy alluvium  
*Slope:* 4 to 15 percent  
*Drainage class:* Excessively drained  
*Slowest permeability:* Moderately rapid (About 2.00 in/hr)  
*Available water capacity:* Low (About 3.7 inches)  
*Shrink-swell potential:* Low (About 1.5 LEP)  
*Flooding hazard:* None  
*Depth to seasonal water saturation:* More than 6 feet  
*Runoff class:* Low  
*Ecological site:* Gravelly Hills (pe20-26)  
*Land capability (irrigated):* 6s  
*Land capability (nonirrigated):* 6s

*Typical Profile:*

H1—0 to 11 inches; gravelly sandy loam  
 H2—11 to 15 inches; gravelly loamy sand  
 H3—15 to 60 inches; gravelly sand

## 167RC—Roxbury silt loam, channeled

### Map Unit Composition

Roxbury: 100 percent

### Component Descriptions

#### Roxbury

*MLRA:* 73 - Rolling Plains and Breaks  
*Landform:* Flood plain on river valley  
*Parent material:* Calcareous fine-silty alluvium  
*Slope:* 0 to 1 percent  
*Drainage class:* Well drained  
*Slowest permeability:* Moderate (About 0.60 in/hr)  
*Available water capacity:* Very high (About 12.6 inches)  
*Shrink-swell potential:* Moderate (About 4.5 LEP)  
*Flooding hazard:* Frequent  
*Depth to seasonal water saturation:* More than 6 feet  
*Runoff class:* Low  
*Ecological site:* Loamy Lowland (pe20-26)  
*Land capability (nonirrigated):* 5w

*Typical Profile:*  
 H1—0 to 26 inches; silt loam  
 H2—26 to 60 inches; silt loam

**Minor Components**  
**Unnamed Hydric Soils**

*Drainage class:* Well drained  
*Slowest permeability:* Moderately slow (About 0.20 in/hr)  
*Available water capacity:* High (About 10.1 inches)  
*Shrink-swell potential:* Moderate (About 4.5 LEP)  
*Flooding hazard:* None  
*Depth to seasonal water saturation:* More than 6 feet  
*Runoff class:* Medium  
*Ecological site:* Chalk Flats (pe20-26)  
*Land capability (irrigated):* 4e  
*Land capability (nonirrigated):* 6

*Typical Profile:*  
 H1—0 to 3 inches; silt loam  
 H2—3 to 60 inches; silt loam

## **195CC—Campus-Canlon loams, 6 to 30 percent slopes**

### **Map Unit Composition**

Campus: 70 percent  
 Canlon: 30 percent

## **195BD—Badland-Manvel complex, 3 to 20 percent slopes**

### **Map Unit Composition**

Badland: 70 percent  
 Manvel: 30 percent

### **Component Descriptions**

#### **Badland**

*MLRA:* 73 - Rolling Plains and Breaks  
*Landform:* Erosion remnant on badlands  
*Parent material:* Calcareous residuum weathered from chalk  
*Slope:* 3 to 20 percent  
*Flooding hazard:* None  
*Depth to seasonal water saturation:* More than 6 feet  
*Runoff class:* Medium

#### **Manvel**

*MLRA:* 73 - Rolling Plains and Breaks  
*Landform:* Fan on upland  
*Parent material:* Calcareous fine-silty colluvium derived from chalk  
*Slope:* 3 to 10 percent

### **Component Descriptions**

#### **Campus**

*MLRA:* 73 - Rolling Plains and Breaks  
*Landform:* Hillslope on upland  
*Parent material:* Old calcareous fine-loamy alluvium and/or calcareous fine-loamy residuum  
*Slope:* 6 to 15 percent  
*Depth to restrictive feature:* 20 to 40 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Slowest permeability:* Moderate (About 0.60 in/hr)  
*Available water capacity:* Moderate (About 6.4 inches)  
*Shrink-swell potential:* Low (About 1.5 LEP)  
*Flooding hazard:* None  
*Depth to seasonal water saturation:* More than 6 feet  
*Runoff class:* Medium  
*Ecological site:* Limy Upland (pe20-26)  
*Land capability (nonirrigated):* 6e

*Typical Profile:*

H1—0 to 7 inches; loam  
H2—7 to 14 inches; loam  
H3—14 to 36 inches; loam  
R—36 to 36 inches; unweathered bedrock

#### **Canlon**

*MLRA:* 73 - Rolling Plains and Breaks

*Landform:* Escarpment on upland

*Parent material:* Calcareous loamy residuum weathered from sandstone

*Slope:* 6 to 30 percent

*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)

*Drainage class:* Somewhat excessively drained

*Slowest permeability:* Moderate (About 0.60 in/hr)

*Available water capacity:* Low (About 3.5 inches)

*Shrink-swell potential:* Low (About 1.5 LEP)

*Flooding hazard:* None

*Depth to seasonal water saturation:* More than 6 feet

*Runoff class:* Medium

*Ecological site:* Shallow Limy (pe20-26)

*Land capability (nonirrigated):* 7s

#### *Typical Profile:*

H1—0 to 8 inches; loam  
H2—8 to 18 inches; gravelly loam  
R—18 to 18 inches; unweathered bedrock

#### **Minor Components**

##### **Unnamed Hydric Soils**

### **195CF—Carlson silt loam, 1 to 3 percent slopes**

#### **Map Unit Composition**

Carlson: 100 percent

#### **Component Descriptions**

##### **Carlson**

*MLRA:* 73 - Rolling Plains and Breaks

*Landform:* Ridge on upland

*Parent material:* Loess over old loamy alluvium

*Slope:* 1 to 3 percent

*Drainage class:* Well drained

*Slowest permeability:* Moderately slow (About 0.20 in/hr)

*Available water capacity:* High (About 10.6 inches)

*Shrink-swell potential:* Moderate (About 4.5 LEP)

*Flooding hazard:* None

*Depth to seasonal water saturation:* More than 6 feet

*Runoff class:* Low

*Ecological site:* Loamy Upland (pe20-26)

*Land capability (irrigated):* 2e

*Land capability (nonirrigated):* 2e

#### *Typical Profile:*

H1—0 to 4 inches; silt loam  
H2—4 to 24 inches; silty clay loam  
H3—24 to 60 inches; clay loam

### **195HU—Humbarger loam, channeled**

#### **Map Unit Composition**

Humbarger: 100 percent

#### **Component Descriptions**

##### **Humbarger**

*MLRA:* 73 - Rolling Plains and Breaks

*Landform:* Flood plain on river valley

*Parent material:* Calcareous loamy alluvium

*Slope:* 0 to 2 percent

*Drainage class:* Well drained

*Slowest permeability:* Moderate (About 0.60 in/hr)

*Available water capacity:* High (About 11.8 inches)

*Shrink-swell potential:* Moderate (About 4.5 LEP)

*Flooding hazard:* Frequent

*Depth to seasonal water saturation:* More than 6 feet

*Runoff class:* Low

*Ecological site:* Loamy Lowland (pe20-26)

*Land capability (nonirrigated):* 5w

#### *Typical Profile:*

H1—0 to 28 inches; loam  
H2—28 to 33 inches; loam  
H3—33 to 60 inches; loam

#### **Minor Components**

##### **Unnamed Hydric Soils**



**195IF—Inavale loamy sand, channeled****Map Unit Composition**

Inavale: 100 percent

**Component Descriptions****Inavale**

*MLRA:* 73 - Rolling Plains and Breaks

*Landform:* Flood plain on river valley

*Parent material:* Sandy alluvium

*Slope:* 0 to 2 percent

*Drainage class:* Excessively drained

*Slowest permeability:* Rapid (About 5.95 in/hr)

*Available water capacity:* Low (About 4.9 inches)

*Shrink-swell potential:* Low (About 1.5 LEP)

*Flooding hazard:* Frequent

*Depth to seasonal water saturation:* More than 6 feet

*Runoff class:* Negligible

*Ecological site:* Sandy Lowland (pe20-26)

*Land capability (nonirrigated):* 6w

*Typical Profile:*

H1—0 to 6 inches; loamy sand

H2—6 to 60 inches; sand

**195PF—Penden clay loam, 3 to 7 percent slopes****Map Unit Composition**

Penden: 100 percent

**Component Descriptions****Penden**

*MLRA:* 73 - Rolling Plains and Breaks

*Landform:* Hillslope on upland

*Parent material:* Fine-loamy residuum weathered from calcareous sandstone

*Slope:* 3 to 7 percent

*Drainage class:* Well drained

*Slowest permeability:* Moderate (About 0.60 in/hr)

*Available water capacity:* High (About 10.3 inches)

*Shrink-swell potential:* Moderate (About 4.5 LEP)

*Flooding hazard:* None

*Depth to seasonal water saturation:* More than 6 feet

*Runoff class:* Medium

*Ecological site:* Limy Upland (pe20-26)

*Land capability (nonirrigated):* 3e

*Typical Profile:*

H1—0 to 10 inches; clay loam

H2—10 to 33 inches; loam

H3—33 to 60 inches; loam

**195PO—Penden loam, 7 to 15 percent slopes****Map Unit Composition**

Penden: 100 percent

**Component Descriptions****Penden**

*MLRA:* 73 - Rolling Plains and Breaks

*Landform:* Hillslope on upland

*Parent material:* Fine-loamy residuum weathered from calcareous sandstone

*Slope:* 7 to 15 percent

*Drainage class:* Well drained

*Slowest permeability:* Moderate (About 0.60 in/hr)

*Available water capacity:* High (About 10.6 inches)

*Shrink-swell potential:* Moderate (About 4.5 LEP)

*Flooding hazard:* None

*Depth to seasonal water saturation:* More than 6 feet

*Runoff class:* Medium

*Ecological site:* Limy Upland (pe20-26)

*Land capability (nonirrigated):* 6e

*Typical Profile:*

H1—0 to 14 inches; loam

H2—14 to 32 inches; loam

H3—32 to 60 inches; loam

**Ab—Fluvents, frequently flooded****Map Unit Composition**

Fluvents: 100 percent

**Component Descriptions****Fluvents**

*MLRA:* 73 - Rolling Plains and Breaks

*Landform:* Flood plain on river valley

*Parent material:* Loamy alluvium

*Slope:* 0 to 10 percent

*Drainage class:* Well drained

*Slowest permeability:* Moderate (About 0.60 in/hr)

*Available water capacity:* High (About 11.9 inches)

*Shrink-swell potential:* Moderate (About 4.5 LEP)

*Flooding hazard:* Frequent

*Depth to seasonal water saturation:* More than 6 feet

*Runoff class:* Negligible

*Land capability (nonirrigated):* 6w

**Typical Profile:**

H1—0 to 6 inches; silt loam

H2—6 to 60 inches; silt loam

**Minor Components****Unnamed Hydric Soils****Ac—New Cambria silty clay, frequently flooded****Map Unit Composition**

New Cambria: 100 percent

**Component Descriptions****New Cambria**

*MLRA:* 73 - Rolling Plains and Breaks

*Landform:* Terrace on river valley

*Parent material:* Clayey alluvium

*Slope:* 0 to 2 percent

*Drainage class:* Moderately well drained

*Slowest permeability:* Impermeable (About 0.00 in/hr)

*Available water capacity:* Moderate (About 8.8 inches)

*Shrink-swell potential:* High (About 7.5 LEP)

*Flooding hazard:* Frequent

*Depth to seasonal water saturation:* More than 6 feet

*Runoff class:* Medium

*Ecological site:* Clay Lowland (pe20-26)

*Land capability (nonirrigated):* 5w

**Typical Profile:**

H1—0 to 9 inches; silty clay

H2—9 to 38 inches; silty clay

H3—38 to 60 inches; silty clay

**Ad—Fluvaquents, occasionally flooded****Map Unit Composition**

Fluvaquents: 100 percent

**Component Descriptions****Fluvaquents**

*MLRA:* 73 - Rolling Plains and Breaks

*Landform:* Terrace on river valley

*Parent material:* Sandy alluvium and/or loamy alluvium and/or clayey alluvium

*Slope:* 0 to 1 percent

*Drainage class:* Somewhat poorly drained

*Slowest permeability:* Moderately slow (About 0.20 in/hr)

*Available water capacity:* High (About 11.4 inches)

*Shrink-swell potential:* Moderate (About 4.5 LEP)

*Flooding hazard:* Occasional

*Depth to seasonal water saturation:* About 24 to 36 inches

*Runoff class:* Very low

*Ecological site:* Subirrigated (pe20-26)

*Land capability (irrigated):* 2w

*Land capability (nonirrigated):* 2w

**Typical Profile:**

H1—0 to 18 inches; silty clay loam

H2—18 to 60 inches; clay loam

**Minor Components****Unnamed Hydric Soils**

## **Ae—Anselmo fine sandy loam, 2 to 6 percent slopes**

### **Map Unit Composition**

Anselmo: 100 percent

### **Component Descriptions**

#### **Anselmo**

*MLRA:* 73 - Rolling Plains and Breaks

*Landform:* Valley side on upland

*Parent material:* Coarse-loamy eolian deposits

*Slope:* 2 to 6 percent

*Drainage class:* Well drained

*Slowest permeability:* Moderate (About 0.57 in/hr)

*Available water capacity:* Moderate (About 7.5 inches)

*Shrink-swell potential:* Low (About 1.5 LEP)

*Flooding hazard:* None

*Depth to seasonal water saturation:* More than 6 feet

*Runoff class:* Very low

*Ecological site:* Sandy (pe20-26)

*Land capability (irrigated):* 3e

*Land capability (nonirrigated):* 3e

#### *Typical Profile:*

H1—0 to 10 inches; fine sandy loam

H2—10 to 25 inches; sandy loam

H3—25 to 35 inches; fine sandy loam

H4—35 to 60 inches; loamy fine sand

## **Am—Armo loam, 1 to 3 percent slopes**

### **Map Unit Composition**

Armo: 100 percent

### **Component Descriptions**

#### **Armo**

*MLRA:* 73 - Rolling Plains and Breaks

*Landform:* Hillslope on upland

*Parent material:* Calcareous loamy colluvium derived from limestone

*Slope:* 1 to 3 percent

*Drainage class:* Well drained

*Slowest permeability:* Moderate (About 0.60 in/hr)

*Available water capacity:* High (About 10.6 inches)

*Shrink-swell potential:* Low (About 1.5 LEP)

*Flooding hazard:* None

*Depth to seasonal water saturation:* More than 6 feet

*Runoff class:* Low

*Ecological site:* Limy Upland (pe20-26)

*Land capability (nonirrigated):* 2e

#### *Typical Profile:*

H1—0 to 17 inches; loam

H2—17 to 30 inches; clay loam

H3—30 to 41 inches; clay loam

H4—41 to 51 inches; silt loam

H5—51 to 60 inches; very gravelly loam

## **An—Armo loam, 3 to 7 percent slopes**

### **Map Unit Composition**

Armo: 100 percent

### **Component Descriptions**

#### **Armo**

*MLRA:* 73 - Rolling Plains and Breaks

*Landform:* Hillslope on upland

*Parent material:* Calcareous loamy colluvium derived from limestone

*Slope:* 3 to 7 percent

*Drainage class:* Well drained

*Slowest permeability:* Moderate (About 0.60 in/hr)

*Available water capacity:* High (About 11.9 inches)

*Shrink-swell potential:* Low (About 1.5 LEP)

*Flooding hazard:* None

*Depth to seasonal water saturation:* More than 6 feet

*Runoff class:* Medium

*Ecological site:* Limy Upland (pe20-26)

*Land capability (nonirrigated):* 3e

#### *Typical Profile:*

H1—0 to 19 inches; loam

H2—19 to 37 inches; loam

H3—37 to 60 inches; loam

## **Ao—Armo loam, 3 to 7 percent slopes, eroded**

### **Map Unit Composition**

Armo: 100 percent

### **Component Descriptions**

#### **Armo**

*MLRA:* 73 - Rolling Plains and Breaks

*Landform:* Hillslope on upland

*Parent material:* Calcareous loamy colluvium derived from limestone

*Slope:* 3 to 7 percent

*Drainage class:* Well drained

*Slowest permeability:* Moderate (About 0.60 in/hr)

*Available water capacity:* High (About 10.1 inches)

*Shrink-swell potential:* Low (About 1.5 LEP)

*Flooding hazard:* None

*Depth to seasonal water saturation:* More than 6 feet

*Runoff class:* Medium

*Ecological site:* Limy Upland (pe20-26)

*Land capability (nonirrigated):* 4e

#### *Typical Profile:*

H1—0 to 5 inches; loam

H2—5 to 23 inches; clay loam

H3—23 to 41 inches; clay loam

H4—41 to 51 inches; silt loam

H5—51 to 60 inches; very gravelly loam

## **Ar—Armo loam, 7 to 15 percent slopes**

### **Map Unit Composition**

Armo: 100 percent

### **Component Descriptions**

#### **Armo**

*MLRA:* 73 - Rolling Plains and Breaks

*Landform:* Hillslope on upland

*Parent material:* Calcareous loamy colluvium derived from limestone

*Slope:* 7 to 15 percent

*Drainage class:* Well drained

*Slowest permeability:* Moderate (About 0.60 in/hr)

*Available water capacity:* High (About 10.2 inches)

*Shrink-swell potential:* Low (About 1.5 LEP)

*Flooding hazard:* None

*Depth to seasonal water saturation:* More than 6 feet

*Runoff class:* Medium

*Ecological site:* Limy Upland (pe20-26)

*Land capability (nonirrigated):* 6e

#### *Typical Profile:*

H1—0 to 10 inches; loam

H2—10 to 20 inches; clay loam

H3—20 to 41 inches; clay loam

H4—41 to 51 inches; silt loam

H5—51 to 60 inches; very gravelly loam

## **Bf—Boel fine sandy loam, occasionally flooded**

### **Map Unit Composition**

Boel: 100 percent

### **Component Descriptions**

#### **Boel**

*MLRA:* 73 - Rolling Plains and Breaks

*Landform:* Flood plain on river valley

*Parent material:* Sandy alluvium

*Slope:* 0 to 2 percent

*Drainage class:* Somewhat poorly drained

*Slowest permeability:* Moderately rapid (About 2.00 in/hr)

*Available water capacity:* Low (About 5.6 inches)

*Shrink-swell potential:* Low (About 1.5 LEP)

*Flooding hazard:* Occasional

*Depth to seasonal water saturation:* About 18 to 42 inches

*Runoff class:* Negligible

*Ecological site:* Subirrigated (pe20-26)

*Land capability (irrigated):* 3w

*Land capability (nonirrigated):* 3w

#### *Typical Profile:*

H1—0 to 10 inches; fine sandy loam

H2—10 to 60 inches; loamy fine sand

### **Minor Components**

#### **Unnamed Hydric Soils**

## Bg—Bogue clay, 3 to 8 percent slopes

### Map Unit Composition

Bogue: 100 percent

### Component Descriptions

#### Bogue

*MLRA:* 73 - Rolling Plains and Breaks

*Landform:* Hillslope on upland

*Parent material:* Residuum weathered from shale

*Slope:* 3 to 8 percent

*Depth to restrictive feature:* 20 to 40 inches to bedrock (paralithic)

*Drainage class:* Moderately well drained

*Slowest permeability:* Very slow (About 0.00 in/hr)

*Available water capacity:* Low (About 3.4 inches)

*Shrink-swell potential:* High (About 7.5 LEP)

*Flooding hazard:* None

*Depth to seasonal water saturation:* More than 6 feet

*Runoff class:* Very high

*Ecological site:* Blue Shale (pe20-26)

*Land capability (nonirrigated):* 6e

#### Typical Profile:

H1—0 to 6 inches; clay

H2—6 to 17 inches; clay

H3—17 to 23 inches; clay

H4—23 to 32 inches; weathered bedrock

Cr—32 to 32 inches; unweathered bedrock

*Parent material:* Residuum weathered from shale

*Slope:* 5 to 25 percent

*Depth to restrictive feature:* 20 to 40 inches to bedrock (paralithic)

*Drainage class:* Moderately well drained

*Slowest permeability:* Very slow (About 0.00 in/hr)

*Available water capacity:* Very low (About 2.5 inches)

*Shrink-swell potential:* High (About 7.5 LEP)

*Flooding hazard:* None

*Depth to seasonal water saturation:* More than 6 feet

*Runoff class:* Very high

*Ecological site:* Blue Shale (pe20-26)

*Land capability (nonirrigated):* 6e

#### Typical Profile:

H1—0 to 6 inches; clay

H2—6 to 17 inches; clay

H3—17 to 23 inches; clay

H4—23 to 32 inches; weathered bedrock

Cr—32 to 32 inches; unweathered bedrock

#### Armo

*MLRA:* 73 - Rolling Plains and Breaks

*Landform:* Hillslope on upland

*Parent material:* Calcareous loamy colluvium derived from limestone

*Slope:* 5 to 15 percent

*Drainage class:* Well drained

*Slowest permeability:* Moderate (About 0.60 in/hr)

*Available water capacity:* High (About 10.5 inches)

*Shrink-swell potential:* Low (About 1.5 LEP)

*Flooding hazard:* None

*Depth to seasonal water saturation:* More than 6 feet

*Runoff class:* Medium

*Ecological site:* Limy Upland (pe20-26)

*Land capability (nonirrigated):* 6e

#### Typical Profile:

H1—0 to 15 inches; loam

H2—15 to 28 inches; clay loam

H3—28 to 41 inches; clay loam

H4—41 to 51 inches; silt loam

H5—51 to 60 inches; very gravelly loam

## Bo—Bogue-Armo complex, 5 to 25 percent slopes

### Map Unit Composition

Bogue: 60 percent

Armo: 40 percent

### Component Descriptions

#### Bogue

*MLRA:* 73 - Rolling Plains and Breaks

*Landform:* Hillslope on upland

**BOP—Borrow Pits****Br—Brownell gravelly loam, 2 to 10 percent slopes****Map Unit Composition**

Brownell: 100 percent

**Component Descriptions****Brownell**

*MLRA:* 73 - Rolling Plains and Breaks

*Landform:* Hillslope on upland

*Parent material:* Calcareous residuum weathered from limestone

*Slope:* 2 to 10 percent

*Depth to restrictive feature:* 20 to 40 inches to bedrock (lithic)

*Drainage class:* Well drained

*Slowest permeability:* Moderate (About 0.60 in/hr)

*Available water capacity:* Low (About 3.2 inches)

*Shrink-swell potential:* Low (About 1.5 LEP)

*Flooding hazard:* None

*Depth to seasonal water saturation:* More than 6 feet

*Runoff class:* Medium

*Ecological site:* Limy Upland (pe20-26)

*Land capability (nonirrigated):* 6e

*Typical Profile:*

H1—0 to 7 inches; gravelly loam

H2—7 to 30 inches; very channery loam

R—30 to 30 inches; unweathered bedrock

*Parent material:* Old calcareous fine-loamy alluvium and/or calcareous fine-loamy residuum

*Slope:* 3 to 7 percent

*Depth to restrictive feature:* 20 to 40 inches to bedrock (lithic)

*Drainage class:* Well drained

*Slowest permeability:* Moderate (About 0.60 in/hr)

*Available water capacity:* Moderate (About 6.1 inches)

*Shrink-swell potential:* Low (About 1.5 LEP)

*Flooding hazard:* None

*Depth to seasonal water saturation:* More than 6 feet

*Runoff class:* Low

*Ecological site:* Limy Upland (pe20-26)

*Land capability (nonirrigated):* 4e

*Typical Profile:*

H1—0 to 9 inches; loam

H2—9 to 19 inches; clay loam

H3—19 to 33 inches; loam

R—33 to 33 inches; unweathered bedrock

**Carlson**

*MLRA:* 73 - Rolling Plains and Breaks

*Landform:* Ridge on upland

*Parent material:* Loess over old loamy alluvium

*Slope:* 3 to 7 percent

*Drainage class:* Well drained

*Slowest permeability:* Moderately slow (About 0.20 in/hr)

*Available water capacity:* High (About 10.8 inches)

*Shrink-swell potential:* Moderate (About 4.5 LEP)

*Flooding hazard:* None

*Depth to seasonal water saturation:* More than 6 feet

*Runoff class:* Low

*Ecological site:* Loamy Upland (pe20-26)

*Land capability (nonirrigated):* 3e

*Typical Profile:*

H1—0 to 8 inches; silt loam

H2—8 to 18 inches; silty clay loam

H3—18 to 60 inches; silty clay loam

**Cc—Campus-Carlson complex, 3 to 7 percent slopes****Map Unit Composition**

Campus: 65 percent

Carlson: 35 percent

**Component Descriptions****Campus**

*MLRA:* 73 - Rolling Plains and Breaks

*Landform:* Hillslope on upland

**Minor Components****Unnamed Hydric Soils**

## **Cd—Campus-Penden complex, 5 to 15 percent slopes**

### **Map Unit Composition**

Campus: 55 percent

Penden: 45 percent

### **Component Descriptions**

#### **Campus**

*MLRA:* 73 - Rolling Plains and Breaks

*Landform:* Hillslope on upland

*Parent material:* Old calcareous fine-loamy alluvium and/or calcareous fine-loamy residuum

*Slope:* 5 to 15 percent

*Depth to restrictive feature:* 20 to 40 inches to bedrock (lithic)

*Drainage class:* Well drained

*Slowest permeability:* Moderate (About 0.60 in/hr)

*Available water capacity:* Moderate (About 6.1 inches)

*Shrink-swell potential:* Low (About 1.5 LEP)

*Flooding hazard:* None

*Depth to seasonal water saturation:* More than 6 feet

*Runoff class:* Medium

*Ecological site:* Limy Upland (pe20-26)

*Land capability (nonirrigated):* 6e

#### *Typical Profile:*

H1—0 to 9 inches; loam

H2—9 to 19 inches; clay loam

H3—19 to 33 inches; loam

R—33 to 33 inches; unweathered bedrock

#### **Penden**

*MLRA:* 73 - Rolling Plains and Breaks

*Landform:* Hillslope on upland

*Parent material:* Fine-loamy residuum weathered from calcareous sandstone

*Slope:* 5 to 15 percent

*Drainage class:* Well drained

*Slowest permeability:* Moderate (About 0.60 in/hr)

*Available water capacity:* High (About 10.5 inches)

*Shrink-swell potential:* Moderate (About 4.5 LEP)

*Flooding hazard:* None

*Depth to seasonal water saturation:* More than 6 feet

*Runoff class:* Medium

*Ecological site:* Shallow Limy (pe20-26)

*Land capability (nonirrigated):* 6e

#### *Typical Profile:*

H1—0 to 14 inches; clay loam

H2—14 to 27 inches; clay loam

H3—27 to 64 inches; clay loam

### **Minor Components**

#### **Unnamed Hydric Soils**

## **Ce—Canlon complex, 5 to 25 percent slopes**

### **Map Unit Composition**

Canlon: 60 percent

Campus: 40 percent

### **Component Descriptions**

#### **Canlon**

*MLRA:* 73 - Rolling Plains and Breaks

*Landform:* Escarpment on upland

*Parent material:* Calcareous loamy residuum weathered from sandstone

*Slope:* 5 to 25 percent

*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)

*Drainage class:* Well drained

*Slowest permeability:* Moderate (About 0.60 in/hr)

*Available water capacity:* Very low (About 2.5 inches)

*Shrink-swell potential:* Low (About 1.5 LEP)

*Flooding hazard:* None

*Depth to seasonal water saturation:* More than 6 feet

*Runoff class:* Medium

*Ecological site:* Shallow Limy (pe20-26)

*Land capability (nonirrigated):* 7s

#### *Typical Profile:*

H1—0 to 4 inches; loam

H2—4 to 13 inches; loam

R—13 to 13 inches; unweathered bedrock

#### **Campus**

*MLRA:* 73 - Rolling Plains and Breaks

*Landform:* Hillslope on upland

*Parent material:* Old calcareous fine-loamy alluvium and/or calcareous fine-loamy residuum

*Slope:* 5 to 15 percent  
*Depth to restrictive feature:* 20 to 40 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Slowest permeability:* Moderate (About 0.60 in/hr)  
*Available water capacity:* Moderate (About 6.1 inches)  
*Shrink-swell potential:* Low (About 1.5 LEP)  
*Flooding hazard:* None  
*Depth to seasonal water saturation:* More than 6 feet  
*Runoff class:* Medium  
*Ecological site:* Limy Upland (pe20-26)  
*Land capability (nonirrigated):* 6e

*Typical Profile:*

H1—0 to 9 inches; loam  
 H2—9 to 19 inches; clay loam  
 H3—19 to 33 inches; loam  
 R—33 to 33 inches; unweathered bedrock

## **Cm—Corinth silty clay loam, 1 to 3 percent slopes**

### **Map Unit Composition**

Corinth: 100 percent

### **Component Descriptions**

#### **Corinth**

*MLRA:* 73 - Rolling Plains and Breaks  
*Landform:* Hillslope on upland  
*Parent material:* Residuum weathered from calcareous shale  
*Slope:* 1 to 3 percent  
*Depth to restrictive feature:* 20 to 40 inches to bedrock (paralithic)  
*Drainage class:* Well drained  
*Slowest permeability:* Impermeable (About 0.00 in/hr)  
*Available water capacity:* Low (About 5.0 inches)  
*Shrink-swell potential:* High (About 7.5 LEP)  
*Flooding hazard:* None  
*Depth to seasonal water saturation:* More than 6 feet  
*Runoff class:* Medium  
*Ecological site:* Limy Upland (pe20-26)  
*Land capability (nonirrigated):* 3e

*Typical Profile:*

H1—0 to 9 inches; silty clay loam

H2—9 to 30 inches; silty clay loam  
 H3—30 to 34 inches; unweathered bedrock

## **Cn—Corinth silty clay loam, 3 to 7 percent slopes**

### **Map Unit Composition**

Corinth: 100 percent

### **Component Descriptions**

#### **Corinth**

*MLRA:* 73 - Rolling Plains and Breaks  
*Landform:* Hillslope on upland  
*Parent material:* Residuum weathered from calcareous shale  
*Slope:* 3 to 7 percent  
*Depth to restrictive feature:* 20 to 40 inches to bedrock (paralithic)  
*Drainage class:* Well drained  
*Slowest permeability:* Impermeable (About 0.00 in/hr)  
*Available water capacity:* Low (About 5.0 inches)  
*Shrink-swell potential:* High (About 7.5 LEP)  
*Flooding hazard:* None  
*Depth to seasonal water saturation:* More than 6 feet  
*Runoff class:* Medium  
*Ecological site:* Limy Upland (pe20-26)  
*Land capability (nonirrigated):* 4e

*Typical Profile:*

H1—0 to 9 inches; silty clay loam  
 H2—9 to 30 inches; silty clay loam  
 Cr—30 to 30 inches; unweathered bedrock

## **Co—Corinth silty clay loam, 7 to 15 percent slopes**

### **Map Unit Composition**

Corinth: 100 percent

### **Component Descriptions**

#### **Corinth**

*MLRA:* 73 - Rolling Plains and Breaks  
*Landform:* Hillslope on upland



*Parent material:* Residuum weathered from calcareous shale  
*Slope:* 7 to 15 percent  
*Depth to restrictive feature:* 20 to 40 inches to bedrock (paralithic)  
*Drainage class:* Well drained  
*Slowest permeability:* Impermeable (About 0.00 in/hr)  
*Available water capacity:* Low (About 5.0 inches)  
*Shrink-swell potential:* High (About 7.5 LEP)  
*Flooding hazard:* None  
*Depth to seasonal water saturation:* More than 6 feet  
*Runoff class:* High  
*Ecological site:* Limy Upland (pe20-26)  
*Land capability (nonirrigated):* 6e

*Typical Profile:*

H1—0 to 9 inches; silty clay loam  
 H2—9 to 30 inches; silty clay loam  
 Cr—30 to 30 inches; unweathered bedrock

**Cr—Crete silty clay loam, 0 to 1 percent slopes**

**Map Unit Composition**

Crete: 100 percent

**Component Descriptions**

**Crete**

*MLRA:* 73 - Rolling Plains and Breaks  
*Landform:* Plain on upland  
*Parent material:* Loess  
*Slope:* 0 to 1 percent  
*Drainage class:* Moderately well drained  
*Slowest permeability:* Impermeable (About 0.00 in/hr)  
*Available water capacity:* Very high (About 12.2 inches)  
*Shrink-swell potential:* High (About 7.5 LEP)  
*Flooding hazard:* None  
*Depth to seasonal water saturation:* More than 6 feet  
*Runoff class:* Medium  
*Ecological site:* Clay Upland (pe20-26)  
*Land capability (irrigated):* 2s  
*Land capability (nonirrigated):* 2s

*Typical Profile:*

H1—0 to 16 inches; silty clay loam  
 H2—16 to 34 inches; silty clay

H3—34 to 41 inches; silty clay loam  
 H4—41 to 68 inches; silty clay loam

**Minor Components**  
**Unnamed Hydric Soils**

**De—Detroit silt loam, rarely flooded**

**Map Unit Composition**

Detroit: 100 percent

**Component Descriptions**

**Detroit**

*MLRA:* 73 - Rolling Plains and Breaks  
*Landform:* Stream terrace on river valley  
*Parent material:* Alluvium  
*Slope:* 0 to 2 percent  
*Drainage class:* Moderately well drained  
*Slowest permeability:* Slow (About 0.06 in/hr)  
*Available water capacity:* High (About 11.1 inches)  
*Shrink-swell potential:* High (About 7.5 LEP)  
*Flooding hazard:* Rare  
*Depth to seasonal water saturation:* More than 6 feet  
*Runoff class:* Medium  
*Ecological site:* Loamy Terrace (pe20-26)  
*Land capability (irrigated):* 1  
*Land capability (nonirrigated):* 2c

*Typical Profile:*

H1—0 to 12 inches; silt loam  
 H2—12 to 34 inches; silty clay  
 H3—34 to 63 inches; silty clay loam

**Ee—Eltree silt loam, 0 to 1 percent slopes**

**Map Unit Composition**

Eltree: 100 percent

**Component Descriptions**

**Eltree**

*MLRA:* 73 - Rolling Plains and Breaks

*Landform:* Terrace on river valley  
*Parent material:* Calcareous silty alluvium and/or calcareous silty colluvium  
*Slope:* 0 to 1 percent  
*Drainage class:* Well drained  
*Slowest permeability:* Moderate (About 0.60 in/hr)  
*Available water capacity:* Very high (About 12.1 inches)  
*Shrink-swell potential:* Low (About 1.5 LEP)  
*Flooding hazard:* None  
*Depth to seasonal water saturation:* More than 6 feet  
*Runoff class:* Low  
*Ecological site:* Limy Upland (pe20-26)  
*Land capability (irrigated):* 1  
*Land capability (nonirrigated):* 2c

*Typical Profile:*  
 H1—0 to 26 inches; silt loam  
 H2—26 to 35 inches; silt loam  
 H3—35 to 63 inches; silty clay loam

### **Ef—Eltree silt loam, 1 to 3 percent slopes**

#### **Map Unit Composition**

Eltree: 100 percent

#### **Component Descriptions**

**Eltree**  
*MLRA:* 73 - Rolling Plains and Breaks  
*Landform:* Terrace on river valley  
*Parent material:* Calcareous silty alluvium and/or calcareous silty colluvium  
*Slope:* 1 to 3 percent  
*Drainage class:* Well drained  
*Slowest permeability:* Moderate (About 0.60 in/hr)  
*Available water capacity:* Very high (About 12.1 inches)  
*Shrink-swell potential:* Low (About 1.5 LEP)  
*Flooding hazard:* None  
*Depth to seasonal water saturation:* More than 6 feet  
*Runoff class:* Low  
*Ecological site:* Limy Upland (pe20-26)  
*Land capability (irrigated):* 2e  
*Land capability (nonirrigated):* 2e

*Typical Profile:*  
 H1—0 to 26 inches; silt loam  
 H2—26 to 35 inches; silt loam  
 H3—35 to 60 inches; silty clay loam

### **Eg—Eltree silt loam, 3 to 7 percent slopes**

#### **Map Unit Composition**

Eltree: 100 percent

#### **Component Descriptions**

**Eltree**  
*MLRA:* 73 - Rolling Plains and Breaks  
*Landform:* Terrace on river valley  
*Parent material:* Calcareous silty alluvium and/or calcareous silty colluvium  
*Slope:* 3 to 7 percent  
*Drainage class:* Well drained  
*Slowest permeability:* Moderate (About 0.60 in/hr)  
*Available water capacity:* Very high (About 12.1 inches)  
*Shrink-swell potential:* Low (About 1.5 LEP)  
*Flooding hazard:* None  
*Depth to seasonal water saturation:* More than 6 feet  
*Runoff class:* Medium  
*Ecological site:* Limy Upland (pe20-26)  
*Land capability (irrigated):* 3e  
*Land capability (nonirrigated):* 3e

*Typical Profile:*  
 H1—0 to 26 inches; silt loam  
 H2—26 to 35 inches; silt loam  
 H3—35 to 63 inches; silty clay loam

### **Eh—Eltree silt loam, 7 to 15 percent slopes**

#### **Map Unit Composition**

Eltree: 100 percent

#### **Component Descriptions**

**Eltree**  
*MLRA:* 73 - Rolling Plains and Breaks

*Landform:* Terrace on river valley  
*Parent material:* Calcareous silty alluvium and/or calcareous silty colluvium  
*Slope:* 7 to 15 percent  
*Drainage class:* Well drained  
*Slowest permeability:* Moderate (About 0.60 in/hr)  
*Available water capacity:* Very high (About 12.1 inches)  
*Shrink-swell potential:* Low (About 1.5 LEP)  
*Flooding hazard:* None  
*Depth to seasonal water saturation:* More than 6 feet  
*Runoff class:* Medium  
*Ecological site:* Limy Upland (pe20-26)  
*Land capability (nonirrigated):* 6e

*Typical Profile:*  
 H1—0 to 26 inches; silt loam  
 H2—26 to 35 inches; silt loam  
 H3—35 to 60 inches; silty clay loam

## GRP—Gravel Pits

## Ha—Harney silt loam, 0 to 1 percent slopes

### Map Unit Composition

Harney: 100 percent

### Component Descriptions

**Harney**  
*MLRA:* 73 - Rolling Plains and Breaks  
*Landform:* Divide on tableland  
*Parent material:* Loess  
*Slope:* 0 to 1 percent  
*Drainage class:* Well drained  
*Slowest permeability:* Moderately slow (About 0.20 in/hr)  
*Available water capacity:* High (About 11.1 inches)  
*Shrink-swell potential:* Moderate (About 4.5 LEP)  
*Flooding hazard:* None  
*Depth to seasonal water saturation:* More than 6 feet  
*Runoff class:* Low  
*Ecological site:* Loamy Upland (pe20-26)  
*Land capability (irrigated):* 1  
*Land capability (nonirrigated):* 2c

*Typical Profile:*  
 H1—0 to 10 inches; silt loam  
 H2—10 to 34 inches; silty clay loam  
 H3—34 to 60 inches; silt loam

### Minor Components

#### Ness

**Unnamed Wet Soils**  
*Phase:* Loamy, Depression

**Unnamed Wet Soils**  
*Phase:* Loamy, Drainageway

## Hb—Harney silt loam, 1 to 3 percent slopes

### Map Unit Composition

Harney: 100 percent

### Component Descriptions

**Harney**  
*MLRA:* 73 - Rolling Plains and Breaks  
*Landform:* Plain on tableland  
*Parent material:* Loess  
*Slope:* 1 to 3 percent  
*Drainage class:* Well drained  
*Slowest permeability:* Moderately slow (About 0.20 in/hr)  
*Available water capacity:* High (About 11.1 inches)  
*Shrink-swell potential:* Moderate (About 4.5 LEP)  
*Flooding hazard:* None  
*Depth to seasonal water saturation:* More than 6 feet  
*Runoff class:* Low  
*Ecological site:* Loamy Upland (pe20-26)  
*Land capability (irrigated):* 2e  
*Land capability (nonirrigated):* 2e

*Typical Profile:*  
 H1—0 to 12 inches; silt loam  
 H2—12 to 39 inches; silty clay loam  
 H3—39 to 60 inches; silty clay loam

**Hc—Harney silt loam, 3 to 7 percent slopes****Map Unit Composition**

Harney: 100 percent

**Component Descriptions****Harney**

*MLRA:* 73 - Rolling Plains and Breaks

*Landform:* Plain on tableland

*Parent material:* Loess

*Slope:* 3 to 7 percent

*Drainage class:* Well drained

*Slowest permeability:* Moderately slow (About 0.20 in/hr)

*Available water capacity:* High (About 10.6 inches)

*Shrink-swell potential:* Moderate (About 4.5 LEP)

*Flooding hazard:* None

*Depth to seasonal water saturation:* More than 6 feet

*Runoff class:* Medium

*Ecological site:* Loamy Upland (pe20-26)

*Land capability (nonirrigated):* 3e

*Typical Profile:*

H1—0 to 6 inches; silt loam

H2—6 to 40 inches; silty clay loam

H3—40 to 74 inches; silty clay loam

*Available water capacity:* High (About 10.6 inches)

*Shrink-swell potential:* Moderate (About 4.5 LEP)

*Flooding hazard:* None

*Depth to seasonal water saturation:* More than 6 feet

*Runoff class:* Low

*Ecological site:* Loamy Upland (pe20-26)

*Land capability (nonirrigated):* 4e

*Typical Profile:*

H1—0 to 6 inches; silty clay loam

H2—6 to 40 inches; silty clay loam

H3—40 to 74 inches; silty clay loam

**He—Harney-Armo complex, 3 to 7 percent slopes, eroded****Map Unit Composition**

Harney: 50 percent

Armo: 50 percent

**Component Descriptions****Harney**

*MLRA:* 73 - Rolling Plains and Breaks

*Landform:* Plain on tableland

*Parent material:* Loess

*Slope:* 3 to 7 percent

*Drainage class:* Well drained

*Slowest permeability:* Moderately slow (About 0.20 in/hr)

*Available water capacity:* High (About 10.6 inches)

*Shrink-swell potential:* Moderate (About 4.5 LEP)

*Flooding hazard:* None

*Depth to seasonal water saturation:* More than 6 feet

*Runoff class:* Medium

*Ecological site:* Loamy Upland (pe20-26)

*Land capability (nonirrigated):* 4e

*Typical Profile:*

H1—0 to 6 inches; silt loam

H2—6 to 40 inches; silty clay loam

H3—40 to 74 inches; silty clay loam

**Armo**

*MLRA:* 73 - Rolling Plains and Breaks

*Landform:* Hillslope on upland

**Hd—Harney silty clay loam, 2 to 5 percent slopes, eroded****Map Unit Composition**

Harney: 100 percent

**Component Descriptions****Harney**

*MLRA:* 73 - Rolling Plains and Breaks

*Landform:* Plain on tableland

*Parent material:* Loess

*Slope:* 2 to 5 percent

*Drainage class:* Well drained

*Slowest permeability:* Moderately slow (About 0.20 in/hr)

*Parent material:* Calcareous loamy colluvium derived from limestone  
*Slope:* 3 to 7 percent  
*Drainage class:* Well drained  
*Slowest permeability:* Moderate (About 0.60 in/hr)  
*Available water capacity:* High (About 10.1 inches)  
*Shrink-swell potential:* Low (About 1.5 LEP)  
*Flooding hazard:* None  
*Depth to seasonal water saturation:* More than 6 feet  
*Runoff class:* Medium  
*Ecological site:* Limy Upland (pe20-26)  
*Land capability (nonirrigated):* 4e

*Typical Profile:*

H1—0 to 5 inches; loam  
 H2—5 to 23 inches; clay loam  
 H3—23 to 41 inches; clay loam  
 H4—41 to 51 inches; silt loam  
 H5—51 to 60 inches; very gravelly loam

## **Hf—Harney-Carlson silt loams, 0 to 1 percent slopes**

### **Map Unit Composition**

Harney: 50 percent  
 Carlson: 50 percent

### **Component Descriptions**

#### **Harney**

*MLRA:* 73 - Rolling Plains and Breaks  
*Landform:* Plain on tableland  
*Parent material:* Loess  
*Slope:* 0 to 1 percent  
*Drainage class:* Well drained  
*Slowest permeability:* Moderately slow (About 0.20 in/hr)  
*Available water capacity:* High (About 10.6 inches)  
*Shrink-swell potential:* Moderate (About 4.5 LEP)  
*Flooding hazard:* None  
*Depth to seasonal water saturation:* More than 6 feet  
*Runoff class:* Low  
*Ecological site:* Loamy Upland (pe20-26)  
*Land capability (irrigated):* 1  
*Land capability (nonirrigated):* 2c

*Typical Profile:*

H1—0 to 6 inches; silt loam  
 H2—6 to 40 inches; silty clay loam  
 H3—40 to 74 inches; silty clay loam

#### **Carlson**

*MLRA:* 73 - Rolling Plains and Breaks  
*Landform:* Ridge on upland  
*Parent material:* Loess over old loamy alluvium  
*Slope:* 0 to 1 percent  
*Drainage class:* Well drained  
*Slowest permeability:* Moderately slow (About 0.20 in/hr)  
*Available water capacity:* High (About 10.8 inches)  
*Shrink-swell potential:* Moderate (About 4.5 LEP)  
*Flooding hazard:* None  
*Depth to seasonal water saturation:* More than 6 feet  
*Runoff class:* Low  
*Ecological site:* Loamy Upland (pe20-26)  
*Land capability (irrigated):* 1  
*Land capability (nonirrigated):* 2c

*Typical Profile:*

H1—0 to 8 inches; silt loam  
 H2—8 to 18 inches; silty clay loam  
 H3—18 to 60 inches; clay loam

## **Hg—Harney-Carlson silt loams, 1 to 3 percent slopes**

### **Map Unit Composition**

Harney: 50 percent  
 Carlson: 50 percent

### **Component Descriptions**

#### **Harney**

*MLRA:* 73 - Rolling Plains and Breaks  
*Landform:* Plain on tableland  
*Parent material:* Loess  
*Slope:* 1 to 3 percent  
*Drainage class:* Well drained  
*Slowest permeability:* Moderately slow (About 0.20 in/hr)  
*Available water capacity:* High (About 10.6 inches)  
*Shrink-swell potential:* Moderate (About 4.5 LEP)  
*Flooding hazard:* None

*Depth to seasonal water saturation:* More than 6 feet

*Runoff class:* Low

*Ecological site:* Loamy Upland (pe20-26)

*Land capability (irrigated):* 2e

*Land capability (nonirrigated):* 2e

*Typical Profile:*

H1—0 to 6 inches; silt loam

H2—6 to 40 inches; silty clay loam

H3—40 to 74 inches; silt loam

### **Carlson**

*MLRA:* 73 - Rolling Plains and Breaks

*Landform:* Ridge on upland

*Parent material:* Loess over old loamy alluvium

*Slope:* 1 to 3 percent

*Drainage class:* Well drained

*Slowest permeability:* Moderately slow (About 0.20 in/hr)

*Available water capacity:* High (About 10.8 inches)

*Shrink-swell potential:* Moderate (About 4.5 LEP)

*Flooding hazard:* None

*Depth to seasonal water saturation:* More than 6 feet

*Runoff class:* Low

*Ecological site:* Loamy Upland (pe20-26)

*Land capability (irrigated):* 2e

*Land capability (nonirrigated):* 2e

*Typical Profile:*

H1—0 to 8 inches; silt loam

H2—8 to 18 inches; silty clay loam

H3—18 to 60 inches; clay loam

## **HGG—Harney-Mento silt loams, 1 to 3 percent slopes**

### **Map Unit Composition**

Harney: 70 percent

Mento: 30 percent

### **Component Descriptions**

#### **Harney**

*MLRA:* 73 - Rolling Plains and Breaks

*Landform:* Plain on tableland

*Parent material:* Loess

*Slope:* 1 to 3 percent

*Drainage class:* Well drained

*Slowest permeability:* Moderately slow (About 0.20 in/hr)

*Available water capacity:* High (About 11.5 inches)

*Shrink-swell potential:* Moderate (About 4.5 LEP)

*Flooding hazard:* None

*Depth to seasonal water saturation:* More than 6 feet

*Runoff class:* Low

*Ecological site:* Loamy Upland (pe20-26)

*Land capability (irrigated):* 2e

*Land capability (nonirrigated):* 2e

*Typical Profile:*

H1—0 to 11 inches; silt loam

H2—11 to 27 inches; silty clay loam

H3—27 to 60 inches; silt loam

### **Mento**

*MLRA:* 73 - Rolling Plains and Breaks

*Landform:* Divide on upland

*Parent material:* Loess over residuum weathered from limestone

*Slope:* 1 to 3 percent

*Drainage class:* Well drained

*Slowest permeability:* Slow (About 0.06 in/hr)

*Available water capacity:* High (About 10.3 inches)

*Shrink-swell potential:* High (About 7.5 LEP)

*Flooding hazard:* None

*Depth to seasonal water saturation:* More than 6 feet

*Runoff class:* Low

*Ecological site:* Clay Upland (pe20-26)

*Land capability (nonirrigated):* 3e

*Typical Profile:*

H1—0 to 8 inches; silt loam

H2—8 to 22 inches; silty clay

H3—22 to 46 inches; silt loam

H4—46 to 60 inches; clay loam

## **Hh—Harney-Wakeen silt loams, 0 to 1 percent slopes**

### **Map Unit Composition**

Harney: 70 percent

Wakeen: 30 percent

### **Component Descriptions**

**Harney***MLRA:* 73 - Rolling Plains and Breaks*Landform:* Plain on tableland*Parent material:* Loess*Slope:* 0 to 1 percent*Drainage class:* Well drained*Slowest permeability:* Moderately slow (About 0.20 in/hr)*Available water capacity:* High (About 10.6 inches)*Shrink-swell potential:* Moderate (About 4.5 LEP)*Flooding hazard:* None*Depth to seasonal water saturation:* More than 6 feet*Runoff class:* Low*Ecological site:* Loamy Upland (pe20-26)*Land capability (irrigated):* 1*Land capability (nonirrigated):* 2c*Typical Profile:*

H1—0 to 6 inches; silt loam

H2—6 to 40 inches; silty clay loam

H3—40 to 74 inches; silty clay loam

**Wakeen***MLRA:* 73 - Rolling Plains and Breaks*Landform:* Hillslope on upland*Parent material:* Calcareous fine-silty residuum weathered from chalk*Slope:* 0 to 1 percent*Depth to restrictive feature:* 20 to 40 inches to bedrock (paralithic)*Drainage class:* Well drained*Slowest permeability:* Moderate (About 0.60 in/hr)*Available water capacity:* Moderate (About 7.3 inches)*Shrink-swell potential:* Moderate (About 4.5 LEP)*Flooding hazard:* None*Depth to seasonal water saturation:* More than 6 feet*Runoff class:* Low*Ecological site:* Limy Upland (pe20-26)*Land capability (nonirrigated):* 3e*Typical Profile:*

H1—0 to 5 inches; silt loam

H2—5 to 36 inches; silty clay loam

Cr—36 to 36 inches; unweathered bedrock

**Hk—Harney-Wakeen silt loams, 1 to 3 percent slopes****Map Unit Composition**

Harney: 60 percent

Wakeen: 40 percent

**Component Descriptions****Harney***MLRA:* 73 - Rolling Plains and Breaks*Landform:* Plain on tableland*Parent material:* Loess*Slope:* 1 to 3 percent*Drainage class:* Well drained*Slowest permeability:* Moderately slow (About 0.20 in/hr)*Available water capacity:* High (About 10.6 inches)*Shrink-swell potential:* Moderate (About 4.5 LEP)*Flooding hazard:* None*Depth to seasonal water saturation:* More than 6 feet*Runoff class:* Low*Ecological site:* Loamy Upland (pe20-26)*Land capability (irrigated):* 2e*Land capability (nonirrigated):* 2e*Typical Profile:*

H1—0 to 6 inches; silt loam

H2—6 to 40 inches; silty clay loam

H3—40 to 74 inches; silt loam

**Wakeen***MLRA:* 73 - Rolling Plains and Breaks*Landform:* Hillslope on upland*Parent material:* Calcareous fine-silty residuum weathered from chalk*Slope:* 1 to 3 percent*Depth to restrictive feature:* 20 to 40 inches to bedrock (paralithic)*Drainage class:* Well drained*Slowest permeability:* Moderate (About 0.60 in/hr)*Available water capacity:* Moderate (About 7.3 inches)*Shrink-swell potential:* Moderate (About 4.5 LEP)*Flooding hazard:* None*Depth to seasonal water saturation:* More than 6 feet*Runoff class:* Low

*Ecological site:* Limy Upland (pe20-26)  
*Land capability (nonirrigated):* 3e

*Typical Profile:*

H1—0 to 5 inches; silt loam  
 H2—5 to 36 inches; silty clay loam  
 Cr—36 to 36 inches; unweathered bedrock

## HI—Heizer-Armo complex, 8 to 25 percent slopes

### Map Unit Composition

Heizer: 50 percent  
 Armo: 50 percent

### Component Descriptions

#### Heizer

*MLRA:* 73 - Rolling Plains and Breaks  
*Landform:* Hillslope on upland  
*Parent material:* Calcareous residuum weathered from limestone  
*Slope:* 8 to 25 percent  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)  
*Drainage class:* Somewhat excessively drained  
*Slowest permeability:* Moderate (About 0.60 in/hr)  
*Available water capacity:* Very low (About 1.6 inches)  
*Shrink-swell potential:* Low (About 1.5 LEP)  
*Flooding hazard:* None  
*Depth to seasonal water saturation:* More than 6 feet  
*Runoff class:* Medium  
*Ecological site:* Shallow Limy (pe20-26)  
*Land capability (nonirrigated):* 7s

*Typical Profile:*

H1—0 to 6 inches; gravelly loam  
 H2—6 to 14 inches; very channery loam  
 R—14 to 14 inches; unweathered bedrock

#### Armo

*MLRA:* 73 - Rolling Plains and Breaks  
*Landform:* Hillslope on upland  
*Parent material:* Calcareous loamy colluvium derived from limestone  
*Slope:* 8 to 15 percent  
*Drainage class:* Well drained  
*Slowest permeability:* Moderate (About 0.60 in/hr)

*Available water capacity:* High (About 10.5 inches)

*Shrink-swell potential:* Low (About 1.5 LEP)

*Flooding hazard:* None

*Depth to seasonal water saturation:* More than 6 feet

*Runoff class:* Medium

*Ecological site:* Limy Upland (pe20-26)

*Land capability (nonirrigated):* 6e

*Typical Profile:*

H1—0 to 15 inches; loam  
 H2—15 to 28 inches; clay loam  
 H3—28 to 41 inches; clay loam  
 H4—41 to 51 inches; silt loam  
 H5—51 to 60 inches; very gravelly loam

## HMM—Heizer-Brownell gravelly loams, 5 to 30 percent slopes

### Map Unit Composition

Heizer: 60 percent  
 Brownell: 40 percent

### Component Descriptions

#### Heizer

*MLRA:* 73 - Rolling Plains and Breaks  
*Landform:* Hillslope on upland  
*Parent material:* Calcareous residuum weathered from limestone  
*Slope:* 8 to 30 percent  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)  
*Drainage class:* Somewhat excessively drained  
*Slowest permeability:* Moderate (About 0.60 in/hr)  
*Available water capacity:* Very low (About 1.7 inches)  
*Shrink-swell potential:* Low (About 1.5 LEP)  
*Flooding hazard:* None  
*Depth to seasonal water saturation:* More than 6 feet  
*Runoff class:* Medium  
*Ecological site:* Shallow Limy (pe20-26)  
*Land capability (nonirrigated):* 7s

*Typical Profile:*

H1—0 to 6 inches; gravelly loam  
 H2—6 to 15 inches; very channery loam  
 R—15 to 15 inches; unweathered bedrock



**Brownell***MLRA:* 73 - Rolling Plains and Breaks*Landform:* Hillslope on upland*Parent material:* Calcareous residuum weathered from limestone*Slope:* 5 to 15 percent*Depth to restrictive feature:* 20 to 40 inches to bedrock (lithic)*Drainage class:* Well drained*Slowest permeability:* Moderate (About 0.60 in/hr)*Available water capacity:* Very low (About 2.7 inches)*Shrink-swell potential:* Low (About 1.5 LEP)*Flooding hazard:* None*Depth to seasonal water saturation:* More than 6 feet*Runoff class:* Medium*Ecological site:* Limy Upland (pe20-26)*Land capability (nonirrigated):* 6e*Typical Profile:*

H1—0 to 9 inches; gravelly loam

H2—9 to 24 inches; very channery loam

R—24 to 24 inches; unweathered bedrock

**Hn—Dorrance sandy loam, 5 to 20 percent slopes****Map Unit Composition**

Dorrance: 100 percent

**Component Descriptions****Dorrance***MLRA:* 73 - Rolling Plains and Breaks*Landform:* Terrace on river valley*Parent material:* Loamy alluvium*Slope:* 5 to 15 percent*Drainage class:* Excessively drained*Slowest permeability:* Moderately rapid (About 2.00 in/hr)*Available water capacity:* Low (About 3.9 inches)*Shrink-swell potential:* Low (About 1.5 LEP)*Flooding hazard:* None*Depth to seasonal water saturation:* More than 6 feet*Runoff class:* Low*Ecological site:* Limy Upland (pe20-26)*Land capability (irrigated):* 6s*Land capability (nonirrigated):* 6s*Typical Profile:*

H1—0 to 11 inches; sandy loam

H2—11 to 15 inches; gravelly sandy loam

H3—15 to 60 inches; gravelly loamy sand

**Ho—Holdrege silt loam, 0 to 1 percent slopes****Map Unit Composition**

Holdrege: 100 percent

**Component Descriptions****Holdrege***MLRA:* 73 - Rolling Plains and Breaks*Landform:* Plain on upland*Parent material:* Calcareous loess*Slope:* 0 to 1 percent*Drainage class:* Well drained*Slowest permeability:* Moderate (About 0.60 in/hr)*Available water capacity:* Very high (About 12.4 inches)*Shrink-swell potential:* Moderate (About 4.5 LEP)*Flooding hazard:* None*Depth to seasonal water saturation:* More than 6 feet*Runoff class:* Low*Ecological site:* Loamy Upland (pe20-26)*Land capability (irrigated):* 1*Land capability (nonirrigated):* 2c*Typical Profile:*

H1—0 to 14 inches; silt loam

H2—14 to 25 inches; silty clay loam

H3—25 to 30 inches; silt loam

H4—30 to 60 inches; silt loam

**Minor Components****Ness****Hp—Holdrege silt loam, 1 to 3 percent slopes****Map Unit Composition**

Holdrege: 100 percent

**Component Descriptions****Holdrege**

*MLRA:* 73 - Rolling Plains and Breaks

*Landform:* Plain on tableland

*Parent material:* Calcareous loess

*Slope:* 1 to 3 percent

*Drainage class:* Well drained

*Slowest permeability:* Moderate (About 0.60 in/hr)

*Available water capacity:* Very high (About 12.0 inches)

*Shrink-swell potential:* Moderate (About 4.5 LEP)

*Flooding hazard:* None

*Depth to seasonal water saturation:* More than 6 feet

*Runoff class:* Low

*Ecological site:* Loamy Upland (pe20-26)

*Land capability (irrigated):* 2e

*Land capability (nonirrigated):* 2e

*Typical Profile:*

H1—0 to 11 inches; silt loam

H2—11 to 33 inches; silty clay loam

H3—33 to 48 inches; silt loam

H4—48 to 66 inches; silt loam

## **Hr—Hord silt loam, rarely flooded**

### **Map Unit Composition**

Hord: 100 percent

### **Component Descriptions**

#### **Hord**

*MLRA:* 73 - Rolling Plains and Breaks

*Landform:* Terrace on river valley

*Parent material:* Fine-silty alluvium

*Slope:* 0 to 1 percent

*Drainage class:* Well drained

*Slowest permeability:* Moderate (About 0.60 in/hr)

*Available water capacity:* Very high (About 12.1 inches)

*Shrink-swell potential:* Low (About 1.5 LEP)

*Flooding hazard:* Rare

*Depth to seasonal water saturation:* More than 6 feet

*Runoff class:* Low

*Ecological site:* Loamy Terrace (pe20-26)

*Land capability (irrigated):* 1

*Land capability (nonirrigated):* 2c

*Typical Profile:*

H1—0 to 13 inches; silt loam

H2—13 to 36 inches; silty clay loam

H3—36 to 60 inches; silt loam

## **In—Inavale loamy sand, occasionally flooded**

### **Map Unit Composition**

Inavale: 100 percent

### **Component Descriptions**

#### **Inavale**

*MLRA:* 73 - Rolling Plains and Breaks

*Landform:* Flood plain on river valley

*Parent material:* Sandy alluvium

*Slope:* 0 to 10 percent

*Drainage class:* Somewhat excessively drained

*Slowest permeability:* Rapid (About 5.95 in/hr)

*Available water capacity:* Low (About 5.1 inches)

*Shrink-swell potential:* Low (About 1.5 LEP)

*Flooding hazard:* Occasional

*Depth to seasonal water saturation:* More than 6 feet

*Runoff class:* Low

*Ecological site:* Sands (pe20-26)

*Land capability (irrigated):* 4e

*Land capability (nonirrigated):* 6e

*Typical Profile:*

H1—0 to 14 inches; loamy sand

H2—14 to 31 inches; fine sand

H3—31 to 60 inches; loamy sand

#### **Minor Components**

#### **Unnamed Hydric Soils**

## **Mc—Mccook fine sandy loam, rarely flooded**

### **Map Unit Composition**

Mccook: 100 percent

### **Component Descriptions**

#### **Mccook**

*MLRA:* 73 - Rolling Plains and Breaks

*Landform:* Stream terrace on river valley

*Parent material:* Weakly stratified calcareous coarse-silty alluvium  
*Slope:* 0 to 2 percent  
*Drainage class:* Well drained  
*Slowest permeability:* Moderate (About 0.60 in/hr)  
*Available water capacity:* High (About 10.9 inches)  
*Shrink-swell potential:* Low (About 1.5 LEP)  
*Flooding hazard:* Rare  
*Depth to seasonal water saturation:* More than 6 feet  
*Runoff class:* Very low  
*Ecological site:* Sandy Terrace (pe20-26)  
*Land capability (irrigated):* 2e  
*Land capability (nonirrigated):* 2e

*Typical Profile:*  
 H1—0 to 14 inches; fine sandy loam  
 H2—14 to 60 inches; silt loam

## **Md—Mccook silt loam, rarely flooded**

### **Map Unit Composition**

Mccook: 100 percent

### **Component Descriptions**

**Mccook**  
*MLRA:* 73 - Rolling Plains and Breaks  
*Landform:* Stream terrace on river valley  
*Parent material:* Weakly stratified calcareous coarse-silty alluvium  
*Slope:* 0 to 1 percent  
*Drainage class:* Well drained  
*Slowest permeability:* Moderate (About 0.60 in/hr)  
*Available water capacity:* High (About 11.6 inches)  
*Shrink-swell potential:* Low (About 1.5 LEP)  
*Flooding hazard:* Rare  
*Depth to seasonal water saturation:* More than 6 feet  
*Runoff class:* Low  
*Ecological site:* Loamy Terrace (pe20-26)  
*Land capability (irrigated):* 1  
*Land capability (nonirrigated):* 2c

*Typical Profile:*  
 H1—0 to 11 inches; silt loam  
 H2—11 to 60 inches; silt loam

## **Me—Mento silt loam, 0 to 1 percent slopes**

### **Map Unit Composition**

Mento: 100 percent

### **Component Descriptions**

**Mento**  
*MLRA:* 73 - Rolling Plains and Breaks  
*Landform:* Divide on upland  
*Parent material:* Loess over residuum weathered from limestone  
*Slope:* 0 to 1 percent  
*Drainage class:* Well drained  
*Slowest permeability:* Slow (About 0.06 in/hr)  
*Available water capacity:* High (About 10.2 inches)  
*Shrink-swell potential:* High (About 7.5 LEP)  
*Flooding hazard:* None  
*Depth to seasonal water saturation:* More than 6 feet  
*Runoff class:* Low  
*Ecological site:* Clay Upland (pe20-26)  
*Land capability (nonirrigated):* 2s

*Typical Profile:*  
 H1—0 to 9 inches; silt loam  
 H2—9 to 21 inches; silty clay loam  
 H3—21 to 41 inches; silty clay loam  
 H4—41 to 67 inches; clay loam  
 H5—67 to 67 inches; unweathered bedrock

## **Mf—Mento silt loam, 1 to 3 percent slopes**

### **Map Unit Composition**

Mento: 100 percent

### **Component Descriptions**

**Mento**  
*MLRA:* 73 - Rolling Plains and Breaks  
*Landform:* Divide on upland  
*Parent material:* Loess over residuum weathered from limestone

*Slope:* 1 to 3 percent  
*Drainage class:* Well drained  
*Slowest permeability:* Slow (About 0.06 in/hr)  
*Available water capacity:* High (About 10.2 inches)  
*Shrink-swell potential:* High (About 7.5 LEP)  
*Flooding hazard:* None  
*Depth to seasonal water saturation:* More than 6 feet  
*Runoff class:* Low  
*Ecological site:* Clay Upland (pe20-26)  
*Land capability (nonirrigated):* 3e

*Typical Profile:*

H1—0 to 9 inches; silt loam  
 H2—9 to 21 inches; silty clay loam  
 H3—21 to 41 inches; silty clay loam  
 H4—41 to 67 inches; clay loam  
 H5—67 to 67 inches; unweathered bedrock

## **Mg—Mento silty clay loam, 1 to 3 percent slopes, eroded**

### **Map Unit Composition**

Mento: 100 percent

### **Component Descriptions**

**Mento**

*MLRA:* 73 - Rolling Plains and Breaks  
*Landform:* Divide on upland  
*Parent material:* Loess over residuum weathered from limestone  
*Slope:* 1 to 3 percent  
*Drainage class:* Well drained  
*Slowest permeability:* Slow (About 0.06 in/hr)  
*Available water capacity:* High (About 9.9 inches)  
*Shrink-swell potential:* High (About 7.5 LEP)  
*Flooding hazard:* None  
*Depth to seasonal water saturation:* More than 6 feet  
*Runoff class:* Medium  
*Ecological site:* Clay Upland (pe20-26)  
*Land capability (nonirrigated):* 3e

*Typical Profile:*

H1—0 to 6 inches; silty clay loam  
 H2—6 to 21 inches; silty clay loam  
 H3—21 to 41 inches; silty clay loam  
 H4—41 to 67 inches; clay loam  
 H5—67 to 71 inches; unweathered bedrock

## **Mo—Mento Soils, 3 to 7 percent slopes, eroded**

### **Map Unit Composition**

Mento: 100 percent

### **Component Descriptions**

**Mento**

*MLRA:* 73 - Rolling Plains and Breaks  
*Landform:* Divide on upland  
*Parent material:* Loess over residuum weathered from limestone  
*Slope:* 3 to 7 percent  
*Drainage class:* Well drained  
*Slowest permeability:* Slow (About 0.06 in/hr)  
*Available water capacity:* Moderate (About 8.7 inches)  
*Shrink-swell potential:* High (About 7.5 LEP)  
*Flooding hazard:* None  
*Depth to seasonal water saturation:* More than 6 feet  
*Runoff class:* High  
*Ecological site:* Clay Upland (pe20-26)  
*Land capability (nonirrigated):* 4e

*Typical Profile:*

H1—0 to 6 inches; silty clay loam  
 H2—6 to 20 inches; silty clay loam  
 H3—20 to 48 inches; silty clay loam  
 H4—48 to 67 inches; weathered bedrock  
 H5—67 to 71 inches; unweathered bedrock

## **Mu—Munyor sandy loam, frequently flooded**

### **Map Unit Composition**

Munyor: 100 percent

### **Component Descriptions**

**Munyor**

*MLRA:* 73 - Rolling Plains and Breaks  
*Landform:* Flood plain on river valley  
*Parent material:* Loamy alluvium  
*Slope:* 0 to 2 percent

*Drainage class:* Well drained  
*Slowest permeability:* Moderately rapid (About 2.00 in/hr)  
*Available water capacity:* Moderate (About 8.3 inches)  
*Shrink-swell potential:* Low (About 1.5 LEP)  
*Flooding hazard:* Frequent  
*Depth to seasonal water saturation:* More than 6 feet  
*Runoff class:* Very low  
*Ecological site:* Sandy Lowland (pe20-26)  
*Land capability (nonirrigated):* 3w

*Typical Profile:*

H1—0 to 7 inches; sandy loam  
 H2—7 to 44 inches; sandy loam  
 H3—44 to 60 inches; sand

**Minor Components**  
**Unnamed Hydric Soils**

**Nc—New Cambria silty clay, rarely flooded**

**Map Unit Composition**

New Cambria: 100 percent

**Component Descriptions**

**New Cambria**

*MLRA:* 73 - Rolling Plains and Breaks  
*Landform:* Stream terrace on river valley  
*Parent material:* Calcareous clayey alluvium  
*Slope:* 0 to 2 percent  
*Drainage class:* Moderately well drained  
*Slowest permeability:* Impermeable (About 0.00 in/hr)  
*Available water capacity:* Moderate (About 8.8 inches)  
*Shrink-swell potential:* High (About 7.5 LEP)  
*Flooding hazard:* Rare  
*Depth to seasonal water saturation:* More than 6 feet  
*Runoff class:* High  
*Ecological site:* Clay Terrace (pe20-26)  
*Land capability (irrigated):* 2s  
*Land capability (nonirrigated):* 2s

*Typical Profile:*

H1—0 to 9 inches; silty clay  
 H2—9 to 38 inches; silty clay  
 H3—38 to 60 inches; silty clay loam

**Nn—Nibson silt loam, 5 to 12 percent slopes**

**Map Unit Composition**

Nibson: 100 percent

**Component Descriptions**

**Nibson**

*MLRA:* 73 - Rolling Plains and Breaks  
*Landform:* Hillslope on upland  
*Parent material:* Calcareous loamy residuum weathered from limestone and shale  
*Slope:* 5 to 12 percent  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (paralithic)  
*Drainage class:* Somewhat excessively drained  
*Slowest permeability:* Moderate (About 0.60 in/hr)  
*Available water capacity:* Low (About 3.9 inches)  
*Shrink-swell potential:* Moderate (About 4.5 LEP)  
*Flooding hazard:* None  
*Depth to seasonal water saturation:* More than 6 feet  
*Runoff class:* Medium  
*Ecological site:* Limy Upland (pe20-26)  
*Land capability (nonirrigated):* 6e

*Typical Profile:*

H1—0 to 7 inches; silt loam  
 H2—7 to 19 inches; silty clay loam  
 Cr—19 to 19 inches; weathered bedrock

**Rb—Roxbury silt loam, rarely flooded**

**Map Unit Composition**

Roxbury: 100 percent

**Component Descriptions**

**Roxbury**

*MLRA:* 73 - Rolling Plains and Breaks  
*Landform:* Stream terrace on river valley

*Parent material:* Calcareous fine-silty alluvium  
*Slope:* 0 to 1 percent  
*Drainage class:* Well drained  
*Slowest permeability:* Moderate (About 0.60 in/hr)  
*Available water capacity:* Very high (About 12.7 inches)  
*Shrink-swell potential:* Moderate (About 4.5 LEP)  
*Flooding hazard:* Rare  
*Depth to seasonal water saturation:* More than 6 feet  
*Runoff class:* Low  
*Ecological site:* Loamy Terrace (pe20-26)  
*Land capability (irrigated):* 1  
*Land capability (nonirrigated):* 2c

*Typical Profile:*

H1—0 to 29 inches; silt loam  
 H2—29 to 40 inches; silt loam  
 H3—40 to 60 inches; silt loam

## **Rf—Roxbury silt loam, frequently flooded**

### **Map Unit Composition**

Roxbury: 100 percent

### **Component Descriptions**

#### **Roxbury**

*MLRA:* 73 - Rolling Plains and Breaks  
*Landform:* Stream terrace on river valley  
*Parent material:* Calcareous fine-silty alluvium  
*Slope:* 0 to 2 percent  
*Drainage class:* Well drained  
*Slowest permeability:* Moderate (About 0.60 in/hr)  
*Available water capacity:* Very high (About 12.5 inches)  
*Shrink-swell potential:* Moderate (About 4.5 LEP)  
*Flooding hazard:* Occasional  
*Depth to seasonal water saturation:* More than 6 feet  
*Runoff class:* Low  
*Ecological site:* Loamy Lowland (pe20-26)  
*Land capability (irrigated):* 2w  
*Land capability (nonirrigated):* 2w

*Typical Profile:*

H1—0 to 24 inches; silt loam  
 H2—24 to 50 inches; silty clay loam  
 H3—50 to 68 inches; silty clay loam

## **Minor Components Unnamed Hydric Soils**

## **RIV—Rivers**

### **Map Unit Composition**

Riverwash And Sandbars: 100 percent

### **Component Descriptions**

#### **Riverwash And Sandbars**

*MLRA:* 73 - Rolling Plains and Breaks  
*Parent material:* Alluvium  
*Slope:* 0 to 10 percent  
*Drainage class:* Well drained  
*Slowest permeability:* Moderate (About 0.60 in/hr)  
*Available water capacity:* High (About 11.9 inches)  
*Shrink-swell potential:* Moderate (About 4.5 LEP)  
*Flooding hazard:* Frequent  
*Depth to seasonal water saturation:* About 0 to 72 inches  
*Runoff class:* Negligible  
*Land capability (nonirrigated):* 8w

## **Minor Components Unnamed Hydric Soils**

## **Ro—Heizer-Brownell complex, 7 to 30 percent slopes**

### **Map Unit Composition**

Heizer: 77 percent  
 Brownell: 23 percent

### **Component Descriptions**

#### **Heizer**

*MLRA:* 73 - Rolling Plains and Breaks  
*Landform:* Hillslope on upland  
*Parent material:* Colluvium derived from chalk  
*Slope:* 7 to 30 percent  
*Depth to restrictive feature:* 10 to 20 inches to bedrock (lithic)  
*Drainage class:* Somewhat excessively drained

*Slowest permeability:* Moderate (About 0.60 in/hr)  
*Available water capacity:* Very low (About 1.7 inches)  
*Shrink-swell potential:* Low (About 1.5 LEP)  
*Flooding hazard:* None  
*Depth to seasonal water saturation:* More than 6 feet  
*Runoff class:* Medium  
*Ecological site:* Shallow Limy (pe20-26)  
*Land capability (nonirrigated):* 7s

*Typical Profile:*

H1—0 to 6 inches; gravelly loam  
 H2—6 to 15 inches; very channery loam  
 R—15 to 15 inches; unweathered bedrock

**Brownell**

*MLRA:* 73 - Rolling Plains and Breaks  
*Landform:* Hillslope on upland  
*Parent material:* Calcareous residuum weathered from limestone  
*Slope:* 1 to 15 percent  
*Depth to restrictive feature:* 20 to 40 inches to bedrock (lithic)  
*Drainage class:* Well drained  
*Slowest permeability:* Moderate (About 0.60 in/hr)  
*Available water capacity:* Low (About 3.4 inches)  
*Shrink-swell potential:* Low (About 1.5 LEP)  
*Flooding hazard:* None  
*Depth to seasonal water saturation:* More than 6 feet  
*Runoff class:* Medium  
*Ecological site:* Limy Upland (pe20-26)  
*Land capability (nonirrigated):* 6e

*Typical Profile:*

H1—0 to 8 inches; gravelly loam  
 H2—8 to 32 inches; very channery loam  
 R—32 to 32 inches; weathered bedrock

**ROO—Roxbury silt loam, occasionally flooded**

**Map Unit Composition**

Roxbury: 100 percent

**Component Descriptions**

**Roxbury**

*MLRA:* 73 - Rolling Plains and Breaks

*Landform:* Flood plain on river valley  
*Parent material:* Calcareous fine-silty alluvium  
*Slope:* 0 to 2 percent  
*Drainage class:* Well drained  
*Slowest permeability:* Moderate (About 0.60 in/hr)  
*Available water capacity:* Very high (About 12.3 inches)  
*Shrink-swell potential:* Moderate (About 4.5 LEP)  
*Flooding hazard:* Occasional  
*Depth to seasonal water saturation:* More than 6 feet  
*Runoff class:* Low  
*Ecological site:* Loamy Lowland (pe20-26)  
*Land capability (irrigated):* 2w  
*Land capability (nonirrigated):* 2w

*Typical Profile:*

H1—0 to 16 inches; silt loam  
 H2—16 to 44 inches; silt loam  
 H3—44 to 60 inches; silt loam

**Minor Components**

**Unnamed Hydric Soils**

**Unnamed Hydric Soils**

**UCC—Uly silt loam, 3 to 6 percent slopes**

**Map Unit Composition**

Uly: 100 percent

**Component Descriptions**

**Uly**

*MLRA:* 73 - Rolling Plains and Breaks  
*Landform:* Hillslope on upland  
*Parent material:* Loess  
*Slope:* 3 to 6 percent  
*Drainage class:* Well drained  
*Slowest permeability:* Moderate (About 0.60 in/hr)  
*Available water capacity:* High (About 11.9 inches)  
*Shrink-swell potential:* Low (About 1.5 LEP)  
*Flooding hazard:* None  
*Depth to seasonal water saturation:* More than 6 feet  
*Runoff class:* Medium

*Ecological site:* Loamy Upland (pe20-26)  
*Land capability (irrigated):* 3e  
*Land capability (nonirrigated):* 3e

*Typical Profile:*

H1—0 to 6 inches; silt loam  
 H2—6 to 28 inches; silt loam  
 H3—28 to 60 inches; silt loam

*Flooding hazard:* None

*Depth to seasonal water saturation:* More than 6 feet

*Runoff class:* Low

*Ecological site:* Limy Upland (pe20-26)

*Land capability (nonirrigated):* 3e

*Typical Profile:*

H1—0 to 10 inches; silt loam  
 H2—10 to 31 inches; silty clay loam  
 Cr—31 to 31 inches; unweathered bedrock

## W—Water

### Map Unit Composition

Water: 100 percent

### Component Descriptions

**Water**

*MLRA:* 73 - Rolling Plains and Breaks

*Depth to seasonal water saturation:* More than 6 feet

*Typical Profile:*

## Wa—Wakeen silt loam, 1 to 3 percent slopes

### Map Unit Composition

Wakeen: 100 percent

### Component Descriptions

**Wakeen**

*MLRA:* 73 - Rolling Plains and Breaks

*Landform:* Hillslope on upland

*Parent material:* Calcareous fine-silty residuum weathered from limestone

*Slope:* 1 to 3 percent

*Depth to restrictive feature:* 20 to 40 inches to bedrock (paralithic)

*Drainage class:* Well drained

*Slowest permeability:* Moderate (About 0.60 in/hr)

*Available water capacity:* Moderate (About 6.5 inches)

*Shrink-swell potential:* Moderate (About 4.5 LEP)

## We—Wakeen silt loam, 1 to 3 percent slopes, eroded

### Map Unit Composition

Wakeen: 100 percent

### Component Descriptions

**Wakeen**

*MLRA:* 73 - Rolling Plains and Breaks

*Landform:* Hillslope on upland

*Parent material:* Calcareous fine-silty residuum weathered from chalk

*Slope:* 1 to 3 percent

*Depth to restrictive feature:* 20 to 40 inches to bedrock (paralithic)

*Drainage class:* Well drained

*Slowest permeability:* Moderate (About 0.60 in/hr)

*Available water capacity:* Moderate (About 6.3 inches)

*Shrink-swell potential:* Moderate (About 4.5 LEP)

*Flooding hazard:* None

*Depth to seasonal water saturation:* More than 6 feet

*Runoff class:* Low

*Ecological site:* Limy Upland (pe20-26)

*Land capability (nonirrigated):* 4e

*Typical Profile:*

H1—0 to 11 inches; silt loam  
 H2—11 to 30 inches; silty clay loam  
 Cr—30 to 30 inches; unweathered bedrock



## **Wh—Wakeen silt loam, 3 to 7 percent slopes**

### **Map Unit Composition**

Wakeen: 100 percent

### **Component Descriptions**

#### **Wakeen**

*MLRA:* 73 - Rolling Plains and Breaks

*Landform:* Hillslope on upland

*Parent material:* Calcareous fine-silty residuum weathered from chalk

*Slope:* 3 to 7 percent

*Depth to restrictive feature:* 20 to 40 inches to bedrock (paralithic)

*Drainage class:* Well drained

*Slowest permeability:* Moderate (About 0.60 in/hr)

*Available water capacity:* Moderate (About 6.3 inches)

*Shrink-swell potential:* Moderate (About 4.5 LEP)

*Flooding hazard:* None

*Depth to seasonal water saturation:* More than 6 feet

*Runoff class:* Medium

*Ecological site:* Limy Upland (pe20-26)

*Land capability (nonirrigated):* 4e

#### *Typical Profile:*

H1—0 to 11 inches; silt loam

H2—11 to 30 inches; silty clay loam

Cr—30 to 30 inches; unweathered bedrock

*Parent material:* Calcareous fine-silty residuum weathered from chalk

*Slope:* 5 to 15 percent

*Depth to restrictive feature:* 20 to 40 inches to bedrock (paralithic)

*Drainage class:* Well drained

*Slowest permeability:* Moderate (About 0.60 in/hr)

*Available water capacity:* Low (About 4.6 inches)

*Shrink-swell potential:* Moderate (About 4.5 LEP)

*Flooding hazard:* None

*Depth to seasonal water saturation:* More than 6 feet

*Runoff class:* Medium

*Ecological site:* Limy Upland (pe20-26)

*Land capability (nonirrigated):* 6e

#### *Typical Profile:*

H1—0 to 8 inches; silt loam

H2—8 to 22 inches; silty clay loam

Cr—22 to 22 inches; unweathered bedrock

### **Minor Components**

#### **Unnamed Hydric Soils**

## **Wn—Wann loam, occasionally flooded**

### **Map Unit Composition**

Wann: 100 percent

### **Component Descriptions**

#### **Wann**

*MLRA:* 73 - Rolling Plains and Breaks

*Landform:* Flood plain on river valley

*Parent material:* Calcareous coarse-loamy alluvium

*Slope:* 0 to 2 percent

*Drainage class:* Somewhat poorly drained

*Slowest permeability:* Moderate (About 0.60 in/hr)

*Available water capacity:* Moderate (About 8.7 inches)

*Shrink-swell potential:* Low (About 1.5 LEP)

*Flooding hazard:* Occasional

*Depth to seasonal water saturation:* About 18 to 42 inches

*Runoff class:* Low

*Ecological site:* Subirrigated (pe20-26)

## **Wk—Wakeen silt loam, 5 to 15 percent slopes, eroded**

### **Map Unit Composition**

Wakeen: 100 percent

### **Component Descriptions**

#### **Wakeen**

*MLRA:* 73 - Rolling Plains and Breaks

*Landform:* Hillslope on upland

*Land capability (irrigated): 2w*

*Land capability (nonirrigated): 2w*

*Typical Profile:*

H1—0 to 13 inches; loam

H2—13 to 44 inches; fine sandy loam

H3—44 to 64 inches; stratified fine sand to  
sandy clay loam

Prime farmland is one of several kinds of important farmland defined by the U.S. Department of Agriculture. It 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 qualities, 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. It 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 parts of the survey area 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.

The map units in the survey area that are considered prime farmland are listed in the following table. This list does not constitute a recommendation for a particular land use. On some soils included in the list, 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. The extent of each listed map unit is shown in the "Acres and Proportionate Extent of Soils" table. The location is shown on the detailed soil maps. The soil qualities that affect use and management are described in other tables in this document."

Map symbol	Mapunit name	Farmland Classification
165UB	Uly silt loam, 1 to 3 percent slopes	All areas are prime farmland
167CR	Crete silt loam, 0 to 1 percent slopes	All areas are prime farmland
195CF	Carlson silt loam, 1 to 3 percent slopes	All areas are prime farmland
Ae	Anselmo fine sandy loam, 2 to 6 percent slopes	All areas are prime farmland
Am	Armo loam, 1 to 3 percent slopes	All areas are prime farmland
An	Armo loam, 3 to 7 percent slopes	All areas are prime farmland
Cc	Campus-carlson complex, 3 to 7 percent slopes	All areas are prime farmland
Cr	Crete silty clay loam, 0 to 1 percent slopes	All areas are prime farmland
De	Detroit silt loam, rarely flooded	All areas are prime farmland
Ee	Eltree silt loam, 0 to 1 percent slopes	All areas are prime farmland
Ef	Eltree silt loam, 1 to 3 percent slopes	All areas are prime farmland
Eg	Eltree silt loam, 3 to 7 percent slopes	All areas are prime farmland
Ha	Harney silt loam, 0 to 1 percent slopes	All areas are prime farmland
Hb	Harney silt loam, 1 to 3 percent slopes	All areas are prime farmland
Hc	Harney silt loam, 3 to 7 percent slopes	All areas are prime farmland
Hf	Harney-carlson silt loams, 0 to 1 percent slopes	All areas are prime farmland
Hg	Harney-carlson silt loams, 1 to 3 percent slopes	All areas are prime farmland
HGG	Harney-mento silt loams, 1 to 3 percent slopes	All areas are prime farmland
Ho	Holdrege silt loam, 0 to 1 percent slopes	All areas are prime farmland
Hp	Holdrege silt loam, 1 to 3 percent slopes	All areas are prime farmland
Hr	Hord silt loam, rarely flooded	All areas are prime farmland
Mc	Mccook fine sandy loam, rarely flooded	All areas are prime farmland
Md	Mccook silt loam, rarely flooded	All areas are prime farmland
Mu	Munjor sandy loam, frequently flooded	All areas are prime farmland
Nc	New cambria silty clay, rarely flooded	All areas are prime farmland
Rb	Roxbury silt loam, rarely flooded	All areas are prime farmland
ROO	Roxbury silt loam, occasionally flooded	All areas are prime farmland
UCC	Uly silt loam, 3 to 6 percent slopes	All areas are prime farmland
Wn	Wann loam, occasionally flooded	All areas are prime farmland

The "Soil Rating for Plant Growth, modified 1998" (SRPG) is a relative rating of the capacity of a soil to produce a specific plant under a defined management system. The index is determined from yield data on a few benchmark soils and is used to calculate yields, the net returns from crops, land assessment values, and taxes and to perform risk analysis when land management decisions are made. Specific information on plants and yields can be obtained from the local office of the Natural Resources Conservation Service or the Cooperative Extension Service.

Map symbol	Soil name	Crop Index
141HM	Harney-Mento Complex, 3 To 7 Percent Slopes-----	62
163AU	Armo-Bogue Complex, 7 To 15 Percent Slopes-----	37
163HE	Harney-Mento Silt Loams, 3 To 7 Percent Slopes-----	61
163IC	Inavale Fine Sand, Channeled, Occasionally Flooded-----	28
163WX	Wakeen Silt Loam, 7 To 20 Percent Slopes-----	11
163WY	Wakeen-Harney Silt Loams, 1 To 3 Percent Slopes-----	43
165BO	Bogue Clay, 3 To 15 Percent Slopes-----	23
165NW	Nibson-Wakeen Silt Loams, 3 To 20 Percent Slopes-----	12
165PE	Penden Clay Loam, 3 To 6 Percent Slopes-----	30
165UB	Uly Silt Loam, 1 To 3 Percent Slopes-----	68
165UR	Uly-Roxbury Silt Loams, 0 To 15 Percent Slopes-----	60
167CR	Crete Silt Loam, 0 To 1 Percent Slopes-----	70
167DR	Dorrance Gravelly Sandy Loam, 4 To 15 Percent Slopes-----	19
167RC	Roxbury Silt Loam, Channeled-----	47
195BD	Badland-Manvel Complex, 3 To 20 Percent Slopes-----	31
195CC	Campus-Canlon Loams, 6 To 30 Percent Slopes-----	16
195CF	Carlson Silt Loam, 1 To 3 Percent Slopes-----	62
195HU	Humbarger Loam, Channeled-----	41
195IF	Inavale Loamy Sand, Channeled-----	22
195PF	Penden Clay Loam, 3 To 7 Percent Slopes-----	31
195PO	Penden Loam, 7 To 15 Percent Slopes-----	29
Ab	Fluvents, Frequently Flooded-----	0
Ac	New Cambria Silty Clay, Frequently Flooded-----	34
Ad	Fluvaquents, Occasionally Flooded-----	53
Ae	Anselmo Fine Sandy Loam, 2 To 6 Percent Slopes-----	49
Am	Armo Loam, 1 To 3 Percent Slopes-----	57
An	Armo Loam, 3 To 7 Percent Slopes-----	53
Ao	Armo Loam, 3 To 7 Percent Slopes, Eroded-----	54
Ar	Armo Loam, 7 To 15 Percent Slopes-----	49
BOP	Borrow Pits-----	0
Bf	Boel Fine Sandy Loam, Occasionally Flooded-----	26
Bg	Bogue Clay, 3 To 8 Percent Slopes-----	16
Bo	Bogue-Armo Complex, 5 To 25 Percent Slopes-----	30
Br	Brownell Gravelly Loam, 2 To 10 Percent Slopes-----	6
Cc	Campus-Carlson Complex, 3 To 7 Percent Slopes-----	34
Cd	Campus-Penden Complex, 5 To 15 Percent Slopes-----	23
Ce	Canlon Complex, 5 To 25 Percent Slopes-----	10
Cm	Corinth Silty Clay Loam, 1 To 3 Percent Slopes-----	31
Cn	Corinth Silty Clay Loam, 3 To 7 Percent Slopes-----	29
Co	Corinth Silty Clay Loam, 7 To 15 Percent Slopes-----	26
Cr	Crete Silty Clay Loam, 0 To 1 Percent Slopes-----	64
De	Detroit Silt Loam, Rarely Flooded-----	65
Ee	Eltree Silt Loam, 0 To 1 Percent Slopes-----	57
Ef	Eltree Silt Loam, 1 To 3 Percent Slopes-----	56
Eg	Eltree Silt Loam, 3 To 7 Percent Slopes-----	54
Eh	Eltree Silt Loam, 7 To 15 Percent Slopes-----	48
GRP	Gravel Pits-----	16
HGG	Harney-Mento Silt Loams, 1 To 3 Percent Slopes-----	65
HMM	Heizer-Brownell Gravelly Loams, 5 To 30 Percent Slopes-----	5
Ha	Harney Silt Loam, 0 To 1 Percent Slopes-----	68
Hb	Harney Silt Loam, 1 To 3 Percent Slopes-----	67
Hc	Harney Silt Loam, 3 To 7 Percent Slopes-----	64
Hd	Harney Silty Clay Loam, 2 To 5 Percent Slopes, Eroded-----	64
He	Harney-Armo Complex, 3 To 7 Percent Slopes, Eroded-----	59
Hf	Harney-Carlson Silt Loams, 0 To 1 Percent Slopes-----	64
Hg	Harney-Carlson Silt Loams, 1 To 3 Percent Slopes-----	63
Hh	Harney-Wakeen Silt Loams, 0 To 1 Percent Slopes-----	54
Hk	Harney-Wakeen Silt Loams, 1 To 3 Percent Slopes-----	49
Hl	Heizer-Armo Complex, 8 To 25 Percent Slopes-----	26
Hn	Dorrance Sandy Loam, 5 To 20 Percent Slopes-----	20
Ho	Holdrege Silt Loam, 0 To 1 Percent Slopes-----	67
Hp	Holdrege Silt Loam, 1 To 3 Percent Slopes-----	67
Hr	Hord Silt Loam, Rarely Flooded-----	72
In	Inavale Loamy Sand, Occasionally Flooded-----	29
Mc	Mccook Fine Sandy Loam, Rarely Flooded-----	52
Md	Mccook Silt Loam, Rarely Flooded-----	56
Me	Mento Silt Loam, 0 To 1 Percent Slopes-----	58
Mf	Mento Silt Loam, 1 To 3 Percent Slopes-----	58
Mg	Mento Silty Clay Loam, 1 To 3 Percent Slopes, Eroded-----	56
Mo	Mento Soils, 3 To 7 Percent Slopes, Eroded-----	54
Mu	Munjoy Sandy Loam, Frequently Flooded-----	33
Nc	New Cambria Silty Clay, Rarely Flooded-----	44
Nn	Nibson Silt Loam, 5 To 12 Percent Slopes-----	10
RIV	Rivers-----	0
ROO	Roxbury Silt Loam, Occasionally Flooded-----	58
Rb	Roxbury Silt Loam, Rarely Flooded-----	58
Rf	Roxbury Silt Loam, Frequently Flooded-----	57
Ro	Heizer-Brownell Complex, 7 To 30 Percent Slopes-----	8
UCC	Uly Silt Loam, 3 To 6 Percent Slopes-----	65
W	Water-----	0
Wa	Wakeen Silt Loam, 1 To 3 Percent Slopes-----	21

SOIL RATING FOR PLANT GROWTH, modified 1998  
Ellis County, Kansas

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The "Soil Rating for Plant Growth, modified 1998" (SRPG) is a relative rating of the capacity of a soil to produce a specific plant under a defined management system. The index is determined from yield data on a few benchmark soils and is used to calculate yields, the net returns from crops, land assessment values, and taxes and to perform risk analysis when land management decisions are made. Specific information on plants and yields can be obtained from the local office of the Natural Resources Conservation Service or the Cooperative Extension Service.

Map symbol	Soil name	Crop Index
We	Wakeen Silt Loam, 1 To 3 Percent Slopes, Eroded-----	18
Wh	Wakeen Silt Loam, 3 To 7 Percent Slopes-----	18
Wk	Wakeen Silt Loam, 5 To 15 Percent Slopes, Eroded-----	12
Wn	Wann Loam, Occasionally Flooded-----	48

Ellis County, Kansas: Published  
Field Office Thunderbook: Soils Properties for Conservation Planning

(Entries under "Erosion factors--T" apply to the entire profile. Entries under "K", "Kf", "Wind Erodibility Group" and "Wind Erodibility Index" apply only to the surface layer)

Map symbol and soil name	Percent	Irr Cap Class	Nonirr Cap Class	Prime Farmland	Hydro- logic Group	Range site name	Windbreak suitability group	Erosion factors			Wind erodi- bility group	Wind erodi- bility index
								K	Kf	T		
141HM:HARNEY----	50	N/A	3e	Not prime farmland	B	Loamy Upland (pe20-26)	7	.32	.32	5	6	48
141HM:MENTO-----	50	N/A	4e	Not prime farmland	C	Clay Upland (pe20-26)	7	.37	.37	3	6	48
163AU:ARMO-----	60	N/A	6e	Not prime farmland	B	Limy Upland (pe20-26)	5	.28	.28	5	4L	86
163AU:BOGUE-----	40	N/A	6e	Not prime farmland	D	Blue Shale (pe20-26)	4	.28	.28	3	4	86
163HE:HARNEY----	55	N/A	3e	Not prime farmland	B	Loamy Upland (pe20-26)	7	.32	.32	5	6	48
163HE:MENTO-----	45	N/A	4e	Not prime farmland	C	Clay Upland (pe20-26)	7	.37	.37	3	6	48
163IC:INVALE----	100	4e-	6e	Not prime farmland	A	Sandy Lowland (pe20-26)	1	.15	.15	5	1	250
163WX:WAKEEN----	100	N/A	6e	Not prime farmland	B	Limy Upland (pe20-26)	5	.32	.32	3	4L	86
163WY:WAKEEN----	55	N/A	3e	Not prime farmland	B	Limy Upland (pe20-26)	5	.32	.32	3	4L	86
163WY:HARNEY----	45	2e-	2e	Not prime farmland	B	Loamy Upland (pe20-26)	7	.32	.32	5	6	48
165BO:BOGUE-----	100	N/A	6e	Not prime farmland	D	Blue Shale (pe20-26)	4	.28	.28	3	4	86
165NW:NIBSON----	55	N/A	6e	Not prime farmland	D	Limy Upland (pe20-26)	5	.32	.32	2	4L	86
165NW:WAKEEN----	45	N/A	6e	Not prime farmland	B	Limy Upland (pe20-26)	5	.32	.32	3	4L	86
165PE:PENDEN----	100	N/A	3e	Not prime farmland	B	Limy Upland (pe20-26)	5	.28	.28	5	4L	86
165UB:ULY-----	100	2e-	2e	All areas are prime farmland	B	Loamy Upland (pe20-26)	7	.32	.32	5	6	48
165UR:ULY-----	65	4e-	4e	Not prime farmland	B	Loamy Upland (pe20-26)	7	.32	.32	5	6	48
165UR:ROXBURY---	35	2w-	2w	Not prime farmland	B	Loamy Lowland (pe20-26)	5	.32	.32	5	4L	86
167CR:CRETE-----	100	2s-	2s	All areas are prime farmland	C	Clay Upland (pe20-26)	7	.37	.37	5	6	48
167DR:DORRANCE--	100	6s-	6s	Not prime farmland	A	Gravelly Hills (pe20-26)	9	.20	.32	3	8	0
167RC:ROXBURY---	100	N/A	5w	Not prime farmland	B	Loamy Lowland (pe20-26)	5	.32	.32	5	4L	86

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Field Office Thunderbook: Soils Properties for Conservation Planning--Continued

Map symbol and soil name	Percent	Irr Cap Class	Nonirr Cap Class	Prime Farmland	Hydro- logic Group	Range site name	Windbreak suitability group	Erosion factors			Wind erodi- bility group	Wind erodi- bility index
								K	Kf	T		
195BD:BADLAND---	70	N/A	N/A	Not prime farmland		Unspecified		---	---	-	---	0
195BD:MANVEL----	30	4e-	6	Not prime farmland	B	Chalk Flats (pe20-26)	5	.37	.37	5	4L	86
195CC:CAMPUS----	70	N/A	6e	Not prime farmland	B	Limy Upland (pe20-26)	5	.28	.28	2	4L	86
195CC:CANLON----	30	N/A	7s	Not prime farmland	D	Shallow Limy (pe20-26)	5	.32	.32	1	4L	86
195CF:CARLSON---	100	2e-	2e	All areas are prime farmland	B	Loamy Upland (pe20-26)	7	.32	.32	5	6	48
195HU:HUMBARGER--	100	N/A	5w	Not prime farmland	B	Loamy Lowland (pe20-26)	5	.28	.28	5	4L	86
195IF:INAVALE---	100	N/A	6w	Not prime farmland	A	Sandy Lowland (pe20-26)	2	.17	.17	5	2	134
195PF:PENDEN----	100	N/A	3e	Not prime farmland	B	Limy Upland (pe20-26)	5	.28	.28	5	4L	86
195PO:PENDEN----	100	N/A	6e	Not prime farmland	B	Limy Upland (pe20-26)	5	.28	.28	5	4L	86
Ab:Fluvents-----	100	N/A	6w	Not prime farmland	B	Unspecified	5	.37	.37	5	4L	86
Ac:New Cambria--	100	N/A	5w	Not prime farmland	C	Clay Lowland (pe20-26)	4	.28	.28	5	4	86
Ad:Fluvaquents--	100	2w-	2w	Not prime farmland	C	Subirrigated (pe20-26)	5	.28	.28	5	4L	86
Ae:ANSELMO-----	100	3e-	3e	All areas are prime farmland	B	Sandy (pe20-26)	3	.20	.20	4	3	86
Am:ARMO-----	100	N/A	2e	All areas are prime farmland	B	Limy Upland (pe20-26)	5	.28	.28	5	4L	86
An:ARMO-----	100	N/A	3e	All areas are prime farmland	B	Limy Upland (pe20-26)	5	.28	.28	5	4L	86
Ao:ARMO-----	100	N/A	4e	Not prime farmland	B	Limy Upland (pe20-26)	5	.28	.28	5	4L	86
Ar:ARMO-----	100	N/A	6e	Not prime farmland	B	Limy Upland (pe20-26)	5	.28	.28	5	4L	86
BOP:BORROW PITS-	100	N/A	N/A	Not prime farmland		Unspecified		---	---	-	---	---
Bf:BOEL-----	100	3w-	3w	Not prime farmland	A	Subirrigated (pe20-26)	3	.20	.20	3	3	86
Bg:BOGUE-----	100	N/A	6e	Not prime farmland	D	Blue Shale (pe20-26)	4	.28	.28	3	4	86



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Map symbol and soil name	Percent	Irr Cap Class	Nonirr Cap Class	Prime Farmland	Hydro- logic Group	Range site name	Windbreak suitability group	Erosion factors			Wind erodi- bility group	Wind erodi- bility index
								K	Kf	T		
Bo:BOGUE-----	60	N/A	6e	Not prime farmland	D	Blue Shale (pe20-26)	4	.28	.28	3	4	86
Bo:ARMO-----	40	N/A	6e	Not prime farmland	B	Limy Upland (pe20-26)	5	.28	.28	5	4L	86
Br:BROWNELL----	100	N/A	6e	Not prime farmland	B	Limy Upland (pe20-26)	9	.20	.49	2	8	0
Cc:CAMPUS-----	65	N/A	4e	All areas are prime farmland	B	Limy Upland (pe20-26)	5	.28	.28	2	4L	86
Cc:CARLSON-----	35	N/A	3e	All areas are prime farmland	B	Loamy Upland (pe20-26)	7	.32	.32	5	6	48
Cd:CAMPUS-----	55	N/A	6e	Not prime farmland	B	Limy Upland (pe20-26)	5	.28	.28	2	4L	86
Cd:PENDEN-----	45	N/A	6e	Not prime farmland	B	Shallow Limy (pe20-26)	5	.28	.28	5	4L	86
Ce:CANLON-----	60	N/A	7s	Not prime farmland	D	Shallow Limy (pe20-26)	5	.32	.32	1	4L	86
Ce:CAMPUS-----	40	N/A	6e	Not prime farmland	B	Limy Upland (pe20-26)	5	.28	.28	2	4L	86
Cm:CORINTH-----	100	N/A	3e	Not prime farmland	C	Limy Upland (pe20-26)	5	.37	.37	3	4L	86
Cn:CORINTH-----	100	N/A	4e	Not prime farmland	C	Limy Upland (pe20-26)	5	.37	.37	3	4L	86
Co:CORINTH-----	100	N/A	6e	Not prime farmland	C	Limy Upland (pe20-26)	5	.37	.37	3	4L	86
Cr:CRETE-----	100	2s-	2s	All areas are prime farmland	C	Clay Upland (pe20-26)	8	.37	.37	5	7	38
De:DETROIT-----	100	1-	2c	All areas are prime farmland	C	Loamy Terrace (pe20-26)	7	.37	.37	5	6	48
Ee:ELTREE-----	100	1-	2c	All areas are prime farmland	B	Limy Upland (pe20-26)	7	.32	.32	5	6	48
Ef:ELTREE-----	100	2e-	2e	All areas are prime farmland	B	Limy Upland (pe20-26)	7	.32	.32	5	6	48
Eg:ELTREE-----	100	3e-	3e	All areas are prime farmland	B	Limy Upland (pe20-26)	7	.32	.32	5	6	48
Eh:ELTREE-----	100	N/A	6e	Not prime farmland	B	Limy Upland (pe20-26)	7	.32	.32	5	6	48
GRP:PITS-----	100	N/A	8s	Not prime farmland	A	Unspecified	9	.10	.17	2	8	0

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Field Office Thunderbook: Soils Properties for Conservation Planning--Continued

Map symbol and soil name	Percent	Irr Cap Class	Nonirr Cap Class	Prime Farmland	Hydro- logic Group	Range site name	Windbreak suitability group	Erosion factors			Wind erodi- bility group	Wind erodi- bility index
								K	Kf	T		
HGG:HARNEY-----	70	2e-	2e	All areas are prime farmland	B	Loamy Upland (pe20-26)	7	.32	.32	5	6	48
HGG:MENTO-----	30	N/A	3e	All areas are prime farmland	C	Clay Upland (pe20-26)	7	.37	.37	3	6	48
HMM:HEIZER-----	60	N/A	7s	Not prime farmland	D	Shallow Limy (pe20-26)	9	.20	.55	1	8	0
HMM:BROWNELL----	40	N/A	6e	Not prime farmland	B	Limy Upland (pe20-26)	9	.20	.55	2	8	0
Ha:HARNEY-----	100	1-	2c	All areas are prime farmland	B	Loamy Upland (pe20-26)	7	.32	.32	5	6	48
Hb:HARNEY-----	100	2e-	2e	All areas are prime farmland	B	Loamy Upland (pe20-26)	7	.32	.32	5	6	48
Hc:HARNEY-----	100	N/A	3e	All areas are prime farmland	B	Loamy Upland (pe20-26)	7	.32	.32	5	6	48
Hd:HARNEY-----	100	N/A	4e	Not prime farmland	B	Loamy Upland (pe20-26)	8	.32	.32	5	7	38
He:HARNEY-----	50	N/A	4e	Not prime farmland	B	Loamy Upland (pe20-26)	7	.32	.32	5	6	48
He:ARMO-----	50	N/A	4e	Not prime farmland	B	Limy Upland (pe20-26)	5	.28	.28	5	4L	86
Hf:HARNEY-----	50	1-	2c	All areas are prime farmland	B	Loamy Upland (pe20-26)	7	.32	.32	5	6	48
Hf:CARLSON-----	50	1-	2c	All areas are prime farmland	B	Loamy Upland (pe20-26)	7	.32	.32	5	6	48
Hg:HARNEY-----	50	2e-	2e	All areas are prime farmland	B	Loamy Upland (pe20-26)	7	.32	.32	5	6	48
Hg:CARLSON-----	50	2e-	2e	All areas are prime farmland	B	Loamy Upland (pe20-26)	7	.32	.32	5	6	48
Hh:HARNEY-----	70	1-	2c	Not prime farmland	B	Loamy Upland (pe20-26)	7	.32	.32	5	6	48
Hh:WAKEEN-----	30	N/A	3e	Not prime farmland	B	Limy Upland (pe20-26)	5	.32	.32	3	4L	86
Hk:HARNEY-----	60	2e-	2e	Not prime farmland	B	Loamy Upland (pe20-26)	7	.32	.32	5	6	48
Hk:WAKEEN-----	40	N/A	3e	Not prime farmland	B	Limy Upland (pe20-26)	5	.32	.32	3	4L	86
Hl:HEIZER-----	50	N/A	7s	Not prime farmland	D	Shallow Limy (pe20-26)	9	.20	.55	1	8	0

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Field Office Thunderbook: Soils Properties for Conservation Planning--Continued

Map symbol and soil name	Percent	Irr Cap Class	Nonirr Cap Class	Prime Farmland	Hydro- logic Group	Range site name	Windbreak suitability group	Erosion factors			Wind erodi- bility group	Wind erodi- bility index
								K	Kf	T		
H1:ARMO-----	50	N/A	6e	Not prime farmland	B	Limy Upland (pe20-26)	5	.28	.28	5	4L	86
Hn:Dorrance----	100	6s-	6s	Not prime farmland	A	Limy Upland (pe20-26)	3	.20	.20	3	3	86
Ho:HOLDREGE----	100	1-	2c	All areas are prime farmland	B	Loamy Upland (pe20-26)	7	.32	.32	5	6	48
Hp:HOLDREGE----	100	2e-	2e	All areas are prime farmland	B	Loamy Upland (pe20-26)	7	.32	.32	5	6	48
Hr:HORD-----	100	1-	2c	All areas are prime farmland	B	Loamy Terrace (pe20-26)	7	.32	.32	5	6	48
In:INVALE-----	100	4e-	6e	Not prime farmland	A	Sands (pe20-26)	2	.17	.17	5	2	134
Mc:MCCOOK-----	100	2e-	2e	All areas are prime farmland	B	Sandy Terrace (pe20-26)	3	.20	.20	5	3	86
Md:MCCOOK-----	100	1-	2c	All areas are prime farmland	B	Loamy Terrace (pe20-26)	5	.32	.32	5	4L	86
Me:MENTO-----	100	N/A	2s	Not prime farmland	C	Clay Upland (pe20-26)	7	.37	.37	3	6	48
Mf:MENTO-----	100	N/A	3e	Not prime farmland	C	Clay Upland (pe20-26)	7	.37	.37	3	6	48
Mg:MENTO-----	100	N/A	3e	Not prime farmland	C	Clay Upland (pe20-26)	7	.37	.37	3	6	48
Mo:MENTO-----	100	N/A	4e	Not prime farmland	C	Clay Upland (pe20-26)	7	.37	.37	3	6	48
Mu:MUNJOR-----	100	N/A	3w	All areas are prime farmland	B	Sandy Lowland (pe20-26)	3	.24	.24	4	3	86
Nc:NEW CAMBRIA--	100	2s-	2s	All areas are prime farmland	C	Clay Terrace (pe20-26)	4	.28	.28	5	4	86
Nn:NIBSON-----	100	N/A	6e	Not prime farmland	D	Limy Upland (pe20-26)	5	.32	.32	2	4L	86
RIV:RIVERWASH AND SANDBARS---	100	N/A	8w	Not prime farmland		Unspecified	5	.37	.37	5	4L	86
ROO:ROXBURY-----	100	2w-	2w	All areas are prime farmland	B	Loamy Lowland (pe20-26)	5	.32	.32	5	4L	86
Rb:ROXBURY-----	100	1-	2c	All areas are prime farmland	B	Loamy Terrace (pe20-26)	5	.32	.32	5	4L	86
Rf:ROXBURY-----	100	2w-	2w	Not prime farmland	B	Loamy Lowland (pe20-26)	5	.32	.32	5	4L	86

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Field Office Thunderbook: Soils Properties for Conservation Planning--Continued

Map symbol and soil name	Percent	Irr Cap Class	Nonirr Cap Class	Prime Farmland	Hydro- logic Group	Range site name	Windbreak suitability group	Erosion factors			Wind erodi- bility group	Wind erodi- bility index
								K	Kf	T		
Ro:Heizer-----	77	N/A	7s	Not prime farmland	D	Shallow Limy (pe20-26)	9	.20	.55	1	8	0
Ro:BROWNELL-----	23	N/A	6e	Not prime farmland	B	Limy Upland (pe20-26)	9	.20	.55	2	8	0
UCC:ULY-----	100	3e-	3e	All areas are prime farmland	B	Loamy Upland (pe20-26)	7	.32	.32	5	6	48
W:WATER-----	100	N/A	N/A	Not prime farmland		Unspecified		---	---	-	---	0
Wa:WAKEEN-----	100	N/A	3e	Not prime farmland	B	Limy Upland (pe20-26)	5	.32	.32	3	4L	86
We:WAKEEN-----	100	N/A	4e	Not prime farmland	B	Limy Upland (pe20-26)	5	.32	.32	3	4L	86
Wh:WAKEEN-----	100	N/A	4e	Not prime farmland	B	Limy Upland (pe20-26)	5	.32	.32	3	4L	86
Wk:WAKEEN-----	100	N/A	6e	Not prime farmland	B	Limy Upland (pe20-26)	5	.32	.32	3	4L	86
Wn:WANN-----	100	2w-	2w	All areas are prime farmland	B	Subirrigated (pe20-26)	6	.28	.28	5	5	56

RANGELAND PRODUCTIVITY  
Ellis County, Kansas

### Use and Explanation of Rangeland, Grazed Forest Land, Native Pastureland Interpretations

Information in this subsection can be used to plan the use and management of soils for rangeland, grazed forest land, and native pasture. Different kinds of soils vary in their capacity to produce native grasses and other plants suitable for grazing. Information in this subsection provides groupings of similar soils and estimates of potential forage production, which can be used to determine livestock stocking rates.

**Rangeland.** Range is land on which the native vegetation (climax or natural potential plant community) is predominantly grasses, grasslike plants, forbs, and shrubs suitable for grazing and browsing. Range includes natural grasslands, savannas, many wetlands, some deserts, tundra, and certain shrub and forb communities. Rangeland receives no regular or frequent cultural treatment. The composition and production of the plant community are determined by soil, climate, topography, overstory canopy, and grazing management.

**Grazed Forest Land.** Includes land on which the understory includes, as an integral part of the forest plant community, plants that can be grazed without significantly impairing other forest values.

**Native Pasture.** Includes land on which the native vegetation (climax or natural potential plant community) is forest but which is used and managed primarily for production of native plants for forage. Native pasture includes cut-over forest land and forest land cleared and now managed for native or naturalized forage plants.

#### Rangeland

In areas that have similar climate and topography, differences in the kind and amount of vegetation produced on rangeland are closely related to the kind of soil. Effective management based on the relationship between the soils and vegetation and water.

The Rangeland, Grazed Forest land, Native Pastureland Interpretations shows, for each soil that supports rangeland vegetation, the ecological site and the potential annual production of vegetation in favorable, normal, unfavorable years. An explanation of the column headings in this table follows.

An ecological site is the product of all the environmental factors responsible for its development. It has characteristic soils that have developed over time throughout the soil development process; a characteristic hydrology, particularly infiltration and runoff, that has developed over time; and a characteristic plant community (kind and amount of vegetation). The hydrology of a site is influenced by development of the soil and plant community. The vegetation, soils, and hydrology are all interrelated. Each is influenced by the others and influences the development of the others. The plant community on an ecological site is typified by an association of species that differs from that of other ecological sites in the kind and/or proportion of species or in total production. Descriptions of ecological sites are provided in the Field Office Technical Guide, which is available in local offices of the Natural Resources Conservation Service.

Total dry-weight production is the amount of vegetation that can be expected to grow annually on well managed rangeland that is supporting the potential natural plant community. It includes all vegetation, whether or not it is palatable to grazing animals. It includes the current year's growth of leaves, twigs, and fruits of woody plants. It does not include the increase in stem diameter of trees and shrubs. It is expressed in pounds per acre of air-dry vegetation for favorable, average, and unfavorable years. In a favorable year, the amount and distribution of precipitation and the temperatures make growing conditions substantially better than average. In a normal year, growing conditions are about average. In an unfavorable year, growing conditions are well below average, generally because of low available soil moisture. Yields are adjusted to a common percent of air-dry moisture content.

Range management requires a knowledge of the kinds of soil and of the potential natural plant community. It also requires an evaluation of the present range similarity index and rangeland trend. Range similarity index is determined by comparing the present plant community with the potential natural plant community on a particular rangeland ecological site. The more closely the existing community resembles the potential community, the higher the range similarity index. Rangeland trend is defined as the direction of change in an existing plant community relative to the potential natural plant community. Further information about the range similarity index and rangeland trend is available in chapter 4 of the National Range and Pasture Handbook, which is available in local offices of the Natural Resources Conservation Service. The objective in range management is to control grazing so that the plants growing on a site are about the same in kind and amount as the potential natural plant community for that site. Such management generally results in the optimum production of vegetation, control of undesirable brush species, conservation of water, and control of erosion. Sometimes, however, an area with a range similarity index somewhat below the potential meets grazing needs, provides wildlife habitat, and protects soil and water resources.

## RANGELAND PRODUCTIVITY--Continued

Ellis County, Kansas

(Only the soils that support rangeland vegetation suitable for grazing are rated.) Refer to range site description to determine the percentage allowable of grasses, forbs, and shrubs for the range ecological site.

Map symbol and soil name	Ecological site	Total dry-weight production		
		Favorable year	Average year	Unfavorable year
		Lb/acre	Lb/acre	Lb/acre
141HM:				
Harney-----	Loamy Upland (pe20-26)	5,000	3,500	2,000
Mento-----	Clay Upland (pe20-26)	3,500	2,000	1,000
163AU:				
Armo-----	Limy Upland (pe20-26)	4,000	3,000	1,000
Bogue-----	Blue Shale (pe20-26)	3,000	2,000	1,000
163HE:				
Harney-----	Loamy Upland (pe20-26)	5,000	3,500	2,000
Mento-----	Clay Upland (pe20-26)	3,500	2,000	1,000
163IC:				
Inavale-----	Sandy Lowland (pe20-26)	3,500	3,000	2,200
163WX:				
Wakeen-----	Limy Upland (pe20-26)	4,000	2,500	1,000
163WY:				
Wakeen-----	Limy Upland (pe20-26)	4,000	2,500	1,000
Harney-----	Loamy Upland (pe20-26)	5,000	3,500	2,000
165BO:				
Bogue-----	Blue Shale (pe20-26)	3,000	2,000	1,000
165NW:				
Nibson-----	Limy Upland (pe20-26)	4,000	2,500	1,500
Wakeen-----	Limy Upland (pe20-26)	4,000	2,500	1,000
165PE:				
Penden-----	Limy Upland (pe20-26)	4,000	2,500	1,000
165UB:				
Uly-----	Loamy Upland (pe20-26)	3,400	2,800	2,000
165UR:				
Uly-----	Loamy Upland (pe20-26)	3,400	2,800	2,000
Roxbury-----	Loamy Lowland (pe20-26)	6,500	5,000	3,500
167CR:				
Crete-----	Clay Upland (pe20-26)	4,500	4,100	3,700
167DR:				
Dorrance-----	Gravelly Hills (pe20-26)	2,000	1,500	1,000
167RC:				
Roxbury-----	Loamy Lowland (pe20-26)	6,500	5,000	3,500
195BD:				
Badland-----	---	---	---	---
Manvel-----	Chalk Flats (pe20-26)	1,800	1,500	1,000
195CC:				
Campus-----	Limy Upland (pe20-26)	3,000	2,000	1,000
Canlon-----	Shallow Limy (pe20-26)	2,400	1,600	900
195CF:				
Carlson-----	Loamy Upland (pe20-26)	4,000	2,500	1,500
195HU:				
Humbarger-----	Loamy Lowland (pe20-26)	5,000	4,000	2,500
195IF:				
Inavale-----	Sandy Lowland (pe20-26)	3,300	2,800	2,200
195PF:				
Penden-----	Limy Upland (pe20-26)	4,000	2,500	1,000
195PO:				
Penden-----	Limy Upland (pe20-26)	4,000	2,500	1,000
Ab:				
Fluvents-----	---	---	---	---
Ac:				
New Cambria-----	Clay Lowland (pe20-26)	7,000	5,000	3,000
Ad:				
Fluvaquents-----	Subirrigated (pe20-26)	7,500	6,500	5,000
Ae:				
Anselmo-----	Sandy (pe20-26)	3,500	3,300	3,000
Am:				
Armo-----	Limy Upland (pe20-26)	4,000	3,000	1,000
An:				
Armo-----	Limy Upland (pe20-26)	4,000	3,000	1,000
Ac:				
Armo-----	Limy Upland (pe20-26)	4,000	3,000	1,000
Ar:				
Armo-----	Limy Upland (pe20-26)	4,000	3,000	1,000
Bf:				
Boel-----	Subirrigated (pe20-26)	5,200	4,900	4,600
Bg:				
Bogue-----	Blue Shale (pe20-26)	3,000	2,000	1,000
Bo:				
Bogue-----	Blue Shale (pe20-26)	3,000	2,000	1,000
Armo-----	Limy Upland (pe20-26)	4,000	3,000	1,000
BOP:				
Borrow Pits-----	---	---	---	---
Br:				
Brownell-----	Limy Upland (pe20-26)	4,000	3,000	1,000
Cc:				
Campus-----	Limy Upland (pe20-26)	3,000	2,000	1,000
Carlson-----	Loamy Upland (pe20-26)	4,000	2,500	1,500
Cd:				
Campus-----	Limy Upland (pe20-26)	3,000	2,000	1,000
Penden-----	Shallow Limy (pe20-26)	4,000	2,500	1,000
Ce:				
Canlon-----	Shallow Limy (pe20-26)	2,400	1,600	900

## RANGELAND PRODUCTIVITY--Continued

Ellis County, Kansas

(Only the soils that support rangeland vegetation suitable for grazing are rated.) Refer to range site description to determine the percentage allowable of grasses, forbs, and shrubs for the range ecological site.

Map symbol and soil name	Ecological site	Total dry-weight production		
		Favorable year	Average year	Unfavorable year
		Lb/acre	Lb/acre	Lb/acre
Campus-----	Limy Upland (pe20-26)	3,000	2,000	1,000
Cm:				
Corinth-----	Limy Upland (pe20-26)	4,000	2,500	1,000
Cn:				
Corinth-----	Limy Upland (pe20-26)	4,000	2,500	1,000
Co:				
Corinth-----	Limy Upland (pe20-26)	4,000	2,500	1,000
Cr:				
Crete-----	Clay Upland (pe20-26)	4,500	4,100	3,700
De:				
Detroit-----	Loamy Terrace (pe20-26)	6,000	4,500	3,000
Ee:				
Eltree-----	Limy Upland (pe20-26)	4,000	3,000	1,500
Ef:				
Eltree-----	Limy Upland (pe20-26)	4,000	3,000	1,500
Eg:				
Eltree-----	Limy Upland (pe20-26)	4,000	3,000	1,500
Eh:				
Eltree-----	Limy Upland (pe20-26)	4,000	3,000	1,500
GRP:				
Pits-----	---	---	---	---
Ha:				
Harney-----	Loamy Upland (pe20-26)	5,000	3,500	2,000
Hb:				
Harney-----	Loamy Upland (pe20-26)	5,000	3,500	2,000
Hc:				
Harney-----	Loamy Upland (pe20-26)	5,000	3,500	2,000
Hd:				
Harney-----	Loamy Upland (pe20-26)	5,000	3,500	2,000
He:				
Armo-----	Limy Upland (pe20-26)	4,000	3,000	1,000
Harney-----	Loamy Upland (pe20-26)	5,000	3,500	2,000
Hf:				
Carlson-----	Loamy Upland (pe20-26)	4,000	2,500	1,500
Harney-----	Loamy Upland (pe20-26)	5,000	3,500	2,000
Hg:				
Carlson-----	Loamy Upland (pe20-26)	4,000	2,500	1,500
Harney-----	Loamy Upland (pe20-26)	5,000	3,500	2,000
HGG:				
Harney-----	Loamy Upland (pe20-26)	4,000	2,200	1,000
Mento-----	Clay Upland (pe20-26)	3,500	2,000	1,000
Hh:				
Harney-----	Loamy Upland (pe20-26)	5,000	3,500	2,000
Wakeen-----	Limy Upland (pe20-26)	4,000	2,500	1,000
Hk:				
Harney-----	Loamy Upland (pe20-26)	5,000	3,500	2,000
Wakeen-----	Limy Upland (pe20-26)	4,000	2,500	1,000
HI:				
Armo-----	Limy Upland (pe20-26)	4,000	3,000	1,000
Heizer-----	Shallow Limy (pe20-26)	3,000	2,000	900
HMM:				
Heizer-----	Shallow Limy (pe20-26)	3,000	2,000	900
Brownell-----	Limy Upland (pe20-26)	4,000	3,000	1,000
Hn:				
Dorrance-----	Limy Upland (pe20-26)	3,000	2,500	1,500
Ho:				
Holdrege-----	Loamy Upland (pe20-26)	4,000	3,600	3,300
Hp:				
Holdrege-----	Loamy Upland (pe20-26)	3,500	2,500	1,500
Hr:				
Hord-----	Loamy Terrace (pe20-26)	4,000	3,600	3,300
In:				
Inavale-----	Sands (pe20-26)	3,300	2,800	2,200
Mc:				
Mccook-----	Sandy Terrace (pe20-26)	3,800	3,300	2,800
Md:				
Mccook-----	Loamy Terrace (pe20-26)	3,800	3,300	2,800
Me:				
Mento-----	Clay Upland (pe20-26)	3,500	2,000	1,000
Mf:				
Mento-----	Clay Upland (pe20-26)	3,500	2,000	1,000
Mg:				
Mento-----	Clay Upland (pe20-26)	3,500	2,000	1,000
Mo:				
Mento-----	Clay Upland (pe20-26)	3,500	2,000	1,000
Mu:				
Munjor-----	Sandy Lowland (pe20-26)	5,000	4,000	3,000
Nc:				
New Cambria-----	Clay Terrace (pe20-26)	5,000	4,000	2,500
Nn:				
Nibson-----	Limy Upland (pe20-26)	4,000	2,500	1,500
Rb:				
Roxbury-----	Loamy Terrace (pe20-26)	4,000	3,000	2,000
Rf:				
Roxbury-----	Loamy Lowland (pe20-26)	6,500	5,000	3,500

## RANGELAND PRODUCTIVITY--Continued

Ellis County, Kansas

(Only the soils that support rangeland vegetation suitable for grazing are rated.) Refer to range site description to determine the percentage allowable of grasses, forbs, and shrubs for the range ecological site.

Map symbol and soil name	Ecological site	Total dry-weight production		
		Favorable year	Average year	Unfavorable year
		Lb/acre	Lb/acre	Lb/acre
RIV: Riverwash And Sandbars-----	---	---	---	---
Ro: Heizer-----	Shallow Limy (pe20-26)	3,000	2,000	900
Brownell-----	Limy Upland (pe20-26)	4,000	3,000	1,000
ROO: Roxbury-----	Loamy Lowland (pe20-26)	6,500	5,000	3,500
UCC: Uly-----	Loamy Upland (pe20-26)	3,400	2,800	2,000
W: Water-----	---	---	---	---
Wa: Wakeen-----	Limy Upland (pe20-26)	4,000	2,500	1,000
We: Wakeen-----	Limy Upland (pe20-26)	4,000	2,500	1,000
Wh: Wakeen-----	Limy Upland (pe20-26)	4,000	2,500	1,000
Wk: Wakeen-----	Limy Upland (pe20-26)	4,000	2,500	1,000
Wn: Wann-----	Subirrigated (pe20-26)	5,500	5,300	5,000



BUILDING SITE DEVELOPMENT  
Ellis County, Kansas

### Building Site Development

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 following tables 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. Slightly limited indicates that the soil has features that are favorable for the specified use. The limitations are minor and can be easily overcome. Good performance and 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 0.00 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.

BUILDING SITE DEVELOPMENT--Continued  
Ellis County, Kansas

(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 potential limitation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Pct of map unit	Dwellings without basements		Dwellings with basements		Small commercial buildings	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
141HM: Harney-----	50	Somewhat limited Shrink-swell	0.50	Not limited		Somewhat limited Shrink-swell	0.50
Mento-----	50	Somewhat limited Shrink-swell	0.50	Somewhat limited Depth to hard bedrock Shrink-swell	0.61 0.50	Somewhat limited Shrink-swell Slope	0.12 0.50
163AU: Armo-----	60	Somewhat limited Slope	0.37	Somewhat limited Slope	0.37	Very limited Slope	1.00
Bogue-----	40	Very limited Shrink-swell Slope	1.00 0.63	Very limited Shrink-swell Slope Depth to soft bedrock	1.00 0.63 0.06	Very limited Shrink-swell Slope	1.00 1.00
163HE: Harney-----	55	Somewhat limited Shrink-swell	0.50	Not limited		Somewhat limited Shrink-swell Slope	0.50 0.12
Mento-----	45	Somewhat limited Shrink-swell	0.50	Somewhat limited Shrink-swell	0.50	Somewhat limited Shrink-swell Slope	0.50 0.12
163IC: Inavale-----	100	Very limited Flooding	1.00	Very limited Flooding	1.00	Very limited Flooding	1.00
163WX: Wakeen-----	100	Somewhat limited Slope Shrink-swell	0.96 0.50	Somewhat limited Depth to soft bedrock Slope Shrink-swell	0.97 0.96 0.50	Very limited Slope Shrink-swell	1.00 0.50
163WY: Wakeen-----	55	Somewhat limited Shrink-swell	0.50	Somewhat limited Shrink-swell Depth to soft bedrock	0.50 0.03	Somewhat limited Shrink-swell	0.50
Harney-----	45	Somewhat limited Shrink-swell	0.50	Somewhat limited Shrink-swell	0.50	Somewhat limited Shrink-swell	0.50
165BO: Bogue-----	100	Somewhat limited Slope	0.04	Somewhat limited Slope Depth to soft bedrock	0.04 0.01	Very limited Slope	1.00
165NW: Nibson-----	55	Somewhat limited Depth to soft bedrock Slope Shrink-swell	1.00 0.84 0.50	Very limited Depth to soft bedrock Slope Shrink-swell	1.00 0.84 0.50	Very limited Depth to soft bedrock Slope Shrink-swell	1.00 1.00 0.50
Wakeen-----	45	Somewhat limited Slope Shrink-swell	0.63 0.50	Somewhat limited Slope Shrink-swell Depth to soft bedrock	0.63 0.50 0.29	Very limited Slope Shrink-swell	1.00 0.50
165PE: Penden-----	100	Somewhat limited Shrink-swell	0.50	Somewhat limited Shrink-swell	0.50	Somewhat limited Shrink-swell Slope	0.50 0.12
165UB: Uly-----	100	Not limited		Not limited		Not limited	
165UR: Uly-----	65	Somewhat limited Slope	0.04	Somewhat limited Slope	0.04	Very limited Slope	1.00
Roxbury-----	35	Very limited Flooding Shrink-swell	1.00 0.50	Very limited Flooding Shrink-swell	1.00 0.50	Very limited Flooding Shrink-swell	1.00 0.50
167CR: Crete-----	100	Very limited Shrink-swell	1.00	Very limited Shrink-swell	1.00	Very limited Shrink-swell	1.00
167DR: Dorrance-----	100	Somewhat limited Slope	0.16	Somewhat limited Slope	0.16	Very limited Slope	1.00
167RC: Roxbury-----	100	Very limited Flooding	1.00	Very limited Flooding Shrink-swell	1.00 0.50	Very limited Flooding	1.00

BUILDING SITE DEVELOPMENT--Continued  
Ellis County, Kansas

(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 potential limitation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Pct of map unit	Dwellings without basements		Dwellings with basements		Small commercial buildings	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
195BD: Badland-----	70	Not rated		Not rated		Not rated	
Manvel-----	30	Somewhat limited Shrink-swell	0.50	Somewhat limited Shrink-swell	0.50	Somewhat limited Slope Shrink-swell	0.86 0.50
195CC: Campus-----	70	Somewhat limited Slope	0.37	Very limited Depth to hard bedrock Slope	1.00	Very limited Slope	1.00
		Depth to hard bedrock	0.06		0.37	Depth to hard bedrock	0.06
Canlon-----	30	Very limited Depth to hard bedrock Slope	1.00	Very limited Depth to hard bedrock Slope	1.00	Very limited Depth to hard bedrock Slope	1.00
195CF: Carlson-----	100	Not limited		Not limited		Not limited	
195HU: Humbarger-----	100	Very limited Flooding	1.00	Very limited Flooding	1.00	Very limited Flooding	1.00
195IF: Inavale-----	100	Very limited Flooding	1.00	Very limited Flooding	1.00	Very limited Flooding	1.00
195PF: Penden-----	100	Somewhat limited Shrink-swell	0.50	Somewhat limited Shrink-swell	0.50	Somewhat limited Shrink-swell Slope	0.50 0.12
195PO: Penden-----	100	Somewhat limited Shrink-swell Slope	0.50 0.37	Somewhat limited Shrink-swell Slope	0.50 0.37	Very limited Slope Shrink-swell	1.00 0.50
Ab: Fluvents-----	100	Very limited Flooding Shrink-swell	1.00 0.50	Very limited Flooding Shrink-swell	1.00 0.50	Very limited Flooding Shrink-swell Slope	1.00 0.50 0.12
Ac: New Cambria-----	100	Very limited Flooding Shrink-swell	1.00 1.00	Very limited Flooding Shrink-swell	1.00 1.00	Very limited Flooding Shrink-swell	1.00 1.00
Ad: Fluvaquents-----	100	Very limited Flooding	1.00	Very limited Flooding Depth to saturated zone	1.00 1.00	Very limited Flooding	1.00
Ae: Anselmo-----	100	Not limited		Not limited		Somewhat limited Slope	0.00
Am: Armo-----	100	Not limited		Not limited		Not limited	
An: Armo-----	100	Not limited		Not limited		Somewhat limited Slope	0.12
Ao: Armo-----	100	Not limited		Not limited		Somewhat limited Slope	0.12
Ar: Armo-----	100	Somewhat limited Slope	0.37	Somewhat limited Slope	0.37	Very limited Slope	1.00
Bf: Boel-----	100	Very limited Flooding	1.00	Very limited Flooding Depth to saturated zone	1.00 1.00	Very limited Flooding	1.00
Bg: Bogue-----	100	Very limited Shrink-swell	1.00	Very limited Shrink-swell Depth to soft bedrock	1.00 0.29	Very limited Shrink-swell Slope	1.00 0.48
Bo: Bogue-----	60	Very limited Slope	1.00	Very limited Slope Depth to soft bedrock	1.00 0.29	Very limited Slope	1.00
Armo-----	40	Somewhat limited Slope	0.16	Somewhat limited Slope	0.16	Very limited Slope	1.00

BUILDING SITE DEVELOPMENT--Continued  
Ellis County, Kansas

(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 potential limitation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Pct of map unit	Dwellings without basements		Dwellings with basements		Small commercial buildings	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
BOP: Borrow Pits-----	100	Not rated		Not rated		Not rated	
Br: Brownell-----	100	Somewhat limited Depth to hard bedrock	0.46	Very limited Depth to hard bedrock	1.00	Somewhat limited Slope  Depth to hard bedrock	0.48  0.46
Cc: Campus-----	65	Somewhat limited Depth to hard bedrock	0.20	Very limited Depth to hard bedrock	1.00	Somewhat limited Depth to hard bedrock	0.20
Carlson-----	35	Not limited		Not limited		Slope Somewhat limited Slope	0.12 0.12
Cd: Campus-----	55	Somewhat limited Depth to hard bedrock Slope	0.20 0.16	Very limited Depth to hard bedrock Slope	1.00 0.16	Very limited Slope  Depth to hard bedrock	1.00  0.20
Penden-----	45	Somewhat limited Shrink-swell Slope	0.50 0.16	Somewhat limited Shrink-swell Slope	0.50 0.16	Very limited Slope Shrink-swell	1.00 0.50
Ce: Canlon-----	60	Very limited Depth to hard bedrock Slope	1.00 1.00	Very limited Depth to hard bedrock Slope	1.00 1.00	Very limited Depth to hard bedrock Slope	1.00 1.00
Campus-----	40	Somewhat limited Depth to hard bedrock Slope	0.20 0.16	Very limited Depth to hard bedrock Slope	1.00 0.16	Very limited Slope  Depth to hard bedrock	1.00  0.20
Cm: Corinth-----	100	Very limited Shrink-swell	1.00	Very limited Shrink-swell Depth to soft bedrock	1.00 0.46	Very limited Shrink-swell	1.00
Cn: Corinth-----	100	Very limited Shrink-swell	1.00	Very limited Shrink-swell Depth to soft bedrock	1.00 0.46	Very limited Shrink-swell Slope	1.00 0.12
Co: Corinth-----	100	Very limited Shrink-swell Slope	1.00 0.37	Very limited Shrink-swell Depth to soft bedrock Slope	1.00 0.46 0.37	Very limited Shrink-swell Slope	1.00 1.00
Cr: Crete-----	100	Very limited Shrink-swell	1.00	Very limited Shrink-swell	1.00	Very limited Shrink-swell	1.00
De: Detroit-----	100	Very limited Flooding Shrink-swell	1.00 1.00	Very limited Flooding Shrink-swell	1.00 0.50	Very limited Flooding Shrink-swell	1.00 1.00
Ee: Eltree-----	100	Not limited		Not limited		Not limited	
Ef: Eltree-----	100	Not limited		Not limited		Not limited	
Eg: Eltree-----	100	Not limited		Not limited		Somewhat limited Slope	0.12
Eh: Eltree-----	100	Somewhat limited Slope	0.37	Somewhat limited Slope	0.37	Very limited Slope	1.00
GRP: Pits-----	100	Not rated		Not rated		Not rated	
Ha: Harney-----	100	Somewhat limited Shrink-swell	0.50	Not limited		Somewhat limited Shrink-swell	0.50
Hb: Harney-----	100	Somewhat limited Shrink-swell	0.50	Somewhat limited Shrink-swell	0.50	Somewhat limited Shrink-swell	0.50

BUILDING SITE DEVELOPMENT--Continued  
Ellis County, Kansas

(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 potential limitation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Pct of map unit	Dwellings without basements		Dwellings with basements		Small commercial buildings	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
Hc: Harney-----	100	Somewhat limited Shrink-swell	0.50	Not limited		Somewhat limited Shrink-swell Slope	0.50 0.12
Hd: Harney-----	100	Somewhat limited Shrink-swell	0.50	Not limited		Somewhat limited Shrink-swell Slope	0.50 0.00
He: Armo-----	50	Not limited		Not limited		Somewhat limited Slope	0.12
Harney-----	50	Somewhat limited Shrink-swell	0.50	Not limited		Somewhat limited Shrink-swell Slope	0.50 0.12
Hf: Carlson-----	50	Not limited		Not limited		Not limited	
Harney-----	50	Somewhat limited Shrink-swell	0.50	Not limited		Somewhat limited Shrink-swell	0.50
Hg: Carlson-----	50	Not limited		Not limited		Not limited	
Harney-----	50	Somewhat limited Shrink-swell	0.50	Not limited		Somewhat limited Shrink-swell	0.50
HGG: Harney-----	70	Somewhat limited Shrink-swell	0.50	Not limited		Somewhat limited Shrink-swell	0.50
Mento-----	30	Somewhat limited Shrink-swell	0.50	Somewhat limited Shrink-swell	0.50	Somewhat limited Shrink-swell	0.50
Hh: Harney-----	70	Somewhat limited Shrink-swell	0.50	Not limited		Somewhat limited Shrink-swell	0.50
Wakeen-----	30	Somewhat limited Shrink-swell	0.50	Somewhat limited Shrink-swell Depth to soft bedrock	0.50 0.06	Somewhat limited Shrink-swell	0.50
Hk: Harney-----	60	Somewhat limited Shrink-swell	0.50	Not limited		Somewhat limited Shrink-swell	0.50
Wakeen-----	40	Somewhat limited Shrink-swell	0.50	Somewhat limited Shrink-swell Depth to soft bedrock	0.50 0.06	Somewhat limited Shrink-swell	0.50
Hl: Armo-----	50	Somewhat limited Slope	0.63	Somewhat limited Slope	0.63	Very limited Slope	1.00
Heizer-----	50	Very limited Depth to hard bedrock Slope	1.00 1.00	Very limited Depth to hard bedrock Slope	1.00 1.00	Very limited Depth to hard bedrock Slope	1.00 1.00
HMM: Heizer-----	60	Very limited Depth to hard bedrock Slope	1.00 1.00	Very limited Depth to hard bedrock Slope	1.00 1.00	Very limited Depth to hard bedrock Slope	1.00 1.00
Brownell-----	40	Somewhat limited Depth to hard bedrock Slope	0.90 0.16	Very limited Depth to hard bedrock Slope	1.00 0.16	Very limited Slope Depth to hard bedrock	1.00 0.90
Hn: Dorrance-----	100	Somewhat limited Slope	0.16	Somewhat limited Slope	0.16	Very limited Slope	1.00
Ho: Holdrege-----	100	Somewhat limited Shrink-swell	0.50	Somewhat limited Shrink-swell	0.50	Somewhat limited Shrink-swell	0.50
Hp: Holdrege-----	100	Somewhat limited Shrink-swell	0.50	Somewhat limited Shrink-swell	0.50	Somewhat limited Shrink-swell	0.50
Hr: Hord-----	100	Very limited Flooding	1.00	Very limited Flooding	1.00	Very limited Flooding	1.00
In: Inavale-----	100	Very limited Flooding	1.00	Very limited Flooding	1.00	Very limited Flooding Slope	1.00 0.12
Mc: Mccook-----	100	Very limited Flooding	1.00	Very limited Flooding	1.00	Very limited Flooding	1.00

BUILDING SITE DEVELOPMENT--Continued  
Ellis County, Kansas

(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 potential limitation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Pct of map unit	Dwellings without basements		Dwellings with basements		Small commercial buildings	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
Md: Mccook-----	100	Very limited Flooding	1.00	Very limited Flooding	1.00	Very limited Flooding	1.00
Me: Mento-----	100	Somewhat limited Shrink-swell	0.50	Somewhat limited Shrink-swell	0.50	Somewhat limited Shrink-swell	0.50
Mf: Mento-----	100	Somewhat limited Shrink-swell	0.50	Somewhat limited Shrink-swell	0.50	Somewhat limited Shrink-swell	0.50
Mg: Mento-----	100	Somewhat limited Shrink-swell	0.50	Somewhat limited Shrink-swell	0.50	Somewhat limited Shrink-swell	0.50
Mo: Mento-----	100	Somewhat limited Shrink-swell	0.50	Somewhat limited Shrink-swell	0.50	Somewhat limited Shrink-swell Slope	0.50 0.12
Mu: Munjoy-----	100	Very limited Flooding	1.00	Very limited Flooding	1.00	Very limited Flooding	1.00
Nc: New Cambria-----	100	Very limited Flooding Shrink-swell	1.00 1.00	Very limited Flooding Shrink-swell	1.00 1.00	Very limited Flooding Shrink-swell	1.00 1.00
Nn: Nibson-----	100	Somewhat limited Depth to soft bedrock Shrink-swell Slope	1.00 0.50 0.04	Very limited Depth to soft bedrock Shrink-swell Slope	1.00 0.50 0.04	Very limited Depth to soft bedrock Slope Shrink-swell	1.00 1.00 0.50
Rb: Roxbury-----	100	Very limited Flooding	1.00	Very limited Flooding Shrink-swell	1.00 0.50	Very limited Flooding	1.00
Rf: Roxbury-----	100	Very limited Flooding Shrink-swell	1.00 0.50	Very limited Flooding Shrink-swell	1.00 0.50	Very limited Flooding Shrink-swell	1.00 0.50
RIV: Riverwash And Sandbars-----	100	Not rated		Not rated		Not rated	
Ro: Heizer-----	77	Very limited Depth to hard bedrock Slope	1.00 1.00	Very limited Depth to hard bedrock Slope	1.00 1.00	Very limited Depth to hard bedrock Slope	1.00 1.00
Brownell-----	23	Somewhat limited Depth to hard bedrock Slope	0.29 0.00	Very limited Depth to hard bedrock Slope	1.00 0.00	Very limited Slope Depth to hard bedrock	1.00 0.29
ROO: Roxbury-----	100	Very limited Flooding Shrink-swell	1.00 0.50	Very limited Flooding Shrink-swell	1.00 0.50	Very limited Flooding Shrink-swell	1.00 0.50
UCC: Uly-----	100	Not limited		Not limited		Somewhat limited Slope	0.12
W: Water-----	100	Very limited Slope	1.00	Very limited Slope	1.00	Very limited Slope	1.00
Wa: Wakeen-----	100	Somewhat limited Shrink-swell	0.50	Somewhat limited Shrink-swell Depth to soft bedrock	0.50 0.35	Somewhat limited Shrink-swell	0.50
We: Wakeen-----	100	Somewhat limited Shrink-swell	0.50	Somewhat limited Shrink-swell Depth to soft bedrock	0.50 0.46	Somewhat limited Shrink-swell	0.50
Wh: Wakeen-----	100	Somewhat limited Shrink-swell	0.50	Somewhat limited Shrink-swell Depth to soft bedrock	0.50 0.46	Somewhat limited Shrink-swell Slope	0.50 0.12

BUILDING SITE DEVELOPMENT--Continued  
Ellis County, Kansas

(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 potential limitation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Pct of map unit	Dwellings without basements		Dwellings with basements		Small commercial buildings	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
Wk: Wakeen-----	100	Somewhat limited Shrink-swell	0.50	Somewhat limited Depth to soft bedrock	0.97	Very limited Slope	1.00
		Slope	0.16	Shrink-swell Slope	0.50 0.16	Shrink-swell	0.50
Wn: Wann-----	100	Very limited Flooding	1.00	Very limited Flooding Depth to saturated zone	1.00 1.00	Very limited Flooding	1.00

BUILDING SITE DEVELOPMENT--Continued  
Ellis County, Kansas

(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 potential limitation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Pct of map unit	Local roads and streets		Shallow excavations		Lawns and landscaping	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
141HM: Harney-----	50	Very limited Low strength Shrink-swell	1.00 0.50	Somewhat limited Cutbanks cave	0.10	Not limited	
Mento-----	50	Very limited Low strength Shrink-swell	1.00 0.50	Somewhat limited Depth to hard bedrock Cutbanks cave	0.61 0.10	Not limited	
163AU: Armo-----	60	Somewhat limited Slope	0.37	Somewhat limited Slope Cutbanks cave	0.37 0.10	Somewhat limited Slope	0.37
Bogue-----	40	Very limited Shrink-swell Slope	1.00 0.63	Very limited Too clayey Cutbanks cave Slope Depth to soft bedrock	1.00 1.00 0.63 0.06	Very limited Too clayey Slope Depth to bedrock Droughty	1.00 0.63 0.06 0.02
163HE: Harney-----	55	Somewhat limited Shrink-swell	0.50	Somewhat limited Cutbanks cave	0.10	Not limited	
Mento-----	45	Somewhat limited Shrink-swell	0.50	Somewhat limited Cutbanks cave	0.10	Not limited	
163IC: Inavale-----	100	Very limited Flooding	1.00	Very limited Cutbanks cave Flooding	1.00 0.60	Somewhat limited Flooding Droughty	0.60 0.13
163WX: Wakeen-----	100	Very limited Low strength Slope Shrink-swell	1.00 0.96 0.50	Somewhat limited Depth to soft bedrock Slope Cutbanks cave	0.97 0.96 0.10	Somewhat limited Depth to bedrock Slope	0.97 0.96
163WY: Wakeen-----	55	Somewhat limited Shrink-swell	0.50	Somewhat limited Cutbanks cave Depth to soft bedrock	0.10 0.03	Somewhat limited Depth to bedrock	0.03
Harney-----	45	Somewhat limited Shrink-swell	0.50	Somewhat limited Cutbanks cave	0.10	Not limited	
165BO: Bogue-----	100	Somewhat limited Slope	0.04	Very limited Too clayey Cutbanks cave Slope Depth to soft bedrock	1.00 1.00 0.04 0.01	Very limited Too clayey Droughty Slope Depth to bedrock	1.00 0.92 0.04 0.01
165NW: Nibson-----	55	Somewhat limited Depth to soft bedrock Slope Shrink-swell	1.00 0.84 0.50	Very limited Depth to soft bedrock Slope Cutbanks cave	1.00 0.84 0.10	Very limited Depth to bedrock Slope Content of large stones Droughty	1.00 0.84 0.08 0.02
Wakeen-----	45	Somewhat limited Slope Shrink-swell	0.63 0.50	Somewhat limited Slope Depth to soft bedrock Cutbanks cave	0.63 0.29 0.10	Somewhat limited Slope Depth to bedrock	0.63 0.29
165PE: Penden-----	100	Very limited Low strength Shrink-swell Frost action	1.00 0.50 0.50	Somewhat limited Cutbanks cave	0.10	Not limited	
165UB: Uly-----	100	Not limited		Somewhat limited Cutbanks cave	0.10	Not limited	
165UR: Uly-----	65	Somewhat limited Slope	0.04	Somewhat limited Cutbanks cave Slope	0.10 0.04	Somewhat limited Slope	0.04
Roxbury-----	35	Very limited Flooding Shrink-swell	1.00 0.50	Somewhat limited Flooding Cutbanks cave	0.60 0.10	Somewhat limited Flooding	0.60



BUILDING SITE DEVELOPMENT--Continued  
Ellis County, Kansas

(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 potential limitation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Pct of map unit	Local roads and streets		Shallow excavations		Lawns and landscaping	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
167CR: Crete-----	100	Very limited Shrink-swell Frost action	1.00 0.50	Somewhat limited Too clayey Cutbanks cave	0.12 0.10	Not limited	
167DR: Dorrance-----	100	Somewhat limited Slope	0.16	Very limited Cutbanks cave Slope	1.00 0.16	Somewhat limited Droughty Slope Gravel content	0.56 0.16 0.14
167RC: Roxbury-----	100	Very limited Flooding Frost action	1.00 0.50	Somewhat limited Flooding Cutbanks cave	0.80 0.10	Very limited Flooding	1.00
195BD: Badland-----	70	Not rated		Not rated		Not rated	
Manvel-----	30	Somewhat limited Shrink-swell	0.50	Somewhat limited Cutbanks cave	0.10	Not limited	
195CC: Campus-----	70	Somewhat limited Slope  Depth to hard bedrock	0.37  0.06	Very limited Depth to hard bedrock Slope  Cutbanks cave	1.00  0.37  0.10	Somewhat limited Slope  Depth to bedrock	0.37  0.06
Canlon-----	30	Very limited Depth to hard bedrock Slope	1.00 1.00	Very limited Depth to hard bedrock Slope Cutbanks cave	1.00 1.00 1.00 0.10	Very limited Depth to bedrock  Slope Droughty	1.00  1.00 0.10
195CF: Carlson-----	100	Not limited		Somewhat limited Cutbanks cave	0.10	Not limited	
195HU: Humbarger-----	100	Very limited Flooding Frost action	1.00 0.50	Somewhat limited Flooding Cutbanks cave	0.80 0.10	Very limited Flooding	1.00
195IF: Inavale-----	100	Very limited Flooding	1.00	Very limited Cutbanks cave Flooding	1.00 0.80	Very limited Flooding Droughty	1.00 0.21
195PF: Penden-----	100	Somewhat limited Shrink-swell	0.50	Somewhat limited Cutbanks cave	0.10	Not limited	
195PO: Penden-----	100	Somewhat limited Shrink-swell Frost action Slope	0.50 0.50 0.37	Somewhat limited Slope Cutbanks cave	0.37 0.10	Somewhat limited Slope	0.37
Ab: Fluvents-----	100	Very limited Flooding Shrink-swell	1.00 0.50	Somewhat limited Flooding Cutbanks cave	0.80 0.10	Very limited Flooding	1.00
Ac: New Cambria-----	100	Very limited Flooding Shrink-swell	1.00 1.00	Somewhat limited Flooding Too clayey Cutbanks cave	0.80 0.50 0.10	Very limited Flooding Too clayey	1.00 1.00
Ad: Fluvaquents-----	100	Very limited Flooding  Frost action	1.00  0.50	Very limited Depth to saturated zone Flooding Cutbanks cave	1.00  0.60 0.10	Somewhat limited Flooding	0.60
Ae: Anselmo-----	100	Somewhat limited Frost action	0.50	Very limited Cutbanks cave	1.00	Not limited	
Am: Armo-----	100	Not limited		Very limited Cutbanks cave	1.00	Not limited	
An: Armo-----	100	Not limited		Somewhat limited Cutbanks cave	0.10	Not limited	
Ao: Armo-----	100	Not limited		Very limited Cutbanks cave	1.00	Not limited	

BUILDING SITE DEVELOPMENT--Continued  
Ellis County, Kansas

(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 potential limitation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Pct of map unit	Local roads and streets		Shallow excavations		Lawns and landscaping	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
Ar: Armo-----	100	Somewhat limited Slope	0.37	Very limited Cutbanks cave Slope	1.00 0.37	Somewhat limited Slope	0.37
Bf: Boel-----	100	Very limited Flooding Frost action	1.00 0.50	Very limited Cutbanks cave Depth to saturated zone Flooding	1.00 1.00 0.60	Somewhat limited Flooding	0.60
Bg: Bogue-----	100	Very limited Shrink-swell	1.00	Very limited Too clayey Cutbanks cave Depth to soft bedrock	1.00 1.00 0.29	Very limited Too clayey Depth to bedrock Droughty	1.00 0.29 0.18
Bo: Bogue-----	60	Very limited Slope	1.00	Very limited Too clayey Cutbanks cave Slope Depth to soft bedrock	1.00 1.00 1.00 0.29	Very limited Too clayey Slope Droughty Depth to bedrock	1.00 1.00 0.88 0.29
Armo-----	40	Somewhat limited Slope	0.16	Very limited Cutbanks cave Slope	1.00 0.16	Somewhat limited Slope	0.16
BOP: Borrow Pits-----	100	Not rated		Not rated		Not rated	
Br: Brownell-----	100	Somewhat limited Depth to hard bedrock	0.46	Very limited Depth to hard bedrock Cutbanks cave	1.00 0.10	Very limited Carbonate content Gravel content Depth to bedrock Droughty Content of large stones	1.00 0.71 0.46 0.29 0.08
Cc: Campus-----	65	Somewhat limited Depth to hard bedrock	0.20	Very limited Depth to hard bedrock Cutbanks cave	1.00 0.10	Somewhat limited Depth to bedrock	0.20
Carlson-----	35	Not limited		Somewhat limited Cutbanks cave	0.10	Not limited	
Cd: Campus-----	55	Somewhat limited Depth to hard bedrock Slope	0.20 0.16	Very limited Depth to hard bedrock Slope Cutbanks cave	1.00 0.16 0.10	Somewhat limited Depth to bedrock Slope	0.20 0.16
Penden-----	45	Somewhat limited Shrink-swell Slope	0.50 0.16	Somewhat limited Slope Cutbanks cave	0.16 0.10	Somewhat limited Slope	0.16
Ce: Canlon-----	60	Very limited Depth to hard bedrock Slope	1.00 1.00	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 0.85
Campus-----	40	Somewhat limited Depth to hard bedrock Slope	0.20 0.16	Very limited Depth to hard bedrock Slope Cutbanks cave	1.00 0.16 0.10	Somewhat limited Depth to bedrock Slope	0.20 0.16
Cm: Corinth-----	100	Very limited Shrink-swell	1.00	Somewhat limited Depth to soft bedrock Cutbanks cave Too clayey	0.46 0.10 0.03	Somewhat limited Depth to bedrock	0.46
Cn: Corinth-----	100	Very limited Shrink-swell	1.00	Somewhat limited Depth to soft bedrock Cutbanks cave Too clayey	0.46 0.10 0.03	Somewhat limited Depth to bedrock	0.46

BUILDING SITE DEVELOPMENT--Continued  
Ellis County, Kansas

(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 potential limitation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Pct of map unit	Local roads and streets		Shallow excavations		Lawns and landscaping	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
Co: Corinth-----	100	Very limited Shrink-swell	1.00	Somewhat limited Depth to soft bedrock	0.46	Somewhat limited Depth to bedrock	0.46
		Slope	0.37	Slope	0.37	Slope	0.37
Cr: Crete-----	100	Very limited Shrink-swell Frost action	1.00 0.50	Somewhat limited Too clayey Cutbanks cave	0.12 0.10	Not limited	
De: Detroit-----	100	Very limited Shrink-swell Flooding	1.00 0.40	Somewhat limited Cutbanks cave	0.10	Not limited	
Ee: Eltree-----	100	Somewhat limited Frost action	0.50	Somewhat limited Cutbanks cave	0.10	Not limited	
Ef: Eltree-----	100	Somewhat limited Frost action	0.50	Somewhat limited Cutbanks cave	0.10	Not limited	
Eg: Eltree-----	100	Somewhat limited Frost action	0.50	Somewhat limited Cutbanks cave	0.10	Not limited	
Eh: Eltree-----	100	Somewhat limited Frost action Slope	0.50 0.37	Somewhat limited Slope Cutbanks cave	0.37 0.10	Somewhat limited Slope	0.37
GRP: Pits-----	100	Not rated		Not rated		Not rated	
Ha: Harney-----	100	Somewhat limited Shrink-swell	0.50	Somewhat limited Cutbanks cave	0.10	Not limited	
Hb: Harney-----	100	Somewhat limited Shrink-swell	0.50	Somewhat limited Cutbanks cave	0.10	Not limited	
Hc: Harney-----	100	Somewhat limited Shrink-swell	0.50	Somewhat limited Cutbanks cave	0.10	Not limited	
Hd: Harney-----	100	Somewhat limited Shrink-swell	0.50	Somewhat limited Cutbanks cave	0.10	Not limited	
He: Armo-----	50	Not limited		Very limited Cutbanks cave	1.00	Not limited	
	50	Somewhat limited Shrink-swell	0.50	Somewhat limited Cutbanks cave	0.10	Not limited	
Hf: Carlson-----	50	Not limited		Somewhat limited Cutbanks cave	0.10	Not limited	
	50	Somewhat limited Shrink-swell	0.50	Somewhat limited Cutbanks cave	0.10	Not limited	
Hg: Carlson-----	50	Not limited		Somewhat limited Cutbanks cave	0.10	Not limited	
	50	Somewhat limited Shrink-swell	0.50	Somewhat limited Cutbanks cave	0.10	Not limited	
HGG: Harney-----	70	Somewhat limited Shrink-swell	0.50	Somewhat limited Cutbanks cave	0.10	Not limited	
Mento-----	30	Somewhat limited Shrink-swell	0.50	Somewhat limited Cutbanks cave	0.10	Not limited	
Hh: Harney-----	70	Somewhat limited Shrink-swell	0.50	Somewhat limited Cutbanks cave	0.10	Not limited	
Wakeen-----	30	Somewhat limited Shrink-swell	0.50	Somewhat limited Cutbanks cave Depth to soft bedrock	0.10 0.06	Somewhat limited Depth to bedrock	0.06

BUILDING SITE DEVELOPMENT--Continued  
Ellis County, Kansas

(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 potential limitation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Pct of map unit	Local roads and streets		Shallow excavations		Lawns and landscaping	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
Hk: Harney-----	60	Somewhat limited Shrink-swell	0.50	Somewhat limited Cutbanks cave	0.10	Not limited	
Wakeen-----	40	Somewhat limited Shrink-swell	0.50	Somewhat limited Cutbanks cave Depth to soft bedrock	0.10 0.06	Somewhat limited Depth to bedrock	0.06
Hl: Armo-----	50	Somewhat limited Slope	0.63	Very limited Cutbanks cave Slope	1.00 0.63	Somewhat limited Slope	0.63
Heizer-----	50	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 1.00 0.10	Very limited Depth to bedrock  Droughty Slope Carbonate content Gravel content	1.00 1.00 1.00 0.71
HMM: Heizer-----	60	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  Droughty Slope Carbonate content Gravel content	1.00 1.00 1.00 0.71
Brownell-----	40	Somewhat limited Depth to hard bedrock Slope	0.90 0.16	Very limited Depth to hard bedrock Slope Cutbanks cave	1.00 0.16 0.10	Very limited Carbonate content  Depth to bedrock Droughty Gravel content Slope	1.00 0.90 0.75 0.71 0.16
Hn: Dorrance-----	100	Somewhat limited Slope	0.16	Very limited Cutbanks cave Slope	1.00 0.16	Somewhat limited Droughty Slope	0.35 0.16
Ho: Holdrege-----	100	Somewhat limited Shrink-swell Frost action	0.50 0.50	Somewhat limited Cutbanks cave	0.10	Not limited	
Hp: Holdrege-----	100	Somewhat limited Shrink-swell	0.50	Somewhat limited Cutbanks cave	0.10	Not limited	
Hr: Hord-----	100	Somewhat limited Frost action Flooding	0.50 0.40	Somewhat limited Cutbanks cave	0.10	Not limited	
In: Inavale-----	100	Very limited Flooding	1.00	Very limited Cutbanks cave Flooding	1.00 0.60	Somewhat limited Flooding Droughty	0.60 0.08
Mc: Mccook-----	100	Somewhat limited Frost action Flooding	0.50 0.40	Somewhat limited Cutbanks cave	0.10	Not limited	
Md: Mccook-----	100	Somewhat limited Frost action Flooding	0.50 0.40	Somewhat limited Cutbanks cave	0.10	Not limited	
Me: Mento-----	100	Somewhat limited Shrink-swell	0.50	Somewhat limited Cutbanks cave	0.10	Not limited	
Mf: Mento-----	100	Somewhat limited Shrink-swell	0.50	Somewhat limited Cutbanks cave	0.10	Not limited	
Mg: Mento-----	100	Somewhat limited Shrink-swell	0.50	Somewhat limited Cutbanks cave	0.10	Not limited	
Mo: Mento-----	100	Somewhat limited Shrink-swell	0.50	Somewhat limited Cutbanks cave	0.10	Not limited	
Mu: Munjor-----	100	Very limited Flooding	1.00	Very limited Cutbanks cave Flooding	1.00 0.80	Very limited Flooding	1.00

BUILDING SITE DEVELOPMENT--Continued  
Ellis County, Kansas

(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 potential limitation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Pct of map unit	Local roads and streets		Shallow excavations		Lawns and landscaping	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
Nc: New Cambria-----	100	Very limited Shrink-swell Flooding	1.00 0.40	Somewhat limited Too clayey Cutbanks cave	0.50 0.10	Very limited Too clayey	1.00
Nn: Nibson-----	100	Somewhat limited Depth to soft bedrock Shrink-swell Slope	1.00 0.50 0.04	Very limited Depth to soft bedrock Cutbanks cave Slope	1.00 0.10 0.04	Very limited Depth to bedrock Content of large stones Slope Droughty	1.00 0.08 0.04 0.00
Rb: Roxbury-----	100	Somewhat limited Frost action Flooding	0.50 0.40	Somewhat limited Cutbanks cave	0.10	Not limited	
Rf: Roxbury-----	100	Very limited Flooding Shrink-swell Frost action	1.00 0.50 0.50	Somewhat limited Flooding Cutbanks cave	0.60 0.10	Somewhat limited Flooding	0.60
RIV: Riverwash And Sandbars-----	100	Not rated		Not rated		Not rated	
Ro: Heizer-----	77	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 Droughty Slope Gravel content Content of large stones	1.00 1.00 0.71 0.08
Brownell-----	23	Somewhat limited Depth to hard bedrock Slope	0.29 0.00	Very limited Depth to hard bedrock Cutbanks cave Slope	1.00 0.10 0.00	Somewhat limited Gravel content Depth to bedrock Droughty Content of large stones Slope	0.71 0.29 0.15 0.08 0.00
ROO: Roxbury-----	100	Very limited Flooding Shrink-swell	1.00 0.50	Somewhat limited Flooding Cutbanks cave	0.60 0.10	Somewhat limited Flooding	0.60
UCC: Uly-----	100	Not limited		Somewhat limited Cutbanks cave	0.10	Not limited	
W: Water-----	100	Very limited Slope Low strength	1.00 1.00	Very limited Slope Cutbanks cave	1.00 0.10	Very limited Slope	1.00
Wa: Wakeen-----	100	Somewhat limited Shrink-swell	0.50	Somewhat limited Depth to soft bedrock Cutbanks cave	0.35 0.10	Somewhat limited Depth to bedrock	0.35
We: Wakeen-----	100	Somewhat limited Shrink-swell	0.50	Somewhat limited Depth to soft bedrock Cutbanks cave	0.46 0.10	Somewhat limited Depth to bedrock	0.46
Wh: Wakeen-----	100	Somewhat limited Shrink-swell	0.50	Somewhat limited Depth to soft bedrock Cutbanks cave	0.46 0.10	Somewhat limited Depth to bedrock	0.46
Wk: Wakeen-----	100	Somewhat limited Shrink-swell Slope	0.50 0.16	Somewhat limited Depth to soft bedrock Slope Cutbanks cave	0.97 0.16 0.10	Somewhat limited Depth to bedrock Slope	0.97 0.16

BUILDING SITE DEVELOPMENT--Continued  
Ellis County, Kansas

(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 potential limitation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Pct of map unit	Local roads and streets		Shallow excavations		Lawns and landscaping	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
Wn: Wann-----	100	Very limited Frost action Flooding	1.00 1.00	Very limited Cutbanks cave Depth to saturated zone Flooding	1.00 1.00 0.60	Somewhat limited Flooding	0.60

CONSTRUCTION MATERIALS  
Ellis County, Kansas

Construction Materials

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

The soils are rated good, fair, or poor as potential sources of topsoil, reclamation material, and roadfill. 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 topsoil, reclamation material, or roadfill. The lower the number, the greater the limitation.

The soils are rated as a probable or improbable source of sand and gravel. A rating of probable means that the source material is likely to be in or below the soil. The numerical ratings in these columns indicate the degree of probability. The number 0.00 indicates that the soil is an improbable source. A number between 0.00 and 1.00 indicates the degree to which the soil is a probable source of sand or gravel.

Sand and gravel are natural aggregates suitable for commercial use with a minimum of processing. They are used in many kinds of construction. Specifications for each use vary widely. In these tables, only the probability 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 lowest layer of the soil contains sand or gravel, the soil is rated as a probable source regardless of thickness. The assumption is that the sand or gravel layer below the depth of observation exceeds the minimum thickness.

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.

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).

CONSTRUCTION MATERIALS--Continued  
Ellis County, Kansas

(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.)

Map symbol and soil name	Pct. of map unit	Potential source of gravel		Potential source of sand	
		Rating class	Value	Rating class	Value
141HM: Harney-----	50	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
Mento-----	50	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
163AU: Armo-----	60	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
Bogue-----	40	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
163HE: Harney-----	55	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
Mento-----	45	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
163IC: Inavale-----	100	Poor Bottom layer Thickest layer	0.00 0.00	Fair Thickest layer Bottom layer	0.65 0.96
163WX: Wakeen-----	100	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
163WY: Wakeen-----	55	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
Harney-----	45	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
165BO: Bogue-----	100	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
165NW: Nibson-----	55	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
Wakeen-----	45	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
165PE: Penden-----	100	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
165UB: Uly-----	100	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
165UR: Uly-----	65	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
Roxbury-----	35	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00



CONSTRUCTION MATERIALS--Continued  
Ellis County, Kansas

(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.)

Map symbol and soil name	Pct. of map unit	Potential source of gravel		Potential source of sand	
		Rating class	Value	Rating class	Value
167CR: Crete-----	100	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
167DR: Dorrance-----	100	Poor Bottom layer Thickest layer	0.00 0.00	Good Thickest layer Bottom layer	0.09 0.99
167RC: Roxbury-----	100	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
195BD: Badland-----	70	Not rated		Not rated	
Manvel-----	30	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
195CC: Campus-----	70	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
Canlon-----	30	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
195CF: Carlson-----	100	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
195HU: Humbarger-----	100	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
195IF: Inavale-----	100	Poor Bottom layer Thickest layer	0.00 0.00	Fair Thickest layer Bottom layer	0.49 0.96
195PF: Penden-----	100	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
195PO: Penden-----	100	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
Ab: Fluvents-----	100	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
Ac: New Cambria-----	100	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
Ad: Fluvaquents-----	100	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
Ae: Anselmo-----	100	Poor Bottom layer Thickest layer	0.00 0.00	Fair Thickest layer Bottom layer	0.09 0.57

CONSTRUCTION MATERIALS--Continued  
Ellis County, Kansas

(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.)

Map symbol and soil name	Pct. of map unit	Potential source of gravel		Potential source of sand	
		Rating class	Value	Rating class	Value
Am: Armo-----	100	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
An: Armo-----	100	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
Ao: Armo-----	100	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
Ar: Armo-----	100	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
Bf: Boel-----	100	Poor Bottom layer Thickest layer	0.00 0.00	Fair Thickest layer Bottom layer	0.09 0.23
Bg: Bogue-----	100	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
Bo: Bogue-----	60	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
Armo-----	40	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
BOP: Borrow Pits-----	100	Not rated		Not rated	
Br: Brownell-----	100	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
Cc: Campus-----	65	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
Carlson-----	35	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
Cd: Campus-----	55	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
Penden-----	45	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
Ce: Canlon-----	60	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
Campus-----	40	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
Cm: Corinth-----	100	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00

CONSTRUCTION MATERIALS--Continued  
Ellis County, Kansas

(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.)

Map symbol and soil name	Pct. of map unit	Potential source of gravel		Potential source of sand	
		Rating class	Value	Rating class	Value
Cn: Corinth-----	100	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
Co: Corinth-----	100	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
Cr: Crete-----	100	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
De: Detroit-----	100	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
Ee: Eltree-----	100	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
Ef: Eltree-----	100	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
Eg: Eltree-----	100	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
Eh: Eltree-----	100	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
GRP: Pits-----	100	Not rated		Not rated	
Ha: Harney-----	100	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
Hb: Harney-----	100	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
Hc: Harney-----	100	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
Hd: Harney-----	100	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
He: Armo-----	50	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
Harney-----	50	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
Hf: Carlson-----	50	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00

CONSTRUCTION MATERIALS--Continued  
Ellis County, Kansas

(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.)

Map symbol and soil name	Pct. of map unit	Potential source of gravel		Potential source of sand	
		Rating class	Value	Rating class	Value
Harney-----	50	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
Hg: Carlson-----	50	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
Harney-----	50	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
HGG: Harney-----	70	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
Mento-----	30	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
Hh: Harney-----	70	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
Wakeen-----	30	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
Hk: Harney-----	60	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
Wakeen-----	40	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
Hl: Armo-----	50	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
Heizer-----	50	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
HMM: Heizer-----	60	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
Brownell-----	40	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
Hn: Dorrance-----	100	Poor Bottom layer Thickest layer	0.00 0.00	Fair Thickest layer Bottom layer	0.09 0.22
Ho: Holdrege-----	100	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
Hp: Holdrege-----	100	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
Hr: Hord-----	100	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00

CONSTRUCTION MATERIALS--Continued  
Ellis County, Kansas

(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.)

Map symbol and soil name	Pct. of map unit	Potential source of gravel		Potential source of sand	
		Rating class	Value	Rating class	Value
In: Inavale-----	100	Poor Bottom layer Thickest layer	0.00 0.00	Fair Bottom layer Thickest layer	0.45 0.61
Mc: Mccook-----	100	Poor Bottom layer Thickest layer	0.00 0.00	Fair Bottom layer Thickest layer	0.00 0.09
Md: Mccook-----	100	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
Me: Mento-----	100	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
Mf: Mento-----	100	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
Mg: Mento-----	100	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
Mo: Mento-----	100	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
Mu: Munjoy-----	100	Poor Bottom layer Thickest layer	0.00 0.00	Fair Thickest layer Bottom layer	0.07 0.25
Nc: New Cambria-----	100	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
Nn: Nibson-----	100	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
Rb: Roxbury-----	100	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
Rf: Roxbury-----	100	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
RIV: Riverwash And Sandbars-----	100	Not rated		Not rated	
Ro: Heizer-----	77	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
Brownell-----	23	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
ROO: Roxbury-----	100	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00

CONSTRUCTION MATERIALS--Continued  
Ellis County, Kansas

(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.)

Map symbol and soil name	Pct. of map unit	Potential source of gravel		Potential source of sand	
		Rating class	Value	Rating class	Value
UCC: Uly-----	100	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
W: Water-----	100	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
Wa: Wakeen-----	100	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
We: Wakeen-----	100	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
Wh: Wakeen-----	100	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
Wk: Wakeen-----	100	Poor Bottom layer Thickest layer	0.00 0.00	Poor Bottom layer Thickest layer	0.00 0.00
Wn: Wann-----	100	Poor Bottom layer Thickest layer	0.00 0.00	Fair Thickest layer Bottom layer	0.07 0.10

CONSTRUCTION MATERIALS--Continued  
Ellis County, Kansas

(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 source of reclamation material		Potential source of roadfill		Potential source of topsoil	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
141HM: Harney-----	50	Poor Low content of organic matter Too clayey Water erosion	0.00 0.05 0.90	Poor Low strength	0.00	Fair Too Clayey	0.02
Mento-----	50	Poor Low content of organic matter No water erosion limitation	0.00 0.99	Poor Low strength Depth to bedrock Shrink-swell	0.00 0.39 0.70	Good	
163AU: Armo-----	60	Poor Low content of organic matter	0.00	Good		Fair Slope	0.63
Bogue-----	40	Poor Too clayey Low content of organic matter Droughty Too acid Depth to bedrock	0.00 0.00 0.16 0.54 0.93	Poor Depth to bedrock Shrink-swell	0.00 0.12	Poor Too Clayey Slope Depth to bedrock Too acid	0.00 0.37 0.93 0.98
163HE: Harney-----	55	Poor Low content of organic matter Too clayey Water erosion	0.00 0.05 0.90	Good		Fair Too Clayey	0.02
Mento-----	45	Poor Low content of organic matter Too clayey No water erosion limitation	0.00 0.00 0.99	Fair Shrink-swell	0.84	Poor Too Clayey	0.00
163IC: Inavale-----	100	Poor Too sandy Wind erosion Low content of organic matter Droughty	0.00 0.00 0.50 0.86	Good		Poor Too sandy	0.00
163WX: Wakeen-----	100	Fair Depth to bedrock Carbonate content Droughty Low content of organic matter Water erosion	0.03 0.16 0.64 0.88 0.90	Poor Depth to bedrock Low strength Shrink-swell	0.00 0.00 0.87	Fair Depth to bedrock Slope Carbonate content	0.03 0.04 0.16
163WY: Wakeen-----	55	Fair Carbonate content Low content of organic matter Water erosion Depth to bedrock	0.16 0.88 0.90 0.97	Poor Depth to bedrock Shrink-swell	0.00 0.91	Fair Carbonate content Depth to bedrock	0.16 0.97
Harney-----	45	Poor Low content of organic matter Too clayey Water erosion	0.00 0.05 0.90	Fair Shrink-swell	0.99	Fair Too Clayey	0.02
165BO: Bogue-----	100	Poor Droughty Low content of organic matter Depth to bedrock	0.00 0.00 0.99	Poor Depth to bedrock Shrink-swell	0.00 0.99	Fair Slope Depth to bedrock	0.96 0.99

CONSTRUCTION MATERIALS--Continued  
Ellis County, Kansas

(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 source of reclamation material		Potential source of roadfill		Potential source of topsoil	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
165NW: Nibson-----	55	Poor Depth to bedrock 0.00 Droughty 0.15 Carbonate content 0.16 Low content of organic matter 0.88 Water erosion 0.90		Poor Depth to bedrock 0.00 Shrink-swell 0.87		Poor Depth to bedrock 0.00 Carbonate content 0.16 Slope 0.16 Rock fragments 0.88	
Wakeen-----	45	Fair Carbonate content 0.16 Depth to bedrock 0.71 Low content of organic matter 0.88 Water erosion 0.90		Poor Depth to bedrock 0.00 Shrink-swell 0.87		Fair Carbonate content 0.16 Slope 0.37 Depth to bedrock 0.71	
165PE: Penden-----	100	Fair Low content of organic matter 0.18 Carbonate content 0.80		Poor Low strength 0.00 Shrink-swell 0.87		Fair Carbonate content 0.80	
165UB: Uly-----	100	Poor Low content of organic matter 0.00 Water erosion 0.90		Good		Good	
165UR: Uly-----	65	Fair Low content of organic matter 0.18 Water erosion 0.90		Good		Fair Slope 0.96	
Roxbury-----	35	Fair Water erosion 0.90		Fair Shrink-swell 0.93		Good	
167CR: Crete-----	100	Poor Low content of organic matter 0.00 Too clayey 0.00 Too acid 0.84 No water erosion limitation 0.99		Fair Shrink-swell 0.12		Poor Too Clayey 0.00	
167DR: Dorrance-----	100	Poor Too sandy 0.00 Low content of organic matter 0.00 Droughty 0.14		Good		Poor Too sandy 0.00 Rock fragments 0.03 Slope 0.84 Hard to reclaim 0.98	
167RC: Roxbury-----	100	Fair Low content of organic matter 0.50 Water erosion 0.90		Fair Shrink-swell 0.98		Good	
195BD: Badland-----	70	Not rated		Not rated		Not rated	
Manvel-----	30	Fair Low content of organic matter 0.50 Water erosion 0.90		Fair Shrink-swell 0.87		Good	
195CC: Campus-----	70	Poor Low content of organic matter 0.00 Carbonate content 0.32 Depth to bedrock 0.93		Poor Depth to bedrock 0.00		Fair Carbonate content 0.32 Slope 0.63 Rock fragments 0.88 Depth to bedrock 0.93	



CONSTRUCTION MATERIALS--Continued  
Ellis County, Kansas

(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 source of reclamation material		Potential source of roadfill		Potential source of topsoil	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
Canlon-----	30	Poor Low content of organic matter Depth to bedrock Droughty Carbonate content	0.00 0.00 0.07 0.97	Poor Depth to bedrock Slope	0.00 0.82	Poor Depth to bedrock Slope Rock fragments Carbonate content	0.00 0.00 0.28 0.97
195CF: Carlson-----	100	Poor Low content of organic matter Too clayey Water erosion	0.00 0.00 0.90	Good		Poor Too Clayey	0.00
195HU: Humbarger-----	100	Good		Good		Good	
195IF: Inavale-----	100	Poor Too sandy Wind erosion Low content of organic matter Droughty	0.00 0.00 0.50 0.80	Good		Poor Too sandy	0.00
195PF: Penden-----	100	Poor Low content of organic matter Carbonate content	0.00 0.80	Fair Shrink-swell	0.87	Fair Carbonate content	0.80
195PO: Penden-----	100	Fair Low content of organic matter Carbonate content	0.18 0.80	Fair Shrink-swell	0.91	Fair Slope Carbonate content	0.63 0.80
Ab: Fluvents-----	100	Poor Low content of organic matter Water erosion	0.00 0.90	Fair Shrink-swell	0.87	Good	
Ac: New Cambria-----	100	Poor Low content of organic matter Too clayey	0.00 0.00	Fair Shrink-swell	0.12	Poor Too Clayey	0.00
Ad: Fluvaquents-----	100	Poor Low content of organic matter	0.00	Fair Depth to saturated zone	0.89	Fair Depth to saturated zone	0.89
Ae: Anselmo-----	100	Fair Low content of organic matter	0.50	Good		Good	
Am: Armo-----	100	Good		Good		Fair Hard to reclaim	0.82
An: Armo-----	100	Poor Low content of organic matter	0.00	Good		Good	
Ao: Armo-----	100	Poor Low content of organic matter	0.00	Good		Fair Hard to reclaim	0.82
Ar: Armo-----	100	Poor Low content of organic matter	0.00	Good		Fair Slope Hard to reclaim	0.63 0.82

CONSTRUCTION MATERIALS--Continued  
Ellis County, Kansas

(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 source of reclamation material		Potential source of roadfill		Potential source of topsoil	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
Bf: Boel-----	100	Fair Too sandy Low content of organic matter Droughty	0.20 0.50 0.99	Fair Depth to saturated zone	0.91	Fair Too sandy Depth to saturated zone	0.20 0.91
Bg: Bogue-----	100	Poor Too clayey Too acid Droughty Depth to bedrock	0.00 0.00 0.04 0.71	Poor Depth to bedrock	0.00	Poor Too Clayey Depth to bedrock	0.00 0.71
Bo: Bogue-----	60	Poor Too clayey Droughty Low content of organic matter Too acid Depth to bedrock	0.00 0.00 0.00 0.54 0.71	Poor Depth to bedrock Shrink-swell	0.00 0.89	Poor Too Clayey Slope Depth to bedrock	0.00 0.00 0.71
Armo-----	40	Good		Good		Fair Hard to reclaim Slope	0.82 0.84
BOP: Borrow Pits-----	100	Not rated		Not rated		Not rated	
Br: Brownell-----	100	Poor Low content of organic matter Carbonate content Droughty Depth to bedrock	0.00 0.00 0.01 0.54	Poor Depth to bedrock Cobble content	0.00 0.62	Poor Rock fragments Carbonate content Depth to bedrock	0.00 0.00 0.54
Cc: Campus-----	65	Poor Low content of organic matter Carbonate content Depth to bedrock	0.00 0.32 0.79	Poor Depth to bedrock	0.00	Fair Carbonate content Depth to bedrock Rock fragments	0.32 0.79 0.88
Carlson-----	35	Poor Low content of organic matter Water erosion	0.00 0.90	Good		Good	
Cd: Campus-----	55	Poor Low content of organic matter Carbonate content Depth to bedrock	0.00 0.32 0.79	Poor Depth to bedrock	0.00	Fair Carbonate content Depth to bedrock Slope Rock fragments	0.32 0.79 0.84 0.88
Penden-----	45	Poor Low content of organic matter Carbonate content Too clayey No water erosion limitation	0.00 0.80 0.95 0.99	Fair Shrink-swell	0.87	Fair Slope Too Clayey	0.84 0.94
Ce: Canlon-----	60	Poor Droughty Low content of organic matter Depth to bedrock Carbonate content	0.00 0.00 0.00 0.97	Poor Depth to bedrock	0.00	Poor Depth to bedrock Slope Rock fragments Carbonate content	0.00 0.00 0.28 0.97

CONSTRUCTION MATERIALS--Continued  
Ellis County, Kansas

(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 source of reclamation material		Potential source of roadfill		Potential source of topsoil	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
Campus-----	40	Poor Low content of organic matter Carbonate content Depth to bedrock	0.00  0.32 0.79	Poor Depth to bedrock	0.00	Fair Carbonate content  Depth to bedrock Slope Rock fragments	0.32  0.79 0.84 0.88
Cm: Corinth-----	100	Poor Low content of organic matter Too clayey Depth to bedrock Droughty No water erosion limitation	0.00  0.00 0.54 0.83 0.99	Poor Depth to bedrock  Shrink-swell	0.00  0.12	Poor Too Clayey  Depth to bedrock	0.00  0.54
Cn: Corinth-----	100	Poor Low content of organic matter Too clayey Depth to bedrock Droughty No water erosion limitation	0.00  0.00 0.54 0.83 0.99	Poor Depth to bedrock  Shrink-swell	0.00  0.12	Poor Too Clayey  Depth to bedrock	0.00  0.54
Co: Corinth-----	100	Poor Low content of organic matter Too clayey Depth to bedrock Droughty No water erosion limitation	0.00  0.00 0.54 0.83 0.99	Poor Depth to bedrock  Shrink-swell	0.00  0.12	Poor Too Clayey  Depth to bedrock Slope	0.00  0.54 0.63
Cr: Crete-----	100	Poor Low content of organic matter Too acid Too clayey No water erosion limitation	0.00  0.84 0.98 0.99	Fair Shrink-swell	0.12	Fair Too Clayey	0.49
De: Detroit-----	100	Poor Low content of organic matter Too clayey No water erosion limitation	0.00  0.00 0.99	Fair Shrink-swell	0.59	Poor Too Clayey	0.00
Ee: Eltree-----	100	Poor Low content of organic matter Water erosion	0.00  0.90	Good		Good	
Ef: Eltree-----	100	Fair Water erosion	0.90	Good		Good	
Eg: Eltree-----	100	Poor Low content of organic matter Water erosion	0.00  0.90	Good		Good	
Eh: Eltree-----	100	Fair Water erosion	0.90	Good		Fair Slope	0.63
GRP: Pits-----	100	Not rated		Not rated		Not rated	

CONSTRUCTION MATERIALS--Continued  
Ellis County, Kansas

(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 source of reclamation material		Potential source of roadfill		Potential source of topsoil	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
Ha: Harney-----	100	Fair Too clayey Low content of organic matter Water erosion	0.05 0.50 0.90	Good		Fair Too Clayey	0.04
Hb: Harney-----	100	Poor Low content of organic matter Too clayey Water erosion	0.00 0.05 0.90	Fair Shrink-swell	0.99	Fair Too Clayey	0.02
Hc: Harney-----	100	Poor Low content of organic matter Too clayey Water erosion	0.00 0.05 0.90	Fair Shrink-swell	0.99	Fair Too Clayey	0.02
Hd: Harney-----	100	Poor Low content of organic matter Too clayey Water erosion	0.00 0.05 0.90	Fair Shrink-swell	0.99	Fair Too Clayey	0.02
He: Armo-----	50	Poor Low content of organic matter	0.00	Good		Fair Hard to reclaim	0.82
Harney-----	50	Poor Low content of organic matter Too clayey Water erosion	0.00 0.05 0.90	Fair Shrink-swell	0.99	Fair Too Clayey	0.02
Hf: Carlson-----	50	Poor Low content of organic matter Water erosion	0.00 0.90	Good		Good	
Harney-----	50	Poor Low content of organic matter Too clayey Water erosion	0.00 0.05 0.90	Fair Shrink-swell	0.99	Fair Too Clayey	0.02
Hg: Carlson-----	50	Poor Low content of organic matter Water erosion	0.00 0.90	Good		Good	
Harney-----	50	Poor Low content of organic matter Too clayey Water erosion	0.00 0.05 0.90	Fair Shrink-swell	0.99	Fair Too Clayey	0.02
HGG: Harney-----	70	Poor Low content of organic matter Too clayey Water erosion	0.00 0.05 0.90	Good		Fair Too Clayey	0.02
Mento-----	30	Poor Low content of organic matter No water erosion limitation	0.00 0.99	Fair Shrink-swell	0.72	Good	

CONSTRUCTION MATERIALS--Continued  
Ellis County, Kansas

(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 source of reclamation material		Potential source of roadfill		Potential source of topsoil	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
Hh: Harney-----	70	Poor Low content of organic matter Too clayey Water erosion	0.00 0.05 0.90	Fair Shrink-swell	0.99	Fair Too Clayey	0.02
Wakeen-----	30	Fair Carbonate content Low content of organic matter Water erosion Depth to bedrock	0.16 0.88 0.90 0.93	Poor Depth to bedrock Shrink-swell	0.00 0.87	Fair Carbonate content Depth to bedrock	0.16 0.93
Hk: Harney-----	60	Poor Low content of organic matter Too clayey Water erosion	0.00 0.05 0.90	Fair Shrink-swell	0.99	Fair Too Clayey	0.02
Wakeen-----	40	Fair Carbonate content Low content of organic matter Water erosion Depth to bedrock	0.16 0.88 0.90 0.93	Poor Depth to bedrock Shrink-swell	0.00 0.87	Fair Carbonate content Depth to bedrock	0.16 0.93
Hl: Armo-----	50	Good		Good		Fair Slope Hard to reclaim	0.37 0.82
Heizer-----	50	Poor Droughty Low content of organic matter Depth to bedrock Carbonate content	0.00 0.00 0.00 0.00	Poor Depth to bedrock Cobble content Slope	0.00 0.85 0.92	Poor Rock fragments Depth to bedrock Carbonate content Slope	0.00 0.00 0.00 0.00
HMM: Heizer-----	60	Poor Droughty Depth to bedrock Carbonate content Low content of organic matter	0.00 0.00 0.00 0.82	Poor Depth to bedrock Slope Cobble content	0.00 0.68 0.83	Poor Rock fragments Depth to bedrock Carbonate content Slope	0.00 0.00 0.00 0.00
Brownell-----	40	Poor Droughty Carbonate content Depth to bedrock Low content of organic matter	0.00 0.00 0.10 0.82	Poor Depth to bedrock Cobble content	0.00 0.81	Poor Rock fragments Carbonate content Depth to bedrock Slope	0.00 0.00 0.10 0.84
Hn: Dorrance-----	100	Poor Low content of organic matter Too sandy Droughty	0.00 0.22 0.23	Good		Fair Rock fragments Too sandy Slope Hard to reclaim	0.03 0.22 0.84 0.98
Ho: Holdrege-----	100	Poor Low content of organic matter Water erosion	0.00 0.90	Fair Shrink-swell	0.87	Good	
Hp: Holdrege-----	100	Fair Water erosion Too clayey	0.90 0.95	Fair Shrink-swell	0.87	Fair Too Clayey	0.84
Hr: Hord-----	100	Poor Low content of organic matter Water erosion	0.00 0.90	Good		Good	

CONSTRUCTION MATERIALS--Continued  
Ellis County, Kansas

(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 source of reclamation material		Potential source of roadfill		Potential source of topsoil	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
In: Inavale-----	100	Poor Too sandy Wind erosion Low content of organic matter Droughty	0.00 0.00 0.50 0.89	Good		Poor Too sandy	0.00
Mc: Mccook-----	100	Poor Low content of organic matter Water erosion	0.00 0.90	Good		Good	
Md: Mccook-----	100	Poor Low content of organic matter Water erosion	0.00 0.90	Good		Good	
Me: Mento-----	100	Poor Low content of organic matter No water erosion limitation	0.00 0.99	Fair Shrink-swell	0.74	Good	
Mf: Mento-----	100	Poor Low content of organic matter No water erosion limitation	0.00 0.99	Fair Shrink-swell	0.74	Good	
Mg: Mento-----	100	Poor Low content of organic matter No water erosion limitation	0.00 0.99	Fair Shrink-swell	0.74	Good	
Mo: Mento-----	100	Poor Low content of organic matter No water erosion limitation	0.00 0.99	Fair Shrink-swell	0.93	Good	
Mu: Munjoy-----	100	Poor Low content of organic matter	0.00	Good		Good	
Nc: New Cambria-----	100	Poor Low content of organic matter Too clayey	0.00 0.00	Fair Shrink-swell	0.12	Poor Too Clayey	0.00
Nn: Nibson-----	100	Poor Depth to bedrock Carbonate content Droughty Low content of organic matter Water erosion	0.00 0.16 0.21 0.88 0.90	Poor Depth to bedrock Shrink-swell	0.00 0.87	Poor Depth to bedrock Carbonate content Rock fragments Slope	0.00 0.16 0.88 0.96
Rb: Roxbury-----	100	Fair Water erosion	0.90	Fair Shrink-swell	0.99	Good	
Rf: Roxbury-----	100	Fair Water erosion	0.90	Fair Shrink-swell	0.98	Good	
RIV: Riverwash And Sandbars-----	100	Not rated		Not rated		Not rated	

CONSTRUCTION MATERIALS--Continued  
Ellis County, Kansas

(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 source of reclamation material		Potential source of roadfill		Potential source of topsoil	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
Ro: Heizer-----	77	Poor Droughty Low content of organic matter Depth to bedrock	0.00 0.00 0.00	Poor Depth to bedrock Slope  Cobble content	0.00 0.68 0.83	Poor Rock fragments Depth to bedrock  Slope	0.00 0.00 0.00
Brownell-----	23	Poor Low content of organic matter Droughty Depth to bedrock	0.00 0.05 0.71	Poor Depth to bedrock  Cobble content	0.00 0.63	Poor Rock fragments Depth to bedrock	0.00 0.71
ROO: Roxbury-----	100	Fair Water erosion	0.90	Fair Shrink-swell	0.93	Good	
UCC: Uly-----	100	Poor Low content of organic matter Water erosion	0.00 0.90	Good		Good	
W: Water-----	100	Poor Low content of organic matter	0.00	Poor Slope  Low strength	0.00 0.00	Poor Slope	0.00
Wa: Wakeen-----	100	Fair Carbonate content Depth to bedrock Low content of organic matter Water erosion	0.16 0.65 0.88 0.90	Poor Depth to bedrock Shrink-swell	0.00 0.87	Fair Carbonate content Depth to bedrock	0.16 0.65
We: Wakeen-----	100	Fair Carbonate content Depth to bedrock Low content of organic matter Water erosion	0.16 0.54 0.88 0.90	Poor Depth to bedrock Shrink-swell	0.00 0.90	Fair Carbonate content Depth to bedrock	0.16 0.54
Wh: Wakeen-----	100	Fair Carbonate content Depth to bedrock Low content of organic matter Water erosion	0.16 0.54 0.88 0.90	Poor Depth to bedrock Shrink-swell	0.00 0.90	Fair Carbonate content Depth to bedrock	0.16 0.54
Wk: Wakeen-----	100	Fair Depth to bedrock Carbonate content Droughty Low content of organic matter Water erosion	0.03 0.16 0.64 0.88 0.90	Poor Depth to bedrock Shrink-swell	0.00 0.87	Fair Depth to bedrock Carbonate content Slope	0.03 0.16 0.84
Wn: Wann-----	100	Poor Low content of organic matter	0.00	Fair Depth to saturated zone	0.91	Fair Depth to saturated zone Rock fragments	0.91 0.97

RECREATIONAL INTERPRETATIONS  
Ellis County, Kansas

## Recreation

The soils of the survey area are rated in the following tables according to limitations that affect their suitability for recreation. The ratings are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect the recreational uses. Not limited indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. Slightly limited indicates that the soil has features that are favorable for the specified use. The limitations are minor and can be easily overcome. Good performance and 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 0.00 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 this table can be supplemented by other information in this survey, for example, interpretations for building site development, construction materials, sanitary facilities, and water management.

Camp areas require site preparation, such as shaping and leveling the tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The ratings are based on the soil properties that affect the ease of developing camp areas and the performance of the areas after development. Slope, stoniness, and depth to bedrock or a cemented pan are the main concerns affecting the development of camp areas.

The soil properties that affect the performance of the areas after development are those that influence trafficability and promote the growth of vegetation, especially in heavily used areas. For good trafficability, the surface of camp areas should absorb rainfall readily, remain firm under heavy foot traffic, and not be dusty when dry. The soil properties that influence trafficability are texture of the surface layer, depth to a water table, ponding, flooding, permeability, and large stones. The soil properties that affect the growth of plants are depth to bedrock or a cemented pan, permeability, and toxic substances in the soil.

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

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.

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.



RECREATIONAL INTERPRETATIONS--Continued  
Ellis County, Kansas

(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 potential limitation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Pct of map unit	Camp areas		Picnic areas		Playgrounds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
141HM: Harney-----	50	Not limited		Not limited		Somewhat limited Slope	0.87
Mento-----	50	Somewhat limited Restricted permeability	0.39	Somewhat limited Restricted permeability	0.39	Somewhat limited Slope	0.87
						Restricted permeability	0.39
163AU: Armo-----	60	Somewhat limited Slope	0.37	Somewhat limited Slope	0.37	Very limited Slope	1.00
Bogue-----	40	Somewhat limited Slope	0.63	Somewhat limited Slope	0.63	Very limited Slope	1.00
		Too clayey	0.50	Too clayey	0.50	Too clayey	0.50
		Restricted permeability	0.45	Restricted permeability	0.45	Restricted permeability	0.45
						Depth to bedrock	0.06
163HE: Harney-----	55	Not limited		Not limited		Somewhat limited Slope	0.87
Mento-----	45	Somewhat limited Restricted permeability	0.39	Somewhat limited Restricted permeability	0.39	Somewhat limited Slope	0.87
						Restricted permeability	0.39
163IC: Inavale-----	100	Very limited Flooding Too sandy	1.00 1.00	Very limited Too sandy	1.00	Very limited Too sandy Flooding Slope	1.00 0.60 0.00
163WX: Wakeen-----	100	Somewhat limited Slope	0.96	Somewhat limited Slope	0.96	Very limited Slope Depth to bedrock	1.00 0.97
163WY: Wakeen-----	55	Not limited		Not limited		Somewhat limited Slope	0.00
Harney-----	45	Not limited		Not limited		Somewhat limited Slope	0.00
165BO: Bogue-----	100	Somewhat limited Too clayey Restricted permeability Slope	0.50 0.45 0.04	Somewhat limited Too clayey Restricted permeability Slope	0.50 0.45 0.04	Very limited Slope Too clayey Restricted permeability Depth to bedrock	1.00 0.50 0.45 0.01
165NW: Nibson-----	55	Very limited Depth to bedrock Slope	1.00 0.84	Very limited Depth to bedrock Slope	1.00 0.84	Very limited Depth to bedrock Slope Gravel content Content of large stones	1.00 1.00 0.11 0.08
Wakeen-----	45	Somewhat limited Slope	0.63	Somewhat limited Slope	0.63	Very limited Slope Depth to bedrock	1.00 0.29
165PE: Penden-----	100	Not limited		Not limited		Somewhat limited Slope	0.87
165UB: Uly-----	100	Not limited		Not limited		Somewhat limited Slope	0.00
165UR: Uly-----	65	Somewhat limited Slope	0.04	Somewhat limited Slope	0.04	Very limited Slope	1.00
Roxbury-----	35	Very limited Flooding	1.00	Not limited		Somewhat limited Flooding	0.60
167CR: Crete-----	100	Somewhat limited Restricted permeability	0.05	Somewhat limited Restricted permeability	0.05	Somewhat limited Restricted permeability	0.05
167DR: Dorrance-----	100	Somewhat limited Slope Gravel content	0.16 0.14	Somewhat limited Slope Gravel content	0.16 0.14	Very limited Slope Gravel content	1.00 1.00
167RC: Roxbury-----	100	Very limited Flooding	1.00	Somewhat limited Flooding	0.40	Very limited Flooding	1.00
195BD: Badland-----	70	Not rated		Not rated		Not rated	

RECREATIONAL INTERPRETATIONS--Continued  
Ellis County, Kansas

(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 potential limitation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Pct of map unit	Camp areas		Picnic areas		Playgrounds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
Manvel-----	30	Somewhat limited Dusty	0.50	Somewhat limited Dusty	0.50	Very limited Slope Dusty	1.00 0.50
195CC: Campus-----	70	Somewhat limited Slope	0.37	Somewhat limited Slope	0.37	Very limited Slope Depth to bedrock	1.00 0.06
Canlon-----	30	Very limited Depth to bedrock Slope	1.00 1.00	Very limited Depth to bedrock Slope	1.00 1.00	Very limited Depth to bedrock Slope Gravel content	1.00 1.00 0.06
195CF: Carlson-----	100	Not limited		Not limited		Somewhat limited Slope	0.00
195HU: Humbarger-----	100	Very limited Flooding	1.00	Somewhat limited Flooding	0.40	Very limited Flooding	1.00
195IF: Inavale-----	100	Very limited Flooding Too sandy	1.00 0.87	Somewhat limited Too sandy Flooding	0.87 0.40	Very limited Flooding Too sandy	1.00 0.87
195PF: Penden-----	100	Not limited		Not limited		Somewhat limited Slope	0.87
195PO: Penden-----	100	Somewhat limited Slope	0.37	Somewhat limited Slope	0.37	Very limited Slope	1.00
Ab: Fluents-----	100	Very limited Flooding	1.00	Somewhat limited Flooding	0.40	Very limited Flooding Slope	1.00 0.87
Ac: New Cambria-----	100	Very limited Flooding Too clayey Restricted permeability	1.00 0.50 0.39	Somewhat limited Too clayey Flooding Restricted permeability	0.50 0.40 0.39	Very limited Flooding Too clayey Restricted permeability	1.00 0.50 0.39
Ad: Fluvaquents-----	100	Very limited Flooding	1.00	Not limited		Somewhat limited Flooding	0.60
Ae: Anselmo-----	100	Not limited		Not limited		Somewhat limited Slope	0.50
Am: Armo-----	100	Not limited		Not limited		Somewhat limited Slope	0.00
An: Armo-----	100	Not limited		Not limited		Somewhat limited Slope	0.87
Ao: Armo-----	100	Not limited		Not limited		Somewhat limited Slope	0.87
Ar: Armo-----	100	Somewhat limited Slope	0.37	Somewhat limited Slope	0.37	Very limited Slope	1.00
Bf: Boel-----	100	Very limited Flooding	1.00	Not limited		Somewhat limited Flooding	0.60
Bg: Bogue-----	100	Somewhat limited Too clayey Restricted permeability	0.50 0.45	Somewhat limited Too clayey Restricted permeability	0.50 0.45	Very limited Slope Too clayey  Restricted permeability Depth to bedrock	1.00 0.50  0.45 0.29
Bo: Bogue-----	60	Very limited Slope Too clayey Restricted permeability	1.00 0.50 0.45	Very limited Slope Too clayey Restricted permeability	1.00 0.50 0.45	Very limited Slope Too clayey Restricted permeability Depth to bedrock	1.00 0.50 0.45 0.29
Armo-----	40	Somewhat limited Slope	0.16	Somewhat limited Slope	0.16	Very limited Slope	1.00
BOP: Borrow Pits-----	100	Not rated		Not rated		Not rated	
Br: Brownell-----	100	Somewhat limited		Somewhat limited		Very limited	

RECREATIONAL INTERPRETATIONS--Continued  
Ellis County, Kansas

(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 potential limitation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Pct of map unit	Camp areas		Picnic areas		Playgrounds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
		Gravel content	0.71	Gravel content	0.71	Gravel content Slope Depth to bedrock Content of large stones	1.00 1.00 0.46 0.08
Cc: Campus-----	65	Not limited		Not limited		Somewhat limited Slope Depth to bedrock	0.87 0.20
Carlson-----	35	Not limited		Not limited		Somewhat limited Slope	0.87
Cd: Campus-----	55	Somewhat limited Slope	0.16	Somewhat limited Slope	0.16	Very limited Slope Depth to bedrock	1.00 0.20
Penden-----	45	Somewhat limited Slope	0.16	Somewhat limited Slope	0.16	Very limited Slope	1.00
Ce: Canlon-----	60	Very limited Depth to bedrock Slope	1.00 1.00	Very limited Depth to bedrock Slope	1.00 1.00	Very limited Depth to bedrock Slope Gravel content	1.00 1.00 0.06
Campus-----	40	Somewhat limited Slope	0.16	Somewhat limited Slope	0.16	Very limited Slope Depth to bedrock	1.00 0.20
Cm: Corinth-----	100	Somewhat limited Restricted permeability	0.05	Somewhat limited Restricted permeability	0.05	Somewhat limited Restricted permeability Slope	0.05 0.00
Cn: Corinth-----	100	Somewhat limited Restricted permeability	0.05	Somewhat limited Restricted permeability	0.05	Somewhat limited Slope Depth to bedrock Restricted permeability	0.87 0.46 0.05
Co: Corinth-----	100	Somewhat limited Slope Restricted permeability	0.37 0.05	Somewhat limited Slope Restricted permeability	0.37 0.05	Very limited Slope Depth to bedrock Restricted permeability	1.00 0.46 0.05
Cr: Crete-----	100	Somewhat limited Restricted permeability	0.05	Somewhat limited Restricted permeability	0.05	Somewhat limited Restricted permeability	0.05
De: Detroit-----	100	Very limited Flooding Restricted permeability	1.00 0.39	Somewhat limited Restricted permeability	0.39	Somewhat limited Restricted permeability	0.39
Ee: Eltree-----	100	Not limited		Not limited		Not limited	
Ef: Eltree-----	100	Not limited		Not limited		Somewhat limited Slope	0.00
Eg: Eltree-----	100	Not limited		Not limited		Somewhat limited Slope	0.87
Eh: Eltree-----	100	Somewhat limited Slope	0.37	Somewhat limited Slope	0.37	Very limited Slope	1.00
GRP: Pits-----	100	Not rated		Not rated		Not rated	
Ha: Harney-----	100	Not limited		Not limited		Not limited	
Hb: Harney-----	100	Not limited		Not limited		Somewhat limited Slope	0.00
Hc: Harney-----	100	Not limited		Not limited		Somewhat limited Slope	0.87
Hd: Harney-----	100	Not limited		Not limited		Somewhat limited Slope	0.50
He: Armo-----	50	Not limited		Not limited		Somewhat limited	

RECREATIONAL INTERPRETATIONS--Continued  
Ellis County, Kansas

(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 potential limitation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Pct of map unit	Camp areas		Picnic areas		Playgrounds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
Harney-----	50	Not limited		Not limited		Slope Somewhat limited Slope	0.87 0.87
Hf: Carlson-----	50	Not limited		Not limited		Not limited	
Harney-----	50	Not limited		Not limited		Not limited	
Hg: Carlson-----	50	Not limited		Not limited		Somewhat limited Slope	0.00
Harney-----	50	Not limited		Not limited		Somewhat limited Slope	0.00
HGG: Harney-----	70	Not limited		Not limited		Somewhat limited Slope	0.00
Mento-----	30	Somewhat limited Restricted permeability	0.39	Somewhat limited Restricted permeability	0.39	Somewhat limited Restricted permeability Slope	0.39 0.00
Hh: Harney-----	70	Not limited		Not limited		Not limited	
Wakeen-----	30	Not limited		Not limited		Not limited	
Hk: Harney-----	60	Not limited		Not limited		Somewhat limited Slope	0.00
Wakeen-----	40	Not limited		Not limited		Somewhat limited Slope	0.00
Hl: Armo-----	50	Somewhat limited Slope	0.63	Somewhat limited Slope	0.63	Very limited Slope	1.00
Heizer-----	50	Very limited Depth to bedrock Slope Gravel content	1.00 1.00 0.71	Very limited Depth to bedrock Slope Gravel content	1.00 1.00 0.71	Very limited Slope Depth to bedrock Gravel content Content of large stones	1.00 1.00 1.00 1.00 0.08
HMM: Heizer-----	60	Very limited Depth to bedrock Slope Gravel content	1.00 1.00 0.71	Very limited Depth to bedrock Slope Gravel content	1.00 1.00 0.71	Very limited Slope Depth to bedrock Gravel content Content of large stones	1.00 1.00 1.00 1.00 0.08
Brownell-----	40	Somewhat limited Gravel content Slope	0.71 0.16	Somewhat limited Gravel content Slope	0.71 0.16	Very limited Gravel content Slope Depth to bedrock Content of large stones	1.00 1.00 0.90 0.08
Hn: Dorrance-----	100	Somewhat limited Slope	0.16	Somewhat limited Slope	0.16	Very limited Slope	1.00
Ho: Holdrege-----	100	Not limited		Not limited		Not limited	
Hp: Holdrege-----	100	Not limited		Not limited		Somewhat limited Slope	0.00
Hr: Hord-----	100	Very limited Flooding	1.00	Not limited		Not limited	
In: Inavale-----	100	Very limited Flooding Too sandy	1.00 0.87	Somewhat limited Too sandy	0.87	Somewhat limited Slope Too sandy Flooding	0.87 0.87 0.60
Mc: Mccook-----	100	Very limited Flooding	1.00	Not limited		Not limited	
Md: Mccook-----	100	Very limited Flooding	1.00	Not limited		Not limited	
Me: Mento-----	100	Somewhat limited Restricted permeability	0.39	Somewhat limited Restricted permeability	0.39	Somewhat limited Restricted permeability	0.39
Mf: Mento-----	100	Somewhat limited Restricted permeability	0.39	Somewhat limited Restricted permeability	0.39	Somewhat limited Restricted permeability Slope	0.39 0.00
Mg: Mento-----	100	Somewhat limited		Somewhat limited		Somewhat limited	

RECREATIONAL INTERPRETATIONS--Continued  
Ellis County, Kansas

(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 potential limitation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Pct of map unit	Camp areas		Picnic areas		Playgrounds	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
Mo: Mento-----	100	Restricted permeability	0.39	Restricted permeability	0.39	Restricted permeability Slope	0.39 0.00
Mu: Munjoy-----	100	Somewhat limited Restricted permeability	0.39	Somewhat limited Restricted permeability	0.39	Somewhat limited Slope Restricted permeability	0.87 0.39
Nc: New Cambria-----	100	Very limited Flooding	1.00	Somewhat limited Flooding	0.40	Very limited Flooding	1.00
Nn: Nibson-----	100	Very limited Flooding Too clayey Restricted permeability	1.00 0.50 0.39	Somewhat limited Too clayey Restricted permeability	0.50 0.39	Somewhat limited Too clayey Restricted permeability	0.50 0.39
Rb: Roxbury-----	100	Very limited Depth to bedrock Slope	1.00 0.04	Very limited Depth to bedrock Slope	1.00 0.04	Very limited Depth to bedrock Slope Gravel content Content of large stones	1.00 1.00 0.11 0.08
Rf: Roxbury-----	100	Very limited Flooding	1.00	Not limited		Not limited	
RIV: Riverwash And Sandbars-----	100	Very limited Flooding	1.00	Not limited		Somewhat limited Flooding	0.60
Ro: Heizer-----	77	Not rated		Not rated		Not rated	
Brownell-----	23	Very limited Depth to bedrock Slope Gravel content	1.00 1.00 0.71	Very limited Depth to bedrock Slope Gravel content	1.00 1.00 0.71	Very limited Slope Depth to bedrock Gravel content Content of large stones	1.00 1.00 1.00 0.08
ROO: Roxbury-----	100	Somewhat limited Gravel content Slope	0.71 0.00	Somewhat limited Gravel content Slope	0.71 0.00	Very limited Gravel content Slope Depth to bedrock Content of large stones	1.00 1.00 0.29 0.08
UCC: Uly-----	100	Very limited Flooding	1.00	Not limited		Somewhat limited Flooding	0.60
W: Water-----	100	Not limited		Not limited		Somewhat limited Slope	0.87
Wa: Wakeen-----	100	Very limited Slope Restricted permeability	1.00 1.00	Very limited Slope Restricted permeability	1.00 1.00	Very limited Slope Restricted permeability	1.00 1.00
We: Wakeen-----	100	Not limited		Not limited		Somewhat limited Slope	0.00
Wh: Wakeen-----	100	Not limited		Not limited		Somewhat limited Slope	0.00
Wk: Wakeen-----	100	Not limited		Not limited		Somewhat limited Slope Depth to bedrock	0.87 0.46
Wn: Wann-----	100	Somewhat limited Slope	0.16	Somewhat limited Slope	0.16	Very limited Slope Depth to bedrock	1.00 0.97
	100	Very limited Flooding	1.00	Not limited		Somewhat limited Flooding	0.60

RECREATIONAL INTERPRETATIONS--Continued  
Ellis County, Kansas

(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 potential limitation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Pct of map unit	Paths and trails		Golf fairways	
		Rating class and limiting features	Value	Rating class and limiting features	Value
141HM:					
Harney-----	50	Not limited		Not limited	
Mento-----	50	Not limited		Not limited	
163AU:					
Armo-----	60	Not limited		Somewhat limited Slope	0.37
Bogue-----	40	Somewhat limited Too clayey	0.50	Very limited Too clayey Slope Depth to bedrock Droughty	1.00 0.63 0.06 0.02
163HE:					
Harney-----	55	Not limited		Not limited	
Mento-----	45	Not limited		Not limited	
163IC:					
Inavale-----	100	Very limited Too sandy	1.00	Somewhat limited Flooding Droughty	0.60 0.13
163WX:					
Wakeen-----	100	Not limited		Somewhat limited Depth to bedrock Slope	0.97 0.96
163WY:					
Wakeen-----	55	Not limited		Somewhat limited Depth to bedrock	0.03
Harney-----	45	Not limited		Not limited	
165BO:					
Bogue-----	100	Somewhat limited Too clayey	0.50	Very limited Too clayey Droughty Slope Depth to bedrock	1.00 0.92 0.04 0.01
165NW:					
Nibson-----	55	Not limited		Very limited Depth to bedrock Slope Content of large stones Droughty	1.00 0.84 0.08 0.02
Wakeen-----	45	Not limited		Somewhat limited Slope Depth to bedrock	0.63 0.29
165PE:					
Penden-----	100	Not limited		Not limited	
165UB:					
Uly-----	100	Not limited		Not limited	
165UR:					
Uly-----	65	Not limited		Somewhat limited Slope	0.04
Roxbury-----	35	Not limited		Somewhat limited Flooding	0.60
167CR:					
Crete-----	100	Not limited		Not limited	
167DR:					
Dorrance-----	100	Not limited		Somewhat limited Droughty Slope Gravel content	0.56 0.16 0.14
167RC:					
Roxbury-----	100	Somewhat limited Flooding	0.40	Very limited Flooding	1.00
195BD:					
Badland-----	70	Not rated		Not rated	
Manvel-----	30	Somewhat limited Dusty	0.50	Not limited	
195CC:					
Campus-----	70	Not limited		Somewhat limited Slope Depth to bedrock	0.37 0.06
Canlon-----	30	Somewhat limited Slope	0.18	Very limited Depth to bedrock Slope Droughty	1.00 1.00 0.10
195CF:					
Carlson-----	100	Not limited		Not limited	
195HU:					
Humbarger-----	100	Somewhat limited Flooding	0.40	Very limited Flooding	1.00
195IF:					
Inavale-----	100	Somewhat limited		Very limited	

RECREATIONAL INTERPRETATIONS--Continued  
Ellis County, Kansas

(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 potential limitation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Pct of map unit	Paths and trails		Golf fairways	
		Rating class and limiting features	Value	Rating class and limiting features	Value
		Too sandy Flooding	0.87 0.40	Flooding Droughty	1.00 0.21
195PF: Penden-----	100	Not limited		Not limited	
195PO: Penden-----	100	Not limited		Somewhat limited Slope	0.37
Ab: Fluents-----	100	Somewhat limited Flooding	0.40	Very limited Flooding	1.00
Ac: New Cambria-----	100	Somewhat limited Too clayey Flooding	0.50 0.40	Very limited Flooding Too clayey	1.00 1.00
Ad: Fluvaquents-----	100	Not limited		Somewhat limited Flooding	0.60
Ae: Anselmo-----	100	Not limited		Not limited	
Am: Armo-----	100	Not limited		Not limited	
An: Armo-----	100	Not limited		Not limited	
AO: Armo-----	100	Not limited		Not limited	
Ar: Armo-----	100	Not limited		Somewhat limited Slope	0.37
Bf: Boel-----	100	Not limited		Somewhat limited Flooding	0.60
Bg: Bogue-----	100	Somewhat limited Too clayey	0.50	Very limited Too clayey Depth to bedrock Droughty	1.00 0.29 0.18
Bo: Bogue-----	60	Somewhat limited Too clayey Slope	0.50 0.00	Very limited Too clayey Slope Droughty Depth to bedrock	1.00 1.00 0.88 0.29
Armo-----	40	Not limited		Somewhat limited Slope	0.16
BOP: Borrow Pits-----	100	Not rated		Not rated	
Br: Brownell-----	100	Not limited		Very limited Carbonate content Gravel content Depth to bedrock Droughty Content of large stones	1.00 0.71 0.46 0.29 0.08
Cc: Campus-----	65	Not limited		Somewhat limited Depth to bedrock	0.20
Carlson-----	35	Not limited		Not limited	
Cd: Campus-----	55	Not limited		Somewhat limited Depth to bedrock Slope	0.20 0.16
Penden-----	45	Not limited		Somewhat limited Slope	0.16
Ce: Canlon-----	60	Somewhat limited Slope	0.00	Very limited Depth to bedrock Slope Droughty	1.00 1.00 0.85
Campus-----	40	Not limited		Somewhat limited Depth to bedrock Slope	0.20 0.16
Cm: Corinth-----	100	Not limited		Somewhat limited Depth to bedrock	0.46
Cn: Corinth-----	100	Not limited		Somewhat limited Depth to bedrock	0.46

RECREATIONAL INTERPRETATIONS--Continued  
Ellis County, Kansas

(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 potential limitation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Pct of map unit	Paths and trails		Golf fairways	
		Rating class and limiting features	Value	Rating class and limiting features	Value
Co: Corinth-----	100	Not limited		Somewhat limited Depth to bedrock Slope	0.46 0.37
Cr: Crete-----	100	Not limited		Not limited	
De: Detroit-----	100	Not limited		Not limited	
Ee: Eltree-----	100	Not limited		Not limited	
Ef: Eltree-----	100	Not limited		Not limited	
Eg: Eltree-----	100	Not limited		Not limited	
Eh: Eltree-----	100	Not limited		Somewhat limited Slope	0.37
GRP: Pits-----	100	Not rated		Not rated	
Ha: Harney-----	100	Not limited		Not limited	
Hb: Harney-----	100	Not limited		Not limited	
Hc: Harney-----	100	Not limited		Not limited	
Hd: Harney-----	100	Not limited		Not limited	
He: Armo-----	50	Not limited		Not limited	
Harney-----	50	Not limited		Not limited	
Hf: Carlson-----	50	Not limited		Not limited	
Harney-----	50	Not limited		Not limited	
Hg: Carlson-----	50	Not limited		Not limited	
Harney-----	50	Not limited		Not limited	
HGG: Harney-----	70	Not limited		Not limited	
Mento-----	30	Not limited		Not limited	
Hh: Harney-----	70	Not limited		Not limited	
Wakeen-----	30	Not limited		Somewhat limited Depth to bedrock	0.06
Hk: Harney-----	60	Not limited		Not limited	
Wakeen-----	40	Not limited		Somewhat limited Depth to bedrock	0.06
Hl: Armo-----	50	Not limited		Somewhat limited Slope	0.63
Heizer-----	50	Somewhat limited Slope	0.08	Very limited Depth to bedrock Droughty Slope Carbonate content Gravel content	1.00 1.00 1.00 1.00 0.71
HMM: Heizer-----	60	Somewhat limited Slope	0.32	Very limited Depth to bedrock Droughty Slope Carbonate content Gravel content	1.00 1.00 1.00 1.00 0.71
Brownell-----	40	Not limited		Very limited Carbonate content Depth to bedrock Droughty Gravel content Slope	1.00 0.90 0.75 0.71 0.16
Hn: Dorrance-----	100	Not limited		Somewhat limited Droughty Slope	0.35 0.16
Ho: Holdrege-----	100	Not limited		Not limited	
Hp: Holdrege-----	100	Not limited		Not limited	



RECREATIONAL INTERPRETATIONS--Continued  
Ellis County, Kansas

(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 potential limitation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Pct of map unit	Paths and trails		Golf fairways	
		Rating class and limiting features	Value	Rating class and limiting features	Value
Hr:					
Hord-----	100	Not limited		Not limited	
In:					
Inavale-----	100	Somewhat limited Too sandy	0.87	Somewhat limited Flooding Droughty	0.60 0.08
Mc:					
Mccook-----	100	Not limited		Not limited	
Md:					
Mccook-----	100	Not limited		Not limited	
Me:					
Mento-----	100	Not limited		Not limited	
Mf:					
Mento-----	100	Not limited		Not limited	
Mg:					
Mento-----	100	Not limited		Not limited	
Mo:					
Mento-----	100	Not limited		Not limited	
Mu:					
Munjoy-----	100	Somewhat limited Flooding	0.40	Very limited Flooding	1.00
Nc:					
New Cambria-----	100	Somewhat limited Too clayey	0.50	Very limited Too clayey	1.00
Nn:					
Nibson-----	100	Not limited		Very limited Depth to bedrock Content of large stones Slope Droughty	1.00 0.08 0.04 0.00
Rb:					
Roxbury-----	100	Not limited		Not limited	
Rf:					
Roxbury-----	100	Not limited		Somewhat limited Flooding	0.60
RIV:					
Riverwash And Sandbars-----	100	Not rated		Not rated	
Ro:					
Heizer-----	77	Somewhat limited Slope	0.32	Very limited Depth to bedrock Droughty Slope Gravel content Content of large stones	1.00 1.00 1.00 0.71 0.08
Brownell-----	23	Not limited		Somewhat limited Gravel content Depth to bedrock Droughty Content of large stones Slope	0.71 0.29 0.15 0.08 0.00
ROO:					
Roxbury-----	100	Not limited		Somewhat limited Flooding	0.60
UCC:					
Uly-----	100	Not limited		Not limited	
W:					
Water-----	100	Very limited Slope Water erosion	1.00 1.00	Very limited Slope	1.00
Wa:					
Wakeen-----	100	Not limited		Somewhat limited Depth to bedrock	0.35
We:					
Wakeen-----	100	Not limited		Somewhat limited Depth to bedrock	0.46
Wh:					
Wakeen-----	100	Not limited		Somewhat limited Depth to bedrock	0.46
Wk:					
Wakeen-----	100	Not limited		Somewhat limited Depth to bedrock Slope	0.97 0.16
Wn:					
Wann-----	100	Not limited		Somewhat limited Flooding	0.60

WILDLIFE INTERPRETATIONS  
Ellis County, Kansas

#### Use and Explanation of Wildlife Interpretations

Soils directly affect the kind and amount of vegetation that is available to wildlife as food and cover. They also affect the development of water impoundments. The kind and abundance of wildlife that populate an area depend largely on the amount and distribution of food, cover, water, and living space. If any one of these elements is missing, inadequate, or inaccessible, wildlife will be scarce or will not inhabit the area. If the soils have the potential, wildlife habitat can be created or improved by planting appropriate vegetation, properly managing the existing plant cover, and fostering the natural establishment of desirable plants.

In the Wildlife Interpretations table, the soils in the survey area are rated according to their potential for providing habitat for various kinds of wildlife. This information can be used in planning parks, wildlife refuges, nature study areas, and other developments for wildlife; in selecting soils that are suitable for establishing, improving, or maintaining specific elements of wildlife habitat; and in determining the intensity of management needed for each element of the habitat.

#### Suitability Ratings

The potential of the soil is rated good, fair, poor, or very poor.

Good - means that the element of wildlife habitat or the kind of habitat is easily created, improved, or maintained. Few or no limitations affect management, and satisfactory results can be expected if the soil is used for the designated purpose.

Fair - means that the element of wildlife habitat or kind of habitat can be created, improved, or maintained in most places. Moderately intensive management is required for satisfactory results.

Poor - means that limitations are severe for the designated element or kind of wildlife habitat. Habitat can be created, improved, or maintained in most places, but management is difficult and requires intensive effort.

Very Poor - means that limitations are very severe for the designated element or kind of wildlife habitat. Habitat is difficult to create, improve, or maintain in most places, and management is difficult and requires intensive effort.

#### Description of Wildlife Habitat Elements

Openland habitat consists of croplands, pastures, meadows, and areas that are overgrown with grasses, herbs, shrubs, and vines. These areas produce grain and seed crops, grasses and legumes, and wild herbaceous plants. The kind of wildlife attracted to these areas include bobwhite quail, pheasant, meadowlark, field sparrow, killdeer, cottontail rabbit, red fox, and coyote.

Woodland habitat consists of hardwood or conifers, or a mixture of these and associated grasses, legumes and wild herbaceous plants. Examples of wildlife attracted to this habitat are wild turkey, thrushes, woodpeckers, owl, tree squirrels, raccoon, and deer.

Wetland habitat consists of water-tolerant plants in open, marshy or swampy, shallow water areas. Examples of wildlife attracted to this habitat are ducks, geese, herons, bitterns, rails, kingfishers, shorebirds, muskrat, mink, and beaver.

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

Grain and seed crops are domestic grains and seed-producing herbaceous plants. Soil properties and features that affect the growth of grain and seed crops are depth of the root zone, texture of the surface layer, available water capacity, wetness, slope, surface stoniness, and flooding. Soil temperature and soil moisture also are considerations. Examples of grain and seed crops are corn, wheat, oats, and barley.

Grasses and legumes are domestic perennial grasses and herbaceous legumes. Soil properties and features that affect the growth of grasses and legumes are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, flooding, and slope. Soil temperature and soil moisture also are considerations. Examples of grasses and legumes are fescue, lovegrass, brome grass, clover, and alfalfa.

Wild herbaceous plants are native or naturally established grasses and forbs, including weeds. Soil properties and features that affect the growth of these plants are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, and flooding. Soil temperature and soil moisture also are considerations. Examples of wild herbaceous plants are bluestem, goldenrod, beggarweed, wheatgrass, and grama.

Hardwood trees and woody understory produce nuts or other fruit, buds, catkins, twigs, bark, and foliage. Soil properties and features that affect the growth of hardwood trees and shrubs are depth of the root zone, available water capacity, and wetness. Examples of these plants are oak, poplar, cherry, sweetgum, apple, hawthorn, dogwood, hickory, blackberry, and blueberry. Examples of fruit-producing shrubs that are suitable for planting on soils rated good are Russian-olive, autumn-olive, and crabapple.

Coniferous plants furnish browse and seeds. Soil properties and features that affect the growth of coniferous trees, shrubs, and ground cover are depth of the root zone, available water capacity, and wetness. Examples of coniferous plants are pine, spruce, fir, cedar, and juniper.

Shrubs are bushy woody plants that produce fruit, buds, twigs, bark, and foliage. Soil properties and features that affect the growth of shrubs are depth of the root zone, available water capacity, salinity, and soil moisture. Examples of shrubs are fragrant sumac, chokecherry, American plum, sand plum, and gorden currant.

Wetland plants are annual and perennial wild herbaceous plants that grow on moist or wet sites. Submerged or floating aquatic plants are excluded. Soil properties and features affecting wetland plants are texture of the surface layer, wetness, reaction, salinity, slope, and surface stoniness. Examples of wetland plants are smartweed, wild millet, saltgrass, cordgrass, rushes, sedges, and cattails.

Shallow water areas have an average depth of less than 5 feet. Some are naturally wet areas. Others are created by dams, levees, or other water-control structures. Soil properties and features affecting shallow water areas are depth to bedrock, wetness, surface stoniness, slope, and permeability. Examples of shallow water areas are marshes, waterfowl feeding areas, and ponds.

The habitat for various kinds of wildlife is described in the following paragraphs.

Habitat for openland wildlife consists of cropland, pasture, meadows, and areas that are overgrown with grasses, herbs, shrubs, and vines. These areas produce grain and seed crops, grasses and legumes, and wild herbaceous plants. Wildlife attracted to these areas include bobwhite quail, pheasant, meadowlark, field sparrow, cottontail, red fox and coyote.

Habitat for woodland wildlife consists of areas of deciduous and/or coniferous plants and associated grasses, legumes, and wild herbaceous plants. Wildlife attracted to these areas include wild turkey, thrushes, woodpeckers, squirrels, gray fox, raccoon, and deer.

Habitat for wetland wildlife consists of open, marshy or swampy shallow water areas. Some of the wildlife attracted to such areas are ducks, geese, herons, shore birds, muskrat, mink, and beaver.

Habitat for rangeland wildlife consists of areas of shrubs and wild herbaceous plants. Wildlife attracted to rangeland include antelope, deer, cottontail rabbit, prairie chicken, meadowlark, quail, and pheasant.

WILDLIFE INTERPRETATIONS  
Ellis County, Kansas

Map symbol and soil name	Potential for habitat elements								Potential as habitat for--			
	Grain and seed crops	Grasses and legumes	Wild herba- ceous plants	Hard- wood trees	Conif- erous plants	Shrubs	Wetland plants	Shallow water areas	Open- land wild- life	Wood- land wild- life	Wetland wild- life	Range- land wild- life
141HM: HARNEY-----	Fair	Good	Fair	Poor	Poor	Fair	Poor	Poor	Fair	---	Poor	Fair
MENTO-----	Fair	Good	Fair	---	---	Fair	Poor	Poor	Fair	---	Poor	Fair
163AU: ARMO-----	Poor	Fair	Good	---	---	Fair	Poor	Very poor	Fair	---	Very poor	Fair
BOGUE-----	Poor	Fair	Poor	Poor	Poor	Poor	Very poor	Poor	Poor	Poor	Very poor	Poor
163HE: HARNEY-----	Fair	Good	Fair	Poor	Poor	Fair	Poor	Poor	Fair	---	Poor	Fair
MENTO-----	Fair	Good	Fair	---	---	Fair	Poor	Poor	Fair	---	Poor	Fair
163IC: INVALE-----	Poor	Fair	Good	Fair	Fair	Fair	Very poor	Very poor	Fair	Fair	Very poor	Fair
163WX: WAKEEN-----	Poor	Fair	Fair	---	---	Fair	Very poor	Very poor	Fair	---	Very poor	Fair
163WY: WAKEEN-----	Fair	Good	Fair	---	---	Fair	Poor	Very poor	Fair	---	Very poor	Fair
HARNEY-----	Good	Good	Good	Poor	Poor	Good	Poor	Fair	Good	---	Poor	Good
165BO: BOGUE-----	Poor	Fair	Poor	Poor	Poor	Poor	Very poor	Poor	Poor	Poor	Very poor	Poor
165NW: NIBSON-----	Poor	Poor	Fair	Very poor	Very poor	Fair	Very poor	Very poor	Fair	---	Very poor	Fair
WAKEEN-----	Poor	Fair	Fair	---	---	Fair	Very poor	Very poor	Fair	---	Very poor	Fair
165PE: PENDEN-----	Fair	Good	Fair	---	---	Poor	Very poor	Poor	Fair	---	Very poor	Fair
165UB: ULY-----	Good	Good	Good	Good	Fair	Fair	Very poor	Very poor	Good	Good	Very poor	Good
165UR: ULY-----	Fair	Good	Good	Good	Fair	Fair	Very poor	Very poor	Fair	Good	Very poor	Good
ROXBURY-----	Good	Good	Good	Fair	Fair	Fair	Poor	Fair	Good	Fair	Poor	Fair
167CR: CRETE-----	Good	Good	Good	Fair	Fair	Fair	Very poor	Very poor	Good	Fair	Very poor	Good
167DR: DORRANCE-----	Poor	Poor	Fair	---	---	Poor	Very poor	Very poor	Poor	---	Very poor	Fair
167RC: ROXBURY-----	Good	Good	Good	Fair	Fair	Fair	Poor	Fair	Good	Fair	Poor	Fair
195BD: BADLAND-----	---	---	---	---	---	---	---	---	---	---	---	---
MANVEL-----	Poor	Fair	Fair	Poor	Very poor	---	Very poor	Very poor	Poor	---	Very poor	Fair
195CC: CAMPUS-----	Poor	Fair	Good	---	---	Poor	Very poor	Very poor	Fair	---	Very poor	Fair
CANLON-----	Very poor	Poor	Poor	---	---	Poor	Very poor	Very poor	Poor	---	Very poor	Poor
195CF: CARLSON-----	Good	Good	Fair	---	---	Fair	Poor	Fair	Fair	---	Poor	Fair

WILDLIFE INTERPRETATIONS--Continued  
Ellis County, Kansas

Map symbol and soil name	Potential for habitat elements								Potential as habitat for--			
	Grain and seed crops	Grasses and legumes	Wild herba- ceous plants	Hard- wood trees	Conif- erous plants	Shrubs	Wetland plants	Shallow water areas	Open- land wild- life	Wood- land wild- life	Wetland wild- life	Range- land wild- life
195HU: HUMBARGER-----	Fair	Fair	Good	Fair	Fair	Fair	Poor	Poor	Fair	Fair	Poor	Fair
195IF: INAVALE-----	Very poor	Poor	Fair	Fair	Fair	Fair	Very poor	Very poor	Poor	Fair	Very poor	Fair
195PF: PENDEN-----	Fair	Good	Fair	---	---	Poor	Very poor	Poor	Fair	---	Very poor	Fair
195PO: PENDEN-----	Poor	Fair	Fair	---	---	Poor	Very poor	Poor	Fair	---	Very poor	Fair
Ab: Fluvents-----	Poor	Poor	Fair	Poor	Good	---	Poor	Very poor	Poor	Fair	Very poor	Fair
Ac: New Cambria-----	Poor	Fair	Poor	Good	Good	Fair	Poor	Poor	Poor	Good	Poor	Poor
Ad: Fluvaquents-----	Fair	Fair	Good	Poor	Poor	Fair	Fair	Fair	Fair	Poor	Fair	Fair
Ae: ANSELMO-----	Fair	Good	Good	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor	Good
Am: ARMO-----	Good	Good	Good	---	---	Fair	Poor	Very poor	Good	---	Very poor	Fair
An: ARMO-----	Fair	Good	Good	---	---	Fair	Poor	Very poor	Good	---	Very poor	Fair
Ao: ARMO-----	Fair	Good	Good	---	---	Fair	Poor	Very poor	Good	---	Very poor	Fair
Ar: ARMO-----	Poor	Fair	Good	---	---	Fair	Poor	Very poor	Fair	---	Very poor	Fair
Bf: BOEL-----	Fair	Fair	Good	Good	Good	Good	Fair	Fair	Fair	Good	Poor	Fair
Bg: BOGUE-----	Poor	Fair	Poor	Poor	Poor	Poor	Very poor	Poor	Poor	Poor	Very poor	Poor
Bo: BOGUE-----	Poor	Fair	Poor	Poor	Poor	Poor	Very poor	Poor	Poor	Poor	Very poor	Poor
ARMO-----	Poor	Fair	Good	---	---	Fair	Poor	Very poor	Fair	---	Very poor	Fair
BOP: BORROW PITS-----	---	---	---	---	---	---	---	---	---	---	---	---
Br: BROWNELL-----	Poor	Fair	Fair	---	---	Poor	Very poor	Very poor	Fair	---	Very poor	Poor
Cc: CAMPUS-----	Fair	Good	Good	---	---	Poor	Very poor	Very poor	Fair	---	Very poor	Fair
CARLSON-----	Fair	Good	Fair	---	---	Poor	Poor	Poor	Fair	---	Poor	Poor
Cd: CAMPUS-----	Poor	Fair	Good	---	---	Poor	Very poor	Very poor	Fair	---	Very poor	Fair
PENDEN-----	Poor	Fair	Fair	---	---	Poor	Very poor	Poor	Fair	---	Very poor	Fair
Ce: CANLON-----	Very poor	Poor	Poor	---	---	Poor	Very poor	Very poor	Poor	---	Very poor	Poor

WILDLIFE INTERPRETATIONS--Continued  
Ellis County, Kansas

Map symbol and soil name	Potential for habitat elements								Potential as habitat for--			
	Grain and seed crops	Grasses and legumes	Wild herba- ceous plants	Hard- wood trees	Conif- erous plants	Shrubs	Wetland plants	Shallow water areas	Open- land wild- life	Wood- land wild- life	Wetland wild- life	Range- land wild- life
CAMPUS-----	Poor	Fair	Good	---	---	Poor	Very poor	Very poor	Fair	---	Very poor	Fair
Cm: CORINTH-----	Fair	Fair	Fair	---	---	Fair	Very poor	Very poor	Fair	---	Very poor	Poor
Cn: CORINTH-----	Fair	Fair	Fair	---	---	Fair	Very poor	Very poor	Fair	---	Very poor	Poor
Co: CORINTH-----	Fair	Fair	Fair	---	---	Fair	Very poor	Very poor	Fair	---	Very poor	Poor
Cr: CRETE-----	Good	Good	Good	Fair	Fair	Fair	Very poor	Very poor	Good	Fair	Very poor	Good
De: DETROIT-----	Good	Good	Good	---	---	Good	Good	Good	Good	---	Good	Good
Ee: ELTREE-----	Good	Good	Fair	---	---	Fair	Poor	Very poor	Good	---	Very poor	Fair
Ef: ELTREE-----	Good	Good	Fair	---	---	Fair	Poor	Very poor	Good	---	Very poor	Fair
Eg: ELTREE-----	Fair	Good	Fair	---	---	Fair	Very poor	Very poor	Fair	---	Very poor	Fair
Eh: ELTREE-----	Poor	Fair	Fair	---	---	Fair	Very poor	Very poor	Fair	---	Very poor	Fair
GRP: PITS-----	Very poor	Very poor	Poor	Poor	Poor	Poor	Very poor	Fair	Very poor	Very poor	Poor	Poor
Ha: HARNEY-----	Good	Good	Good	Poor	Poor	Good	Poor	Fair	Good	---	Poor	Good
Hb: HARNEY-----	Good	Good	Good	Poor	Poor	Good	Poor	Fair	Good	---	Poor	Good
Hc: HARNEY-----	Fair	Good	Fair	Poor	Poor	Fair	Poor	Poor	Fair	---	Poor	Fair
Hd: HARNEY-----	Fair	Good	Fair	Poor	Poor	Fair	Poor	Poor	Fair	---	Poor	Fair
He: ARMO-----	Fair	Good	Good	---	---	Fair	Poor	Very poor	Good	---	Very poor	Fair
HARNEY-----	Fair	Good	Fair	Poor	Poor	Fair	Poor	Poor	Fair	---	Poor	Fair
Hf: CARLSON-----	Good	Good	Fair	---	---	Fair	Poor	Fair	Fair	---	Fair	Fair
HARNEY-----	Good	Good	Good	Poor	Poor	Good	Poor	Fair	Good	---	Poor	Good
Hg: CARLSON-----	Good	Good	Fair	---	---	Fair	Poor	Fair	Fair	---	Poor	Fair
HARNEY-----	Good	Good	Good	Poor	Poor	Good	Poor	Fair	Good	---	Poor	Good
HGG: HARNEY-----	Good	Good	Good	Poor	Poor	Good	Poor	Fair	Good	---	Poor	Good
MENTO-----	Fair	Good	Fair	---	---	Fair	Poor	Poor	Fair	---	Poor	Fair
Hh: HARNEY-----	Good	Good	Good	Poor	Poor	Good	Poor	Fair	Good	---	Poor	Good
WAKEEN-----	Fair	Good	Fair	---	---	Fair	Poor	Very poor	Fair	---	Very poor	Fair
Hk: HARNEY-----	Good	Good	Good	Poor	Poor	Good	Poor	Fair	Good	---	Poor	Good

WILDLIFE INTERPRETATIONS--Continued  
Ellis County, Kansas

Map symbol and soil name	Potential for habitat elements								Potential as habitat for--			
	Grain and seed crops	Grasses and legumes	Wild herba- ceous plants	Hard- wood trees	Conif- erous plants	Shrubs	Wetland plants	Shallow water areas	Open- land wild- life	Wood- land wild- life	Wetland wild- life	Range- land wild- life
WAKEEN-----	Fair	Good	Fair	---	---	Fair	Poor	Very poor	Fair	---	Very poor	Fair
Hl: ARMO-----	Poor	Fair	Good	---	---	Fair	Poor	Very poor	Fair	---	Very poor	Fair
HEIZER-----	Very poor	Poor	Poor	---	---	Poor	Very poor	Very poor	Poor	---	Very poor	Poor
HMM: HEIZER-----	Very poor	Poor	Poor	---	---	Poor	Very poor	Very poor	Poor	---	Very poor	Poor
BROWNELL-----	Poor	Fair	Fair	---	---	Poor	Very poor	Very poor	Fair	---	Very poor	Poor
Hn: Dorrance-----	Poor	Poor	Fair	---	---	Poor	Very poor	Very poor	Poor	---	Very poor	Fair
Ho: HOLDREGE-----	Good	Good	Fair	Good	Fair	Fair	Very poor	Very poor	Good	Good	Very poor	Fair
Hp: HOLDREGE-----	Good	Good	Fair	Good	Fair	Fair	Very poor	Very poor	Good	Good	Very poor	Fair
Hr: HORD-----	Good	Good	Good	Good	Good	Good	Very poor	Very poor	Good	Good	Very poor	Good
In: INVALE-----	Poor	Fair	Good	Fair	Fair	Fair	Very poor	Very poor	Fair	Fair	Very poor	Fair
Mc: MCCOOK-----	Good	Good	Good	Good	Fair	Good	Very poor	Very poor	Good	Fair	Very poor	Good
Md: MCCOOK-----	Good	Good	Good	Good	Fair	Good	Very poor	Very poor	Good	Fair	Very poor	Good
Me: MENTO-----	Good	Good	Fair	---	---	Fair	Poor	Poor	Good	---	Poor	Fair
Mf: MENTO-----	Fair	Good	Fair	---	---	Fair	Poor	Poor	Fair	---	Poor	Fair
Mg: MENTO-----	Fair	Good	Fair	---	---	Fair	Poor	Poor	Fair	---	Poor	Fair
Mo: MENTO-----	Fair	Good	Fair	---	---	Fair	Poor	Poor	Fair	---	Poor	Fair
Mu: MUNJOR-----	Fair	Fair	Good	Fair	Fair	Good	Poor	Poor	Fair	Fair	Poor	Good
Nc: NEW CAMBRIA-----	Fair	Fair	Poor	Good	Good	Fair	Poor	Poor	Fair	Good	Poor	Poor
Nn: NIBSON-----	Poor	Poor	Fair	Very poor	Very poor	Fair	Very poor	Very poor	Fair	---	Very poor	Fair
Rb: ROXBURY-----	Good	Good	Good	Fair	Fair	Fair	Poor	Fair	Good	Fair	Poor	Fair
Rf: ROXBURY-----	Good	Good	Good	Fair	Fair	Fair	Poor	Fair	Good	Fair	Poor	Fair
RIV: RIVERWASH AND SANDBARS-----	Poor	Poor	Fair	Poor	Good	---	Poor	Very poor	Poor	Fair	Very poor	Fair
Ro: Heizer-----	Very poor	Poor	Poor	---	---	Poor	Very poor	Very poor	Poor	---	Very poor	Poor
BROWNELL-----	Poor	Fair	Fair	---	---	Poor	Very poor	Very poor	Fair	---	Very poor	Poor

WILDLIFE INTERPRETATIONS--Continued  
Ellis County, Kansas

Map symbol and soil name	Potential for habitat elements								Potential as habitat for--			
	Grain and seed crops	Grasses and legumes	Wild herba- ceous plants	Hard- wood trees	Conif- erous plants	Shrubs	Wetland plants	Shallow water areas	Open- land wild- life	Wood- land wild- life	Wetland wild- life	Range- land wild- life
ROO: ROXBURY-----	Good	Good	Good	Fair	Fair	Fair	Poor	Fair	Good	Fair	Poor	Fair
UCC: ULY-----	Fair	Good	Good	Good	Fair	Fair	Very poor	Very poor	Fair	Good	Very poor	Good
W: WATER-----	---	---	---	---	---	---	---	---	---	---	---	---
Wa: WAKEEN-----	Fair	Good	Fair	---	---	Fair	Poor	Very poor	Fair	---	Very poor	Fair
We: WAKEEN-----	Fair	Good	Fair	---	---	Fair	Poor	Very poor	Fair	---	Very poor	Fair
Wh: WAKEEN-----	Fair	Good	Fair	---	---	Fair	Poor	Very poor	Fair	---	Very poor	Fair
Wk: WAKEEN-----	Poor	Fair	Fair	---	---	Fair	Very poor	Very poor	Fair	---	Very poor	Fair
Wn: WANN-----	Good	Good	Good	Good	Fair	Good	Poor	Fair	Good	Good	Fair	Good



YIELDS PER ACRE OF PASTURE AND HAYLAND  
Ellis County, Kansas

## Use and Explanation of Pastureland and Hayland Interpretations

This subsection provides information concerning the suitability of soils for the production of pasture and hayland. This subsection may contain pasture and hayland suitability groupings, land capability and yield estimates, yield estimates for individual grasses or legumes, or other information pertaining to the production of forage.

## Pasture and Hayland Suitability Groupings

Soils are placed in pasture and hayland groups according to their suitability for the production of forage. The soils in each group are enough alike to be suited to the same grasses or legumes, to have similar limitations and hazards, to require similar management, and to have similar productivity and other responses to management. Thus, the pasture and hayland suitability group is a convenient way of grouping the soils for their management. If used, these groupings are identified and described in other reports in the subsection.

## Yield Estimates

The average yields per acre that can be expected of the principal pasture or hayland crops, under a high level of management, are presented in this subsection. In any given year, yields may be higher or lower than those indicated in the tables because of variations in rainfall or 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 are also considered.

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

The Pasture and Hayland table show yield estimates in tons per acre and animal unit months for pasture and hayland groups. An animal unit month is the amount of forage required by one animal unit (AU) for 30 days. One animal unit (AU) is one (1000 pound) mature cow and a calf up to weaning age (usually six months of age) or their equivalent. The Natural Resources Conservation Service uses 900 pounds of air dry forage as the amount needed to meet this requirement. To maintain a healthy and vigorous plant community, the degree of use should never be greater than 50 percent. Therefore only 25 percent of the total biomass grown is considered consumed by the grazing animal. Animal Unit Months can be converted to air dry pounds per acre production by multiplying the AUM by 30 days, then by 30 pounds per day, and then by four. This figure is the amount of total forage production.

Planners of management systems for individual fields or farms should consider the detailed information given in the description of each soil in the Nontechnical Description section. Specific information on plants and yields can be obtained from the local office of the Natural Resources Conservation Service or the Cooperative Extension Service.

(Yields in the "N" columns are for nonirrigated soils; those in the "I" columns are for irrigated soils. Yields are those that can be expected under a high level of nonirrigated and irrigated management by component. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil)  
Animal-unit-month: The amount of forage or feed required to feed one animal unit (one cow, one horse, one mule, five sheep, or five goats) for 30 days.

Map symbol and soil name	Land capability		Alfalfa hay		Smooth brome grass	
	N	I	N	I	N	I
			Tons	Tons	AUM	AUM
141HM: Harney-----	3e	---	---	---	3.50	---
Mento-----	4e	---	---	---	2.50	---
163AU: Armo-----	6e	---	---	---	---	---
Bogue-----	6e	---	---	---	---	---
163HE: Harney-----	3e	---	---	---	3.50	---
Mento-----	4e	---	---	---	2.50	---
163IC: Inavale-----	6e	4e	---	---	---	---
163WX: Wakeen-----	6e	---	---	---	---	---
163WY: Wakeen-----	3e	---	---	---	3.00	---
Harney-----	2e	2e	---	---	4.00	---
165BO: Bogue-----	6e	---	---	---	---	---
165NW: Nibson-----	6e	---	---	---	---	---
Wakeen-----	6e	---	---	---	---	---
165PE: Penden-----	3e	---	---	---	---	---
165UB: Uly-----	2e	2e	2.40	5.00	---	---
165UR: Uly-----	4e	4e	1.70	4.00	---	---
Roxbury-----	2w	2w	3.50	6.50	---	---
167CR: Crete-----	2s	2s	3.20	5.50	---	---
167DR: Dorrance-----	6s	6s	---	---	---	---
167RC: Roxbury-----	5w	---	---	---	4.00	---
195BD: Badland-----	s	---	---	---	---	---
Manvel-----	6	4e	---	---	---	---
195CC: Campus-----	6e	---	---	---	---	---
Canlon-----	7s	---	---	---	---	---
195CF: Carlson-----	2e	2e	---	5.50	---	---
195HU: Humbarger-----	5w	---	---	---	---	---
195IF: Inavale-----	6w	---	---	---	---	---
195PF: Penden-----	3e	---	---	---	---	---
195PO: Penden-----	6e	---	---	---	---	---

(Yields in the "N" columns are for nonirrigated soils; those in the "I" columns are for irrigated soils. Yields are those that can be expected under a high level of nonirrigated and irrigated management by component. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil)  
Animal-unit-month: The amount of forage or feed required to feed one animal unit (one cow, one horse, one mule, five sheep, or five goats) for 30 days.

Map symbol and soil name	Land capability		Alfalfa hay		Smooth brome grass	
	N	I	N	I	N	I
			Tons	Tons	AUM	AUM
Ab: Fluvents-----	6w	---	---	---	---	---
Ac: New Cambria-----	5w	---	---	---	---	---
Ad: Fluvaquents-----	2w	2w	3.00	6.00	4.50	10.50
Ae: Anselmo-----	3e	3e	2.30	4.50	---	---
Am: Armo-----	2e	---	---	---	4.00	---
An: Armo-----	3e	---	---	---	---	---
Ao: Armo-----	4e	---	---	---	3.50	---
Ar: Armo-----	6e	---	---	---	---	---
Bf: Boel-----	3w	3w	2.50	4.00	---	---
Bg: Bogue-----	6e	---	---	---	---	---
Bo: Bogue-----	6e	---	---	---	---	---
Armo-----	6e	---	---	---	---	---
BOP: Borrow Pits-----	---	---	---	---	---	---
Br: Brownell-----	6e	---	---	---	---	---
Cc: Campus-----	4e	---	---	---	2.00	---
Carlson-----	3e	---	---	---	3.50	---
Cd: Campus-----	6e	---	---	---	2.00	---
Penden-----	6e	---	---	---	3.00	---
Ce: Canlon-----	7s	---	---	---	---	---
Campus-----	6e	---	---	---	---	---
Cm: Corinth-----	3e	---	1.70	---	3.50	---
Cn: Corinth-----	4e	---	1.50	---	3.50	---
Co: Corinth-----	6e	---	---	---	3.00	---
Cr: Crete-----	2s	2s	3.20	5.50	---	---
De: Detroit-----	2c	1	---	---	4.00	10.00
Ee: Eltree-----	2c	1	3.00	6.00	4.00	11.00
Ef: Eltree-----	2e	2e	2.50	5.50	4.00	11.00
Eg: Eltree-----	3e	3e	2.00	5.00	3.50	---

(Yields in the "N" columns are for nonirrigated soils; those in the "I" columns are for irrigated soils. Yields are those that can be expected under a high level of nonirrigated and irrigated management by component. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil)  
Animal-unit-month: The amount of forage or feed required to feed one animal unit (one cow, one horse, one mule, five sheep, or five goats) for 30 days.

Map symbol and soil name	Land capability		Alfalfa hay		Smooth brome grass	
	N	I	N	I	N	I
			Tons	Tons	AUM	AUM
Eh: Eltree-----	6e	---	---	---	3.00	---
GRP: Pits-----	8s	---	---	---	---	---
Ha: Harney-----	2c	1	---	6.50	---	---
Hb: Harney-----	2e	2e	---	5.50	4.00	8.00
Hc: Harney-----	3e	---	---	---	3.50	---
Hd: Harney-----	4e	---	---	---	3.00	---
He: Armo-----	4e	---	---	---	3.50	---
Harney-----	4e	---	---	---	3.00	---
Hf: Carlson-----	2c	1	---	6.50	4.50	9.00
Harney-----	2c	1	---	6.50	4.50	9.00
Hg: Carlson-----	2e	2e	---	5.50	4.00	8.00
Harney-----	2e	2e	---	5.50	4.00	8.00
HGG: Harney-----	2e	2e	---	---	---	---
Mento-----	3e	---	---	---	---	---
Hh: Harney-----	2c	1	---	6.50	4.50	9.00
Wakeen-----	3e	---	---	---	3.00	---
Hk: Harney-----	2e	2e	---	5.50	4.00	8.00
Wakeen-----	3e	---	---	---	3.00	---
Hl: Armo-----	6e	---	---	---	---	---
Heizer-----	7s	---	---	---	---	---
HMM: Heizer-----	7s	---	---	---	---	---
Brownell-----	6e	---	---	---	---	---
Hn: Dorrance-----	6s	6s	---	---	---	---
Ho: Holdrege-----	2c	1	2.50	6.50	---	---
Hp: Holdrege-----	2e	2e	2.30	6.00	---	---
Hr: Hord-----	2c	1	3.00	6.50	3.50	11.00
In: Inavale-----	6e	4e	---	---	---	---
Mc: Mccook-----	2e	2e	2.80	6.20	---	---
Md: Mccook-----	2c	1	2.80	6.00	---	---

(Yields in the "N" columns are for nonirrigated soils; those in the "I" columns are for irrigated soils. Yields are those that can be expected under a high level of nonirrigated and irrigated management by component. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil)  
Animal-unit-month: The amount of forage or feed required to feed one animal unit (one cow, one horse, one mule, five sheep, or five goats) for 30 days.

Map symbol and soil name	Land capability		Alfalfa hay		Smooth brome grass	
	N	I	N	I	N	I
			Tons	Tons	AUM	AUM
Me: Mento-----	2s	---	---	---	3.00	---
Mf: Mento-----	3e	---	---	---	3.00	---
Mg: Mento-----	3e	---	---	---	2.50	---
Mo: Mento-----	4e	---	---	---	2.00	---
Mu: Munjor-----	3w	---	2.00	---	4.00	---
Nc: New Cambria-----	2s	2s	3.50	5.50	5.00	10.00
Nn: Nibson-----	6e	---	---	---	---	---
Rb: Roxbury-----	2c	1	3.00	7.00	4.50	11.00
Rf: Roxbury-----	2w	2w	3.50	6.50	5.00	11.00
RIV: Riverwash And Sandbars---	8w	---	---	---	---	---
Ro: Heizer-----	7s	---	---	---	---	---
Brownell-----	6e	---	---	---	---	---
ROO: Roxbury-----	2w	2w	3.50	6.50	---	---
UCC: Uly-----	3e	3e	1.90	4.50	---	---
W: Water-----	---	---	---	---	---	---
Wa: Wakeen-----	3e	---	---	---	3.00	---
We: Wakeen-----	4e	---	---	---	2.50	---
Wh: Wakeen-----	4e	---	---	---	2.50	---
Wk: Wakeen-----	6e	---	---	---	---	---
Wn: Wann-----	2w	2w	3.70	6.00	---	---

CONSERVATION TREE AND SHRUB MANAGEMENT  
Ellis County, Kansas

A Conservation Tree/Shrub Suitability Group (CTSG), formerly Windbreak Suitability Group, is a physiographic unit or area having similar climatic and edaphic characteristics that control the selection and height growth of trees and shrubs.

In this table, the Conservation Tree and Shrub Grouping is expressed as a group index number. The group index for Conservation Tree and Shrub groups (CTSG) are a guide for species best suited for different kinds of soil and for prediction height, growth, and effectiveness. The groupings can be used when selection woody plants for windbreaks, wildlife plantings riparian buffers, reforestation, other environmental plantings, recreation, landscaping, wetland restoration or enhancement and critical area plantings. CTSG's are developed to assure satisfactory species selection and adaptation to specific conditions of soil, climate and physiography. CTSG's are a guide for selection species best suited for different kinds of soil and prediction height growth and effectiveness.

All soil series mapped in the state have been placed in 10 groups of similar soil characteristics. Groups 1, 2, 3, 4, 6, and 9 are further divided into subgroups. In addition, all groups provide information by Major Land Resource Areas.

Each tree or shrub species has certain climatic and physiographic limits. Within these parameters a tree or shrub may be well or poorly suited because of soil characteristics. Each tree or shrub also has definable potentials of height growth depending on the factors just mentioned. Accurate definitions of potential heights are necessary for proper windbreak planning and design.

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

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

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

Windbreaks are often planted on land that did not grow trees originally. Knowledge of how trees perform on such land can be gained only by observing and recording their performance where trees have been planted and survived. The problem is compounded by the fact that many favorite windbreak species are not indigenous to the areas in which they are planted.

The Kansas Field Office Technical Guide Notice KS-230, Conservation Tree and Shrub Plantings Suitability Groups shows the adapted species listing for each group index number. Showing the height that locally grown trees and shrubs are expected to reach in 20 years on various soils. The estimates are based on measurements and observation of established plantings that have been given adequate care. This information should be used to determine the placement of a windbreak, the area protected and the arrangement of species.

A number of attributes are included in the CTSG species tables for each group number found in this section of the Field Office Technical Guide. These attributes were rated subjectively and assigned a relative value to further assist those unfamiliar with individual species characteristics or desirability for the intended use. Definitions and explanations can be found. Additional information on planning windbreaks and screens and planting and caring for trees and shrubs can be obtained from the local office of the Natural Resources Conservation Service or of the Cooperative Extension Service or from a commercial nursery. See part 537 of the National Forestry Manual for additional information.

In the Tree and Shrub Management table interpretive ratings are given for various aspects of forest and conservation tree and shrub management. Some rating class terms indicate the degree to which the soils are suited to a specified forest management practice. Well suited indicates that the soil has features that are favorable for the specified practice and has no limitations. Good performance can be expected, and little or no maintenance is needed. Moderately well suited indicates that the soil has features that are moderately favorable for the specified practice. One or more soil properties are less than desirable and fair performance can be expected. Some maintenance is needed. Poorly suited indicates that the soil has one or more properties that are unfavorable for the specified practice. Overcoming the unfavorable properties requires special design, extra maintenance, and costly alteration. Unsited indicates that the expected performance of the soil is unacceptable for the specified practice or that extreme measures are needed to overcome the undesirable soil properties.

The paragraphs that follow indicate the soil properties considered in rating the soils for forest and conservation tree and shrub management practices. More detailed information about the criteria used in the ratings is available in the "National Forestry Manual," which is available in local offices of the Natural Resources Conservation Service or on the Internet. Also, in the Kansas Field Office Technical Guide Notice KS-230, Conservation Tree and Shrub Plantings Suitability Groups.

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

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

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

Ratings in the column potential for seedling mortality are based on flooding, ponding, depth to a water table, content of lime, reaction, salinity, available water capacity, soil moisture regime, soil temperature regime, aspect, and slope. The soils are described as having a low, moderate, or high potential for seedling mortality. See the National Forestry Manual, Subpart B for criteria used in rating management concerns. Specific information on plants and yields can be obtained from the local office of the Natural Resources Conservation Service or the Cooperative Extension Service.

CONSERVATION TREE AND SHRUB MANAGEMENT  
Ellis County, Kansas

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. Pines and spruces are prone to disease problems. See text for further explanation of ratings in this table.)

Map symbol and soil name	Wind break Group	Suitability for hand planting	Suitability for mechanical planting	Suitability for mechanical site preparation (surface)	Suitability for mechanical site preparation (deep)	Potential for seedling mortality
		Rating class and limiting features	Rating class and limiting features	Rating class and limiting features	Rating class and limiting features	Rating class and limiting features
141HM: Harney-----	3	Moderately suited Stickiness	Moderately suited Stickiness Slope	Well suited	Well suited	Low
Mento-----	9C	Poorly suited Stickiness	Poorly suited Stickiness Slope	Poorly suited Stickiness	Well suited	Low
163AU: Armo-----	8	Well suited	Moderately suited Slope	Well suited	Well suited	Low
Bogue-----	4C	Poorly suited Stickiness	Poorly suited Stickiness Slope	Poorly suited Stickiness	Well suited	Low
163HE: Harney-----	3	Moderately suited Stickiness	Moderately suited Stickiness Slope	Well suited	Well suited	Low
Mento-----	9C	Poorly suited Stickiness	Poorly suited Stickiness Slope	Poorly suited Stickiness	Well suited	Low
163IC: Inavale-----	1	Well suited	Well suited	Well suited	Well suited	Low
163WX: Wakeen-----	8	Well suited	Moderately suited Slope	Well suited	Well suited	Moderate  Lime Soil reaction
163WY: Wakeen-----	8	Well suited	Well suited	Well suited	Well suited	Moderate Lime Soil reaction Low
Harney-----	3	Moderately suited Stickiness	Moderately suited Stickiness	Well suited	Well suited	
165BO: Bogue-----	4C	Poorly suited Stickiness	Poorly suited Stickiness Slope	Poorly suited Stickiness	Well suited	Low
165NW: Nibson-----	10	Well suited	Moderately suited Slope Rock fragments	Well suited	Well suited	Moderate  Soil reaction Lime
Wakeen-----	8	Well suited	Moderately suited Slope	Well suited	Well suited	Moderate  Lime Soil reaction
165PE: Penden-----	8	Well suited	Moderately suited Slope	Well suited	Well suited	Moderate  Soil reaction
165UB: Uly-----	3	Well suited	Well suited	Well suited	Well suited	Low
165UR: Uly-----	3	Well suited	Moderately suited Slope	Well suited	Well suited	Low
Roxbury-----	1	Well suited	Well suited	Well suited	Well suited	Low
167CR: Crete-----	4C	Moderately suited Stickiness	Moderately suited Stickiness	Well suited	Well suited	Low
167DR: Dorrance-----	10	Well suited	Moderately suited Slope	Well suited	Well suited	Low
167RC: Roxbury-----	1K	Well suited	Well suited	Well suited	Well suited	Low
195BD: Badland-----		Not rated	Not rated	Not rated	Not rated	Not rated
Manvel-----	8	Well suited	Moderately suited Slope	Well suited	Well suited	Moderate  Soil reaction
195CC: Campus-----	8	Well suited	Moderately suited	Well suited	Well suited	Moderate

CONSERVATION TREE AND SHRUB MANAGEMENT  
Ellis County, Kansas

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. Pines and spruces are prone to disease problems. See text for further explanation of ratings in this table.)

Map symbol and soil name	Wind break Group	Suitability for hand planting	Suitability for mechanical planting	Suitability for mechanical site preparation (surface)	Suitability for mechanical site preparation (deep)	Potential for seedling mortality
		Rating class and limiting features	Rating class and limiting features	Rating class and limiting features	Rating class and limiting features	Rating class and limiting features
Canlon-----	10	Well suited	Slope Poorly suited Slope	Poorly suited Slope	Unsuited Restrictive layer Slope	Lime Soil reaction Moderate Lime
195CF: Carlson-----	3	Moderately suited Stickiness	Moderately suited Stickiness	Well suited	Well suited	Soil reaction Low
195HU: Humbarger-----	1K	Well suited	Well suited	Well suited	Well suited	Moderate Soil reaction
195IF: Inavale-----	1	Well suited	Well suited	Well suited	Well suited	Low
195PF: Penden-----	8	Well suited	Moderately suited Slope	Well suited	Well suited	Moderate  Lime Soil reaction
195PO: Penden-----	8	Well suited	Moderately suited Slope	Well suited	Well suited	Moderate  Soil reaction
Ab: Fluents-----		Well suited	Moderately suited Slope	Well suited	Well suited	Low
Ac: New Cambria-----	1	Poorly suited Stickiness	Poorly suited Stickiness	Poorly suited Stickiness	Well suited	Low
Ad: Fluvaquents-----	1K	Well suited	Well suited	Well suited	Well suited	Moderate Soil reaction
Ae: Anselmo-----	5	Well suited	Well suited	Well suited	Well suited	Low
Am: Armo-----	8	Well suited	Well suited	Well suited	Well suited	Low
An: Armo-----	8	Well suited	Moderately suited Slope	Well suited	Well suited	Low
Ao: Armo-----	8	Well suited	Moderately suited Slope	Well suited	Well suited	Low
Ar: Armo-----	8	Well suited	Moderately suited Slope	Well suited	Well suited	Low
Bf: Boel-----	1K	Well suited	Well suited	Well suited	Well suited	Low
Bg: Bogue-----	4C	Poorly suited Stickiness	Poorly suited Stickiness Slope	Poorly suited Stickiness	Well suited	Low
Bo: Bogue-----	4C	Poorly suited Stickiness	Poorly suited Stickiness Slope	Poorly suited Stickiness Slope	Poorly suited Slope	Low
Armo-----	8	Well suited	Moderately suited Slope	Well suited	Well suited	Low
BOP: Borrow Pits-----		Not rated	Not rated	Not rated	Not rated	Not rated
Br: Brownell-----	10	Moderately suited Rock fragments	Poorly suited  Rock fragments Slope	Poorly suited  Rock fragments	Well suited	High  Lime  Soil reaction
Cc: Campus-----	8	Well suited	Moderately suited Slope	Well suited	Well suited	Moderate
Carlson-----	3	Moderately suited Stickiness	Moderately suited Stickiness Slope	Well suited	Well suited	Lime Soil reaction Low



CONSERVATION TREE AND SHRUB MANAGEMENT  
Ellis County, Kansas

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. Pines and spruces are prone to disease problems. See text for further explanation of ratings in this table.)

Map symbol and soil name	Wind break Group	Suitability for hand planting	Suitability for mechanical planting	Suitability for mechanical site preparation (surface)	Suitability for mechanical site preparation (deep)	Potential for seedling mortality
		Rating class and limiting features	Rating class and limiting features	Rating class and limiting features	Rating class and limiting features	Rating class and limiting features
Cd: Campus-----	8	Well suited	Moderately suited Slope	Well suited	Well suited	Moderate
Penden-----	8	Well suited	Moderately suited Slope	Well suited	Well suited	Lime Soil reaction Moderate
Ce: Canlon-----	10	Well suited	Moderately suited Slope	Poorly suited Slope	Unsuited Restrictive layer Slope	Soil reaction Moderate Lime
Campus-----	8	Well suited	Moderately suited Slope	Well suited	Well suited	Soil reaction Moderate Lime Soil reaction
Cm: Corinth-----	8	Moderately suited Stickiness	Moderately suited Stickiness	Poorly suited Stickiness	Well suited	Moderate Soil reaction
Cn: Corinth-----	8	Moderately suited Stickiness	Moderately suited Stickiness Slope	Poorly suited Stickiness	Well suited	Moderate Soil reaction
Co: Corinth-----	8	Moderately suited Stickiness	Moderately suited Stickiness Slope	Poorly suited Stickiness	Well suited	Moderate Soil reaction
Cr: Crete-----	4C	Moderately suited Stickiness	Moderately suited Stickiness	Well suited	Well suited	Low
De: Detroit-----	1	Moderately suited Stickiness	Moderately suited Stickiness	Poorly suited Stickiness	Well suited	Low
Ee: Eltree-----	3	Well suited	Well suited	Well suited	Well suited	Low
Ef: Eltree-----	3	Well suited	Well suited	Well suited	Well suited	Low
Eg: Eltree-----	3	Well suited	Moderately suited Slope	Well suited	Well suited	Low
Eh: Eltree-----	3	Well suited	Moderately suited Slope	Well suited	Well suited	Low
GRP: Pits-----		Not rated	Not rated	Not rated	Not rated	Not rated
Ha: Harney-----	3	Moderately suited Stickiness	Moderately suited Stickiness	Well suited	Well suited	Low
Hb: Harney-----	3	Moderately suited Stickiness	Moderately suited Stickiness	Well suited	Well suited	Low
Hc: Harney-----	3	Moderately suited Stickiness	Moderately suited Stickiness Slope	Well suited	Well suited	Low
Hd: Harney-----	3	Moderately suited Stickiness	Moderately suited Stickiness	Well suited	Well suited	Low
He: Armo-----	8	Well suited	Moderately suited Slope	Well suited	Well suited	Low
Harney-----	3	Moderately suited Stickiness	Moderately suited Stickiness Slope	Well suited	Well suited	Low

CONSERVATION TREE AND SHRUB MANAGEMENT  
Ellis County, Kansas

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. Pines and spruces are prone to disease problems. See text for further explanation of ratings in this table.)

Map symbol and soil name	Wind break Group	Suitability for hand planting	Suitability for mechanical planting	Suitability for mechanical site preparation (surface)	Suitability for mechanical site preparation (deep)	Potential for seedling mortality
		Rating class and limiting features	Rating class and limiting features	Rating class and limiting features	Rating class and limiting features	Rating class and limiting features
Hf: Carlson-----	3	Moderately suited	Moderately suited	Well suited	Well suited	Low
Harney-----	3	Stickiness Moderately suited	Stickiness Moderately suited	Well suited	Well suited	Low
Hg: Carlson-----	3	Stickiness Moderately suited	Stickiness Moderately suited	Well suited	Well suited	Low
Harney-----	3	Stickiness Moderately suited	Stickiness Moderately suited	Well suited	Well suited	Low
HGG: Harney-----	3	Stickiness Moderately suited	Stickiness Moderately suited	Well suited	Well suited	Low
Mento-----	9C	Poorly suited Stickiness	Poorly suited Stickiness	Poorly suited Stickiness	Well suited	Low
Hh: Harney-----	3	Moderately suited	Moderately suited	Well suited	Well suited	Low
Wakeen-----	8	Stickiness Well suited	Stickiness Well suited	Well suited	Well suited	Moderate Lime Soil reaction
Hk: Harney-----	3	Moderately suited	Moderately suited	Well suited	Well suited	Low
Wakeen-----	8	Stickiness Well suited	Stickiness Well suited	Well suited	Well suited	Moderate Lime Soil reaction
Hl: Armo-----	8	Well suited	Moderately suited	Well suited	Well suited	Low
Heizer-----	10	Rock fragments	Poorly suited Slope	Poorly suited Slope	Unsuited Restrictive layer Slope	High Lime Soil reaction
HMM: Heizer-----	10	Moderately suited Rock fragments	Poorly suited Slope	Poorly suited Slope	Unsuited Restrictive layer Slope	High Lime Soil reaction
Brownell-----	10	Moderately suited Rock fragments	Poorly suited Rock fragments Slope	Poorly suited Rock fragments	Well suited	High Lime Soil reaction
Hn: Dorrance-----	10	Well suited	Moderately suited Slope	Well suited	Well suited	Low
Ho: Holdrege-----	3	Well suited	Well suited	Well suited	Well suited	Low
Hp: Holdrege-----	3	Moderately suited Stickiness	Moderately suited Stickiness	Well suited	Well suited	Low
Hr: Hord-----	1	Well suited	Well suited	Well suited	Well suited	Low
In: Inavale-----	1	Well suited	Moderately suited Slope	Well suited	Well suited	Low
Mc: Mccook-----	1K	Well suited	Well suited	Well suited	Well suited	Moderate Soil reaction
Md: Mccook-----	1K	Well suited	Well suited	Well suited	Well suited	Moderate Soil reaction
Me: Mento-----	9C	Poorly suited Stickiness	Poorly suited Stickiness	Poorly suited Stickiness	Well suited	Low

CONSERVATION TREE AND SHRUB MANAGEMENT  
Ellis County, Kansas

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. Pines and spruces are prone to disease problems. See text for further explanation of ratings in this table.)

Map symbol and soil name	Wind break Group	Suitability for hand planting	Suitability for mechanical planting	Suitability for mechanical site preparation (surface)	Suitability for mechanical site preparation (deep)	Potential for seedling mortality
		Rating class and limiting features	Rating class and limiting features	Rating class and limiting features	Rating class and limiting features	Rating class and limiting features
Mf: Mento-----	9C	Poorly suited Stickiness	Poorly suited Stickiness	Poorly suited Stickiness	Well suited	Low
Mg: Mento-----	9C	Poorly suited Stickiness	Poorly suited Stickiness	Poorly suited Stickiness	Well suited	Low
Mo: Mento-----	9C	Poorly suited Stickiness	Poorly suited Stickiness Slope	Poorly suited Stickiness	Well suited	Low
Mu: Munjoy-----	1K	Well suited	Well suited	Well suited	Well suited	Moderate Soil reaction
Nc: New Cambria-----	1K	Poorly suited Stickiness	Poorly suited Stickiness	Poorly suited Stickiness	Well suited	Low
Nn: Nibson-----	10	Well suited	Moderately suited Slope Rock fragments	Well suited	Well suited	Moderate Soil reaction Lime
Rb: Roxbury-----	1	Well suited	Well suited	Well suited	Well suited	Moderate Soil reaction
Rf: Roxbury-----	1K	Well suited	Well suited	Well suited	Well suited	Low
RIV: Riverwash And Sandbars-----		Not rated	Not rated	Not rated	Not rated	Not rated
Ro: Heizer-----	10	Moderately suited Rock fragments	Poorly suited Slope Rock fragments	Poorly suited Slope Rock fragments	Poorly suited Slope	Moderate Soil reaction
Brownell-----	10	Moderately suited Rock fragments	Poorly suited Rock fragments Slope	Poorly suited Rock fragments	Well suited	Moderate Soil reaction
ROO: Roxbury-----	1	Well suited	Well suited	Well suited	Well suited	Low
UCC: Uly-----	3	Well suited	Moderately suited Slope	Well suited	Well suited	Low
W: Water-----		Unsuited Horizon table contains no data	Unsuited Horizon table contains no data	Unsuited Horizon table contains no data	Unsuited Horizon table contains no data	High Horizon table contains no data
Wa: Wakeen-----	8	Well suited	Well suited	Well suited	Well suited	Moderate Lime Soil reaction
We: Wakeen-----	8	Well suited	Well suited	Well suited	Well suited	Moderate Lime Soil reaction
Wh: Wakeen-----	8	Well suited	Moderately suited Slope	Well suited	Well suited	Moderate Lime Soil reaction
Wk: Wakeen-----	8	Well suited	Moderately suited Slope	Well suited	Well suited	Moderate Lime Soil reaction
Wn: Wann-----	1K	Well suited	Well suited	Well suited	Well suited	Low

ENGINEERING INDEX PROPERTIES  
Ellis County, Kansas

Engineering Index Properties table gives the engineering classifications and the range of index 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.

Classification of the soils is determined according to the Unified soil classification system (ASTM, 1998) and the system adopted by the American Association of State Highway and Transportation Officials (AASHTO, 1998). 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. The AASHTO classification for soils tested, with group index numbers in parentheses, is given in Engineering Index Properties table.

Rock fragments larger than 10 inches in diameter and 3 to 10 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage. Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an oven-dry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

Liquid limit and plasticity index (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination. The estimates of particle-size distribution, liquid limit, and plasticity index are generally rounded to the nearest 5 percent. Thus, if the ranges of gradation and Atterberg limits extend a marginal amount (1 or 2 percentage points) across classification boundaries, the classification in the marginal zone is generally omitted in the table.

ENGINEERING INDEX PROPERTIES--Continued  
Ellis County, Kansas

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

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index	
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200			
	In				Pct	Pct					Pct		
141HM: Harney-----	0-10	Silt loam	CL, CL-ML	A-4, A-6	0	0	100	100	95-100	85-100	25-40	5-20	
	10-26	Silty clay loam	CH, CL	A-7-6	0	0	100	100	95-100	85-100	40-60	15-35	
	26-60	Silt loam	CL	A-6, A-7-6	0	0	100	100	95-100	85-100	30-45	10-20	
	Mento-----	0-6	Silty clay loam	CL	A-4, A-6, A-7-6	0	0	100	100	90-100	85-100	30-45	8-20
		6-20	Silty clay loam	CH	A-7	0	0	100	95-100	90-100	85-100	50-70	25-45
	20-48	Silty clay loam	CL	A-6, A-7-6	0	0	100	95-100	90-100	85-100	30-50	11-25	
	>48	Unweathered bedrock			---	---	---	---	---	---	---	---	
163AU: Armo-----	0-12	Loam	CL	A-4, A-6	0	0	95-100	90-100	90-100	70-95	25-40	7-18	
	12-30	Loam	CL	A-4, A-6, A-7	0	0	95-100	90-100	90-100	70-90	25-45	7-22	
	30-60	Silt loam	CL	A-4, A-6, A-7	0	0	95-100	85-100	70-100	65-80	25-45	7-22	
	Bogue-----	0-7	Clay	CH, MH	A-7	0	0	100	100	90-100	90-100	55-80	25-45
		7-21	Clay	CH	A-7	0	0	100	100	90-100	90-100	55-80	30-50
	21-36	Clay	CH, MH	A-7	0	0	100	100	90-100	80-100	55-80	25-45	
	>36	Unweathered bedrock			---	---	---	---	---	---	---	---	
163HE: Harney-----	0-9	Silt loam	CL, CL-ML	A-4, A-6	0	0	100	100	95-100	85-100	25-40	5-20	
	9-34	Silty clay loam	CH, CL	A-7-6	0	0	100	100	95-100	85-100	40-60	15-35	
	34-60	Silt loam	CL	A-6, A-7-6	0	0	100	100	95-100	85-100	30-45	10-20	
	Mento-----	0-5	Silt loam	CL, CL-ML, ML	A-4, A-6	0	0	100	100	90-100	85-100	25-40	5-15
		5-24	Silty clay loam	CH	A-7	0	0	100	95-100	90-100	85-100	50-70	25-45
	24-52	Silt loam	CL	A-6, A-7-6	0	0	100	95-100	90-100	85-100	30-50	11-25	
	52-64	Unweathered bedrock			---	---	---	---	---	---	---	---	
163IC: Inavale-----	0-8	Fine sand	SC-SM, SM, SP-SM	A-2, A-3	0	0	100	90-100	65-85	5-30	15-25	NP-5	
	8-40	Loamy fine sand	SC-SM, SM, SP-SM	A-2, A-3	0	0	100	90-100	65-85	5-30	15-25	NP-5	
	40-60	Sand	SC-SM, SM, SP-SM	A-2, A-3	0	0	100	90-100	65-85	5-30	15-25	NP-5	
163WX: Wakeen-----	0-8	Silt loam	CL	A-4, A-6	0	0	100	100	90-100	70-90	30-35	10-15	
	8-22	Silty clay loam	CL	A-4, A-6, A-7-6	0	0	95-100	85-100	75-100	60-95	30-45	10-20	
	>22	Unweathered bedrock			---	---	---	---	---	---	---	---	
163WY: Wakeen-----	0-12	Silt loam	CL	A-4, A-6	0	0	100	100	90-100	70-90	30-35	10-15	
	12-37	Silty clay loam	CL	A-4, A-6, A-7-6	0	0	95-100	85-100	75-100	60-95	30-45	10-20	
	>37	Unweathered bedrock			---	---	---	---	---	---	---	---	
	Harney-----	0-10	Silt loam	CL, CL-ML	A-4, A-6	0	0	100	100	95-100	85-100	25-40	5-20
		10-37	Silty clay loam	CH, CL	A-7-6	0	0	100	100	95-100	85-100	40-60	15-35
	37-60	Silt loam	CL	A-6, A-7-6	0	0	100	100	95-100	85-100	30-45	10-20	
165BO: Bogue-----	0-5	Clay	CH, MH	A-7	0	0	100	100	90-100	90-100	55-80	25-45	
	5-10	Clay	CH	A-7	0	0	100	100	90-100	90-100	55-80	30-50	
	10-22	Clay	CH, MH	A-7	0	0	100	100	90-100	80-100	55-80	25-45	
	22-38	Weathered bedrock			---	---	---	---	---	---	---	---	
	>38	Unweathered bedrock			---	---	---	---	---	---	---	---	
165NW: Nibson-----	0-7	Silt loam	CL	A-4, A-6	0	0-20	85-100	75-95	65-95	50-85	25-35	7-15	
	7-18	Silty clay loam	CL	A-4, A-6, A-7	0	0-20	85-95	75-95	70-95	50-90	30-45	10-20	
	>18	Unweathered bedrock			---	---	---	---	---	---	---	---	
Wakeen-----	0-8	Silt loam	CL	A-4, A-6	0	0	100	100	90-100	70-90	30-35	10-15	
	8-32	Silty clay loam	CL	A-4, A-6, A-7-6	0	0	95-100	85-100	75-100	60-95	30-45	10-20	
	>32	Unweathered bedrock			---	---	---	---	---	---	---	---	
165PE: Penden-----	0-14	Clay loam	CL	A-6, A-7-6	0	0	100	100	85-100	65-95	30-45	11-25	
	14-32	Clay loam	CL	A-6, A-7-6	0	0	100	100	85-100	60-90	30-45	11-25	
	32-60	Clay loam	CL	A-6, A-7-6	0	0	100	100	75-100	55-75	30-45	11-25	
165UB: Uly-----	0-6	Silt loam	CL, ML	A-4, A-6	0	0	100	100	100	95-100	20-40	2-20	
	6-28	Silt loam	CL, ML, CL-ML	A-4, A-6	0	0	100	100	100	95-100	25-40	3-15	
	28-60	Silt loam	CL, ML, CL-ML	A-4, A-6	0	0	100	100	100	95-100	25-40	3-15	
165UR: Uly-----	0-6	Silt loam	CL, ML	A-4, A-6	0	0	100	100	100	95-100	20-40	2-20	
	6-28	Silt loam	CL, ML, CL-ML	A-4, A-6	0	0	100	100	100	95-100	25-40	3-15	
	28-60	Silt loam	CL, ML, CL-ML	A-4, A-6	0	0	100	100	100	95-100	25-40	3-15	
Roxbury-----	0-16	Silt loam	CL	A-6	0	0	100	100	90-100	70-90	30-35	10-15	
	16-44	Silt loam	CL	A-6, A-7-6	0	0	100	100	95-100	85-100	30-45	10-20	
	44-60	Silt loam	CL		0	0	100	100	85-100	65-95	30-45	10-20	
167CR: Crete-----	0-6	Silt loam	CL, ML	A-4, A-6	0	0	100	100	100	90-100	30-40	5-15	
	6-14	Silty clay loam	CL	A-6, A-7	0	0	100	100	100	90-100	35-50	15-30	
	14-27	Silty clay	CH	A-7	0	0	100	100	100	90-100	50-65	25-40	
	27-60	Silty clay loam	CH, CL	A-6, A-7	0	0	100	100	100	95-100	30-55	10-35	

ENGINEERING INDEX PROPERTIES--Continued  
Ellis County, Kansas

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

Map symbol and soil name	Depth  In	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit  Pct	Plas- ticity index
			Unified	AASHTO	>10 inches  Pct	3-10 inches  Pct	4	10	40	200		
167DR: Dorrance-----	0-11	Gravelly sandy loam	SC, SC-SM	A-1, A-2, A-4	---	0-5	70-100	50-85	25-80	15-50	20-30	4-10
	11-15	Gravelly loamy sand	SC-SM, SM, SP-SM	A-1, A-2	---	0-5	70-100	50-95	25-65	12-35	15-25	NP-7
	15-60	Gravelly sand	SP, SP-SM	A-1, A-2, A-3	0	0	80-100	50-95	15-60	1-10	15-20	NP
167RC: Roxbury-----	0-26	Silt loam	CL	A-6	0	0	100	100	90-100	70-90	30-35	10-15
	26-60	Silt loam	CL		0	0	100	100	85-100	65-95	30-45	10-20
195BD: Badland----- Manvel-----	0-1	Silt loam			---	---	---	---	---	---	---	---
	0-3	Silt loam	CL, CL-ML	A-4, A-6	0	0	95-100	95-100	95-100	70-90	25-35	5-15
	3-60	Silt loam	CL, CL-ML	A-4, A-6	0	0	85-100	85-100	85-100	80-90	20-40	5-20
195CC: Campus-----	0-7	Loam	CL, CL-ML, ML	A-4, A-6	0	0	100	95-100	80-100	55-90	20-40	3-20
	7-14	Loam	CL, ML	A-4, A-6, A-7	0	0	100	100	75-95	50-80	33-45	8-20
	14-36	Loam	CL, ML, SC, SM	A-4, A-6, A-7	0	0	90-100	70-100	65-85	40-80	33-45	8-20
Canlon-----	>36	Unweathered bedrock			---	---	---	---	---	---	---	---
	0-8	Loam	CL, CL-ML	A-4, A-6	0	0	90-100	75-100	65-100	50-90	20-40	4-20
	8-18	Gravelly loam	CL, CL-ML, SC, SC-SM	A-4, A-6	0	0	75-100	55-100	50-95	35-85	20-40	4-20
	>18	Unweathered bedrock			---	---	---	---	---	---	---	---
195CF: Carlson-----	0-4	Silt loam	CL, CL-ML	A-4, A-6	0	0	100	100	90-100	80-100	25-40	5-20
	4-24	Silty clay loam	CH, CL	A-7-6	0	0	100	100	90-100	85-100	40-55	20-30
	24-60	Clay loam	CL, CL-ML	A-4, A-6, A-7-6	0	0	100	95-100	80-100	55-100	25-45	5-20
195HU: Humbarger-----	0-28	Loam	CL, CL-ML	A-4, A-6	0	0	95-100	90-100	90-100	65-90	20-35	4-15
	28-33	Loam	CL	A-4, A-6	0	0	95-100	90-100	80-95	55-85	25-40	8-20
	33-60	Loam	CL, CL-ML, SC, SC-SM	A-4, A-6	0	0	95-100	90-100	80-95	40-80	20-40	5-20
195IF: Inavale-----	0-6	Loamy sand	SC-SM, SM, SP-SM	A-2, A-3	0	0	100	100	85-95	5-35	15-25	NP-5
	6-60	Sand	SC-SM, SM, SP-SM	A-2, A-3	0	0	100	90-100	65-85	5-30	15-25	NP-5
195PF: Penden-----	0-10	Clay loam	CL	A-6, A-7-6	0	0	100	100	85-100	65-95	30-45	11-25
	10-33	Loam	CL	A-6, A-7-6	0	0	100	100	85-100	60-90	30-45	11-25
	33-60	Loam	CL	A-6, A-7-6	0	0	100	100	75-100	55-75	30-45	11-25
195PO: Penden-----	0-14	Loam	CL	A-4, A-6	0	0	100	100	85-100	65-95	25-40	7-20
	14-32	Loam	CL	A-6, A-7-6	0	0	100	100	85-100	60-90	30-45	11-25
	32-60	Loam	CL	A-6, A-7-6	0	0	100	100	75-100	55-75	30-45	11-25
Ab: Fluvents-----	0-6	Silt loam	CL, CL-ML	A-4, A-6	0	0	100	100	85-100	60-90	20-35	5-15
	6-60	Silt loam	CL, CL-ML	A-4, A-6	0	0	100	100	85-100	60-95	20-40	5-20
Ac: New Cambria----	0-9	Silty clay	CH	A-7-6	0	0	100	100	95-100	90-100	50-75	30-45
	9-38	Silty clay	CH	A-7-6	0	0	100	100	95-100	85-100	50-75	30-45
	38-60	Silty clay	CH, CL	A-7-6	0	0	100	100	95-100	85-100	40-60	20-40
Ad: Fluvaquents----	0-18	Silty clay loam	CL	A-6, A-7	0	0	100	100	95-100	70-95	35-45	11-20
	18-60	Clay loam	CL, CL-ML	A-4, A-6, A-7	0	0	100	100	95-100	65-85	25-45	5-20
Ae: Anselmo-----	0-10	Fine sandy loam	CL-ML, ML, SC-SM, SM	A-2, A-4	0	0	100	100	60-100	30-65	15-25	NP-7
	10-25	Sandy loam	CL-ML, ML, SC-SM, SM	A-4	0	0	100	100	70-95	35-65	15-25	NP-7
	25-35	Fine sandy loam	SC-SM, SM	A-4	0	0	100	100	70-85	40-50	15-25	NP-7
Am: Armo-----	35-60	Loamy fine sand	SM, SP-SM	A-2	0	0	100	100	50-80	15-35	15-20	NP-5
	0-17	Loam	CL	A-4, A-6	0	0	95-100	90-100	90-100	70-95	25-40	7-18
	17-30	Clay loam	CL	A-4, A-6, A-7	0	0	95-100	90-100	90-100	70-90	25-45	7-22
	30-41	Clay loam	CL	A-7, A-4, A-6	0	0	95-100	85-100	70-100	65-80	25-45	7-22
	41-51	Silt loam	CL, GC, SC	A-4, A-6	0	0	60-85	50-85	50-60	40-55	25-35	8-18
	51-60	Very gravelly loam	GM, SC-SM, SM, SP-SM	A-1, A-2	0	0	50-70	10-25	5-15	5-15	15-25	NP-7
An: Armo-----	0-19	Loam	CL	A-4, A-6	0	0	95-100	90-100	90-100	70-95	25-40	7-18
	19-37	Loam	CL	A-4, A-6, A-7	0	0	95-100	90-100	90-100	70-90	25-45	7-22
	37-60	Loam	CL	A-4, A-6, A-7	0	0	95-100	85-100	70-100	65-80	25-45	7-22
Ao: Armo-----	0-5	Loam	CL	A-6, A-4	0	0	95-100	90-100	90-100	70-95	25-40	7-18
	5-23	Clay loam	CL	A-4, A-6, A-7	0	0	95-100	90-100	90-100	70-90	25-45	7-22
	23-41	Clay loam	CL	A-4, A-6, A-7	0	0	95-100	85-100	70-100	65-80	25-45	7-22
	41-51	Silt loam	CL, GC, SC	A-4, A-6	0	0	60-85	50-85	50-60	40-55	25-35	8-18
	51-60	Very gravelly loam	GM, SC-SM, SM, SP-SM	A-1, A-2	0	0	50-70	10-25	5-15	5-15	15-25	NP-7

ENGINEERING INDEX PROPERTIES--Continued  
Ellis County, Kansas

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

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
Ar:												
Armo-----	0-10	Loam	CL	A-4, A-6	0	0	95-100	90-100	90-100	70-95	25-40	7-18
	10-20	Clay loam	CL	A-4, A-6, A-7	0	0	95-100	90-100	90-100	70-90	25-45	7-22
	20-41	Clay loam	CL	A-4, A-6, A-7	0	0	95-100	85-100	70-100	65-80	25-45	7-22
	41-51	Silt loam	CL, GC, SC	A-4, A-6	0	0	60-85	50-85	50-60	40-55	25-35	8-18
	51-60	Very gravelly loam	GM, SC-SM, SM, SP-SM	A-1, A-2	0	0	50-70	10-25	5-15	5-15	15-25	NP-7
Bf:												
Boel-----	0-10	Fine sandy loam	SM	A-2, A-4	0	0	100	100	85-95	20-40	15-20	NP
	10-60	Loamy fine sand	SM, SP	A-2, A-3	0	0	100	95-100	85-95	0-25	---	NP
Bg:												
Bogue-----	0-6	Clay	CH, MH	A-7	0	0	100	100	90-100	90-100	55-80	25-45
	6-17	Clay	CH	A-7	0	0	100	100	90-100	90-100	55-80	30-50
	17-23	Clay	CH, MH	A-7	0	0	100	100	90-100	80-100	55-80	25-45
	23-32	Weathered bedrock			---	---	100	100	90-100	80-100	55-80	25-45
	>32	Unweathered bedrock			---	---	---	---	---	---	---	---
Bo:												
Bogue-----	0-6	Clay	CH, MH	A-7	0	0	100	100	90-100	90-100	55-80	25-45
	6-17	Clay	CH	A-7	0	0	100	100	90-100	90-100	55-80	30-50
	17-23	Clay	CH, MH	A-7	0	0	100	100	90-100	80-100	55-80	25-45
	23-32	Weathered bedrock			---	---	---	---	---	---	---	---
	>32	Unweathered bedrock			---	---	---	---	---	---	---	---
Armo-----	0-15	Loam	CL	A-4, A-6	0	0	95-100	90-100	90-100	70-95	25-40	7-18
	15-28	Clay loam	CL	A-4, A-6, A-7	0	0	95-100	90-100	90-100	70-90	25-45	7-22
	28-41	Clay loam	CL	A-4, A-6, A-7	0	0	95-100	85-100	70-100	65-80	25-45	7-22
	41-51	Silt loam	CL, GC, SC	A-4, A-6	0	0	60-85	50-85	50-60	40-55	25-35	8-18
	51-60	Very gravelly loam	GM, SC-SM, SM, SP-SM	A-1, A-2	0	0	50-70	10-25	5-15	5-15	15-25	NP-7
BOP:												
Borrow Pits----	---	---	---	---	---	---	---	---	---	---	---	---
Br:												
Brownell-----	0-7	Gravelly loam	GC, GC-GM, SC, SC-SM	A-1, A-2-4, A-2-6	---	0-20	50-90	40-70	30-60	20-35	20-40	5-20
	7-30	Very channery loam	GC, GP-GC, SC, SP-SC	A-1, A-2-4, A-2-6	---	5-50	20-80	10-50	10-45	8-35	20-40	5-20
	>30	Unweathered bedrock			---	---	---	---	---	---	---	---
Cc:												
Campus-----	0-9	Loam	CL, CL-ML, ML	A-4, A-6	0	0	100	95-100	80-100	55-90	20-40	3-20
	9-19	Clay loam	CL, ML	A-4, A-6, A-7	0	0	100	100	75-95	50-80	33-45	8-20
	19-33	Loam	CL, ML, SC, SM	A-4, A-6, A-7	0	0	90-100	70-100	65-85	40-80	33-45	8-20
	>33	Unweathered bedrock			---	---	---	---	---	---	---	---
Carlson-----	0-8	Silt loam	CL, CL-ML	A-4, A-6	0	0	100	100	90-100	80-100	25-40	5-20
	8-18	Silty clay loam	CH, CL	A-7-6	0	0	100	100	90-100	85-100	40-55	20-30
	18-60	Silty clay loam	CL, CL-ML	A-4, A-6, A- 7-6	0	0	100	95-100	80-100	55-100	25-45	5-20
Cd:												
Campus-----	0-9	Loam	CL, CL-ML, ML	A-4, A-6	0	0	100	95-100	80-100	55-90	20-40	3-20
	9-19	Clay loam	CL, ML	A-4, A-6, A-7	0	0	100	100	75-95	50-80	33-45	8-20
	19-33	Loam	CL, ML, SC, SM	A-4, A-6, A-7	0	0	90-100	70-100	65-85	40-80	33-45	8-20
	>33	Unweathered bedrock			---	---	---	---	---	---	---	---
Penden-----	0-14	Clay loam	CL	A-6, A-7-6	0	0	100	100	85-100	65-95	30-45	11-25
	14-27	Clay loam	CL	A-6, A-7-6	0	0	100	100	85-100	60-90	30-45	11-25
	27-64	Clay loam	CL	A-6, A-7-6	0	0	100	100	75-100	55-75	30-45	11-25
Ce:												
Canlon-----	0-4	Loam	CL, CL-ML	A-4, A-6	0	0	90-100	75-100	65-100	50-90	20-40	4-20
	4-13	Loam	CL, CL-ML, SC, SC-SM	A-4, A-6	0	0	75-100	55-100	50-95	35-85	20-40	4-20
	>13	Unweathered bedrock			---	---	---	---	---	---	---	---
Campus-----	0-9	Loam	CL, CL-ML, ML	A-4, A-6	0	0	100	95-100	80-100	55-90	20-40	3-20
	9-19	Clay loam	CL, ML	A-4, A-6, A-7	0	0	100	100	75-95	50-80	33-45	8-20
	19-33	Loam	CL, ML, SC, SM	A-4, A-6, A-7	0	0	90-100	70-100	65-85	40-80	33-45	8-20
	>33	Unweathered bedrock			---	---	---	---	---	---	---	---
Cm:												
Corinth-----	0-9	Silty clay loam	CH, CL	A-6, A-7	0	0	100	100	95-100	70-90	38-60	18-35
	9-30	Silty clay loam	CH, CL	A-7	0	0	100	100	95-100	75-95	40-60	20-40
	30-34	Unweathered bedrock			---	---	---	---	---	---	---	---
Cn:												
Corinth-----	0-9	Silty clay loam	CH, CL	A-6, A-7	0	0	100	100	95-100	70-90	38-60	18-35
	9-30	Silty clay loam	CH, CL	A-7	0	0	100	100	95-100	75-95	40-60	20-40
	>30	Unweathered bedrock			---	---	---	---	---	---	---	---

ENGINEERING INDEX PROPERTIES--Continued  
Ellis County, Kansas

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

Map symbol and soil name	Depth  In	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit  Pct	Plas- ticity index
			Unified	AASHTO	>10 inches  Pct	3-10 inches  Pct	4	10	40	200		
Co: Corinth-----	0-9 9-30 >30	Silty clay loam Silty clay loam Unweathered bedrock	CH, CL CH, CL	A-6, A-7 A-7	0 0 ---	0 0 ---	100 100 ---	100 100 ---	95-100 95-100 ---	70-90 75-95 ---	38-60 40-60 ---	18-35 20-40 ---
Cr: Crete-----	0-16 16-34 34-41 41-68	Silty clay loam Silty clay Silty clay loam Silty clay loam	CL CL CH CH, CL	A-6, A-7 A-6, A-7 A-7 A-6, A-7	0 0 0 0	0 0 0 0	100 100 100 100	100 100 100 100	100 100 100 100	90-100 90-100 90-100 95-100	35-50 35-50 50-65 30-55	15-30 15-30 25-40 10-35
De: Detroit-----	0-12 12-34 34-63	Silt loam Silty clay Silty clay loam	CL CH CL	A-4, A-6 A-7 A-6, A-7	0 0 0	0 0 0	100 100 100	100 100 100	95-100 90-100 95-100	85-95 90-100 85-100	25-40 50-60 25-45	8-20 25-35 10-25
Ee: Eltree-----	0-26 26-35 35-63	Silt loam Silt loam Silty clay loam	CL, CL-ML, ML CL, CL-ML CL	A-4, A-6 A-4, A-6 A-4, A-6, A-7-6	0 0 0	0 0 0	100 100 100	100 95-100 95-100	85-100 85-100 90-100	65-100 85-100 65-100	20-40 25-40 25-45	3-15 5-20 7-22
Ef: Eltree-----	0-26 26-35 35-60	Silt loam Silt loam Silty clay loam	CL, CL-ML, ML CL, CL-ML CL	A-4, A-6 A-4, A-6 A-4, A-6, A-7-6	0 0 0	0 0 0	100 100 100	100 95-100 95-100	85-100 85-100 90-100	65-100 85-100 65-100	20-40 25-40 25-45	3-15 5-20 7-22
Eg: Eltree-----	0-26 26-35 35-63	Silt loam Silt loam Silty clay loam	CL, CL-ML, ML CL, CL-ML CL	A-4, A-6 A-4, A-6 A-4, A-6, A-7-6	0 0 0	0 0 0	100 100 100	100 95-100 95-100	85-100 85-100 90-100	65-100 85-100 65-100	20-40 25-40 25-45	3-15 5-20 7-22
Eh: Eltree-----	0-26 26-35 35-60	Silt loam Silt loam Silty clay loam	CL, CL-ML, ML CL, CL-ML CL	A-4, A-6 A-4, A-6 A-4, A-6, A-7-6	0 0 0	0 0 0	100 100 100	100 95-100 95-100	85-100 85-100 90-100	65-100 85-100 65-100	20-40 25-40 25-45	3-15 5-20 7-22
GRP: Pits-----	0-60	Gravelly sand	GP-GM, SM, SP, SP-SM	A-1, A-2, A-3	---	0-5	45-100	40-100	0-80	0-40	0-14	NP
Ha: Harney-----	0-10 10-34 34-60	Silt loam Silty clay loam Silt loam	CL, CL-ML CH, CL CL	A-4, A-6 A-7-6 A-6, A-7-6	0 0 0	0 0 0	100 100 100	100 100 100	95-100 95-100 95-100	85-100 85-100 85-100	25-40 40-60 30-45	5-20 15-35 10-20
Hb: Harney-----	0-12 12-39 39-60	Silt loam Silty clay loam Silty clay loam	CL, CL-ML CH, CL CL	A-4, A-6 A-7-6 A-6, A-7-6	0 0 0	0 0 0	100 100 100	100 100 100	95-100 95-100 95-100	85-100 85-100 85-100	25-40 40-60 30-45	5-20 15-35 10-20
Hc: Harney-----	0-6 6-40 40-74	Silt loam Silty clay loam Silty clay loam	CL, CL-ML CH, CL CL	A-4, A-6 A-7-6 A-6, A-7-6	0 0 0	0 0 0	100 100 100	100 100 100	95-100 95-100 95-100	85-100 85-100 85-100	25-40 40-60 30-45	5-20 15-35 10-20
Hd: Harney-----	0-6 6-40 40-74	Silty clay loam Silty clay loam Silty clay loam	CL CH, CL CL	A-6, A-7-6 A-7-6 A-6, A-7-6	0 0 0	0 0 0	100 100 100	100 100 100	95-100 95-100 95-100	85-100 85-100 85-100	30-45 40-60 30-45	15-22 15-35 10-20
He: Harney-----	0-6 6-40 40-74	Silt loam Silty clay loam Silty clay loam	CL, CL-ML CH, CL CL	A-4, A-6 A-7-6 A-6, A-7-6	0 0 0	0 0 0	100 100 100	100 100 100	95-100 95-100 95-100	85-100 85-100 85-100	25-40 40-60 30-45	5-20 15-35 10-20
Armo-----	0-5 5-23 23-41 41-51 51-60	Loam Clay loam Clay loam Silt loam Very gravelly loam	CL CL CL CL, GC, SC GM, SC-SM, SM, SP-SM	A-4, A-6 A-4, A-6, A-7 A-4, A-6, A-7 A-4, A-6 A-1, A-2	0 0 0 0 0	0 0 0 0 0	95-100 95-100 95-100 60-85 50-70	90-100 90-100 90-100 50-85 10-25	90-100 90-100 90-100 50-60 5-15	70-95 70-90 65-80 40-55 5-15	25-40 25-45 25-45 25-35 15-25	7-18 7-22 7-22 8-18 NP-7
Hf: Harney-----	0-6 6-40 40-74	Silt loam Silty clay loam Silty clay loam	CL, CL-ML CH, CL CL	A-4, A-6 A-7-6 A-6, A-7-6	0 0 0	0 0 0	100 100 100	100 100 100	95-100 95-100 95-100	85-100 85-100 85-100	25-40 40-60 30-45	5-20 15-35 10-20
Carlson-----	0-8 8-18 18-60	Silt loam Silty clay loam Clay loam	CL, CL-ML CH, CL CL, CL-ML	A-4, A-6 A-7-6 A-4, A-6, A-7-6	0 0 0	0 0 0	100 100 100	100 100 95-100	90-100 90-100 80-100	80-100 85-100 55-100	25-40 40-55 25-45	5-20 20-30 5-20
Hg: Harney-----	0-6 6-40 40-74	Silt loam Silty clay loam Silt loam	CL, CL-ML CH, CL CL	A-4, A-6 A-7-6 A-6, A-7-6	0 0 0	0 0 0	100 100 100	100 100 100	95-100 95-100 95-100	85-100 85-100 85-100	25-40 40-60 30-45	5-20 15-35 10-20
Carlson-----	0-8 8-18 18-60	Silt loam Silty clay loam Clay loam	CL, CL-ML CH, CL CL, CL-ML	A-4, A-6 A-7-6 A-4, A-6, A-7-6	0 0 0	0 0 0	100 100 100	100 100 95-100	90-100 90-100 80-100	80-100 85-100 55-100	25-40 40-55 25-45	5-20 20-30 5-20
HGG: Harney-----	0-11 11-27 27-60	Silt loam Silty clay loam Silt loam	CL, CL-ML CH, CL CL	A-4, A-6 A-7-6 A-6, A-7-6	0 0 0	0 0 0	100 100 100	100 100 100	95-100 95-100 95-100	85-100 85-100 85-100	25-40 40-60 30-45	5-20 15-35 10-20
Mento-----	0-8 8-22 22-46 46-60	Silt loam Silty clay Silt loam Clay loam	CL, CL-ML, ML CH CL CL, GC, SC	A-4, A-6 A-7 A-6, A-7-6 A-6, A-7-6	0 0 0 0	0 0 0 0	100 100 100 70-100	100 95-100 95-100 65-95	90-100 90-100 90-100 55-95	85-100 85-100 85-100 40-80	25-40 50-70 30-50 35-50	5-15 25-45 11-25 15-30



ENGINEERING INDEX PROPERTIES--Continued  
Ellis County, Kansas

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

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
Hh:												
Harney-----	0-6	Silt loam	CL, CL-ML	A-4, A-6	0	0	100	100	95-100	85-100	25-40	5-20
	6-40	Silty clay loam	CH, CL	A-7-6	0	0	100	100	95-100	85-100	40-60	15-35
	40-74	Silty clay loam	CL	A-6, A-7-6	0	0	100	100	95-100	85-100	30-45	10-20
Wakeen-----	0-5	Silt loam	CL	A-4, A-6	0	0	100	100	90-100	70-90	30-35	10-15
	5-36	Silty clay loam	CL	A-4, A-6, A-7-6	0	0	95-100	85-100	75-100	60-95	30-45	10-20
	>36	Unweathered bedrock			---	---	---	---	---	---	---	---
Hk:												
Harney-----	0-6	Silt loam	CL, CL-ML	A-4, A-6	0	0	100	100	95-100	85-100	25-40	5-20
	6-40	Silty clay loam	CH, CL	A-7-6	0	0	100	100	95-100	85-100	40-60	15-35
	40-74	Silt loam	CL	A-6, A-7-6	0	0	100	100	95-100	85-100	30-45	10-20
Wakeen-----	0-5	Silt loam	CL	A-4, A-6	0	0	100	100	90-100	70-90	30-35	10-15
	5-36	Silty clay loam	CL	A-4, A-6, A-7-6	0	0	95-100	85-100	75-100	60-95	30-45	10-20
	>36	Unweathered bedrock			---	---	---	---	---	---	---	---
Hl:												
Heizer-----	0-6	Gravelly loam	GC, GC-GM, SC, SC-SM	A-1, A-2-4, A-2-6	---	0-20	50-90	40-70	30-60	20-35	20-40	5-20
	6-14	Very channery loam	GC, GP-GC, SC, SP-SC	A-1, A-2-4, A-2-6	---	5-50	20-80	10-50	10-45	8-35	20-40	5-20
	>14	Unweathered bedrock			---	---	---	---	---	---	---	---
Armo-----	0-15	Loam	CL	A-4, A-6	0	0	95-100	90-100	90-100	70-95	25-40	7-18
	15-28	Clay loam	CL	A-4, A-6, A-7	0	0	95-100	90-100	90-100	70-90	25-45	7-22
	28-41	Clay loam	CL	A-4, A-6, A-7	0	0	95-100	85-100	70-100	65-80	25-45	7-22
	41-51	Silt loam	CL, GC, SC	A-4, A-6	0	0	60-85	50-85	50-60	40-55	25-35	8-18
	51-60	Very gravelly loam	GM, SC-SM, SM, SP-SM	A-1, A-2	0	0	50-70	10-25	5-15	5-15	15-25	NP-7
HMM:												
Heizer-----	0-6	Gravelly loam	SC-SM, GC, GC-GM, SC	A-1, A-2-4, A-2-6	---	0-20	50-90	40-70	30-60	20-35	20-40	5-20
	6-15	Very channery loam	GC, GP-GC, SC, SP-SC	A-1, A-2-4, A-2-6	---	5-50	20-80	10-50	10-45	8-35	20-40	5-20
	>15	Unweathered bedrock			---	---	---	---	---	---	---	---
Brownell-----	0-9	Gravelly loam	GC, GC-GM, SC, SC-SM	A-1, A-2-4, A-2-6	---	0-20	50-90	40-70	30-60	20-35	20-40	5-20
	9-24	Very channery loam	GC, GP-GC, SC, SP-SC	A-1, A-2-4, A-2-6	---	5-50	20-80	10-50	10-45	8-35	20-40	5-20
	>24	Unweathered bedrock			---	---	---	---	---	---	---	---
Hn:												
Dorrance-----	0-11	Sandy loam	SC, SC-SM	A-2, A-4	0	0	95-100	85-100	45-90	25-50	15-25	4-10
	11-15	Gravelly sandy loam	SC-SM, SM, SP-SM	A-1, A-2	---	0-5	70-100	50-95	25-65	12-35	15-25	NP-7
	15-60	Gravelly loamy sand	SP, SP-SM	A-1, A-2, A-3	0	0	80-100	50-95	15-60	1-10	15-20	NP
Ho:												
Holdrege-----	0-14	Silt loam	CL, CL-ML, ML	A-4, A-6, A-7	0	0	100	100	95-100	85-100	20-45	2-20
	14-25	Silty clay loam	CH, CL	A-6, A-7	0	0	100	100	98-100	90-100	30-55	15-35
	25-30	Silt loam	CL	A-4, A-6	0	0	100	100	95-100	95-100	25-40	9-17
	30-60	Silt loam	CL, ML, CL-ML	A-4, A-6	0	0	100	100	95-100	90-100	30-40	5-15
Hp:												
Holdrege-----	0-11	Silt loam	CL, CL-ML, ML	A-4, A-6, A-7	0	0	100	100	95-100	85-100	20-45	2-20
	11-33	Silty clay loam	CH, CL	A-6, A-7	0	0	100	100	98-100	90-100	30-55	15-35
	33-48	Silt loam	CL	A-4, A-6	0	0	100	100	95-100	95-100	25-40	9-17
	48-66	Silt loam	CL, ML, CL-ML	A-4, A-6	0	0	100	100	95-100	90-100	30-40	5-15
Hr:												
Hord-----	0-13	Silt loam	CL-ML, ML, CL	A-4, A-6	0	0	100	100	95-100	85-100	20-35	3-18
	13-36	Silty clay loam	CL	A-4, A-6	0	0	100	100	98-100	85-100	25-40	8-23
	36-60	Silt loam	CL, CL-ML	A-4, A-6	0	0	100	100	100	85-100	25-40	6-21
In:												
Inavale-----	0-14	Loamy sand	SC-SM, SM, SP-SM	A-2, A-3	0	0	100	100	85-95	5-35	15-25	NP-5
	14-31	Fine sand	SC-SM, SM, SP-SM	A-2, A-3	0	0	100	100	70-90	5-30	15-25	NP-5
	31-60	Loamy sand	SC-SM, SM, SP-SM	A-2, A-3	0	0	100	90-100	65-85	5-30	15-25	NP-5
Mc:												
Mccook-----	0-14	Fine sandy loam	CL-ML, ML, SC-SM, SM	A-4	0	0	100	100	70-85	35-55	15-20	NP-5
	14-60	Silt loam	CL, CL-ML, ML	A-4	0	0	100	100	95-100	80-100	15-20	NP-10
Md:												
Mccook-----	0-11	Silt loam	CL-ML, ML	A-4	0	0	100	100	95-100	60-100	20-35	2-10
	11-60	Silt loam	CL, CL-ML, ML	A-4	0	0	100	100	95-100	80-100	15-20	NP-10
Me:												
Mento-----	0-9	Silt loam	CL, CL-ML, ML	A-4, A-6	0	0	100	100	90-100	85-100	25-40	5-15
	9-21	Silty clay loam	CH	A-7	0	0	100	95-100	90-100	85-100	50-70	25-45
	21-41	Silty clay loam	CL	A-6, A-7-6	0	0	100	95-100	90-100	85-100	30-50	11-25
	41-67	Clay loam	CL, GC, SC	A-6, A-7-6	0	0	70-100	65-95	55-95	40-80	35-50	15-30
	>67	Unweathered bedrock			---	---	---	---	---	---	---	---

ENGINEERING INDEX PROPERTIES--Continued  
Ellis County, Kansas

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

Map symbol and soil name	Depth  In	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit  Pct	Plas- ticity index
			Unified	AASHTO	>10 inches  Pct	3-10 inches  Pct	4	10	40	200		
Mf: Mento-----	0-9	Silt loam	CL, CL-ML	A-4, A-6	0	0	100	100	90-100	85-100	25-40	5-15
	9-21	Silty clay loam	CH	A-7	0	0	100	95-100	90-100	85-100	50-70	25-45
	21-41	Silty clay loam	CL	A-6, A-7-6	0	0	100	95-100	90-100	85-100	30-50	11-25
	41-67	Clay loam	CL, GC, SC	A-6, A-7-6	0	0	70-100	65-95	55-95	40-80	35-50	15-30
	>67	Unweathered bedrock			---	---	---	---	---	---	---	---
Mg: Mento-----	0-6	Silty clay loam	CL	A-4, A-6, A-7-6	0	0	100	100	90-100	85-100	30-45	8-20
	6-21	Silty clay loam	CH	A-7	0	0	100	95-100	90-100	85-100	50-70	25-45
	21-41	Silty clay loam	CL	A-6, A-7-6	0	0	100	95-100	90-100	85-100	30-50	11-25
	41-67	Clay loam	CL, GC, SC	A-6, A-7-6	0	0	70-100	65-95	55-95	40-80	35-50	15-30
	67-71	Unweathered bedrock			---	---	---	---	---	---	---	---
Mo: Mento-----	0-6	Silty clay loam	CL	A-4, A-6, A-7-6	0	0	100	100	90-100	85-100	30-45	8-20
	6-20	Silty clay loam	CH	A-7	0	0	100	95-100	90-100	85-100	50-70	25-45
	20-48	Silty clay loam	CL	A-6, A-7-6	0	0	100	95-100	90-100	85-100	30-50	11-25
	48-67	Weathered bedrock			---	---	---	---	---	---	---	---
	67-71	Unweathered bedrock			---	---	---	---	---	---	---	---
Mu: Munjor-----	0-7	Sandy loam	CL-ML, ML, SC-SM, SM	A-2-4, A-4	0	0	100	95-100	65-100	25-55	15-30	NP-7
	7-44	Sandy loam	CL, ML, SC, SM	A-4	0	0	100	95-100	65-100	35-65	15-30	3-10
	44-60	Sand	SM, SP-SM	A-2-4, A-3	0	0	95-100	95-100	55-100	5-30	---	NP
Nc: New Cambria----	0-9	Silty clay	CH	A-7-6	0	0	100	100	95-100	90-100	50-75	30-45
	9-38	Silty clay	CH	A-7-6	0	0	100	100	95-100	85-100	50-75	25-45
	38-60	Silty clay loam	CH, CL	A-7-6	0	0	100	100	95-100	85-100	40-60	20-40
Nn: Nibson-----	0-7	Silt loam	CL	A-4, A-6	0	0-20	85-100	75-95	65-95	50-85	25-35	7-15
	7-19	Silty clay loam	CL	A-4, A-6, A-7	0	0-20	85-95	75-95	70-95	50-90	30-45	10-20
	>19	Weathered bedrock			---	---	---	---	---	---	---	---
Rb: Roxbury-----	0-29	Silt loam	CL	A-4, A-6	0	0	100	100	90-100	70-90	30-35	10-15
	29-40	Silt loam	CL	A-4, A-6, A-7-6	0	0	100	100	95-100	85-100	30-45	10-20
	40-60	Silt loam	CL, ML	A-4, A-6, A-7-6	0	0	100	100	85-100	65-95	30-45	10-20
Rf: Roxbury-----	0-24	Silt loam	CL	A-6	0	0	100	100	90-100	70-90	30-35	10-15
	24-50	Silty clay loam	CL	A-6, A-7-6	0	0	100	100	95-100	85-100	30-45	10-20
	50-68	Silty clay loam	CL		0	0	100	100	85-100	65-95	30-45	10-20
RIV: Riverwash And Sandbars-----	0-6	Silt loam	CL, CL-ML	A-4, A-6	0	0	100	100	85-100	60-90	20-35	5-15
	6-60	Loam	CL, CL-ML	A-4, A-6	0	0	100	100	85-100	60-95	20-40	5-20
Ro: Heizer-----	0-6	Gravelly loam	GC-GM, SC, SC-SM, GC	A-1, A-2-4, A-2-6	---	0-20	50-90	40-70	30-60	20-35	20-40	5-20
	6-15	Very channery loam	GC, GP-GC, SC, SP-SC	A-1, A-2-4, A-2-6	---	5-50	20-80	10-50	10-45	8-35	20-40	5-20
	>15	Unweathered bedrock			---	---	---	---	---	---	---	---
Brownell-----	0-8	Gravelly loam	GC, GC-GM, SC, SC-SM	A-1, A-2-4, A-2-6	---	0-20	50-90	40-70	30-60	20-35	20-40	5-20
	8-32	Very channery loam	GC, GP-GC, SC, SP-SC	A-1, A-2-4, A-2-6	---	5-50	20-80	10-50	10-45	8-35	20-40	5-20
	>32	Weathered bedrock			---	---	---	---	---	---	---	---
ROO: Roxbury-----	0-16	Silt loam	CL	A-6	0	0	100	100	90-100	70-90	30-35	10-15
	16-44	Silt loam	CL	A-6, A-7-6	0	0	100	100	95-100	85-100	30-45	10-20
	44-60	Silt loam	CL		0	0	100	100	85-100	65-95	30-45	10-20
UCC: Uly-----	0-6	Silt loam	CL, ML	A-4, A-6	0	0	100	100	100	95-100	20-40	2-20
	6-28	Silt loam	CL, ML, CL-ML	A-4, A-6	0	0	100	100	100	95-100	25-40	3-15
	28-60	Silt loam	CL, ML, CL-ML	A-4, A-6	0	0	100	100	100	95-100	25-40	3-15
W: Water-----	---	---	---	---	---	---	---	---	---	---	---	---
Wa: Wakeen-----	0-10	Silt loam	CL	A-4, A-6	0	0	100	100	90-100	70-90	30-35	10-15
	10-31	Silty clay loam	CL	A-4, A-6, A-7-6	0	0	95-100	85-100	75-100	60-95	30-45	10-20
	>31	Unweathered bedrock			---	---	---	---	---	---	---	---
We: Wakeen-----	0-11	Silt loam	CL	A-4, A-6	0	0	100	100	90-100	70-90	30-35	10-15
	11-30	Silty clay loam	CL	A-4, A-6, A-7-6	0	0	95-100	85-100	75-100	60-95	30-45	10-20
	>30	Unweathered bedrock			---	---	---	---	---	---	---	---

ENGINEERING INDEX PROPERTIES--Continued  
Ellis County, Kansas

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

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
					Pct	Pct					Pct	
Wh: Wakeen-----	In											
	0-11	Silt loam	CL	A-4, A-6	0	0	100	100	90-100	70-90	30-35	10-15
	11-30	Silty clay loam	CL	A-4, A-6, A-7-6	0	0	95-100	85-100	75-100	60-95	30-45	10-20
	>30	Unweathered bedrock			---	---	---	---	---	---	---	---
Wk: Wakeen-----	0-8	Silt loam	CL	A-4, A-6	0	0	100	100	90-100	70-90	30-35	10-15
	8-22	Silty clay loam	CL	A-4, A-6, A-7-6	0	0	95-100	85-100	75-100	60-95	30-45	10-20
	>22	Unweathered bedrock			---	---	---	---	---	---	---	---
Wn: Wann-----	0-13	Loam	CL, CL-ML, ML	A-4, A-6	0	0	95-100	95-100	85-100	55-75	15-30	2-15
	13-44	Fine sandy loam	SC-SM, SM	A-2, A-4	0	0	95-100	75-100	60-100	20-50	15-25	NP-5
	44-64	Stratified fine sand to sandy clay loam	SM	A-2, A-4	0	0	95-100	95-100	70-100	15-40	15-20	NP-3

Physical Properties table 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.

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

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

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

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

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

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

Moist bulk density is the weight of soil (oven-dry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at 1/3- or 1/10-bar (33kPa or 10kPa) moisture tension. Weight is determined after the soil is dried at 105 degrees C. In the table, the estimated moist bulk density of each soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. Depending on soil texture, a bulk density of more than 1.4 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

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

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

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 Physical Properties 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 Physical Properties table as the K factor ( $K_w$  and  $K_f$ ) 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  $K_w$  indicates the erodibility of the whole soil. The estimates are modified by the presence of rock fragments.

Erosion factor  $K_f$  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 as follows:

1. Coarse sands, sands, fine sands, and very fine sands.
2. Loamy coarse sands, loamy sands, loamy fine sands, loamy very fine sands, ash material, and sapric soil material.
3. Coarse sandy loams, sandy loams, fine sandy loams, and very fine sandy loams.
- 4L. Calcareous loams, silt loams, clay loams, and silty clay loams.
4. Clays, silty clays, noncalcareous clay loams, and silty clay loams that are more than 35 percent clay.
5. Noncalcareous loams and silt loams that are less than 20 percent clay and sandy clay loams, sandy clays, and hemic soil material.
6. Noncalcareous loams and silt loams that are more than 20 percent clay and noncalcareous clay loams that are less than 35 percent clay.
7. Silts, noncalcareous silty clay loams that are less than 35 percent clay, and fibric soil material.
8. Soils that are not subject to wind erosion because of coarse fragments on the surface or because of surface wetness.

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.

#### Explanation of Wind Erodibility Groups

Soil erodibility by wind is directly related to the percentage of dry non-erodible surface soil aggregates larger than 0.84 mm in diameter. From this percentage, the wind erodibility index (I-factor) is determined. The I-factor is an expression of the stability of these soil aggregates against breakdown by tillage and abrasion from wind erosion. Soils are placed in Wind Erodibility Groups (WEG) having similar percentages of dry soil aggregates larger than 0.84 mm as shown in the following table.

WEG	Properties of Soil Surface Layer	Dry Soil Aggregates >0.84mm Percent	Wind Erodibility Index T/Ac/Yr (I)
1	Very fine sand, fine sand, sand, or coarse sand	1 2 3 5 7	310 1/ 250 220 180 160
2	Loamy very fine sand, loamy fine sand, loamy sand, loamy coarse sand, organic soil materials.	10	134
3	Very fine sandy loam, fine sandy loam, sandy loam, or coarse sandy loam.	25	86
4	Clay, silty clay, non-calcareous clay loam, or silty clay loam with >35 percent clay content.	25	86
4L	Calcareous 2/ loam, silt loam, clay loam, or silty clay loam.	25	86
5	Non-calcareous loam and silt loam with <20 percent clay content, or sandy clay loam, sandy clay, and hemic 3/ organic soil materials.	40	56
6	Non-calcareous loam and silt loam with >20 percent clay content, or non-calcareous clay loam with <35 percent clay content.	45	48
7	Silt, non-calcareous silty clay loam with >35 percent clay content and fibric 3/ organic soil material.	50	38
8	Soils not suitable for cultivation due to coarse fragments or wetness; wind erosion is not a problem.	--	0

1/ The "I" values for WEG 1 vary from 160 for coarse sands to 310 for very fine sands. Use an "I" of 220 as an average figure. For coarser sand that has gravel, use a lower figure. For a soil that has no gravel and very fine sand, use a higher figure. (Modification for coarse fragments is preparation.)

2/ Calcareous is a strongly or violently effervescent reaction to cold dilute (1N) HCL.

3/ See Soil Taxonomy for definition.

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(Single entries under "Sand and Silt" are a representative percentage are calculated using an algorithm. 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)

Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Permea- bility (Ksat)	Available water capacity	Linear extensi- bility	Organic matter	Erosion factors			Wind erodi- bility group	Wind erodi- bility index
										K	Kf	T		
141HM: Harney-----	0-10 10-26 26-60	24 7 20	51 54 50	22-27 35-42 24-35	1.30-1.40 1.35-1.50 1.20-1.35	0.60-2.00 0.20-0.60 0.60-2.00	0.22-0.24 0.12-0.19 0.18-0.22	0.0-2.9 3.0-5.9 0.0-2.9	2.0-4.0 --- ---	.32 .43 .43	.32 .43 .43	5	6	48
Mento-----	0-6 6-20 20-48 >48	20 7 20	48 53 52	28-35 35-45 21-35	1.30-1.40 1.35-1.45 1.30-1.40	0.20-0.60 0.06-0.20 0.20-0.60	0.21-0.23 0.12-0.18 0.18-0.20	3.0-5.9 6.0-8.9 3.0-5.9	1.0-3.0 --- ---	.37 .37 .37	.37 .37 .37	3	6	48
163AU: Armo-----	0-12 12-30 30-60	40 38 24	38 36 50	18-27 18-35 18-35	1.25-1.40 1.30-1.40 1.30-1.45	0.60-2.00 0.60-2.00 0.60-2.00	0.21-0.24 0.18-0.22 0.15-0.21	0.0-2.9 0.0-2.9 0.0-2.9	1.0-3.0 --- ---	.28 .28 .28	.28 .32 .43	5	4L	86
Bogue-----	0-7 7-21 21-36 >36	11 9 9	26 21 21	50-75 60-80 60-80	1.10-1.30 1.30-1.45 1.30-1.45	0.00-0.06 0.00-0.06 0.00-0.06	0.11-0.14 0.09-0.11 0.09-0.11	6.0-8.9 6.0-8.9 6.0-8.9	0.5-1.0 --- ---	.28 .28 .28	.28 .28 .28	3	4	86
163HE: Harney-----	0-9 9-34 34-60	24 7 20	51 54 50	22-27 35-42 24-35	1.30-1.40 1.35-1.50 1.20-1.35	0.60-2.00 0.20-0.60 0.60-2.00	0.22-0.24 0.12-0.19 0.18-0.22	0.0-2.9 3.0-5.9 0.0-2.9	2.0-4.0 --- ---	.32 .43 .43	.32 .43 .43	5	6	48
Mento-----	0-5 5-24 24-52 52-64	26 7 22	53 53 50	15-27 35-45 21-35	1.30-1.40 1.35-1.45 1.30-1.40	0.60-2.00 0.06-0.20 0.20-0.60	0.22-0.24 0.12-0.18 0.18-0.20	0.0-2.9 6.0-8.9 3.0-5.9	1.0-3.0 --- ---	.37 .37 .37	.37 .37 .37	3	6	48
163IC: Inavale-----	0-8 8-40 40-60	96 87 92	1 7 2	1-5 3-10 3-10	1.50-1.60 1.50-1.60 1.50-1.60	5.95-19.98 5.95-19.98 5.95-19.98	0.07-0.09 0.06-0.11 0.05-0.11	0.0-2.9 0.0-2.9 0.0-2.9	0.5-1.0 0.5-0.5 0.5-0.5	.15 .17 .17	.15 .17 .17	5	1	250
163WX: Wakeen-----	0-8 8-22 >22	10 7	68 66	18-27 18-35	1.30-1.45 1.35-1.50	0.60-2.00 0.60-2.00	0.22-0.24 0.18-0.22	0.0-2.9 3.0-5.9	1.0-3.0 0.5-1.0	.32 .43	.32 .49	3	4L	86
163WY: Wakeen-----	0-12 12-37 >37	10 7	68 66	18-27 18-35	1.30-1.45 1.35-1.50	0.60-2.00 0.60-2.00	0.22-0.24 0.18-0.22	0.0-2.9 3.0-5.9	1.0-3.0 0.5-1.0	.32 .43	.32 .49	3	4L	86
Harney-----	0-10 10-37 37-60	24 7 20	51 54 50	22-27 35-42 24-35	1.30-1.40 1.35-1.50 1.20-1.35	0.60-2.00 0.20-0.60 0.60-2.00	0.22-0.24 0.12-0.19 0.18-0.22	0.0-2.9 3.0-5.9 0.0-2.9	2.0-4.0 --- ---	.32 .43 .43	.32 .43 .43	5	6	48
165BO: Bogue-----	0-5 5-10 10-22 22-38 >38	11 9 9	26 21 21	50-75 60-80 60-80	1.10-1.30 1.30-1.45 1.30-1.45	0.00-0.06 0.00-0.06 0.00-0.06	0.11-0.14 0.09-0.11 0.09-0.11	6.0-8.9 6.0-8.9 6.0-8.9	0.5-1.0 --- ---	.28 .28 .28	.28 .28 .28	3	4	86
165NW: Nibson-----	0-7 7-18 >18	26 20	53 54	15-27 18-35	1.25-1.35 1.30-1.40	0.60-2.00 0.60-2.00	0.20-0.24 0.18-0.22	0.0-2.9 3.0-5.9	1.0-3.0 0.5-1.0	.32 .43	.32 .64	2	4L	86
Wakeen-----	0-8 8-32 >32	10 7	68 66	18-27 18-35	1.30-1.45 1.35-1.50	0.60-2.00 0.60-2.00	0.22-0.24 0.18-0.22	0.0-2.9 3.0-5.9	1.0-3.0 0.5-1.0	.32 .43	.32 .49	3	4L	86
165PE: Penden-----	0-14 14-32 32-60	35 34 34	33 37 37	28-35 24-35 24-35	1.35-1.45 1.40-1.50 1.30-1.50	0.60-2.00 0.60-2.00 0.60-2.00	0.17-0.19 0.15-0.20 0.14-0.19	3.0-5.9 3.0-5.9 3.0-5.9	1.0-2.0 0.5-1.0 0.1-0.5	.28 .32 .32	.28 .32 .32	5	4L	86
165UB: Uly-----	0-6 6-28 28-60	11 9 10	67 66 68	17-27 20-30 18-27	1.20-1.30 1.20-1.30 1.10-1.20	0.60-2.00 0.60-2.00 0.60-2.00	0.20-0.24 0.18-0.22 0.18-0.22	0.0-2.9 0.0-2.9 0.0-2.9	1.0-3.0 --- ---	.32 .43 .43	.32 .43 .43	5	6	48
165UR: Uly-----	0-6 6-28 28-60	11 9 10	67 66 68	17-27 20-30 18-27	1.20-1.30 1.20-1.30 1.10-1.20	0.60-2.00 0.60-2.00 0.60-2.00	0.20-0.24 0.18-0.22 0.18-0.22	0.0-2.9 0.0-2.9 0.0-2.9	1.0-3.0 0.5-1.0 0.1-0.5	.32 .43 .43	.32 .43 .43	5	6	48
Roxbury-----	0-16 16-44 44-60	10 9 9	68 64 64	18-27 18-35 18-35	1.30-1.45 1.35-1.50 1.35-1.50	0.60-2.00 0.60-2.00 0.60-2.00	0.22-0.24 0.17-0.22 0.17-0.22	0.0-2.9 3.0-5.9 3.0-5.9	2.0-4.0 1.0-3.0 0.5-0.5	.32 .43 .43	.32 .43 .43	5	4L	86
167CR: Crete-----	0-6 6-14 14-27 27-60	24 20 7 20	52 49 48 48	20-27 27-35 35-55 25-40	1.20-1.40 1.20-1.40 1.10-1.30 1.20-1.40	0.60-2.00 0.20-0.60 0.00-0.60 0.20-2.00	0.22-0.24 0.21-0.23 0.12-0.20 0.18-0.22	3.0-5.9 6.0-8.9 6.0-8.9 6.0-8.9	2.0-4.0 --- --- ---	.37 .37 .37 .37	.37 .37 .37 .37	5	6	48
167DR: Dorrance-----	0-11 11-15 15-60	66 84 95	19 4 1	10-20 5-18 1-7	1.45-1.55 1.50-1.65 1.60-1.70	2.00-6.00 5.95-19.98 19.98-19.98	0.10-0.18 0.07-0.12 0.02-0.06	0.0-2.9 0.0-2.9 0.0-2.9	1.0-3.0 --- ---	.20 .10 .10	.32 .17 .17	3	8	0
167RC: Roxbury-----	0-26 26-60	10 9	68 64	18-27 18-35	1.30-1.45 1.35-1.50	0.60-2.00 0.60-2.00	0.22-0.24 0.17-0.22	0.0-2.9 3.0-5.9	2.0-4.0 0.5-0.5	.32 .43	.32 .43	5	4L	86
195BD: Badland----- Manvel-----	0-1 0-3 3-60	11 9	68 64	15-27 18-35	1.30-1.40 1.35-1.40	0.60-2.00 0.20-0.60	0.18-0.20 0.16-0.18	3.0-5.9 3.0-5.9	0.5-2.0 0.0-1.0	.37 .43	.37 .43	5	4L	0 86

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Ellis County, Kansas: Published

(Single entries under "Sand and Silt" are a representative percentage are calculated using an algorithm. 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)

Map symbol and soil name	Depth In	Sand Pct	Silt Pct	Clay Pct	Moist bulk density g/cc	Permea- bility (Ksat) in/hr	Available water capacity In/in	Linear extensi- bility Pct	Organic matter Pct	Erosion factors			Wind erodi- bility group	Wind erodi- bility index
										K	Kf	T		
195CC: Campus-----	0-7 7-14 14-36 >36	42 38 38 ---	37 36 36 ---	15-27 18-35 18-35 ---	1.25-1.35 1.30-1.40 1.40-1.60 ---	0.60-2.00 0.60-2.00 0.60-2.00 ---	0.20-0.22 0.17-0.19 0.15-0.19 ---	0.0-2.9 0.0-2.9 0.0-2.9 ---	1.0-2.0 --- --- ---	.28 .28 .28 ---	.28 .32 .32 ---	2	4L	86
Canlon-----	0-8 8-18 >18	42 43 ---	38 40 ---	12-27 8-27 ---	1.30-1.45 1.35-1.50 ---	0.60-2.00 0.60-2.00 ---	0.15-0.24 0.15-0.22 ---	0.0-2.9 0.0-2.9 ---	0.5-2.0 --- ---	.32 .32 ---	.32 .43 ---	1	4L	86
195CF: Carlson-----	0-4 4-24 24-60	26 7 35	53 53 38	15-27 35-45 18-35	1.30-1.40 1.35-1.50 1.35-1.50	0.60-2.00 0.20-0.60 0.60-2.00	0.19-0.24 0.14-0.19 0.16-0.20	0.0-2.9 3.0-5.9 0.0-2.9	1.0-3.0 --- ---	.32 .43 .43	.32 .43 .43	5	6	48
195HU: Humbarger----	0-28 28-33 33-60	42 38 41	38 36 37	14-27 16-35 12-32	1.30-1.40 1.40-1.50 1.40-1.50	0.60-2.00 0.60-2.00 0.60-2.00	0.22-0.24 0.18-0.20 0.13-0.20	0.0-2.9 3.0-5.9 0.0-2.9	1.0-3.0 --- ---	.28 .28 .28	.28 .28 .28	5	4L	86
195IF: Inavale-----	0-6 6-60	85 92	9 2	2-10 3-10	1.50-1.60 1.50-1.60	5.95-19.98 5.95-19.98	0.10-0.12 0.05-0.11	0.0-2.9 0.0-2.9	0.5-1.0 0.5-0.5	.17 .17	.17 .17	5	2	134
195PF: Penden-----	0-10 10-33 33-60	35 36 36	33 34 34	28-35 24-35 24-35	1.30-1.45 1.35-1.50 1.30-1.50	0.60-2.00 0.60-2.00 0.60-2.00	0.17-0.22 0.15-0.19 0.14-0.19	3.0-5.9 3.0-5.9 3.0-5.9	1.0-4.0 --- ---	.28 .32 .32	.28 .32 .32	5	4L	86
195PO: Penden-----	0-14 14-32 32-60	39 36 36	37 34 34	20-27 24-35 24-35	1.30-1.45 1.35-1.50 1.30-1.50	0.60-2.00 0.60-2.00 0.60-2.00	0.20-0.22 0.15-0.19 0.14-0.19	0.0-2.9 3.0-5.9 3.0-5.9	1.0-4.0 0.5-1.0 0.1-0.5	.28 .32 .32	.28 .32 .32	5	4L	86
Ab: Fluvents-----	0-6 6-60	27 25	54 53	10-27 10-35	1.30-1.45 1.30-1.45	0.60-2.00 0.60-2.00	0.20-0.24 0.18-0.22	0.0-2.9 3.0-5.9	0.5-2.0 ---	.37 .43	.37 .43	5	4L	86
Ac: New Cambria--	0-9 9-38 38-60	5 5 8	45 46 52	40-60 38-60 30-50	1.30-1.40 1.35-1.45 1.35-1.45	0.06-0.20 0.06-0.20 0.00-0.60	0.12-0.14 0.13-0.18 0.12-0.16	6.0-8.9 6.0-8.9 6.0-8.9	2.0-4.0 --- ---	.28 .28 .28	.28 .28 .28	5	4	86
Ad: Fluvaquents--	0-18 18-60	20 35	49 38	27-35 18-35	1.35-1.45 1.35-1.50	0.20-0.60 0.20-2.00	0.17-0.23 0.16-0.22	3.0-5.9 0.0-2.9	1.0-4.0 ---	.28 .32	.28 .32	5	4L	86
Ae: Anselmo-----	0-10 10-25 25-35 35-60	66 67 66 86	20 19 20 7	10-18 10-18 10-18 5-10	1.30-1.60 1.40-1.60 1.40-1.60 1.50-1.75	0.57-5.95 2.00-6.00 2.00-6.00 5.95-19.98	0.13-0.18 0.15-0.19 0.12-0.16 0.05-0.10	0.0-2.9 0.0-2.9 0.0-2.9 0.0-2.9	1.0-2.0 0.5-1.0 0.5-1.0 0.5-0.5	.20 .20 .24 .17	.20 .20 .24 .17	4	3	86
Am: Armo-----	0-17 17-30 30-41 41-51 51-60	40 35 35 24 43	38 38 38 52 38	18-27 18-35 18-35 18-30 12-25	1.25-1.40 1.30-1.40 1.30-1.45 1.30-1.50 1.35-1.50	0.60-2.00 0.60-2.00 0.60-2.00 0.60-2.00 2.00-6.00	0.21-0.24 0.18-0.22 0.15-0.21 0.15-0.21 0.02-0.05	0.0-2.9 0.0-2.9 0.0-2.9 0.0-2.9 0.0-2.9	1.0-3.0 --- --- --- ---	.28 .28 .28 .28 .28	.28 .32 .32 .43 .64	5	4L	86
An: Armo-----	0-19 19-37 37-60	40 38 38	38 36 36	18-27 18-35 18-35	1.25-1.40 1.30-1.40 1.30-1.45	0.60-2.00 0.60-2.00 0.60-2.00	0.21-0.24 0.18-0.22 0.15-0.21	0.0-2.9 0.0-2.9 0.0-2.9	1.0-3.0 --- ---	.28 .28 .28	.28 .28 .32	5	4L	86
Ao: Armo-----	0-5 5-23 23-41 41-51 51-60	40 35 35 24 43	38 38 38 52 38	18-27 18-35 18-35 18-30 12-25	1.25-1.40 1.30-1.40 1.30-1.45 1.30-1.50 1.35-1.50	0.60-2.00 0.60-2.00 0.60-2.00 0.60-2.00 2.00-6.00	0.21-0.24 0.18-0.22 0.15-0.21 0.15-0.21 0.02-0.05	0.0-2.9 0.0-2.9 0.0-2.9 0.0-2.9 0.0-2.9	1.0-3.0 --- --- --- ---	.28 .28 .28 .28 .28	.28 .28 .32 .43 .64	5	4L	86
Ar: Armo-----	0-10 10-20 20-41 41-51 51-60	40 35 35 24 43	38 38 38 52 38	18-27 18-35 18-35 18-30 12-25	1.25-1.40 1.30-1.40 1.30-1.45 1.30-1.50 1.35-1.50	0.60-2.00 0.60-2.00 0.60-2.00 0.60-2.00 2.00-6.00	0.21-0.24 0.18-0.22 0.15-0.21 0.15-0.21 0.02-0.05	0.0-2.9 0.0-2.9 0.0-2.9 0.0-2.9 0.0-2.9	1.0-3.0 --- --- --- ---	.28 .28 .28 .28 .28	.28 .28 .32 .43 .64	5	4L	86
Bf: Boel-----	0-10 10-60	67 80	20 17	8-18 0-6	1.50-1.70 1.50-1.60	2.00-6.00 5.95-19.98	0.16-0.18 0.05-0.10	0.0-2.9 0.0-2.9	1.0-2.0 0.5-0.5	.20 .20	.20 .20	3	3	86
Bg: Bogue-----	0-6 6-17 17-23 23-32 >32	11 9 9 9 ---	26 21 21 21 ---	50-75 60-80 60-80 60-80 ---	1.10-1.30 1.30-1.45 1.30-1.45 --- ---	0.00-0.06 0.00-0.06 0.00-0.06 0.00-0.06 ---	0.11-0.14 0.09-0.11 0.09-0.11 0.09-0.11 ---	6.0-8.9 6.0-8.9 6.0-8.9 --- ---	0.5-3.5 0.5-2.0 0.5-1.5 0.5-1.0 ---	.28 .28 .28 .28 ---	.28 .28 .28 .28 ---	3	4	86
Bo: Bogue-----	0-6 6-17 17-23 23-32 >32	11 9 9 9 ---	26 21 21 21 ---	50-75 60-80 60-80 60-80 ---	1.10-1.30 1.30-1.45 1.30-1.45 --- ---	0.00-0.06 0.00-0.06 0.00-0.06 --- ---	0.11-0.14 0.09-0.11 0.09-0.11 --- ---	6.0-8.9 6.0-8.9 6.0-8.9 --- ---	0.5-1.0 --- --- ---	.28 .28 .28 ---	.28 .28 .28 ---	3	4	86
Armo-----	0-15 15-28 28-41 41-51 51-60	40 35 35 24 43	38 38 38 52 38	18-27 18-35 18-35 18-30 12-25	1.25-1.40 1.30-1.40 1.30-1.45 1.30-1.50 1.35-1.50	0.60-2.00 0.60-2.00 0.60-2.00 0.60-2.00 2.00-6.00	0.21-0.24 0.18-0.22 0.15-0.21 0.15-0.21 0.02-0.05	0.0-2.9 0.0-2.9 0.0-2.9 0.0-2.9 0.0-2.9	1.0-3.0 --- --- --- ---	.28 .28 .28 .28 .28	.28 .28 .32 .43 .64	5	4L	86

PHYSICAL PROPERTIES OF THE SOILS--Continued  
Ellis County, Kansas: Published

(Single entries under "Sand and Silt" are a representative percentage are calculated using an algorithm. 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)

Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Permea- bility (Ksat)	Available water capacity	Linear extensi- bility	Organic matter	Erosion factors			Wind erodi- bility group	Wind erodi- bility index
										K	Kf	T		
BOP: Borrow Pits-- Br:	In	Pct	Pct	Pct	g/cc	in/hr	In/in	Pct	Pct					
Brownell-----	0-7	42	37	15-27	1.30-1.45	0.60-2.00	0.10-0.16	0.0-2.9	1.0-2.0	.20	.49	2	8	0
	7-30	42	37	15-27	1.35-1.50	0.60-2.00	0.06-0.13	0.0-2.9	---	.20	.64			
	>30			---	---	---	---	---	---	---	---			
Cc: Campus-----	0-9	42	37	15-27	1.25-1.35	0.60-2.00	0.20-0.22	0.0-2.9	1.0-2.0	.28	.28	2	4L	86
	9-19	35	38	18-35	1.30-1.40	0.60-2.00	0.17-0.19	0.0-2.9	---	.28	.32			
	19-33	38	36	18-35	1.40-1.60	0.60-2.00	0.15-0.19	0.0-2.9	---	.28	.32			
	>33			---	---	---	---	---	---	---	---			
Carlson-----	0-8	26	53	15-27	1.30-1.40	0.60-2.00	0.19-0.24	0.0-2.9	1.0-3.0	.32	.32	5	6	48
	8-18	7	53	35-45	1.35-1.50	0.20-0.60	0.14-0.19	3.0-5.9	---	.43	.43			
	18-60	20	54	18-35	1.35-1.50	0.60-2.00	0.16-0.20	0.0-2.9	---	.43	.43			
Cd: Campus-----	0-9	42	37	15-27	1.25-1.35	0.60-2.00	0.20-0.22	0.0-2.9	1.0-2.0	.28	.28	2	4L	86
	9-19	35	38	18-35	1.30-1.40	0.60-2.00	0.17-0.19	0.0-2.9	---	.28	.32			
	19-33	38	36	18-35	1.40-1.60	0.60-2.00	0.15-0.19	0.0-2.9	---	.28	.32			
	>33			---	---	---	---	---	---	---	---			
Penden-----	0-14	35	33	28-35	1.30-1.45	0.60-2.00	0.17-0.22	3.0-5.9	1.0-4.0	.28	.28	5	4L	86
	14-27	34	37	24-35	1.35-1.50	0.60-2.00	0.15-0.19	3.0-5.9	---	.37	.37			
	27-64	34	37	24-35	1.30-1.50	0.60-2.00	0.14-0.19	3.0-5.9	---	.37	.37			
Ce: Canlon-----	0-4	42	38	12-27	1.30-1.45	0.60-2.00	0.15-0.24	0.0-2.9	0.5-1.0	.32	.32	1	4L	86
	4-13	43	40	8-27	1.35-1.50	0.60-2.00	0.15-0.22	0.0-2.9	---	.32	.43			
	>13			---	---	---	---	---	---	---	---			
Campus-----	0-9	42	37	15-27	1.25-1.35	0.60-2.00	0.20-0.22	0.0-2.9	1.0-2.0	.28	.28	2	4L	86
	9-19	35	38	18-35	1.30-1.40	0.60-2.00	0.17-0.19	0.0-2.9	---	.28	.32			
	19-33	38	36	18-35	1.40-1.60	0.60-2.00	0.15-0.19	0.0-2.9	---	.28	.32			
	>33			---	---	---	---	---	---	---	---			
Cm: Corinth-----	0-9	19	48	27-39	1.35-1.50	0.20-0.60	0.19-0.23	3.0-5.9	0.5-1.0	.37	.37	3	4L	86
	9-30	7	51	35-50	1.45-1.50	0.00-0.60	0.11-0.18	6.0-8.9	---	.32	.32			
	30-34			---	---	---	---	---	---	---	---			
Cn: Corinth-----	0-9	19	48	27-39	1.35-1.50	0.20-0.60	0.19-0.23	3.0-5.9	0.5-1.0	.37	.37	3	4L	86
	9-30	7	51	35-50	1.45-1.50	0.00-0.60	0.11-0.18	6.0-8.9	---	.32	.32			
	>30			---	---	---	---	---	---	---	---			
Co: Corinth-----	0-9	19	48	27-39	1.35-1.50	0.20-0.60	0.19-0.23	3.0-5.9	0.5-1.0	.37	.37	3	4L	86
	9-30	7	51	35-50	1.45-1.50	0.00-0.60	0.11-0.18	6.0-8.9	---	.32	.32			
	>30			---	---	---	---	---	---	---	---			
Cr: Crete-----	0-16	20	49	27-35	1.20-1.40	0.20-0.60	0.21-0.23	6.0-8.9	2.0-4.0	.37	.37	5	7	38
	16-34	9	60	27-35	1.20-1.40	0.20-0.60	0.21-0.23	6.0-8.9	---	.37	.37			
	34-41	7	48	35-55	1.10-1.30	0.00-0.60	0.12-0.20	6.0-8.9	---	.37	.37			
	41-68	20	48	25-40	1.20-1.40	0.20-2.00	0.18-0.22	6.0-8.9	---	.37	.37			
De: Detroit-----	0-12	24	51	22-27	1.25-1.40	0.20-0.60	0.22-0.24	0.0-2.9	2.0-4.0	.37	.37	5	6	48
	12-34	8	52	35-45	1.35-1.50	0.06-0.20	0.12-0.18	6.0-8.9	---	.37	.37			
	34-63	20	54	18-35	1.30-1.50	0.20-0.60	0.18-0.22	3.0-5.9	---	.37	.37			
Ee: Eltree-----	0-26	12	69	12-27	1.25-1.35	0.60-2.00	0.20-0.24	0.0-2.9	1.0-3.0	.32	.32	5	6	48
	26-35	10	68	18-27	1.30-1.45	0.60-2.00	0.17-0.22	0.0-2.9	---	.43	.43			
	35-63	7	66	18-35	1.35-1.45	0.60-2.00	0.17-0.20	0.0-2.9	---	.43	.43			
Ef: Eltree-----	0-26	12	69	12-27	1.25-1.35	0.60-2.00	0.20-0.24	0.0-2.9	1.0-3.0	.32	.32	5	6	48
	26-35	10	68	18-27	1.30-1.45	0.60-2.00	0.17-0.22	0.0-2.9	---	.43	.43			
	35-60	7	66	18-35	1.35-1.45	0.60-2.00	0.17-0.20	0.0-2.9	---	.43	.43			
Eg: Eltree-----	0-26	12	69	12-27	1.25-1.35	0.60-2.00	0.20-0.24	0.0-2.9	1.0-3.0	.32	.32	5	6	48
	26-35	10	68	18-27	1.30-1.45	0.60-2.00	0.17-0.22	0.0-2.9	---	.43	.43			
	35-63	7	66	18-35	1.35-1.45	0.60-2.00	0.17-0.20	0.0-2.9	---	.43	.43			
Eh: Eltree-----	0-26	12	69	12-27	1.25-1.35	0.60-2.00	0.20-0.24	0.0-2.9	1.0-3.0	.32	.32	5	6	48
	26-35	10	68	18-27	1.30-1.45	0.60-2.00	0.17-0.22	0.0-2.9	---	.43	.43			
	35-60	7	66	18-35	1.35-1.45	0.60-2.00	0.17-0.20	0.0-2.9	---	.43	.43			
GRP: Pits-----	0-60			0-8	1.70-2.00	5.95-19.98	0.02-0.09	0.0-2.9	0.0-0.5	.10	.17	2	8	0
Ha: Harney-----	0-10	24	51	22-27	1.30-1.40	0.60-2.00	0.22-0.24	0.0-2.9	1.0-3.0	.32	.32	5	6	48
	10-34	7	54	35-42	1.35-1.50	0.20-0.60	0.12-0.19	3.0-5.9	0.5-1.5	.43	.43			
	34-60	20	50	24-35	1.20-1.35	0.60-2.00	0.18-0.22	0.0-2.9	0.0-0.5	.43	.43			
Hb: Harney-----	0-12	24	51	22-27	1.30-1.40	0.60-2.00	0.22-0.24	0.0-2.9	2.0-4.0	.32	.32	5	6	48
	12-39	7	54	35-42	1.35-1.50	0.20-0.60	0.12-0.19	3.0-5.9	---	.43	.43			
	39-60	18	52	24-35	1.20-1.35	0.60-2.00	0.18-0.22	0.0-2.9	---	.43	.43			
Hc: Harney-----	0-6	24	51	22-27	1.30-1.40	0.60-2.00	0.22-0.24	0.0-2.9	2.0-4.0	.32	.32	5	6	48
	6-40	7	54	35-42	1.35-1.50	0.20-0.60	0.12-0.19	3.0-5.9	---	.43	.43			
	40-74	18	52	24-35	1.20-1.35	0.60-2.00	0.18-0.22	0.0-2.9	---	.43	.43			



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Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Permea- bility (Ksat)	Available water capacity	Linear extensi- bility	Organic matter	Erosion factors			Wind erodi- bility group	Wind erodi- bility index
										K	Kf	T		
Hd:														
Harney-----	0-6	20	48	28-35	1.30-1.40	0.60-2.00	0.21-0.23	3.0-5.9	2.0-4.0	.32	.32	5	7	38
	6-40	7	54	35-42	1.35-1.50	0.20-0.60	0.12-0.19	3.0-5.9	---	.43	.43			
	40-74	18	52	24-35	1.20-1.35	0.60-2.00	0.18-0.22	0.0-2.9	---	.43	.43			
He:														
Armo-----	0-5	40	38	18-27	1.25-1.40	0.60-2.00	0.21-0.24	0.0-2.9	1.0-3.0	.28	.28	5	4L	86
	5-23	35	38	18-35	1.30-1.40	0.60-2.00	0.18-0.22	0.0-2.9	---	.28	.28			
	23-41	35	38	18-35	1.30-1.45	0.60-2.00	0.15-0.21	0.0-2.9	---	.28	.32			
	41-51	24	52	18-30	1.30-1.50	0.60-2.00	0.15-0.21	0.0-2.9	---	.28	.43			
	51-60	43	38	12-25	1.35-1.50	2.00-6.00	0.02-0.05	0.0-2.9	---	.28	.64			
Harney-----	0-6	24	51	22-27	1.30-1.40	0.60-2.00	0.22-0.24	0.0-2.9	2.0-4.0	.32	.32	5	6	48
	6-40	7	54	35-42	1.35-1.50	0.20-0.60	0.12-0.19	3.0-5.9	---	.43	.43			
	40-74	18	52	24-35	1.20-1.35	0.60-2.00	0.18-0.22	0.0-2.9	---	.43	.43			
Hf:														
Carlson-----	0-8	26	53	15-27	1.30-1.40	0.60-2.00	0.19-0.24	0.0-2.9	1.0-3.0	.32	.32	5	6	48
	8-18	7	53	35-45	1.35-1.50	0.20-0.60	0.14-0.19	3.0-5.9	---	.43	.43			
	18-60	35	38	18-35	1.35-1.50	0.60-2.00	0.16-0.20	0.0-2.9	---	.43	.43			
Harney-----	0-6	24	51	22-27	1.30-1.40	0.60-2.00	0.22-0.24	0.0-2.9	2.0-4.0	.32	.32	5	6	48
	6-40	7	54	35-42	1.35-1.50	0.20-0.60	0.12-0.19	3.0-5.9	---	.43	.43			
	40-74	18	52	24-35	1.20-1.35	0.60-2.00	0.18-0.22	0.0-2.9	---	.43	.43			
Hg:														
Carlson-----	0-8	26	53	15-27	1.30-1.40	0.60-2.00	0.19-0.24	0.0-2.9	1.0-3.0	.32	.32	5	6	48
	8-18	7	53	35-45	1.35-1.50	0.20-0.60	0.14-0.19	3.0-5.9	---	.43	.43			
	18-60	35	38	18-35	1.35-1.50	0.60-2.00	0.16-0.20	0.0-2.9	---	.43	.43			
Harney-----	0-6	24	51	22-27	1.30-1.40	0.60-2.00	0.22-0.24	0.0-2.9	2.0-4.0	.32	.32	5	6	48
	6-40	7	54	35-42	1.35-1.50	0.20-0.60	0.12-0.19	3.0-5.9	---	.43	.43			
	40-74	20	50	24-35	1.20-1.35	0.60-2.00	0.18-0.22	0.0-2.9	---	.43	.43			
HGG:														
Harney-----	0-11	24	51	22-27	1.30-1.40	0.60-2.00	0.22-0.24	0.0-2.9	2.0-4.0	.32	.32	5	6	48
	11-27	7	54	35-42	1.35-1.50	0.20-0.60	0.12-0.19	3.0-5.9	---	.43	.43			
	27-60	20	50	24-35	1.20-1.35	0.60-2.00	0.18-0.22	0.0-2.9	---	.43	.43			
Mento-----	0-8	26	53	15-27	1.30-1.40	0.60-2.00	0.22-0.24	0.0-2.9	1.0-3.0	.37	.37	3	6	48
	8-22	8	52	35-45	1.35-1.45	0.06-0.20	0.12-0.18	6.0-8.9	---	.37	.37			
	22-46	22	50	21-35	1.30-1.40	0.20-0.60	0.18-0.20	3.0-5.9	---	.37	.37			
	46-60	35	33	28-35	1.35-1.45	0.20-0.60	0.10-0.18	3.0-5.9	---	.37	.49			
Hh:														
Harney-----	0-6	24	51	22-27	1.30-1.40	0.60-2.00	0.22-0.24	0.0-2.9	2.0-4.0	.32	.32	5	6	48
	6-40	7	54	35-42	1.35-1.50	0.20-0.60	0.12-0.19	3.0-5.9	---	.43	.43			
	40-74	18	52	24-35	1.20-1.35	0.60-2.00	0.18-0.22	0.0-2.9	---	.43	.43			
Wakeen-----	0-5	10	68	18-27	1.30-1.45	0.60-2.00	0.22-0.24	0.0-2.9	1.0-3.0	.32	.32	3	4L	86
	5-36	7	66	18-35	1.35-1.50	0.60-2.00	0.18-0.22	3.0-5.9	0.5-1.0	.43	.49			
	>36			---	---	---	---	---	---	---	---			
Hk:														
Harney-----	0-6	24	51	22-27	1.30-1.40	0.60-2.00	0.22-0.24	0.0-2.9	2.0-4.0	.32	.32	5	6	48
	6-40	7	54	35-42	1.35-1.50	0.20-0.60	0.12-0.19	3.0-5.9	---	.43	.43			
	40-74	20	50	24-35	1.20-1.35	0.60-2.00	0.18-0.22	0.0-2.9	---	.43	.43			
Wakeen-----	0-5	10	68	18-27	1.30-1.45	0.60-2.00	0.22-0.24	0.0-2.9	1.0-3.0	.32	.32	3	4L	86
	5-36	7	66	18-35	1.35-1.50	0.60-2.00	0.18-0.22	3.0-5.9	0.5-1.0	.43	.49			
	>36			---	---	---	---	---	---	---	---			
Hl:														
Armo-----	0-15	40	38	18-27	1.25-1.40	0.60-2.00	0.21-0.24	0.0-2.9	1.0-3.0	.28	.28	5	4L	86
	15-28	35	38	18-35	1.30-1.40	0.60-2.00	0.18-0.22	0.0-2.9	---	.28	.28			
	28-41	35	38	18-35	1.30-1.45	0.60-2.00	0.15-0.21	0.0-2.9	---	.28	.32			
	41-51	24	52	18-30	1.30-1.50	0.60-2.00	0.15-0.21	0.0-2.9	---	.28	.43			
	51-60	43	38	12-25	1.35-1.50	2.00-6.00	0.02-0.05	0.0-2.9	---	.28	.64			
Heizer-----	0-6	42	37	15-27	1.30-1.45	0.60-2.00	0.10-0.16	0.0-2.9	---	.20	.55	1	8	0
	6-14	42	37	15-27	1.35-1.50	0.60-2.00	0.06-0.13	0.0-2.9	---	.24	.64			
	>14			---	---	---	---	---	---	---	---			
HMM:														
Heizer-----	0-6	42	37	15-27	1.30-1.45	0.60-2.00	0.10-0.16	0.0-2.9	1.0-2.0	.20	.55	1	8	0
	6-15	42	37	15-27	1.35-1.50	0.60-2.00	0.06-0.13	0.0-2.9	0.5-1.0	.24	.64			
	>15			---	---	---	---	---	---	---	---			
Brownell-----	0-9	42	37	15-27	1.30-1.45	0.60-2.00	0.10-0.16	0.0-2.9	1.0-2.0	.20	.55	2	8	0
	9-24	42	37	15-27	1.35-1.50	0.60-2.00	0.06-0.13	0.0-2.9	0.5-1.0	.20	.64			
	>24			---	---	---	---	---	---	---	---			
Hn:														
Dorrance-----	0-11	66	19	10-20	1.35-1.45	2.00-6.00	0.14-0.18	0.0-2.9	1.0-3.0	.20	.20	3	3	86
	11-15	65	23	5-18	1.50-1.65	5.95-19.98	0.07-0.12	0.0-2.9	---	.10	.17			
	15-60	80	16	1-7	1.60-1.70	19.98-19.98	0.02-0.06	0.0-2.9	---	.10	.17			
Ho:														
Holdrege-----	0-14	11	69	15-25	1.40-1.60	0.60-2.00	0.22-0.24	3.0-5.9	1.0-3.0	.32	.32	5	6	48
	14-25	7	62	28-35	1.20-1.40	0.60-2.00	0.18-0.20	3.0-5.9	---	.43	.43			
	25-30	9	67	18-30	1.30-1.50	0.60-2.00	0.17-0.20	3.0-5.9	---	.43	.43			
	30-60	14	69	15-20	1.40-1.60	0.60-2.00	0.20-0.22	3.0-5.9	---	.43	.43			
Hp:														
Holdrege-----	0-11	11	69	15-25	1.40-1.50	0.60-2.00	0.22-0.24	3.0-5.9	1.0-3.0	.32	.32	5	6	48
	11-33	7	62	28-35	1.25-1.35	0.60-2.00	0.18-0.20	3.0-5.9	---	.43	.43			
	33-48	9	67	18-30	1.35-1.45	0.60-2.00	0.18-0.22	3.0-5.9	0.5-1.0	.43	.43			
	48-66	14	69	15-20	1.40-1.50	0.60-2.00	0.20-0.22	3.0-5.9	0.0-0.5	.43	.43			
Hr:														
Hord-----	0-13	11	67	17-27	1.30-1.40	0.60-2.00	0.20-0.24	0.0-2.9	2.0-4.0	.32	.32	5	6	48
	13-36	7	65	20-35	1.35-1.45	0.60-2.00	0.17-0.22	0.0-2.9	---	.32	.32			
	36-60	9	67	18-30	1.30-1.50	0.60-2.00	0.17-0.22	0.0-2.9	---	.43	.43			

PHYSICAL PROPERTIES OF THE SOILS--Continued  
Ellis County, Kansas: Published

(Single entries under "Sand and Silt" are a representative percentage are calculated using an algorithm. 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)

Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Permea- bility (Ksat)	Available water capacity	Linear extensi- bility	Organic matter	Erosion factors			Wind erodi- bility group	Wind erodi- bility index
										K	Kf	T		
In: Inavale-----	In	Pct	Pct	Pct	g/cc	in/hr	In/in	Pct	Pct					
	0-14	85	9	2-10	1.50-1.60	5.95-19.98	0.10-0.12	0.0-2.9	0.5-1.0	.17	.17	5	2	134
	14-31	92	1	3-10	1.50-1.60	5.95-19.98	0.05-0.10	0.0-2.9	0.5-0.5	.17	.17			
	31-60	84	9	3-10	1.50-1.60	5.95-19.98	0.05-0.11	0.0-2.9	0.5-0.5	.17	.17			
Mc: Mccook-----	0-14	66	20	10-17	1.40-1.60	2.00-6.00	0.16-0.18	0.0-2.9	1.0-2.0	.20	.20	5	3	86
	14-60	14	72	10-18	1.30-1.45	0.60-2.00	0.17-0.20	0.0-2.9	---	.43	.43			
Md: Mccook-----	0-11	14	69	15-20	1.20-1.40	0.60-2.00	0.20-0.24	0.0-2.9	2.0-4.0	.32	.32	5	4L	86
	11-60	14	72	10-18	1.30-1.45	0.60-2.00	0.17-0.20	0.0-2.9	---	.43	.43			
Me: Mento-----	0-9	26	53	15-27	1.30-1.40	0.60-2.00	0.22-0.24	0.0-2.9	1.0-3.0	.37	.37	3	6	48
	9-21	7	53	35-45	1.35-1.45	0.06-0.20	0.12-0.18	6.0-8.9	---	.37	.37			
	21-41	20	52	21-35	1.30-1.40	0.20-0.60	0.18-0.20	3.0-5.9	---	.37	.37			
	41-67	35	33	28-35	1.35-1.45	0.20-0.60	0.10-0.18	3.0-5.9	---	.37	.49			
	>67			---	---	---	---	---	---	---	---			
Mf: Mento-----	0-9	26	53	15-27	1.30-1.40	0.60-2.00	0.22-0.24	0.0-2.9	1.0-3.0	.37	.37	3	6	48
	9-21	7	53	35-45	1.35-1.45	0.06-0.20	0.12-0.18	6.0-8.9	---	.37	.37			
	21-41	20	52	21-35	1.30-1.40	0.20-0.60	0.18-0.20	3.0-5.9	---	.37	.37			
	41-67	35	33	28-35	1.35-1.45	0.20-0.60	0.10-0.18	3.0-5.9	---	.37	.49			
	>67			---	---	---	---	---	---	---	---			
Mg: Mento-----	0-6	20	48	28-35	1.30-1.40	0.20-0.60	0.21-0.23	3.0-5.9	1.0-3.0	.37	.37	3	6	48
	6-21	7	53	35-45	1.35-1.45	0.06-0.20	0.12-0.18	6.0-8.9	---	.37	.37			
	21-41	20	52	21-35	1.30-1.40	0.20-0.60	0.18-0.20	3.0-5.9	---	.37	.37			
	41-67	35	33	28-35	1.35-1.45	0.20-0.60	0.10-0.18	3.0-5.9	---	.37	.49			
	67-71			---	---	---	---	---	---	---	---			
Mo: Mento-----	0-6	20	48	28-35	1.30-1.40	0.20-0.60	0.21-0.23	3.0-5.9	1.0-3.0	.37	.37	3	6	48
	6-20	7	53	35-45	1.35-1.45	0.06-0.20	0.12-0.18	6.0-8.9	---	.37	.37			
	20-48	20	52	21-35	1.30-1.40	0.20-0.60	0.18-0.20	3.0-5.9	---	.37	.37			
	48-67			---	---	---	---	---	---	---	---			
	67-71			---	---	---	---	---	---	---	---			
Mu: Munjour-----	0-7	66	23	7-15	1.30-1.40	2.00-6.00	0.14-0.20	0.0-2.9	0.5-1.0	.24	.24	4	3	86
	7-44	63	26	7-15	1.30-1.40	2.00-6.00	0.13-0.18	0.0-2.9	---	.24	.24			
	44-60	81	16	1-5	1.40-1.50	5.95-19.98	0.06-0.09	0.0-2.9	---	.15	.15			
Nc: New Cambria--	0-9	5	45	40-60	1.30-1.40	0.06-0.20	0.12-0.14	6.0-8.9	2.0-4.0	.28	.28	5	4	86
	9-38	5	46	38-60	1.35-1.45	0.06-0.20	0.13-0.18	6.0-8.9	---	.28	.28			
	38-60	7	53	30-50	1.35-1.45	0.00-0.60	0.12-0.16	6.0-8.9	---	.28	.28			
Nn: Nibson-----	0-7	26	53	15-27	1.25-1.35	0.60-2.00	0.20-0.24	0.0-2.9	1.0-3.0	.32	.32	2	4L	86
	7-19	20	54	18-35	1.30-1.40	0.60-2.00	0.18-0.22	3.0-5.9	0.5-1.0	.43	.64			
	>19			---	---	---	---	---	---	---	---			
Rb: Roxbury-----	0-29	10	68	18-27	1.30-1.45	0.60-2.00	0.22-0.24	0.0-2.9	2.0-4.0	.32	.32	5	4L	86
	29-40	9	64	18-35	1.35-1.50	0.60-2.00	0.17-0.22	3.0-5.9	1.0-3.0	.43	.43			
	40-60	9	64	18-35	1.35-1.50	0.60-2.00	0.17-0.22	3.0-5.9	0.5-0.5	.43	.43			
Rf: Roxbury-----	0-24	10	68	18-27	1.30-1.45	0.60-2.00	0.22-0.24	0.0-2.9	2.0-4.0	.32	.32	5	4L	86
	24-50	7	66	18-35	1.35-1.50	0.60-2.00	0.17-0.22	3.0-5.9	1.0-3.0	.43	.43			
	50-68	7	66	18-35	1.35-1.50	0.60-2.00	0.17-0.22	3.0-5.9	0.5-0.5	.43	.43			
RIV: Riverwash And Sandbars----	0-6			10-27	1.30-1.45	0.60-2.00	0.20-0.24	0.0-2.9	0.5-2.0	.37	.37	5	4L	86
	6-60			10-35	1.30-1.45	0.60-2.00	0.18-0.22	3.0-5.9	---	.43	.43			
Ro: Heizer-----	0-6	42	37	15-27	1.30-1.45	0.60-2.00	0.10-0.16	0.0-2.9	0.5-2.0	.20	.55	1	8	0
	6-15	42	37	15-27	1.35-1.50	0.60-2.00	0.06-0.13	0.0-2.9	---	.24	.64			
	>15			---	---	---	---	---	---	---	---			
Brownell-----	0-8	42	37	15-27	1.30-1.45	0.60-2.00	0.10-0.16	0.0-2.9	0.5-1.0	.20	.55	2	8	0
	8-32	42	37	15-27	1.35-1.50	0.60-2.00	0.06-0.13	0.0-2.9	---	.20	.64			
	>32			---	---	---	---	---	---	---	---			
ROO: Roxbury-----	0-16	10	68	18-27	1.30-1.45	0.60-2.00	0.22-0.24	0.0-2.9	2.0-4.0	.32	.32	5	4L	86
	16-44	9	64	18-35	1.35-1.50	0.60-2.00	0.17-0.22	3.0-5.9	1.0-3.0	.43	.43			
	44-60	9	64	18-35	1.35-1.50	0.60-2.00	0.17-0.22	3.0-5.9	0.5-0.5	.43	.43			
UCC: Uly-----	0-6	11	67	17-27	1.20-1.30	0.60-2.00	0.20-0.24	0.0-2.9	1.0-3.0	.32	.32	5	6	48
	6-28	9	66	20-30	1.20-1.30	0.60-2.00	0.18-0.22	0.0-2.9	---	.43	.43			
	28-60	10	68	18-27	1.10-1.20	0.60-2.00	0.18-0.22	0.0-2.9	---	.43	.43			
W: Water-----	---			---	---	---	---	---	---	---	---	-	---	0
Wa: Wakeen-----	0-10	10	68	18-27	1.30-1.45	0.60-2.00	0.22-0.24	0.0-2.9	1.0-3.0	.32	.32	3	4L	86
	10-31	7	66	18-35	1.35-1.50	0.60-2.00	0.18-0.22	3.0-5.9	0.5-1.0	.43	.49			
	>31			---	---	---	---	---	---	---	---			
We: Wakeen-----	0-11	10	68	18-27	1.30-1.45	0.60-2.00	0.22-0.24	0.0-2.9	1.0-3.0	.32	.32	3	4L	86
	11-30	7	66	18-35	1.35-1.50	0.60-2.00	0.18-0.22	3.0-5.9	0.5-1.0	.43	.49			
	>30			---	---	---	---	---	---	---	---			

(Single entries under "Sand and Silt" are a representative percentage are calculated using an algorithm. 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)

Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Permea- bility (Ksat)	Available water capacity	Linear extensi- bility	Organic matter	Erosion factors			Wind erodi- bility group	Wind erodi- bility index
										K	Kf	T		
Wh: Wakeen-----	In	Pct	Pct	Pct	g/cc	in/hr	In/in	Pct	Pct					
	0-11	10	68	18-27	1.30-1.45	0.60-2.00	0.22-0.24	0.0-2.9	1.0-3.0	.32	.32	3	4L	86
	11-30	7	66	18-35	1.35-1.50	0.60-2.00	0.18-0.22	3.0-5.9	0.5-1.0	.43	.49			
	>30			---	---	---	---	---	---	---	---			
Wk: Wakeen-----	0-8	10	68	18-27	1.30-1.45	0.60-2.00	0.22-0.24	0.0-2.9	1.0-3.0	.32	.32	3	4L	86
	8-22	7	66	18-35	1.35-1.50	0.60-2.00	0.18-0.22	3.0-5.9	0.5-1.0	.43	.49			
	>22			---	---	---	---	---	---	---	---			
Wn: Wann-----	0-13	43	38	12-25	1.40-1.50	0.60-2.00	0.20-0.22	0.0-2.9	1.0-2.0	.28	.28	5	5	56
	13-44	63	26	3-18	1.50-1.60	2.00-6.00	0.11-0.17	0.0-2.9	---	.20	.28			
	44-64			3-22	1.40-1.60	2.00-6.00	0.09-0.12	0.0-2.9	---	.15	---			

CHEMICAL PROPERTIES OF THE SOILS  
Ellis County, Kansas

The Chemical Properties table shows estimates of some characteristics and features that affect soil behavior. These estimates are given for the major layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils. Depth to the upper and lower boundaries of each layer is indicated.

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. Soils having a high cation-exchange capacity can retain cations. The ability to retain cations helps to prevent the pollution of ground water.

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

Calcium carbonate 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 and can be dissolved and removed by water. Soils that have a high content of gypsum may collapse if the gypsum is removed by percolating water.

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

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

CHEMICAL PROPERTIES OF THE SOILS--Continued  
Ellis County, Kansas

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Map symbol and soil name	Depth	Cation- exchange capacity	Soil reaction	Calcium carbonate	Gypsum	Salinity	Sodium adsorption ratio
	In	meq/100g	pH	Pct	Pct	mmhos/cm	
141HM:							
Harney-----	0-10	9.0-19	5.6-7.8	0	0	0	0
	10-26	14-25	6.1-8.4	0-2	0	0	0
	26-60	9.0-21	7.4-8.4	0-10	0	0	0
Mento-----	0-6	11-23	6.6-7.8	---	---	0.0-2.0	---
	6-20	14-27	7.4-8.4	---	---	0.0-2.0	---
	20-48	8.0-21	7.9-8.4	0-10	---	0.0-4.0	---
	>48	---	---	---	---	---	---
163AU:							
Armo-----	0-12	7.0-18	6.6-8.4	5-15	---	---	---
	12-30	7.0-21	7.4-8.4	5-15	---	---	---
	30-60	7.0-21	7.9-8.4	5-15	---	---	---
Bogue-----	0-7	20-46	6.6-8.4	0-5	---	---	---
	7-21	24-48	6.6-8.4	---	---	---	---
	21-36	---	4.0-6.5	---	---	---	---
	>36	---	---	---	---	---	---
163HE:							
Harney-----	0-9	9.0-19	5.6-7.8	0	0	0	0
	9-34	14-25	6.1-8.4	0-2	0	0	0
	34-60	9.0-21	7.4-8.4	0-10	0	0	0
Mento-----	0-5	6.0-18	6.6-7.8	---	---	0.0-2.0	---
	5-24	14-27	7.4-8.4	---	---	0.0-2.0	---
	24-52	8.0-21	7.9-8.4	0-10	---	0.0-4.0	---
	52-64	---	---	---	---	---	---
163IC:							
Inavale-----	0-8	0.0-4.0	5.6-7.8	0	0	0	0
	8-40	1.0-6.0	5.6-7.8	0	0	0	0
	40-60	1.0-6.0	6.6-8.4	0-5	0	0	0
163WX:							
Wakeen-----	0-8	7.0-18	7.4-8.4	10-20	---	---	---
	8-22	7.0-22	7.4-9.0	25-40	---	---	---
	>22	---	---	---	---	---	---
163WY:							
Wakeen-----	0-12	7.0-18	7.4-8.4	10-20	---	---	---
	12-37	7.0-22	7.4-9.0	25-40	---	---	---
	>37	---	---	---	---	---	---
Harney-----	0-10	9.0-19	5.6-7.8	0	0	0	0
	10-37	14-25	6.1-8.4	0-2	0	0	0
	37-60	9.0-21	7.4-8.4	0-10	0	0	0
165BO:							
Bogue-----	0-5	20-46	6.6-8.4	---	---	---	---
	5-10	24-48	6.6-8.4	---	---	---	---
	10-22	24-48	6.5-8.4	---	---	---	---
	22-38	---	---	---	---	---	---
	>38	---	---	---	---	---	---
165NW:							
Nibson-----	0-7	6.0-18	7.4-9.0	10-20	0	0	0
	7-18	7.0-22	7.9-9.0	25-40	0	0	0
	>18	---	---	---	---	---	---
Wakeen-----	0-8	7.0-18	7.4-8.4	10-20	---	---	---
	8-32	7.0-22	7.4-9.0	25-40	---	---	---
	>32	---	---	---	---	---	---
165PE:							
Penden-----	0-14	11-22	7.4-8.4	5-10	---	0.0-2.0	0
	14-32	9.0-21	7.9-8.4	15-30	---	0.0-2.0	0
	32-60	9.0-21	7.9-8.4	15-30	---	0.0-2.0	0
165UB:							
Uly-----	0-6	7.0-18	6.1-7.8	0	0	0	0
	6-28	8.0-18	6.1-8.4	0	0	0	0
	28-60	7.0-16	7.4-8.4	---	0	0	0
165UR:							
Uly-----	0-6	7.0-18	6.1-7.8	0	0	0	0
	6-28	8.0-18	6.1-8.4	0	0	0	0
	28-60	7.0-16	7.4-8.4	---	0	0	0
Roxbury-----	0-16	8.0-19	6.6-8.4	1-5	---	---	---
	16-44	7.0-23	7.4-8.4	1-5	---	---	---
	44-60	7.0-21	7.4-8.4	5-10	---	---	---

CHEMICAL PROPERTIES OF THE SOILS--Continued  
Ellis County, Kansas

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Map symbol and soil name	Depth	Cation- exchange capacity	Soil reaction	Calcium carbonate	Gypsum	Salinity	Sodium adsorption ratio
	In	meq/100g	pH	Pct	Pct	mmhos/cm	
167CR: Crete-----	0-6	8.0-19	5.6-6.0	0	0	0	0
	6-14	10-21	5.6-6.0	0	0	0	0
	14-27	14-33	6.1-7.3	0	0	0	0
	27-60	10-24	7.4-8.4	0-5	0	0	0
167DR: Dorrance-----	0-11	4.0-14	6.6-8.4	0-10	0	0	0
	11-15	2.0-11	7.4-8.4	0-10	0	0	0
	15-60	0.0-4.0	7.4-8.4	10-15	0	0	0
167RC: Roxbury-----	0-26	8.0-19	6.6-8.4	1-5	---	---	---
	26-60	7.0-21	7.4-8.4	5-10	---	---	---
195BD: Badland-----	0-1	---	---	---	---	---	---
Manvel-----	0-3	6.0-18	7.9-8.4	0-10	0	0.0-2.0	0
	3-60	7.0-21	7.9-8.4	10-20	---	2.0-4.0	---
195CC: Campus-----	0-7	6.0-18	7.4-8.4	0-10	---	---	---
	7-14	7.0-21	7.4-8.4	10-25	---	---	---
	14-36	7.0-21	7.9-8.4	15-45	---	---	---
	>36	---	---	---	---	---	---
Canlon-----	0-8	5.0-18	7.4-8.4	5-10	0	0	0
	8-18	3.0-16	7.4-8.4	10-25	0	0	0
	>18	---	---	---	---	---	---
195CF: Carlson-----	0-4	6.0-18	6.1-7.8	---	---	---	---
	4-24	14-27	6.6-8.4	---	---	---	---
	24-60	7.0-21	7.9-8.4	0-15	---	---	---
195HU: Humbarger-----	0-28	6.0-18	7.4-8.4	0-5	---	---	---
	28-33	6.0-21	7.9-8.4	0-5	---	---	---
	33-60	4.0-19	7.9-8.4	0-5	---	---	---
195IF: Inavale-----	0-6	1.0-7.0	5.6-7.8	0	0	0	0
	6-60	1.0-6.0	6.6-8.4	0-5	0	0	0
195PF: Penden-----	0-10	11-24	7.4-8.4	0-5	---	---	---
	10-33	9.0-21	7.9-8.4	15-30	---	---	---
	33-60	9.0-21	7.9-8.4	0-10	---	---	---
195PO: Penden-----	0-14	8.0-19	7.4-8.4	0-5	---	0.0-2.0	0
	14-32	9.0-21	7.9-8.4	15-30	---	0.0-2.0	0
	32-60	9.0-21	7.9-8.4	0-10	---	0.0-2.0	0
Ab: Fluents-----	0-6	4.0-18	6.6-8.4	---	---	---	---
	6-60	4.0-21	7.4-8.4	---	---	---	---
Ac: New Cambria-----	0-9	16-39	6.6-8.4	0-5	---	---	---
	9-38	15-36	7.9-8.4	0-10	---	---	---
	38-60	12-30	7.9-8.4	5-15	---	---	---
Ad: Fluvaquents-----	0-18	11-24	7.4-8.4	0-5	0	0.0-4.0	0
	18-60	7.0-21	7.4-8.4	0-5	0	0.0-4.0	0
Ae: Anselmo-----	0-10	4.0-12	5.6-7.3	0	0	0	0
	10-25	4.0-11	6.6-7.8	0	0	0	0
	25-35	4.0-11	6.6-7.8	0-3	0	0	0
	35-60	2.0-6.0	6.6-7.8	0-3	0	0	0
Am: Armo-----	0-17	7.0-18	6.6-8.4	0-5	---	---	---
	17-30	7.0-21	7.4-8.4	0-5	---	---	---
	30-41	7.0-21	7.9-8.4	5-10	---	---	---
	41-51	7.0-18	7.9-8.4	5-10	---	---	---
	51-60	4.0-15	7.9-8.4	5-10	---	---	---
An: Armo-----	0-19	7.0-18	6.6-8.4	0-5	---	---	---
	19-37	7.0-21	7.4-8.4	5-10	---	---	---
	37-60	7.0-21	7.9-8.4	5-10	---	---	---

CHEMICAL PROPERTIES OF THE SOILS--Continued  
Ellis County, Kansas

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Map symbol and soil name	Depth	Cation- exchange capacity	Soil reaction	Calcium carbonate	Gypsum	Salinity	Sodium adsorption ratio
	In	meq/100g	pH	Pct	Pct	mmhos/cm	
Ao:							
Armo-----	0-5	7.0-18	6.6-8.4	0-5	---	---	---
	5-23	7.0-21	7.4-8.4	0-5	---	---	---
	23-41	7.0-21	7.9-8.4	5-10	---	---	---
	41-51	7.0-18	7.9-8.4	5-10	---	---	---
	51-60	4.0-15	7.9-8.4	5-10	---	---	---
Ar:							
Armo-----	0-10	7.0-18	6.6-8.4	0-5	---	---	---
	10-20	7.0-21	7.4-8.4	0-5	---	---	---
	20-41	7.0-21	7.9-8.4	5-10	---	---	---
	41-51	7.0-18	7.9-8.4	5-10	---	---	---
	51-60	4.0-15	7.9-8.4	5-10	---	---	---
Bf:							
Boel-----	0-10	3.0-12	6.6-8.4	0-5	0	0	0
	10-60	0.0-4.0	6.6-8.4	0-5	0	0	0
Bg:							
Bogue-----	0-6	20-46	6.6-8.4	0-5	---	---	---
	6-17	24-48	6.6-8.4	---	---	---	---
	17-23	24-48	4.5-6.0	---	---	---	---
	23-32	24-48	3.5-6.0	---	---	---	---
	>32	---	---	---	---	---	---
Bo:							
Bogue-----	0-6	20-46	6.6-8.4	0-5	---	---	---
	6-17	24-48	6.6-8.4	---	---	---	---
	17-23	---	4.5-6.0	---	---	---	---
	23-32	---	---	---	---	---	---
	>32	---	---	---	---	---	---
Armo-----	0-15	7.0-18	6.6-8.4	0-5	---	---	---
	15-28	7.0-21	7.4-8.4	0-5	---	---	---
	28-41	7.0-21	7.9-8.4	5-10	---	---	---
	41-51	7.0-18	7.9-8.4	5-10	---	---	---
	51-60	4.0-15	7.9-8.4	5-10	---	---	---
BOP:							
Borrow Pits----	---	---	---	---	---	---	---
Br:							
Brownell-----	0-7	6.0-18	7.4-8.4	10-25	0	0	0
	7-30	6.0-16	7.4-8.4	30-65	0	0	0
	>30	---	---	---	---	---	---
Cc:							
Campus-----	0-9	6.0-18	7.4-8.4	0-10	---	---	---
	9-19	7.0-21	7.4-8.4	10-25	---	---	---
	19-33	7.0-21	7.9-8.4	15-45	---	---	---
	>33	---	---	---	---	---	---
Carlson-----	0-8	6.0-18	6.1-7.8	---	---	---	---
	8-18	14-27	6.6-8.4	---	---	---	---
	18-60	7.0-21	7.9-8.4	0-15	---	---	---
Cd:							
Campus-----	0-9	6.0-18	7.4-8.4	0-10	---	---	---
	9-19	7.0-21	7.4-8.4	10-25	---	---	---
	19-33	7.0-21	7.9-8.4	15-45	---	---	---
	>33	---	---	---	---	---	---
Penden-----	0-14	11-24	7.4-8.4	0-5	---	---	---
	14-27	9.0-21	7.9-8.4	15-30	---	---	---
	27-64	9.0-21	7.9-8.4	0-10	---	---	---
Ce:							
Canlon-----	0-4	5.0-17	7.4-8.4	5-10	0	0	0
	4-13	3.0-16	7.4-8.4	10-25	0	0	0
	>13	---	---	---	---	---	---
Campus-----	0-9	6.0-18	7.4-8.4	0-10	---	---	---
	9-19	7.0-21	7.4-8.4	10-25	---	---	---
	19-33	7.0-21	7.9-8.4	15-45	---	---	---
	>33	---	---	---	---	---	---
Cm:							
Corinth-----	0-9	11-24	7.4-8.4	0-10	---	---	---
	9-30	14-30	7.4-8.4	0-5	---	---	---
	30-34	---	---	---	---	---	---
Cn:							
Corinth-----	0-9	11-24	7.4-8.4	0-10	---	---	---
	9-30	14-30	7.4-8.4	0-5	---	---	---
	>30	---	---	---	---	---	---

CHEMICAL PROPERTIES OF THE SOILS--Continued  
Ellis County, Kansas

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Map symbol and soil name	Depth	Cation- exchange capacity	Soil reaction	Calcium carbonate	Gypsum	Salinity	Sodium adsorption ratio
	In	meq/100g	pH	Pct	Pct	mmhos/cm	
Co:							
Corinth-----	0-9	11-24	7.4-8.4	0-10	---	---	---
	9-30	14-30	7.4-8.4	0-5	---	---	---
	>30	---	---	---	---	---	---
Cr:							
Crete-----	0-16	11-24	5.6-6.0	0	0	0	0
	16-34	10-21	5.6-6.0	0	0	0	0
	34-41	14-33	6.1-7.3	0	0	0	0
	41-68	10-24	7.4-8.4	0-5	0	0	0
De:							
Detroit-----	0-12	9.0-19	6.1-7.3	0	0	0	0
	12-34	14-27	6.6-7.8	0-2	0	0	0
	34-63	7.0-21	6.6-8.4	0-10	0	0	---
Ee:							
Eltree-----	0-26	5.0-18	6.6-8.4	0-5	---	---	---
	26-35	7.0-16	7.4-8.4	5-15	---	---	---
	35-63	7.0-21	7.4-8.4	5-15	---	---	---
Ef:							
Eltree-----	0-26	5.0-18	6.6-8.4	0-5	---	---	---
	26-35	7.0-16	7.4-8.4	5-15	---	---	---
	35-60	7.0-21	7.4-8.4	5-15	---	---	---
Eg:							
Eltree-----	0-26	5.0-18	6.6-8.4	0-5	---	---	---
	26-35	7.0-16	7.4-8.4	5-15	---	---	---
	35-63	7.0-21	7.4-8.4	5-15	---	---	---
Eh:							
Eltree-----	0-26	5.0-18	6.6-8.4	0-5	---	---	---
	26-35	7.0-16	7.4-8.4	5-15	---	---	---
	35-60	7.0-21	7.4-8.4	5-15	---	---	---
GRP:							
Pits-----	0-60	0.0-5.0	6.6-8.4	0	0	0	0
Ha:							
Harney-----	0-10	9.0-19	5.6-7.8	0	0	0	0
	10-34	14-25	6.1-8.4	0	0	0	0
	34-60	9.0-21	7.4-8.4	5-10	0	0	0
Hb:							
Harney-----	0-12	9.0-19	5.6-7.8	0	0	0	0
	12-39	14-25	6.1-8.4	0-2	0	0	0
	39-60	9.0-21	7.4-8.4	0-10	0	0	0
Hc:							
Harney-----	0-6	9.0-19	5.6-7.8	0	0	0	0
	6-40	14-25	6.1-8.4	0-2	0	0	0
	40-74	9.0-21	7.4-8.4	0-10	0	0	0
Hd:							
Harney-----	0-6	12-24	5.6-7.8	0	0	0	0
	6-40	14-25	6.1-8.4	0-2	0	0	0
	40-74	9.0-21	7.4-8.4	0-10	0	0	0
He:							
Harney-----	0-6	9.0-19	5.6-7.8	0	0	0	0
	6-40	14-25	6.1-8.4	0-2	0	0	0
	40-74	9.0-21	7.4-8.4	0-10	0	0	0
Armo-----	0-5	7.0-18	6.6-8.4	0-5	---	---	---
	5-23	7.0-21	7.4-8.4	0-5	---	---	---
	23-41	7.0-21	7.9-8.4	5-10	---	---	---
	41-51	7.0-18	7.9-8.4	5-10	---	---	---
	51-60	4.0-15	7.9-8.4	5-10	---	---	---
Hf:							
Harney-----	0-6	9.0-19	5.6-7.8	0	0	0	0
	6-40	14-25	6.1-8.4	0-2	0	0	0
	40-74	9.0-21	7.4-8.4	0-10	0	0	0
Carlson-----	0-8	6.0-18	6.1-7.8	---	---	---	---
	8-18	14-27	6.6-8.4	---	---	---	---
	18-60	7.0-21	7.9-8.4	0-15	---	---	---
Hg:							
Harney-----	0-6	9.0-19	5.6-7.8	0	0	0	0
	6-40	14-25	6.1-8.4	0-2	0	0	0
	40-74	9.0-21	7.4-8.4	0-10	0	0	0
Carlson-----	0-8	6.0-18	6.1-7.8	---	---	---	---
	8-18	14-27	6.6-8.4	---	---	---	---
	18-60	7.0-21	7.9-8.4	0-15	---	---	---



CHEMICAL PROPERTIES OF THE SOILS--Continued  
Ellis County, Kansas

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Map symbol and soil name	Depth	Cation- exchange capacity	Soil reaction	Calcium carbonate	Gypsum	Salinity	Sodium adsorption ratio
	In	meq/100g	pH	Pct	Pct	mmhos/cm	
HGG:							
Harney-----	0-11	9.0-19	5.6-7.8	0	0	0	0
	11-27	14-25	6.1-8.4	0-2	0	0	0
	27-60	9.0-21	7.4-8.4	0-10	0	0	0
Mento-----	0-8	6.0-18	6.6-7.8	---	---	0.0-2.0	---
	8-22	14-27	7.4-8.4	---	---	0.0-2.0	---
	22-46	8.0-21	7.9-8.4	---	---	0.0-4.0	---
	46-60	11-21	7.9-8.4	0-10	---	2.0-8.0	---
Hh:							
Harney-----	0-6	9.0-19	5.6-7.8	0	0	0	0
	6-40	14-25	6.1-8.4	0-2	0	0	0
	40-74	9.0-21	7.4-8.4	0-10	0	0	0
Wakeen-----	0-5	7.0-18	7.4-8.4	10-20	---	---	---
	5-36	7.0-22	7.4-9.0	25-40	---	---	---
	>36	---	---	---	---	---	---
Hk:							
Harney-----	0-6	9.0-19	5.6-7.8	0	0	0	0
	6-40	14-25	6.1-8.4	0-2	0	0	0
	40-74	9.0-21	7.4-8.4	0-10	0	0	0
Wakeen-----	0-5	7.0-18	7.4-8.4	10-20	---	---	---
	5-36	7.0-22	7.4-9.0	25-40	---	---	---
	>36	---	---	---	---	---	---
Hl:							
Heizer-----	0-6	6.0-16	7.4-8.4	10-25	0	0	0
	6-14	6.0-16	7.4-8.4	30-65	0	0	0
	>14	---	---	---	---	---	---
Armo-----	0-15	7.0-18	6.6-8.4	0-5	---	---	---
	15-28	7.0-21	7.4-8.4	0-5	---	---	---
	28-41	7.0-21	7.9-8.4	5-10	---	---	---
	41-51	7.0-18	7.9-8.4	5-10	---	---	---
	51-60	4.0-15	7.9-8.4	5-10	---	---	---
HMM:							
Heizer-----	0-6	6.0-18	7.4-8.4	10-25	0	0	0
	6-15	6.0-16	7.4-8.4	30-65	0	0	0
	>15	---	---	---	---	---	---
Brownell-----	0-9	6.0-18	7.4-8.4	10-25	0	0	0
	9-24	6.0-16	7.4-8.4	30-65	0	0	0
	>24	---	---	---	---	---	---
Hn:							
Dorrance-----	0-11	4.0-14	6.6-8.4	0-10	0	0	0
	11-15	2.0-11	7.4-8.4	10-15	0	0	0
	15-60	0.0-4.0	7.4-8.4	10-15	0	0	0
Ho:							
Holdrege-----	0-14	6.0-17	5.6-7.3	0	0	0	0
	14-25	11-21	6.6-7.8	0	0	0	0
	25-30	7.0-18	6.6-7.8	0-10	0	0	0
	30-60	6.0-12	7.4-8.4	1-10	0	0	0
Hp:							
Holdrege-----	0-11	6.0-17	5.6-7.3	0	0	0	0
	11-33	11-21	6.6-7.8	1-5	0	0	0
	33-48	7.0-18	6.6-7.8	1-5	0	0	0
	48-66	6.0-12	7.4-8.4	1-5	0	0	0
Hr:							
Hord-----	0-13	7.0-19	5.6-7.3	0	0	0	0
	13-36	8.0-21	6.1-7.8	0	0	0	0
	36-60	7.0-18	7.4-8.4	0-5	0	0	0
In:							
Inavale-----	0-14	1.0-7.0	5.6-7.8	0	0	0	0
	14-31	1.0-6.0	5.6-7.8	0	0	0	0
	31-60	1.0-6.0	6.6-8.4	0-5	0	0	0
Mc:							
Mccook-----	0-14	4.0-11	7.4-8.4	0-5	0	0	0
	14-60	4.0-11	7.4-8.4	0-10	0	0	0
Md:							
Mccook-----	0-11	6.0-15	7.4-8.4	0-5	0	0	0
	11-60	4.0-11	7.4-8.4	0-10	0	0	0

CHEMICAL PROPERTIES OF THE SOILS--Continued  
Ellis County, Kansas

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Map symbol and soil name	Depth	Cation- exchange capacity	Soil reaction	Calcium carbonate	Gypsum	Salinity	Sodium adsorption ratio
	In	meq/100g	pH	Pct	Pct	mmhos/cm	
Me:							
Mento-----	0-9	6.0-18	6.6-7.8	---	---	0.0-2.0	---
	9-21	14-27	7.4-8.4	---	---	0.0-2.0	---
	21-41	8.0-21	7.9-8.4	---	---	0.0-4.0	---
	41-67	11-21	7.9-8.4	0-10	---	2.0-8.0	---
	>67	---	---	---	---	---	---
Mf:							
Mento-----	0-9	6.0-18	6.6-7.8	---	---	0.0-2.0	---
	9-21	14-27	7.4-8.4	---	---	0.0-2.0	---
	21-41	8.0-21	7.9-8.4	---	---	0.0-4.0	---
	41-67	11-21	7.9-8.4	0-10	---	2.0-8.0	---
	>67	---	---	---	---	---	---
Mg:							
Mento-----	0-6	11-23	6.6-7.8	---	---	0.0-2.0	---
	6-21	14-27	7.4-8.4	---	---	0.0-2.0	---
	21-41	8.0-21	7.9-8.4	---	---	0.0-4.0	---
	41-67	11-21	7.9-8.4	0-10	---	2.0-8.0	---
	67-71	---	---	---	---	---	---
Mo:							
Mento-----	0-6	11-23	6.6-7.8	---	---	0.0-2.0	---
	6-20	14-27	7.4-8.4	---	---	0.0-2.0	---
	20-48	8.0-21	7.9-8.4	0-10	---	0.0-4.0	---
	48-67	---	---	---	---	---	---
	67-71	---	---	---	---	---	---
Mu:							
Munjor-----	0-7	3.0-10	7.4-8.4	0-10	---	---	---
	7-44	2.0-9.0	7.4-8.4	5-10	---	---	---
	44-60	0.0-3.0	7.4-8.4	5-10	---	---	---
Nc:							
New Cambria----	0-9	16-39	6.6-8.4	0-5	---	---	---
	9-38	15-36	7.9-8.4	0-10	---	---	---
	38-60	12-30	7.9-8.4	5-15	---	---	---
Nn:							
Nibson-----	0-7	6.0-18	7.4-9.0	10-20	0	0	0
	7-19	7.0-22	7.9-9.0	25-40	0	0	0
	>19	---	---	---	---	---	---
Rb:							
Roxbury-----	0-29	8.0-19	7.4-8.4	1-5	---	---	---
	29-40	7.0-23	7.4-8.4	1-5	---	---	---
	40-60	7.0-21	7.4-8.4	5-10	---	---	---
Rf:							
Roxbury-----	0-24	8.0-19	6.6-8.4	1-5	---	---	---
	24-50	7.0-23	7.4-8.4	1-5	---	---	---
	50-68	7.0-21	7.4-8.4	5-10	---	---	---
RIV:							
Riverwash And Sandbars-----	0-6	4.0-18	6.6-8.4	---	---	---	---
	6-60	4.0-21	7.4-8.4	---	---	---	---
Ro:							
Heizer-----	0-6	6.0-18	7.4-8.4	0	0	0	0
	6-15	6.0-16	7.4-8.4	0	0	0	0
	>15	---	---	---	---	---	---
Brownell-----	0-8	6.0-17	7.4-8.4	0	0	0	0
	8-32	6.0-16	7.4-8.4	0	0	0	0
	>32	---	---	---	---	---	---
ROO:							
Roxbury-----	0-16	8.0-19	6.6-8.4	1-5	---	---	---
	16-44	7.0-23	7.4-8.4	1-5	---	---	---
	44-60	7.0-21	7.4-8.4	5-10	---	---	---
UCC:							
Uly-----	0-6	7.0-18	6.1-7.8	0	0	0	0
	6-28	8.0-18	6.1-8.4	0	0	0	0
	28-60	7.0-16	7.4-8.4	---	0	0	0
W:							
Water-----	---	---	---	---	---	---	---
Wa:							
Wakeen-----	0-10	7.0-18	7.4-8.4	10-20	---	---	---
	10-31	7.0-22	7.4-9.0	25-40	---	---	---
	>31	---	---	---	---	---	---

CHEMICAL PROPERTIES OF THE SOILS--Continued  
Ellis County, Kansas

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Map symbol and soil name	Depth	Cation- exchange capacity	Soil reaction	Calcium carbonate	Gypsum	Salinity	Sodium adsorption ratio
	In	meq/100g	pH	Pct	Pct	mmhos/cm	
We:							
Wakeen-----	0-11	7.0-18	7.4-8.4	10-20	---	---	---
	11-30	7.0-22	7.4-9.0	25-40	---	---	---
	>30	---	---	---	---	---	---
Wh:							
Wakeen-----	0-11	7.0-18	7.4-8.4	10-20	---	---	---
	11-30	7.0-22	7.4-9.0	25-40	---	---	---
	>30	---	---	---	---	---	---
Wk:							
Wakeen-----	0-8	7.0-18	7.4-8.4	10-20	---	---	---
	8-22	7.0-22	7.4-9.0	25-40	---	---	---
	>22	---	---	---	---	---	---
Wn:							
Wann-----	0-13	5.0-16	6.6-8.4	1-5	0	0.0-2.0	---
	13-44	1.0-11	7.4-8.4	1-5	0	0.0-2.0	---
	44-64	0.0-15	7.4-8.4	0-5	0	0.0-2.0	---

# WATER FEATURES Ellis County, Kansas

The Water Features table 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.

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 Water Features 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 Water Features 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, the temporary inundation of an area, is 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.

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

Map symbol and soil name	Hydro- logic group	Month	Soil Saturation		Ponding			Flooding	
			Upper limit	Lower limit	Surface water depth	Duration	Frequency	Duration	Frequency
141HM: Harney-----	B		Ft	Ft	Ft				
Mento-----	C		---	---	---	---	---	---	---
163AU: Armo-----	B		---	---	---	---	---	---	---
Bogue-----	D		---	---	---	---	---	---	---
163HE: Harney-----	B		---	---	---	---	---	---	---
Mento-----	C		---	---	---	---	---	---	---
163IC: Inavale-----	A		---	---	---	---	---	---	---
		January	---	---	---	---	---	Very brief	Occasional
		February	---	---	---	---	---	Very brief	Occasional
		March	---	---	---	---	---	Very brief	Occasional
		April	---	---	---	---	---	Very brief	Occasional
		May	---	---	---	---	---	Very brief	Occasional
		June	---	---	---	---	---	Very brief	Occasional
		July	---	---	---	---	---	Very brief	Occasional
163WX: Wakeen-----	B		---	---	---	---	---	---	---
163WY: Wakeen-----	B		---	---	---	---	---	---	---
Harney-----	B		---	---	---	---	---	---	---
165BO: Bogue-----	D		---	---	---	---	---	---	---
165NW: Nibson-----	D		---	---	---	---	---	---	---
Wakeen-----	B		---	---	---	---	---	---	---
165PE: Penden-----	B		---	---	---	---	---	---	---
165UB: Uly-----	B		---	---	---	---	---	---	---
165UR: Uly-----	B		---	---	---	---	---	---	---
Roxbury-----	B		---	---	---	---	---	---	---
		April	---	---	---	---	---	Very brief	Occasional
		May	---	---	---	---	---	Very brief	Occasional
		June	---	---	---	---	---	Very brief	Occasional
		July	---	---	---	---	---	Very brief	Occasional
		August	---	---	---	---	---	Very brief	Occasional
		September	---	---	---	---	---	Very brief	Occasional
167CR: Crete-----	C		---	---	---	---	---	---	---
167DR: Dorrance-----	A		---	---	---	---	---	---	---
167RC: Roxbury-----	B		---	---	---	---	---	---	---
		April	---	---	---	---	---	Very brief	Frequent
		May	---	---	---	---	---	Very brief	Frequent
		June	---	---	---	---	---	Very brief	Frequent
		July	---	---	---	---	---	Very brief	Frequent
		August	---	---	---	---	---	Very brief	Frequent
		September	---	---	---	---	---	Very brief	Frequent
195BD: Badland-----	---		---	---	---	---	---	---	---
Manvel-----	B		---	---	---	---	---	---	---
195CC: Campus-----	B		---	---	---	---	---	---	---
Canlon-----	D		---	---	---	---	---	---	---
195CF: Carlson-----	B		---	---	---	---	---	---	---
195HU:			---	---	---	---	---	---	---

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

Map symbol and soil name	Hydro- logic group	Month	Soil Saturation		Ponding			Flooding	
			Upper limit	Lower limit	Surface water depth	Duration	Frequency	Duration	Frequency
Humbarger-----	B	April	---	---	---	---	---	Very brief	Frequent
		May	---	---	---	---	---	Very brief	Frequent
		June	---	---	---	---	---	Very brief	Frequent
		July	---	---	---	---	---	Very brief	Frequent
		August	---	---	---	---	---	Very brief	Frequent
		September	---	---	---	---	---	Very brief	Frequent
1951F: Inavale-----	A	January	---	---	---	---	---	Very brief	Frequent
		February	---	---	---	---	---	Very brief	Frequent
		March	---	---	---	---	---	Very brief	Frequent
		April	---	---	---	---	---	Very brief	Frequent
		May	---	---	---	---	---	Very brief	Frequent
		June	---	---	---	---	---	Very brief	Frequent
		July	---	---	---	---	---	Very brief	Frequent
195PF: Penden-----	B		---	---	---	---	---	---	---
195PO: Penden-----	B		---	---	---	---	---	---	---
Ab: Fluvents-----	B	April	---	---	---	---	---	Very brief	Frequent
		May	---	---	---	---	---	Very brief	Frequent
		June	---	---	---	---	---	Very brief	Frequent
		July	---	---	---	---	---	Very brief	Frequent
		August	---	---	---	---	---	Very brief	Frequent
		September	---	---	---	---	---	Very brief	Frequent
Ac: New Cambria-----	C	March	---	---	---	---	---	Very brief	Frequent
		April	---	---	---	---	---	Very brief	Frequent
		May	---	---	---	---	---	Very brief	Frequent
		June	---	---	---	---	---	Very brief	Frequent
		July	---	---	---	---	---	Very brief	Frequent
		August	---	---	---	---	---	Very brief	Frequent
		September	---	---	---	---	---	Very brief	Frequent
Ad: Fluvaquents-----	C	March	2.0-3.0	>6.0	---	---	---	---	None
		April	2.0-3.0	>6.0	---	---	---	Very brief	Occasional
		May	2.0-3.0	>6.0	---	---	---	Very brief	Occasional
		June	2.0-3.0	>6.0	---	---	---	Very brief	Occasional
		July	---	---	---	---	---	Very brief	Occasional
		August	---	---	---	---	---	Very brief	Occasional
		September	---	---	---	---	---	Very brief	Occasional
Ae: Anselmo-----	B		---	---	---	---	---	---	---
Am: Armo-----	B		---	---	---	---	---	---	---
An: Armo-----	B		---	---	---	---	---	---	---
Ao: Armo-----	B		---	---	---	---	---	---	---
Ar: Armo-----	B		---	---	---	---	---	---	---
Bf: Boel-----	A	January	1.5-3.5	>6.0	---	---	---	---	None
		February	1.5-3.5	>6.0	---	---	---	---	None
		March	1.5-3.5	>6.0	---	---	---	Brief	Occasional
		April	1.5-3.5	>6.0	---	---	---	Brief	Occasional
		May	1.5-3.5	>6.0	---	---	---	Brief	Occasional
		June	---	---	---	---	---	Brief	Occasional
		November	1.5-3.5	>6.0	---	---	---	---	None
		December	1.5-3.5	>6.0	---	---	---	---	None
Bg: Bogue-----	D		---	---	---	---	---	---	---
Bo: Bogue-----	D		---	---	---	---	---	---	---
Armo-----	B		---	---	---	---	---	---	---
BOP: Borrow Pits-----	---		---	---	---	---	---	---	---

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Map symbol and soil name	Hydro- logic group	Month	Soil Saturation		Ponding			Flooding	
			Upper limit	Lower limit	Surface water depth	Duration	Frequency	Duration	Frequency
Br: Brownell-----	B		Ft	Ft	Ft				
Cc: Campus-----	B		---	---	---	---	---	---	---
Carlson-----	B		---	---	---	---	---	---	---
Cd: Campus-----	B		---	---	---	---	---	---	---
Penden-----	B		---	---	---	---	---	---	---
Ce: Canlon-----	D		---	---	---	---	---	---	---
Campus-----	B		---	---	---	---	---	---	---
Cm: Corinth-----	C		---	---	---	---	---	---	---
Cn: Corinth-----	C		---	---	---	---	---	---	---
Co: Corinth-----	C		---	---	---	---	---	---	---
Cr: Crete-----	C		---	---	---	---	---	---	---
De: Detroit-----	C		---	---	---	---	---	---	---
		January	---	---	---	---	---	---	Rare
		February	---	---	---	---	---	---	Rare
		March	---	---	---	---	---	---	Rare
		April	---	---	---	---	---	---	Rare
		May	---	---	---	---	---	Very brief	Rare
		June	---	---	---	---	---	Very brief	Rare
		July	---	---	---	---	---	Very brief	Rare
		August	---	---	---	---	---	Very brief	Rare
		September	---	---	---	---	---	Very brief	Rare
		October	---	---	---	---	---	---	Rare
		November	---	---	---	---	---	---	Rare
		December	---	---	---	---	---	---	Rare
Ee: Eltree-----	B		---	---	---	---	---	---	---
Ef: Eltree-----	B		---	---	---	---	---	---	---
Eg: Eltree-----	B		---	---	---	---	---	---	---
Eh: Eltree-----	B		---	---	---	---	---	---	---
GRP: Pits-----	A		---	---	---	---	---	---	---
Ha: Harney-----	B		---	---	---	---	---	---	---
Hb: Harney-----	B		---	---	---	---	---	---	---
Hc: Harney-----	B		---	---	---	---	---	---	---
Hd: Harney-----	B		---	---	---	---	---	---	---
He: Armo-----	B		---	---	---	---	---	---	---
Harney-----	B		---	---	---	---	---	---	---
Hf: Carlson-----	B		---	---	---	---	---	---	---
Harney-----	B		---	---	---	---	---	---	---
Hg: Carlson-----	B		---	---	---	---	---	---	---

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

Map symbol and soil name	Hydro- logic group	Month	Soil Saturation		Ponding			Flooding	
			Upper limit	Lower limit	Surface water depth	Duration	Frequency	Duration	Frequency
Harney-----	B		Ft	Ft	Ft				
HGG: Harney-----	B		---	---	---	---	---	---	---
Mento-----	C		---	---	---	---	---	---	---
Hh: Harney-----	B		---	---	---	---	---	---	---
Wakeen-----	B		---	---	---	---	---	---	---
Hk: Harney-----	B		---	---	---	---	---	---	---
Wakeen-----	B		---	---	---	---	---	---	---
Hl: Armo-----	B		---	---	---	---	---	---	---
Heizer-----	D		---	---	---	---	---	---	---
HMM: Heizer-----	D		---	---	---	---	---	---	---
Brownell-----	B		---	---	---	---	---	---	---
Hn: Dorrance-----	A		---	---	---	---	---	---	---
Ho: Holdrege-----	B		---	---	---	---	---	---	---
Hp: Holdrege-----	B		---	---	---	---	---	---	---
Hr: Hord-----	B		---	---	---	---	---	---	---
		March	---	---	---	---	---	Very brief	Rare
		April	---	---	---	---	---	Very brief	Rare
		May	---	---	---	---	---	Very brief	Rare
		June	---	---	---	---	---	Very brief	Rare
		July	---	---	---	---	---	Very brief	Rare
		August	---	---	---	---	---	Very brief	Rare
		September	---	---	---	---	---	Very brief	Rare
		October	---	---	---	---	---	Very brief	Rare
In: Inavale-----	A		---	---	---	---	---	Very brief	Occasional
		January	---	---	---	---	---	Very brief	Occasional
		February	---	---	---	---	---	Very brief	Occasional
		March	---	---	---	---	---	Very brief	Occasional
		April	---	---	---	---	---	Very brief	Occasional
		May	---	---	---	---	---	Very brief	Occasional
		June	---	---	---	---	---	Very brief	Occasional
		July	---	---	---	---	---	Very brief	Occasional
Mc: Mccook-----	B		---	---	---	---	---	---	Rare
		January	---	---	---	---	---	---	Rare
		February	---	---	---	---	---	---	Rare
		March	---	---	---	---	---	---	Rare
		April	---	---	---	---	---	Very brief	Rare
		May	---	---	---	---	---	Very brief	Rare
		June	---	---	---	---	---	Very brief	Rare
		July	---	---	---	---	---	Very brief	Rare
		August	---	---	---	---	---	Very brief	Rare
		September	---	---	---	---	---	Very brief	Rare
		October	---	---	---	---	---	---	Rare
		November	---	---	---	---	---	---	Rare
		December	---	---	---	---	---	---	Rare
Md: Mccook-----	B		---	---	---	---	---	---	---
		March	---	---	---	---	---	Very brief	Rare
		April	---	---	---	---	---	Very brief	Rare
		May	---	---	---	---	---	Very brief	Rare
		June	---	---	---	---	---	Very brief	Rare
		July	---	---	---	---	---	Very brief	Rare
		August	---	---	---	---	---	Very brief	Rare
		September	---	---	---	---	---	Very brief	Rare
		October	---	---	---	---	---	Very brief	Rare
Me: Mento-----	C		---	---	---	---	---	---	---
Mf: Mento-----	C		---	---	---	---	---	---	---



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

Map symbol and soil name	Hydro- logic group	Month	Soil Saturation		Ponding			Flooding	
			Upper limit	Lower limit	Surface water depth	Duration	Frequency	Duration	Frequency
Mg: Mento-----	C		---	---	---	---	---	---	---
Mo: Mento-----	C		---	---	---	---	---	---	---
Mu: Munjor-----	B		---	---	---	---	---	---	---
		April	---	---	---	---	---	Very brief	Frequent
		May	---	---	---	---	---	Very brief	Frequent
		June	---	---	---	---	---	Very brief	Frequent
		July	---	---	---	---	---	Very brief	Frequent
		August	---	---	---	---	---	Very brief	Frequent
		September	---	---	---	---	---	Very brief	Frequent
Nc: New Cambria-----	C		---	---	---	---	---	---	---
		January	---	---	---	---	---	---	Rare
		February	---	---	---	---	---	---	Rare
		March	---	---	---	---	---	Very brief	Rare
		April	---	---	---	---	---	Very brief	Rare
		May	---	---	---	---	---	Very brief	Rare
		June	---	---	---	---	---	Very brief	Rare
		July	---	---	---	---	---	Very brief	Rare
		August	---	---	---	---	---	Very brief	Rare
		September	---	---	---	---	---	Very brief	Rare
		October	---	---	---	---	---	Very brief	Rare
		November	---	---	---	---	---	---	Rare
		December	---	---	---	---	---	---	Rare
Nn: Nibson-----	D		---	---	---	---	---	---	---
Rb: Roxbury-----	B		---	---	---	---	---	---	---
		April	---	---	---	---	---	Very brief	Rare
		May	---	---	---	---	---	Very brief	Rare
		June	---	---	---	---	---	Very brief	Rare
		July	---	---	---	---	---	Very brief	Rare
		August	---	---	---	---	---	Very brief	Rare
		September	---	---	---	---	---	Very brief	Rare
Rf: Roxbury-----	B		---	---	---	---	---	---	---
		April	---	---	---	---	---	Very brief	Occasional
		May	---	---	---	---	---	Very brief	Occasional
		June	---	---	---	---	---	Very brief	Occasional
		July	---	---	---	---	---	Very brief	Occasional
		August	---	---	---	---	---	Very brief	Occasional
		September	---	---	---	---	---	Very brief	Occasional
RIV: Riverwash And Sandbars----	---		---	---	---	---	---	---	---
		January	0.0-6.0	>6.0	---	---	---	---	None
		February	0.0-6.0	>6.0	---	---	---	---	None
		March	0.0-6.0	>6.0	---	---	---	---	None
		April	0.0-6.0	>6.0	---	---	---	Brief	Frequent
		May	0.0-6.0	>6.0	---	---	---	Brief	Frequent
		June	0.0-6.0	>6.0	---	---	---	Brief	Frequent
		July	0.0-6.0	>6.0	---	---	---	Brief	Frequent
		August	0.0-6.0	>6.0	---	---	---	Brief	Frequent
		September	0.0-6.0	>6.0	---	---	---	Brief	Frequent
		October	0.0-6.0	>6.0	---	---	---	---	None
		November	0.0-6.0	>6.0	---	---	---	---	None
		December	0.0-6.0	>6.0	---	---	---	---	None
Ro: Heizer-----	D		---	---	---	---	---	---	---
Brownell-----	B		---	---	---	---	---	---	---
ROO: Roxbury-----	B		---	---	---	---	---	---	---
		April	---	---	---	---	---	Very brief	Occasional
		May	---	---	---	---	---	Very brief	Occasional
		June	---	---	---	---	---	Very brief	Occasional
		July	---	---	---	---	---	Very brief	Occasional
		August	---	---	---	---	---	Very brief	Occasional
		September	---	---	---	---	---	Very brief	Occasional
UCC: Uly-----	B		---	---	---	---	---	---	---
W: Water-----	---		---	---	---	---	---	---	---
Wa: Wakeen-----	B		---	---	---	---	---	---	---

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

Map symbol and soil name	Hydro- logic group	Month	Soil Saturation		Ponding			Flooding	
			Upper limit	Lower limit	Surface water depth	Duration	Frequency	Duration	Frequency
We: Wakeen-----	B		Ft	Ft	Ft				
Wh: Wakeen-----	B		---	---	---	---	---	---	---
Wk: Wakeen-----	B		---	---	---	---	---	---	---
Wn: Wann-----	B		---	---	---	---	---	---	---
		March	1.5-3.5	>6.0	---	---	---	Brief	Occasional
		April	1.5-3.5	>6.0	---	---	---	Brief	Occasional
		May	1.5-3.5	>6.0	---	---	---	Brief	Occasional
		June	1.5-3.5	>6.0	---	---	---	Brief	Occasional
		July	1.5-3.5	>6.0	---	---	---	Brief	Occasional
		August	---	---	---	---	---	Brief	Occasional
		September	---	---	---	---	---	Brief	Occasional
		October	---	---	---	---	---	Brief	Occasional
		November	---	---	---	---	---	Brief	Occasional

The following table 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 and thickness of the restrictive layer, both of which significantly affect the ease of excavation. Depth to top is the vertical distance from the soil surface to the upper boundary of the restrictive layer.

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

Map symbol and soil name	Restrictive layer				Potential for Frost action	Risk of corrosion	
	Kind	Depth to top	Thickness	Hardness		Uncoated Steel	Concrete
141HM:		In	In				
Harney-----	---	---	---	---	Low	High	Low
Mento-----	40-70	Bedrock (lithic)	---	Strongly cemented	Low	High	Low
163AU:							
Armo-----	---	---	---	---	Low	Low	Low
Bogue-----	20-40	Bedrock (paralithic)	---	Weakly cemented	Low	High	Moderate
163HE:							
Harney-----	---	---	---	---	Low	High	Low
Mento-----	---	---	---	---	Low	High	Low
163IC:							
Inavale-----	---	---	---	---	Low	Moderate	Low
163WX:							
Wakeen-----	20-40	Bedrock (paralithic)	---	Weakly cemented	Low	Moderate	Low
163WY:							
Wakeen-----	20-40	Bedrock (paralithic)	---	Weakly cemented	Low	Moderate	Low
Harney-----	---	---	---	---	Low	High	Low
165BO:							
Bogue-----	20-40	Bedrock (paralithic)	---	Weakly cemented	Low	High	Moderate
165NW:							
Nibson-----	10-20	Bedrock (paralithic)	---	Weakly cemented	Low	Low	Low
Wakeen-----	20-40	Bedrock (paralithic)	---	Weakly cemented	Low	Moderate	Low
165PE:							
Penden-----	---	---	---	---	Moderate	Moderate	Low
165UB:							
Uly-----	---	---	---	---	Low	High	Low
165UR:							
Uly-----	---	---	---	---	Low	High	Low
Roxbury-----	---	---	---	---	Low	Low	Low
167CR:							
Crete-----	---	---	---	---	Moderate	Moderate	Low
167DR:							
Dorrance-----	---	---	---	---	Low	Low	Low
167RC:							
Roxbury-----	---	---	---	---	Moderate	Low	Low
195BD:							
Badland-----	---	---	---	---	---	---	---
Manvel-----	---	---	---	---	Low	High	Low
195CC:							
Campus-----	20-40	Bedrock (lithic)	---	Strongly cemented	Low	Low	Low
Canlon-----	10-20	Bedrock (lithic)	---	Indurated	Low	Low	Low
195CF:							
Carlson-----	---	---	---	---	Low	High	Low
195HU:							
Humbarger-----	---	---	---	---	Moderate	Low	Low
195IF:							
Inavale-----	---	---	---	---	Low	Moderate	Low
195PF:							
Penden-----	---	---	---	---	Low	Moderate	Low
195PO:							
Penden-----	---	---	---	---	Moderate	Moderate	Low
Ab:							
Fluvents-----	---	---	---	---	Low	Low	Low
Ac:							
New Cambria-----	---	---	---	---	Low	High	Low
Ad:							
Fluvaquents-----	---	---	---	---	Moderate	High	Moderate
Ae:							
Anselmo-----	---	---	---	---	Moderate	Moderate	Low
Am:							
Armo-----	---	---	---	---	Low	Low	Low
An:							
Armo-----	---	---	---	---	Low	Low	Low
Ao:							
Armo-----	---	---	---	---	Low	Low	Low
Ar:							
Armo-----	---	---	---	---	Low	Low	Low
Bf:							
Boel-----	---	---	---	---	Moderate	High	Low
Bg:							
Bogue-----	20-40	Bedrock (paralithic)	---	Weakly cemented	Low	High	Moderate
Bo:							
Bogue-----	20-40	Bedrock (paralithic)	---	Weakly cemented	Low	High	Moderate
Armo-----	---	---	---	---	Low	Low	Low
BOP:							
Borrow Pits-----	---	---	---	---	---	---	---
Br:							
Brownell-----	20-40	Bedrock (lithic)	---	Strongly cemented	Low	Low	Low

Map symbol and soil name	Restrictive layer				Potential for Frost action	Risk of corrosion	
	Kind	Depth to top	Thickness	Hardness		Uncoated Steel	Concrete
		In	In				
Cc: Campus----- Carlson-----	20-40 ---	Bedrock (lithic) ---	--- ---	Strongly cemented ---	Low Low	Low High	Low Low
Cd: Campus----- Penden-----	20-40 ---	Bedrock (lithic) ---	--- ---	Strongly cemented ---	Low Low	Low Moderate	Low Low
Ce: Canlon----- Campus-----	10-20 20-40	Bedrock (lithic) Bedrock (lithic)	--- ---	Indurated Strongly cemented	Low Low	Low Low	Low Low
Cm: Corinth-----	20-40	Bedrock (paralithic)	---	Weakly cemented	Low	High	Low
Cn: Corinth-----	20-40	Bedrock (paralithic)	---	Weakly cemented	Low	High	Low
Co: Corinth-----	20-40	Bedrock (paralithic)	---	Weakly cemented	Low	High	Low
Cr: Crete-----	---	---	---	---	Moderate	Moderate	Low
De: Detroit-----	---	---	---	---	Low	High	Low
Ee: Eltree-----	---	---	---	---	Moderate	Low	Low
Ef: Eltree-----	---	---	---	---	Moderate	Low	Low
Eg: Eltree-----	---	---	---	---	Moderate	Low	Low
Eh: Eltree-----	---	---	---	---	Moderate	Low	Low
GRP: Pits-----	---	---	---	---	Low	Low	Low
Ha: Harney-----	---	---	---	---	Low	High	Low
Hb: Harney-----	---	---	---	---	Low	High	Low
Hc: Harney-----	---	---	---	---	Low	High	Low
Hd: Harney-----	---	---	---	---	Low	High	Low
He: Harney-----	---	---	---	---	Low	High	Low
Armo: Harney-----	---	---	---	---	Low	Low	Low
Hf: Carlson----- Harney-----	---	---	---	---	Low Low	High High	Low Low
Hg: Carlson----- Harney-----	---	---	---	---	Low Low	High High	Low Low
HGG: Harney----- Mento-----	---	---	---	---	Low Low	High High	Low Low
Hh: Harney----- Wakeen-----	---	---	---	---	Low Low	High Moderate	Low Low
Hk: Harney----- Wakeen-----	---	---	---	---	Low Low	High Moderate	Low Low
Hl: Armo----- Heizer-----	---	---	---	---	Low Moderate	Low Low	Low Low
HMM: Heizer-----	10-20	Bedrock (lithic)	---	Very strongly cemented	Moderate	Low	Low
Brownell-----	20-40	Bedrock (lithic)	---	Strongly cemented	Low	Low	Low
Hn: Dorrance-----	---	---	---	---	Low	Low	Low
Ho: Holdrege-----	---	---	---	---	Moderate	Low	Low
Hp: Holdrege-----	---	---	---	---	Low	Low	Low
Hr: Hord-----	---	---	---	---	Moderate	High	Low
In: Inavale-----	---	---	---	---	Low	Moderate	Low
Mc: McCook-----	---	---	---	---	Moderate	Low	Low
Md: McCook-----	---	---	---	---	Moderate	Low	Low
Me: Mento-----	---	---	---	---	Low	High	Low
Mf: Mento-----	---	---	---	---	Low	High	Low

Map symbol and soil name	Restrictive layer				Potential for Frost action	Risk of corrosion	
	Kind	Depth to top	Thickness	Hardness		Uncoated Steel	Concrete
		In	In				
Mg: Mento-----	---	---	---	---	Low	High	Low
Mo: Mento-----	---	---	---	---	Low	High	Low
Mu: Munjor-----	---	---	---	---	Low	Moderate	Low
Nc: New Cambria----	---	---	---	---	Low	High	Low
Nn: Nibson-----	10-20	Bedrock (paralithic)	---	Weakly cemented	Low	Low	Low
Rb: Roxbury-----	---	---	---	---	Moderate	Low	Low
Rf: Roxbury-----	---	---	---	---	Moderate	Low	Low
RIV: Riverwash And Sandbars-----	---	---	---	---	---	---	---
Ro: Heizer-----	10-20	Bedrock (lithic)	---	---	Moderate	Low	Low
Brownell-----	20-40	Bedrock (lithic)	---	Strongly cemented	Low	Low	Low
ROO: Roxbury-----	---	---	---	---	Low	Low	Low
UCC: Uly-----	---	---	---	---	Low	High	Low
W: Water-----	---	---	---	---	---	---	---
Wa: Wakeen-----	20-40	Bedrock (paralithic)	---	Weakly cemented	Low	Moderate	Low
We: Wakeen-----	20-40	Bedrock (paralithic)	---	Weakly cemented	Low	Moderate	Low
Wh: Wakeen-----	20-40	Bedrock (paralithic)	---	Weakly cemented	Low	Moderate	Low
Wk: Wakeen-----	20-40	Bedrock (paralithic)	---	Weakly cemented	Low	Moderate	Low
Wn: Wann-----	---	---	---	---	High	Moderate	Low

WATER MANAGEMENT  
Ellis County, Kansas

The soils of the survey area are rated in the Water Management table according to limitations that affect their suitability for water management. Soils are rated for pond reservoir areas, drainage, irrigation, terraces and diversions, and grassed waterways. Restrictive features that affect each soil for the specified use is also provided in the table.

The ratings in the table are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect the specified use. 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. Slightly limited indicates that the soil has features that are favorable for the specified use. The limitations are minor and can be easily overcome. Good performance and low maintenance can be expected. Moderately 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. Limited indicates that the soil has one or more features that are significant limitations for the specified use. The limitations can be overcome, but generally require special design, soil reclamation, or installation procedures that may result in additional expense. Fair performance and moderate to high 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.

Limitation class terms, such as very limited or limited, etc., limitation ratings, and numerical ratings are shown for each soil feature listed. As many as three soil features may be listed for each soil component if applicable. The overall limitation rating for the soil component is based on the most severe limitation.

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

Embankments, dikes, and levees are raised structures of soil material, generally less than 20 feet high, constructed to impound water or to protect land against overflow. In 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 traffic ability.

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

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

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

Terraces and diversions are embankments or a combination of channels and ridges constructed across a slope to control erosion and conserve moisture by intercepting runoff. Slope, wetness, large stones, and depth to bedrock or to a cemented pan affect the construction of terraces and diversions. A restricted rooting depth, a very limited hazard of wind erosion or water erosion, an excessively coarse texture, and restricted permeability adversely affect maintenance.

Grassed waterways are natural or constructed channels, generally broad and shallow, which conduct surface water to outlets at a non-erosive velocity. Large stones, wetness, slope, and depth to bedrock or to a cemented pan affect the construction of grassed waterways. A hazard of wind erosion, low available water capacity, restricted rooting depth, toxic substances such as salts and sodium, and restricted permeability adversely affect the growth and maintenance of the grass after construction.

WATER MANAGEMENT--Continued  
Ellis County, Kansas

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Features affecting--			
	Drainage	Irrigation	Terraces and diversions	Grassed waterways
141HM: Harney-----	Limitation: deep to water	Limitation: slope	Limitation: erodes easily	Limitation: erodes easily
Mento-----	Limitation: deep to water	Limitation: erodes easily percs slowly slope	Limitation: erodes easily	Limitation: erodes easily percs slowly
163AU: Armo-----	Limitation: deep to water	Limitation: slope	Limitation: slope	Limitation: slope
Bogue-----	Limitation: deep to water	Limitation: slope slow intake droughty	Limitation: percs slowly slope depth to rock	Limitation: slope depth to rock droughty
163HE: Harney-----	Limitation: deep to water	Limitation: slope	Limitation: erodes easily	Limitation: erodes easily
Mento-----	Limitation: deep to water	Limitation: erodes easily percs slowly slope	Limitation: erodes easily	Limitation: erodes easily percs slowly
163IC: Inavale-----	Limitation: deep to water	Limitation: fast intake soil blowing droughty	Limitation: too sandy soil blowing	Limitation: droughty
163WX: Wakeen-----	Limitation: deep to water	Limitation: slope depth to rock	Limitation: erodes easily slope depth to rock	Limitation: erodes easily slope depth to rock
163WY: Wakeen-----	Limitation: deep to water	Limitation: depth to rock	Limitation: erodes easily depth to rock	Limitation: erodes easily depth to rock
Harney-----	Limitation: deep to water	Favorable	Limitation: erodes easily	Limitation: erodes easily
165BO: Bogue-----	Limitation: deep to water	Limitation: slope slow intake droughty	Limitation: percs slowly slope depth to rock	Limitation: slope depth to rock droughty
165NW: Nibson-----	Limitation: deep to water	Limitation: slope depth to rock	Limitation: large stones slope depth to rock	Limitation: erodes easily large stones slope
Wakeen-----	Limitation: deep to water	Limitation: slope depth to rock	Limitation: erodes easily slope depth to rock	Limitation: erodes easily slope depth to rock
165PE: Penden-----	Limitation: deep to water	Limitation: slope	Favorable	Favorable
165UB: Uly-----	Limitation: deep to water	Favorable	Limitation: erodes easily	Limitation: erodes easily
165UR: Uly-----	Limitation: deep to water	Limitation: slope	Limitation: erodes easily slope	Limitation: erodes easily slope
Roxbury-----	Limitation: deep to water	Limitation: flooding	Limitation: erodes easily	Limitation: erodes easily
167CR: Crete-----	Limitation: deep to water	Limitation: erodes easily percs slowly	Limitation: erodes easily	Limitation: erodes easily percs slowly
167DR: Dorrance-----	Limitation: deep to water	Limitation: slope droughty	Limitation: slope too sandy	Limitation: slope droughty
167RC: Roxbury-----	Limitation: deep to water	Limitation: flooding	Limitation: erodes easily	Limitation: erodes easily
195BD: Badland-----	---	---	---	---
Manvel-----	Limitation: deep to water	Limitation: erodes easily slope	Limitation: erodes easily	Limitation: erodes easily too arid
195CC: Campus-----	Limitation: deep to water	Limitation: slope depth to rock	Limitation: slope depth to rock	Limitation: slope depth to rock



WATER MANAGEMENT--Continued  
Ellis County, Kansas

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Features affecting--			
	Drainage	Irrigation	Terraces and diversions	Grassed waterways
Canlon-----	Limitation: deep to water	Limitation: slope depth to rock	Limitation: slope depth to rock	Limitation: slope depth to rock
195CF: Carlson-----	Limitation: deep to water	Favorable	Limitation: erodes easily	Limitation: erodes easily
195HU: Humbarger-----	Limitation: deep to water	Limitation: flooding	Favorable	Favorable
195IF: Inavale-----	Limitation: deep to water	Limitation: fast intake soil blowing droughty	Limitation: too sandy soil blowing	Limitation: droughty
195PF: Penden-----	Limitation: deep to water	Limitation: slope	Favorable	Favorable
195PO: Penden-----	Limitation: deep to water	Limitation: slope	Limitation: slope	Limitation: slope
Ab: Fluvents-----	Limitation: deep to water	Limitation: erodes easily flooding slope	Limitation: erodes easily	Limitation: erodes easily
Ac: New Cambria-----	Limitation: deep to water	Limitation: flooding percs slowly slow intake	Limitation: percs slowly	Limitation: percs slowly
Ad: Fluvaquents-----	Limitation: flooding	Limitation: flooding wetness	Limitation: wetness	Favorable
Ae: Anselmo-----	Limitation: deep to water	Limitation: rooting depth slope soil blowing	Limitation: too sandy soil blowing	Limitation: rooting depth
Am: Armo-----	Limitation: deep to water	Favorable	Favorable	Favorable
An: Armo-----	Limitation: deep to water	Limitation: slope	Favorable	Favorable
Ao: Armo-----	Limitation: deep to water	Limitation: slope	Favorable	Favorable
Ar: Armo-----	Limitation: deep to water	Limitation: slope	Limitation: slope	Limitation: slope
Bf: Boel-----	Limitation: flooding cutbanks cave	Limitation: wetness soil blowing droughty	Limitation: too sandy wetness soil blowing	Limitation: droughty
Bg: Bogue-----	Limitation: deep to water	Limitation: slope slow intake droughty	Limitation: percs slowly depth to rock	Limitation: percs slowly depth to rock droughty
Bo: Bogue-----	Limitation: deep to water	Limitation: slope slow intake droughty	Limitation: percs slowly slope depth to rock	Limitation: slope depth to rock droughty
Armo-----	Limitation: deep to water	Limitation: slope	Limitation: slope	Limitation: slope
BOP: Borrow Pits-----	---	---	---	---
Br: Brownell-----	Limitation: deep to water	Limitation: large stones slope droughty	Limitation: large stones depth to rock	Limitation: large stones depth to rock droughty
Cc: Campus-----	Limitation: deep to water	Limitation: slope depth to rock	Limitation: depth to rock	Limitation: depth to rock
Carlson-----	Limitation: deep to water	Limitation: slope	Limitation: erodes easily	Limitation: erodes easily
Cd: Campus-----	Limitation: deep to water	Limitation: slope depth to rock	Limitation: slope depth to rock	Limitation: slope depth to rock

WATER MANAGEMENT--Continued  
Ellis County, Kansas

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Features affecting--			
	Drainage	Irrigation	Terraces and diversions	Grassed waterways
Penden-----	Limitation: deep to water	Limitation: slope	Limitation: erodes easily slope	Limitation: erodes easily slope
Ce: Canlon-----	Limitation: deep to water	Limitation: slope depth to rock	Limitation: slope depth to rock	Limitation: slope depth to rock
Campus-----	Limitation: deep to water	Limitation: slope depth to rock	Limitation: slope depth to rock	Limitation: slope depth to rock
Cm: Corinth-----	Limitation: deep to water	Limitation: erodes easily percs slowly depth to rock	Limitation: erodes easily percs slowly depth to rock	Limitation: erodes easily percs slowly depth to rock
Cn: Corinth-----	Limitation: deep to water	Limitation: percs slowly slope depth to rock	Limitation: erodes easily percs slowly depth to rock	Limitation: erodes easily percs slowly depth to rock
Co: Corinth-----	Limitation: deep to water	Limitation: percs slowly slope depth to rock	Limitation: erodes easily slope depth to rock	Limitation: erodes easily slope depth to rock
Cr: Crete-----	Limitation: deep to water	Limitation: erodes easily percs slowly	Limitation: erodes easily	Limitation: erodes easily percs slowly
De: Detroit-----	Limitation: deep to water	Limitation: erodes easily percs slowly	Limitation: erodes easily	Limitation: erodes easily percs slowly
Ee: Eltree-----	Limitation: deep to water	Favorable	Limitation: erodes easily	Limitation: erodes easily
Ef: Eltree-----	Limitation: deep to water	Favorable	Limitation: erodes easily	Limitation: erodes easily
Eg: Eltree-----	Limitation: deep to water	Limitation: slope	Limitation: erodes easily	Limitation: erodes easily
Eh: Eltree-----	Limitation: deep to water	Limitation: slope	Limitation: erodes easily slope	Limitation: erodes easily slope
GRP: Pits-----	Limitation: deep to water	Limitation: fast intake slope droughty	Limitation: slope too sandy	Limitation: rooting depth slope droughty
Ha: Harney-----	Limitation: deep to water	Favorable	Limitation: erodes easily	Limitation: erodes easily
Hb: Harney-----	Limitation: deep to water	Favorable	Limitation: erodes easily	Limitation: erodes easily
Hc: Harney-----	Limitation: deep to water	Limitation: slope	Limitation: erodes easily	Limitation: erodes easily
Hd: Harney-----	Limitation: deep to water	Limitation: slope	Limitation: erodes easily	Limitation: erodes easily
He: Armo-----	Limitation: deep to water	Limitation: slope	Favorable	Favorable
Harney-----	Limitation: deep to water	Limitation: slope	Limitation: erodes easily	Limitation: erodes easily
Hf: Carlson-----	Limitation: deep to water	Favorable	Limitation: erodes easily	Limitation: erodes easily
Harney-----	Limitation: deep to water	Favorable	Limitation: erodes easily	Limitation: erodes easily
Hg: Carlson-----	Limitation: deep to water	Favorable	Limitation: erodes easily	Limitation: erodes easily
Harney-----	Limitation: deep to water	Favorable	Limitation: erodes easily	Limitation: erodes easily
HGG: Harney-----	Limitation: deep to water	Favorable	Limitation: erodes easily	Limitation: erodes easily
Mento-----	Limitation: deep to water	Limitation: erodes easily percs slowly	Limitation: erodes easily	Limitation: erodes easily percs slowly

WATER MANAGEMENT--Continued  
Ellis County, Kansas

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Features affecting--			
	Drainage	Irrigation	Terraces and diversions	Grassed waterways
Hh: Harney-----	Limitation: deep to water	Favorable	Limitation: erodes easily	Limitation: erodes easily
Wakeen-----	Limitation: deep to water	Limitation: depth to rock	Limitation: erodes easily depth to rock	Limitation: erodes easily depth to rock
Hk: Harney-----	Limitation: deep to water	Favorable	Limitation: erodes easily	Limitation: erodes easily
Wakeen-----	Limitation: deep to water	Limitation: depth to rock	Limitation: erodes easily depth to rock	Limitation: erodes easily depth to rock
Hl: Armo-----	Limitation: deep to water	Limitation: slope	Limitation: slope	Limitation: slope
Heizer-----	Limitation: deep to water	Limitation: large stones slope droughty	Limitation: large stones slope depth to rock	Limitation: large stones slope droughty
HMM: Heizer-----	Limitation: deep to water	Limitation: large stones slope droughty	Limitation: large stones slope depth to rock	Limitation: large stones slope droughty
Brownell-----	Limitation: deep to water	Limitation: large stones slope droughty	Limitation: large stones slope depth to rock	Limitation: large stones slope droughty
Hn: Dorrance-----	Limitation: deep to water	Limitation: slope soil blowing droughty	Limitation: slope too sandy soil blowing	Limitation: slope droughty
Ho: Holdrege-----	Limitation: deep to water	Favorable	Limitation: erodes easily	Limitation: erodes easily
Hp: Holdrege-----	Limitation: deep to water	Favorable	Limitation: erodes easily	Limitation: erodes easily
Hr: Hord-----	Limitation: deep to water	Favorable	Limitation: erodes easily	Limitation: erodes easily
In: Inavale-----	Limitation: deep to water	Limitation: fast intake slope droughty	Limitation: too sandy soil blowing	Limitation: droughty
Mc: Mccook-----	Limitation: deep to water	Limitation: soil blowing	Limitation: erodes easily soil blowing	Limitation: erodes easily
Md: Mccook-----	Limitation: deep to water	Favorable	Limitation: erodes easily	Limitation: erodes easily
Me: Mento-----	Limitation: deep to water	Limitation: erodes easily percs slowly	Limitation: erodes easily	Limitation: erodes easily percs slowly
Mf: Mento-----	Limitation: deep to water	Limitation: erodes easily percs slowly	Limitation: erodes easily	Limitation: erodes easily percs slowly
Mg: Mento-----	Limitation: deep to water	Limitation: erodes easily percs slowly	Limitation: erodes easily	Limitation: erodes easily percs slowly
Mo: Mento-----	Limitation: deep to water	Limitation: erodes easily percs slowly slope	Limitation: erodes easily	Limitation: erodes easily percs slowly
Mu: Munjor-----	Limitation: deep to water	Limitation: flooding soil blowing	Limitation: soil blowing	Favorable
Nc: New Cambria----	Limitation: deep to water	Limitation: percs slowly slow intake	Limitation: percs slowly	Limitation: percs slowly
Nn: Nibson-----	Limitation: deep to water	Limitation: slope depth to rock	Limitation: large stones slope depth to rock	Limitation: erodes easily large stones slope

WATER MANAGEMENT--Continued  
Ellis County, Kansas

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Features affecting--			
	Drainage	Irrigation	Terraces and diversions	Grassed waterways
Rb: Roxbury-----	Limitation: deep to water	Favorable	Limitation: erodes easily	Limitation: erodes easily
Rf: Roxbury-----	Limitation: deep to water	Limitation: flooding	Limitation: erodes easily	Limitation: erodes easily
RIV: Riverwash And Sandbars-----	Limitation: flooding slope	Limitation: erodes easily slope wetness	Limitation: erodes easily wetness	Limitation: erodes easily wetness
Ro: Heizer-----	Limitation: deep to water	Limitation: large stones slope droughty	Limitation: large stones slope depth to rock	Limitation: large stones slope droughty
Brownell-----	Limitation: deep to water	Limitation: large stones slope droughty	Limitation: large stones slope depth to rock	Limitation: large stones slope droughty
ROO: Roxbury-----	Limitation: deep to water	Limitation: flooding	Limitation: erodes easily	Limitation: erodes easily
UCC: Uly-----	Limitation: deep to water	Limitation: slope	Limitation: erodes easily	Limitation: erodes easily
W: Water-----	---	---	---	---
Wa: Wakeen-----	Limitation: deep to water	Limitation: depth to rock	Limitation: erodes easily depth to rock	Limitation: erodes easily depth to rock
We: Wakeen-----	Limitation: deep to water	Limitation: depth to rock	Limitation: erodes easily depth to rock	Limitation: erodes easily depth to rock
Wh: Wakeen-----	Limitation: deep to water	Limitation: slope depth to rock	Limitation: erodes easily depth to rock	Limitation: erodes easily depth to rock
Wk: Wakeen-----	Limitation: deep to water	Limitation: slope depth to rock	Limitation: erodes easily slope depth to rock	Limitation: erodes easily slope depth to rock
Wn: Wann-----	Limitation: flooding frost action	Limitation: flooding wetness	Limitation: wetness	Favorable

WATER MANAGEMENT--Continued  
Ellis County, Kansas

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Map symbol and soil name	Pct of map unit	Pond Reservoir Area		Embankments, Dikes, and Levees		Excavated Ponds (Aquifer- fed)	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
141HM: Harney-----	50	Somewhat limited Seepage	0.70	Somewhat limited Piping	0.06	Very limited Deep to water	1.00
Mento-----	50	Somewhat limited Depth to bedrock Seepage	0.16 0.05	Somewhat limited Thin layer	0.16	Very limited Deep to water	1.00
163AU: Armo-----	60	Somewhat limited Seepage Slope	0.70 0.00	Somewhat limited Piping	0.61	Very limited Deep to water	1.00
Bogue-----	40	Somewhat limited Depth to bedrock Slope	0.03 0.00	Somewhat limited Hard to pack Thin layer	0.96 0.66	Very limited Deep to water	1.00
163HE: Harney-----	55	Somewhat limited Seepage	0.70	Somewhat limited Piping	0.00	Very limited Deep to water	1.00
Mento-----	45	Somewhat limited Seepage	0.05	Somewhat limited Piping	0.05	Very limited Deep to water	1.00
163IC: Inavale-----	100	Very limited Seepage	1.00	Somewhat limited Seepage	0.96	Very limited Deep to water	1.00
163WX: Wakeen-----	100	Somewhat limited Seepage Depth to bedrock Slope	0.70 0.37 0.02	Somewhat limited Thin layer Piping	0.99 0.50	Very limited Deep to water	1.00
163WY: Wakeen-----	55	Somewhat limited Seepage Depth to bedrock	0.70 0.02	Somewhat limited Thin layer Piping	0.61 0.54	Very limited Deep to water	1.00
Harney-----	45	Somewhat limited Seepage	0.70	Not limited		Very limited Deep to water	1.00
165BO: Bogue-----	100	Somewhat limited Depth to bedrock	0.02	Somewhat limited Thin layer	0.56	Very limited Deep to water	1.00
165NW: Nibson-----	55	Very limited Seepage Depth to bedrock Slope	1.00 0.53 0.01	Very limited Thin layer Piping	1.00 0.50	Very limited Deep to water	1.00
Wakeen-----	45	Somewhat limited Seepage Depth to bedrock Slope	0.70 0.08 0.00	Somewhat limited Thin layer Piping	0.81 0.50	Very limited Deep to water	1.00
165PE: Penden-----	100	Somewhat limited Seepage	0.70	Somewhat limited Piping	0.08	Very limited Deep to water	1.00
165UB: Uly-----	100	Somewhat limited Seepage	0.70	Very limited Piping	1.00	Very limited Deep to water	1.00
165UR: Uly-----	65	Somewhat limited Seepage	0.70	Very limited Piping	1.00	Very limited Deep to water	1.00
Roxbury-----	35	Somewhat limited Seepage	0.70	Somewhat limited Piping	0.56	Very limited Deep to water	1.00
167CR: Crete-----	100	Somewhat limited Seepage	0.57	Not limited		Very limited Deep to water	1.00
167DR: Dorrance-----	100	Very limited Seepage	1.00	Very limited Seepage	1.00	Very limited Deep to water	1.00

WATER MANAGEMENT--Continued  
Ellis County, Kansas

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Map symbol and soil name	Pct of map unit	Pond Reservoir Area		Embankments, Dikes, and Levees		Excavated Ponds (Aquifer- fed)	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
167RC: Roxbury-----	100	Somewhat limited Seepage	0.70	Somewhat limited Piping	0.65	Very limited Deep to water	1.00
195BD: Badland-----	70	Not rated		Not rated		Not rated	
Manvel-----	30	Somewhat limited Seepage	0.05	Somewhat limited Piping	0.88	Very limited Deep to water	1.00
195CC: Campus-----	70	Somewhat limited Seepage Depth to bedrock Slope	0.70 0.66 0.00	Somewhat limited Piping Thin layer	0.68 0.66	Very limited Deep to water	1.00
Canlon-----	30	Very limited Seepage Depth to bedrock Slope	1.00 1.00 0.08	Very limited Thin layer Piping	1.00 0.92	Very limited Deep to water	1.00
195CF: Carlson-----	100	Somewhat limited Seepage	0.70	Somewhat limited Piping	0.31	Very limited Deep to water	1.00
195HU: Humbarger-----	100	Somewhat limited Seepage	0.70	Somewhat limited Piping	0.95	Very limited Deep to water	1.00
195IF: Inavale-----	100	Very limited Seepage	1.00	Somewhat limited Seepage	0.96	Very limited Deep to water	1.00
195PF: Penden-----	100	Somewhat limited Seepage	0.70	Somewhat limited Piping	0.08	Very limited Deep to water	1.00
195PO: Penden-----	100	Somewhat limited Seepage Slope	0.70 0.00	Somewhat limited Piping	0.11	Very limited Deep to water	1.00
Ab: Fluvents-----	100	Somewhat limited Seepage	0.70	Somewhat limited Piping	0.88	Very limited Deep to water	1.00
Ac: New Cambria-----	100	Somewhat limited Seepage	0.01	Somewhat limited Hard to pack	0.83	Very limited Deep to water	1.00
Ad: Fluvaquents-----	100	Somewhat limited Seepage	0.57	Somewhat limited Depth to saturated zone Piping	0.86 0.82	Somewhat limited Slow refill Cutbanks cave Deep to water	0.43 0.10 0.06
Ae: Anselmo-----	100	Very limited Seepage	1.00	Somewhat limited Seepage	0.57	Very limited Deep to water	1.00
Am: Armo-----	100	Very limited Seepage	1.00	Somewhat limited Piping	0.92	Very limited Deep to water	1.00
An: Armo-----	100	Somewhat limited Seepage	0.70	Somewhat limited Piping	0.66	Very limited Deep to water	1.00
Ao: Armo-----	100	Very limited Seepage	1.00	Somewhat limited Piping	0.90	Very limited Deep to water	1.00
Ar: Armo-----	100	Very limited Seepage Slope	1.00 0.00	Somewhat limited Piping	0.90	Very limited Deep to water	1.00

WATER MANAGEMENT--Continued  
Ellis County, Kansas

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Map symbol and soil name	Pct of map unit	Pond Reservoir Area		Embankments, Dikes, and Levees		Excavated Ponds (Aquifer- fed)	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
Bf: Boel-----	100	Very limited Seepage	1.00	Somewhat limited Depth to saturated zone Seepage	0.84 0.23	Very limited Cutbanks cave Deep to water	1.00 0.07
Bg: Bogue-----	100	Somewhat limited Depth to bedrock	0.08	Somewhat limited Thin layer Hard to pack	0.81 0.80	Very limited Deep to water	1.00
Bo: Bogue-----	60	Somewhat limited Depth to bedrock Slope	0.08 0.03	Somewhat limited Thin layer	0.81	Very limited Deep to water	1.00
Armo-----	40	Very limited Seepage	1.00	Somewhat limited Piping	0.91	Very limited Deep to water	1.00
BOP: Borrow Pits-----	100	Not rated		Not rated		Not rated	
Br: Brownell-----	100	Somewhat limited Depth to bedrock Seepage	0.86 0.70	Somewhat limited Thin layer	0.86	Very limited Deep to water	1.00
Cc: Campus-----	65	Somewhat limited Depth to bedrock Seepage	0.77 0.70	Somewhat limited Thin layer Piping	0.77 0.68	Very limited Deep to water	1.00
Carlson-----	35	Somewhat limited Seepage	0.70	Somewhat limited Piping	0.58	Very limited Deep to water	1.00
Cd: Campus-----	55	Somewhat limited Depth to bedrock Seepage	0.77 0.70	Somewhat limited Thin layer Piping	0.77 0.68	Very limited Deep to water	1.00
Penden-----	45	Somewhat limited Seepage	0.70	Somewhat limited Piping	0.08	Very limited Deep to water	1.00
Ce: Canlon-----	60	Very limited Seepage Depth to bedrock Slope	1.00 1.00 0.03	Very limited Thin layer Piping	1.00 0.92	Very limited Deep to water	1.00
Campus-----	40	Somewhat limited Depth to bedrock Seepage	0.77 0.70	Somewhat limited Thin layer Piping	0.77 0.68	Very limited Deep to water	1.00
Cm: Corinth-----	100	Somewhat limited Depth to bedrock Seepage	0.11 0.01	Somewhat limited Thin layer Hard to pack	0.86 0.50	Very limited Deep to water	1.00
Cn: Corinth-----	100	Somewhat limited Depth to bedrock Seepage	0.11 0.01	Somewhat limited Thin layer Hard to pack	0.86 0.50	Very limited Deep to water	1.00
Co: Corinth-----	100	Somewhat limited Depth to bedrock Seepage Slope	0.11 0.01 0.00	Somewhat limited Thin layer Hard to pack	0.86 0.50	Very limited Deep to water	1.00
Cr: Crete-----	100	Somewhat limited Seepage	0.57	Not limited		Very limited Deep to water	1.00
De: Detroit-----	100	Somewhat limited Seepage	0.05	Not limited		Very limited Deep to water	1.00

WATER MANAGEMENT--Continued  
Ellis County, Kansas

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Map symbol and soil name	Pct of map unit	Pond Reservoir Area		Embankments, Dikes, and Levees		Excavated Ponds (Aquifer- fed)	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
Ee: Eltree-----	100	Somewhat limited Seepage	0.70	Somewhat limited Piping	0.88	Very limited Deep to water	1.00
Ef: Eltree-----	100	Somewhat limited Seepage	0.70	Somewhat limited Piping	0.89	Very limited Deep to water	1.00
Eg: Eltree-----	100	Somewhat limited Seepage	0.70	Somewhat limited Piping	0.88	Very limited Deep to water	1.00
Eh: Eltree-----	100	Somewhat limited Seepage Slope	0.70 0.00	Somewhat limited Piping	0.89	Very limited Deep to water	1.00
GRP: Pits-----	100	Not rated		Not rated		Not rated	
Ha: Harney-----	100	Somewhat limited Seepage	0.70	Somewhat limited Piping	0.00	Very limited Deep to water	1.00
Hb: Harney-----	100	Somewhat limited Seepage	0.70	Not limited		Very limited Deep to water	1.00
Hc: Harney-----	100	Somewhat limited Seepage	0.70	Somewhat limited Piping	0.00	Very limited Deep to water	1.00
Hd: Harney-----	100	Somewhat limited Seepage	0.70	Somewhat limited Piping	0.00	Very limited Deep to water	1.00
He: Armo-----	50	Very limited Seepage	1.00	Somewhat limited Piping	0.90	Very limited Deep to water	1.00
Harney-----	50	Somewhat limited Seepage	0.70	Somewhat limited Piping	0.00	Very limited Deep to water	1.00
Hf: Carlson-----	50	Somewhat limited Seepage	0.70	Somewhat limited Piping	0.58	Very limited Deep to water	1.00
Harney-----	50	Somewhat limited Seepage	0.70	Somewhat limited Piping	0.00	Very limited Deep to water	1.00
Hg: Carlson-----	50	Somewhat limited Seepage	0.70	Somewhat limited Piping	0.58	Very limited Deep to water	1.00
Harney-----	50	Somewhat limited Seepage	0.70	Somewhat limited Piping	0.00	Very limited Deep to water	1.00
HGG: Harney-----	70	Somewhat limited Seepage	0.70	Somewhat limited Piping	0.07	Very limited Deep to water	1.00
Mento-----	30	Somewhat limited Seepage	0.05	Not limited		Very limited Deep to water	1.00
Hh: Harney-----	70	Somewhat limited Seepage	0.70	Somewhat limited Piping	0.00	Very limited Deep to water	1.00
Wakeen-----	30	Somewhat limited Seepage Depth to bedrock	0.70 0.03	Somewhat limited Thin layer Piping	0.66 0.50	Very limited Deep to water	1.00
Hk: Harney-----	60	Somewhat limited Seepage	0.70	Somewhat limited Piping	0.00	Very limited Deep to water	1.00
Wakeen-----	40	Somewhat limited Seepage	0.70	Somewhat limited Thin layer	0.66	Very limited Deep to water	1.00



WATER MANAGEMENT--Continued  
Ellis County, Kansas

(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 potential limitation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Pct of map unit	Pond Reservoir Area		Embankments, Dikes, and Levees		Excavated Ponds (Aquifer- fed)	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
		Depth to bedrock	0.03	Piping	0.50		
Hl: Armo-----	50	Very limited Seepage Slope	1.00 0.00	Somewhat limited Piping	0.91	Very limited Deep to water	1.00
Heizer-----	50	Very limited Seepage Depth to bedrock Slope	1.00 1.00 0.06	Very limited Thin layer	1.00	Very limited Deep to water	1.00
HMM: Heizer-----	60	Very limited Seepage Depth to bedrock Slope	1.00 1.00 0.10	Very limited Thin layer	1.00	Very limited Deep to water	1.00
Brownell-----	40	Somewhat limited Depth to bedrock Seepage	0.98 0.70	Somewhat limited Thin layer	0.98	Very limited Deep to water	1.00
Hn: Dorrance-----	100	Very limited Seepage	1.00	Somewhat limited Seepage	0.22	Very limited Deep to water	1.00
Ho: Holdrege-----	100	Somewhat limited Seepage	0.70	Somewhat limited Piping	0.73	Very limited Deep to water	1.00
Hp: Holdrege-----	100	Somewhat limited Seepage	0.70	Somewhat limited Piping	0.22	Very limited Deep to water	1.00
Hr: Hord-----	100	Somewhat limited Seepage	0.70	Somewhat limited Piping	0.64	Very limited Deep to water	1.00
In: Inavale-----	100	Very limited Seepage	1.00	Somewhat limited Seepage	0.98	Very limited Deep to water	1.00
Mc: Mccook-----	100	Somewhat limited Seepage	0.70	Very limited Piping Seepage	1.00 0.09	Very limited Deep to water	1.00
Md: Mccook-----	100	Somewhat limited Seepage	0.70	Very limited Piping	1.00	Very limited Deep to water	1.00
Me: Mento-----	100	Somewhat limited Seepage	0.05	Not limited		Very limited Deep to water	1.00
Mf: Mento-----	100	Somewhat limited Seepage	0.05	Not limited		Very limited Deep to water	1.00
Mg: Mento-----	100	Somewhat limited Seepage	0.05	Not limited		Very limited Deep to water	1.00
Mo: Mento-----	100	Somewhat limited Seepage	0.05	Somewhat limited Piping	0.66	Very limited Deep to water	1.00
Mu: Munjor-----	100	Very limited Seepage	1.00	Somewhat limited Seepage	0.25	Very limited Deep to water	1.00
Nc: New Cambria-----	100	Somewhat limited Seepage	0.01	Somewhat limited Hard to pack	0.74	Very limited Deep to water	1.00
Nn: Nibson-----	100	Very limited Seepage Depth to bedrock	1.00 0.50	Very limited Thin layer Piping	1.00 0.50	Very limited Deep to water	1.00

WATER MANAGEMENT--Continued  
Ellis County, Kansas

(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 potential limitation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Pct of map unit	Pond Reservoir Area		Embankments, Dikes, and Levees		Excavated Ponds (Aquifer- fed)	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
Rb: Roxbury-----	100	Somewhat limited Seepage	0.70	Somewhat limited Piping	0.67	Very limited Deep to water	1.00
Rf: Roxbury-----	100	Somewhat limited Seepage	0.70	Somewhat limited Piping	0.61	Very limited Deep to water	1.00
RIV: Riverwash And Sandbars-----	100	Not rated		Not rated		Not rated	
Ro: Heizer-----	77	Very limited Seepage Depth to bedrock Slope	1.00 1.00 0.10	Very limited Thin layer	1.00	Very limited Deep to water	1.00
Brownell-----	23	Somewhat limited Depth to bedrock Seepage	0.81 0.70	Somewhat limited Thin layer	0.81	Very limited Deep to water	1.00
ROO: Roxbury-----	100	Somewhat limited Seepage	0.70	Somewhat limited Piping	0.56	Very limited Deep to water	1.00
UCC: Uly-----	100	Somewhat limited Seepage	0.70	Very limited Piping	1.00	Very limited Deep to water	1.00
W: Water-----	100	Very limited Seepage Slope	1.00 0.50	Very limited Hard to pack	1.00	Very limited Deep to water	1.00
Wa: Wakeen-----	100	Somewhat limited Seepage Depth to bedrock	0.70 0.09	Somewhat limited Thin layer Piping	0.83 0.50	Very limited Deep to water	1.00
We: Wakeen-----	100	Somewhat limited Seepage Depth to bedrock	0.70 0.11	Somewhat limited Thin layer Piping	0.86 0.53	Very limited Deep to water	1.00
Wh: Wakeen-----	100	Somewhat limited Seepage Depth to bedrock	0.70 0.11	Somewhat limited Thin layer Piping	0.86 0.53	Very limited Deep to water	1.00
Wk: Wakeen-----	100	Somewhat limited Seepage Depth to bedrock	0.70 0.37	Somewhat limited Thin layer Piping	0.99 0.50	Very limited Deep to water	1.00
Wn: Wann-----	100	Very limited Seepage	1.00	Somewhat limited Depth to saturated zone Seepage	0.84 0.10	Very limited Cutbanks cave Deep to water	1.00 0.07

SANITARY FACILITIES  
Ellis County, Kansas

### Sanitary Facilities

The following 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. Slightly limited indicates that the soil has features that are favorable for the specified use. The limitations are minor and can be easily overcome. Good performance and 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 0.00 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.

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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.

SANITARY FACILITIES--Continued  
Ellis County, Kansas

(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 potential limitation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Pct of map unit	Septic tank absorption fields		Sewage lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value
141HM: Harney-----	50	Very limited Restricted permeability	1.00	Somewhat limited Slope	0.67
Mento-----	50	Very limited Restricted permeability	1.00	Seepage Somewhat limited Slope	0.50 0.67
163AU: Armo-----	60	Depth to bedrock Somewhat limited Restricted permeability	0.86 0.50	Depth to hard bedrock Very limited Slope	0.61 1.00
Bogue-----	40	Slope Very limited Restricted permeability	0.37 1.00	Seepage Very limited Depth to soft bedrock	0.50 1.00
163HE: Harney-----	55	Depth to bedrock Slope	1.00 0.63	Slope Somewhat limited Slope	1.00 0.67
Mento-----	45	Very limited Restricted permeability	1.00	Seepage Somewhat limited Slope	0.50 0.67
163IC: Inavale-----	100	Very limited Flooding Filtering capacity	1.00 1.00	Very limited Flooding Seepage Slope	1.00 1.00 0.00
163WX: Wakeen-----	100	Very limited Depth to bedrock Slope	1.00 0.96	Very limited Depth to soft bedrock Slope Seepage	1.00 1.00 0.50
163WY: Wakeen-----	55	Very limited Depth to bedrock Restricted permeability	1.00 0.50	Very limited Depth to soft bedrock Seepage	1.00 0.50
Harney-----	45	Very limited Restricted permeability	1.00	Slope Somewhat limited Seepage Slope	0.00 0.50 0.00
165BO: Bogue-----	100	Very limited Depth to bedrock Slope	1.00 0.04	Very limited Depth to soft bedrock Slope	1.00 1.00
165NW: Nibson-----	55	Very limited Depth to bedrock Slope	1.00 0.84	Very limited Depth to soft bedrock Slope Seepage	1.00 1.00 0.50
Wakeen-----	45	Very limited Depth to bedrock Slope Restricted permeability	1.00 0.63 0.50	Very limited Depth to soft bedrock Slope Seepage	1.00 1.00 0.50
165PE: Penden-----	100	Somewhat limited Restricted permeability	0.50	Somewhat limited Slope Seepage	0.67 0.50
165UB: Uly-----	100	Somewhat limited Restricted permeability	0.50	Somewhat limited Seepage Slope	0.50 0.00
165UR: Uly-----	65	Somewhat limited		Very limited	

SANITARY FACILITIES--Continued  
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(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 potential limitation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Pct of map unit	Septic tank absorption fields		Sewage lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value
Roxbury-----	35	Restricted permeability	0.50	Slope	1.00
		Slope	0.04	Seepage	0.50
		Very limited Flooding	1.00	Very limited Flooding	1.00
		Restricted permeability	0.50	Seepage	0.50
167CR: Crete-----	100	Very limited Restricted permeability	1.00	Somewhat limited Seepage	0.32
167DR: Dorrance-----	100	Very limited Filtering capacity Slope	1.00 0.16	Very limited Seepage	1.00
167RC: Roxbury-----	100	Very limited Flooding Restricted permeability	1.00	Very limited Flooding	1.00
			0.50	Seepage	0.50
195BD: Badland-----	70	Not rated		Not rated	
Manvel-----	30	Very limited Restricted permeability	1.00	Very limited Slope	1.00
195CC: Campus-----	70	Very limited Depth to bedrock	1.00	Very limited Depth to hard bedrock	1.00
		Restricted permeability	0.50	Slope	1.00
		Slope	0.37	Seepage	0.50
		Very limited Depth to bedrock	1.00	Very limited Depth to hard bedrock	1.00
Canlon-----	30	Slope	1.00	Slope	1.00
				Seepage	0.50
195CF: Carlson-----	100	Very limited Restricted permeability	1.00	Somewhat limited Seepage	0.50
				Slope	0.00
195HU: Humbarger-----	100	Very limited Flooding	1.00	Very limited Flooding	1.00
		Restricted permeability	0.50	Seepage	0.50
195IF: Inavale-----	100	Very limited Flooding	1.00	Very limited Flooding	1.00
		Filtering capacity	1.00	Seepage	1.00
195PF: Penden-----	100	Somewhat limited Restricted permeability	0.50	Somewhat limited Slope	0.67
				Seepage	0.50
195PO: Penden-----	100	Somewhat limited Restricted permeability	0.50	Very limited Slope	1.00
		Slope	0.37	Seepage	0.50
Ab: Fluvents-----	100	Very limited Flooding	1.00	Very limited Flooding	1.00
		Restricted permeability	0.50	Slope	0.67
Ac: New Cambria-----	100	Very limited Flooding Restricted permeability	1.00	Seepage	0.50
			1.00	Very limited Flooding	1.00
Ad: Fluvaquents-----	100	Very limited Flooding	1.00	Very limited Flooding	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00

SANITARY FACILITIES--Continued  
Ellis County, Kansas

(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 potential limitation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Pct of map unit	Septic tank absorption fields		Sewage lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value
Ae: Anselmo-----	100	Restricted permeability	0.68	Seepage	0.32
		Very limited Filtering capacity	1.00	Very limited Seepage	1.00
Am: Armo-----	100	Somewhat limited Restricted permeability	0.50	Slope	0.33
				Very limited Seepage	1.00
An: Armo-----	100	Somewhat limited Restricted permeability	0.50	Slope	0.00
				Somewhat limited Slope	0.67
Ao: Armo-----	100	Somewhat limited Restricted permeability	0.50	Seepage	0.50
				Very limited Seepage	1.00
Ar: Armo-----	100	Somewhat limited Restricted permeability	0.50	Slope	0.67
				Very limited Seepage	1.00
Bf: Boel-----	100	Somewhat limited Restricted permeability Slope	0.37	Slope	1.00
				Very limited Flooding	1.00
Bg: Bogue-----	100	Very limited Flooding Depth to saturated zone Filtering capacity	1.00	Seepage	1.00
				Depth to saturated zone	1.00
Bo: Bogue-----	60	Very limited Restricted permeability Depth to bedrock	1.00	Very limited Depth to soft bedrock	1.00
				Slope	0.91
Armo-----	40	Slope Somewhat limited Restricted permeability Slope	1.00	Very limited Depth to soft bedrock	1.00
				Slope	1.00
BOP: Borrow Pits-----	100	Not rated	0.50	Very limited Seepage	1.00
				Slope	1.00
Br: Brownell-----	100	Very limited Depth to bedrock Restricted permeability	1.00	Not rated	
				Very limited Depth to hard bedrock	1.00
Cc: Campus-----	65	Restricted permeability	0.50	Slope	0.91
				Seepage Content of large stones	0.50 0.02
Carlson-----	35	Very limited Depth to bedrock Restricted permeability	1.00	Very limited Depth to hard bedrock	1.00
				Slope	0.67
Cd: Campus-----	55	Somewhat limited Restricted permeability	0.50	Seepage	0.50
				Somewhat limited Slope	0.67
Penden-----	45	Very limited Depth to bedrock Restricted permeability Slope	1.00	Seepage	0.50
				Very limited	

SANITARY FACILITIES--Continued  
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Map symbol and soil name	Pct of map unit	Septic tank absorption fields		Sewage lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value
Ce: Canlon-----	60	Restricted permeability	0.50	Slope	1.00
		Slope	0.16	Seepage	0.50
		Very limited Depth to bedrock	1.00	Very limited Depth to hard bedrock	1.00
		Slope	1.00	Slope	1.00
Campus-----	40	Seepage	0.50	Seepage	0.50
		Very limited Depth to bedrock	1.00	Very limited Depth to hard bedrock	1.00
		Restricted permeability	0.50	Slope	1.00
		Slope	0.16	Seepage	0.50
Cm: Corinth-----	100	Seepage	0.50	Seepage	0.50
		Very limited Depth to bedrock	1.00	Very limited Depth to soft bedrock	1.00
		Restricted permeability	1.00	Slope	0.00
		Seepage	0.50	Seepage	0.50
Cn: Corinth-----	100	Seepage	0.50	Seepage	0.50
		Very limited Depth to bedrock	1.00	Very limited Depth to soft bedrock	1.00
		Restricted permeability	1.00	Slope	0.67
		Seepage	0.50	Seepage	0.50
Co: Corinth-----	100	Seepage	0.50	Seepage	0.50
		Very limited Depth to bedrock	1.00	Very limited Depth to soft bedrock	1.00
		Restricted permeability	1.00	Slope	1.00
		Slope	0.37	Slope	0.00
Cr: Crete-----	100	Slope	0.37	Slope	0.00
		Very limited Restricted permeability	1.00	Somewhat limited Seepage	0.32
		Seepage	0.50	Seepage	0.50
		Very limited Restricted permeability Flooding	1.00	Somewhat limited Flooding	0.40
De: Detroit-----	100	Flooding	0.40	Flooding	0.40
		Somewhat limited Restricted permeability	0.50	Somewhat limited Seepage	0.50
		Seepage	0.50	Seepage	0.50
		Somewhat limited Restricted permeability	0.50	Somewhat limited Seepage	0.50
Ef: Eltree-----	100	Seepage	0.50	Seepage	0.50
		Somewhat limited Restricted permeability	0.50	Somewhat limited Seepage	0.50
		Seepage	0.50	Slope	0.00
		Somewhat limited Restricted permeability	0.50	Somewhat limited Slope	0.67
Eg: Eltree-----	100	Seepage	0.50	Seepage	0.50
		Somewhat limited Restricted permeability	0.50	Somewhat limited Slope	0.67
		Seepage	0.50	Seepage	0.50
		Somewhat limited Restricted permeability	0.50	Somewhat limited Slope	0.67
Eh: Eltree-----	100	Seepage	0.50	Seepage	0.50
		Somewhat limited Restricted permeability	0.50	Somewhat limited Slope	0.67
		Seepage	0.50	Seepage	0.50
		Somewhat limited Restricted permeability	0.50	Somewhat limited Slope	0.67
GRP: Pits-----	100	Seepage	0.50	Seepage	0.50
		Somewhat limited Restricted permeability	0.50	Somewhat limited Slope	0.67
		Seepage	0.50	Seepage	0.50
		Somewhat limited Restricted permeability	0.50	Somewhat limited Slope	0.67
Ha: Harney-----	100	Seepage	0.50	Seepage	0.50
		Somewhat limited Restricted permeability	0.50	Somewhat limited Slope	0.67
		Seepage	0.50	Seepage	0.50
		Somewhat limited Restricted permeability	0.50	Somewhat limited Slope	0.67
Hb: Harney-----	100	Seepage	0.50	Seepage	0.50
		Somewhat limited Restricted permeability	0.50	Somewhat limited Slope	0.67
		Seepage	0.50	Seepage	0.50
		Somewhat limited Restricted permeability	0.50	Somewhat limited Slope	0.67
Hc: Harney-----	100	Seepage	0.50	Seepage	0.50
		Somewhat limited Restricted permeability	0.50	Somewhat limited Slope	0.67
		Seepage	0.50	Seepage	0.50
		Somewhat limited Restricted permeability	0.50	Somewhat limited Slope	0.67



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Map symbol and soil name	Pct of map unit	Septic tank absorption fields		Sewage lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value
Hd: Harney-----	100	Very limited Restricted permeability	1.00	Somewhat limited Seepage	0.50
				Slope	0.33
He: Armo-----	50	Somewhat limited Restricted permeability	0.50	Very limited Seepage	1.00
				Slope	0.67
Harney-----	50	Very limited Restricted permeability	1.00	Somewhat limited Slope	0.67
				Seepage	0.50
Hf: Carlson-----	50	Somewhat limited Restricted permeability	0.50	Somewhat limited Seepage	0.50
Harney-----	50	Very limited Restricted permeability	1.00	Somewhat limited Seepage	0.50
Hg: Carlson-----	50	Somewhat limited Restricted permeability	0.50	Somewhat limited Seepage	0.50
				Slope	0.00
Harney-----	50	Very limited Restricted permeability	1.00	Somewhat limited Seepage	0.50
				Slope	0.00
HGG: Harney-----	70	Very limited Restricted permeability	1.00	Somewhat limited Seepage	0.50
				Slope	0.00
Mento-----	30	Very limited Restricted permeability	1.00	Somewhat limited Slope	0.00
Hh: Harney-----	70	Very limited Restricted permeability	1.00	Somewhat limited Seepage	0.50
Wakeen-----	30	Very limited Depth to bedrock	1.00	Very limited Depth to soft bedrock	1.00
		Restricted permeability	0.50	Seepage	0.50
Hk: Harney-----	60	Very limited Restricted permeability	1.00	Somewhat limited Seepage	0.50
				Slope	0.00
Wakeen-----	40	Very limited Depth to bedrock	1.00	Very limited Depth to soft bedrock	1.00
		Restricted permeability	0.50	Seepage	0.50
				Slope	0.00
Hl: Armo-----	50	Somewhat limited Slope	0.63	Very limited Slope	1.00
		Restricted permeability	0.50	Seepage	1.00
Heizer-----	50	Very limited Depth to bedrock	1.00	Very limited Depth to hard bedrock	1.00
		Slope	1.00	Slope	1.00
				Seepage	0.50
				Content of large stones	0.00
HMM: Heizer-----	60	Very limited Depth to bedrock	1.00	Very limited Depth to hard bedrock	1.00
		Slope	1.00	Slope	1.00
				Seepage	0.50
				Content of large stones	0.01
Brownell-----	40	Very limited		Very limited	

SANITARY FACILITIES--Continued  
Ellis County, Kansas

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Map symbol and soil name	Pct of map unit	Septic tank absorption fields		Sewage lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value
Hn: Dorrance-----	100	Depth to bedrock	1.00	Depth to hard bedrock	1.00
		Restricted permeability	0.50	Slope	1.00
		Slope	0.16	Seepage	0.50
		Very limited Filtering capacity	1.00	Very limited Seepage	1.00
Ho: Holdrege-----	100	Slope	0.16	Slope	1.00
Hp: Holdrege-----	100	Somewhat limited Restricted permeability	0.50	Somewhat limited Seepage	0.50
		Somewhat limited Restricted permeability	0.50	Somewhat limited Seepage	0.50
Hr: Hord-----	100	Slope	0.00	Slope	0.00
Hr: Hord-----	100	Somewhat limited Restricted permeability	0.50	Somewhat limited Seepage	0.50
		Flooding	0.40	Flooding	0.40
In: Inavale-----	100	Very limited Flooding	1.00	Very limited Flooding	1.00
In: Inavale-----	100	Filtering capacity	1.00	Seepage	1.00
				Slope	0.67
Mc: Mccook-----	100	Somewhat limited Restricted permeability	0.50	Somewhat limited Seepage	0.50
Md: Mccook-----	100	Flooding	0.40	Flooding	0.40
		Somewhat limited Restricted permeability	0.50	Somewhat limited Seepage	0.50
Me: Mento-----	100	Flooding	0.40	Flooding	0.40
Me: Mento-----	100	Very limited Restricted permeability	1.00	Not limited	
		Very limited Restricted permeability	1.00	Somewhat limited Slope	0.00
Mf: Mento-----	100	Very limited Restricted permeability	1.00	Somewhat limited Slope	0.00
Mg: Mento-----	100	Very limited Restricted permeability	1.00	Somewhat limited Slope	0.00
Mo: Mento-----	100	Very limited Restricted permeability	1.00	Somewhat limited Slope	0.67
Mu: Munjor-----	100	Very limited Flooding	1.00	Very limited Flooding	1.00
Nc: New Cambria-----	100	Filtering capacity	1.00	Seepage	1.00
		Very limited Restricted permeability	1.00	Somewhat limited Flooding	0.40
Nn: Nibson-----	100	Flooding	0.40		
Nn: Nibson-----	100	Very limited Depth to bedrock	1.00	Very limited Depth to soft bedrock	1.00
		Slope	0.04	Slope	1.00
Rb: Roxbury-----	100	Seepage	0.50	Seepage	0.50
Rb: Roxbury-----	100	Somewhat limited Restricted permeability	0.50	Somewhat limited Seepage	0.50
		Flooding	0.40	Flooding	0.40
Rf: Roxbury-----	100	Very limited Flooding	1.00	Very limited Flooding	1.00

SANITARY FACILITIES--Continued  
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(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 potential limitation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Pct of map unit	Septic tank absorption fields		Sewage lagoons	
		Rating class and limiting features	Value	Rating class and limiting features	Value
RIV: Riverwash And Sandbars-----	100	Restricted permeability Not rated	0.50	Seepage Not rated	0.50
Ro: Heizer-----	77	Very limited Depth to bedrock Slope	1.00 1.00	Very limited Depth to hard bedrock Slope Seepage Content of large stones	1.00 1.00 0.50 0.01
Brownell-----	23	Very limited Depth to bedrock Restricted permeability Slope	1.00 0.50 0.00	Very limited Depth to hard bedrock Slope Seepage Content of large stones	1.00 1.00 0.50 0.01
ROO: Roxbury-----	100	Very limited Flooding Restricted permeability	1.00 0.50	Very limited Flooding Seepage	1.00 0.50
UCC: Uly-----	100	Somewhat limited Restricted permeability	0.50	Somewhat limited Slope Seepage	0.67 0.50
W: Water-----	100	Very limited Slope	1.00	Very limited Slope	1.00
Wa: Wakeen-----	100	Very limited Depth to bedrock Restricted permeability	1.00 0.50	Very limited Depth to soft bedrock Seepage Slope	1.00 0.50 0.00
We: Wakeen-----	100	Very limited Depth to bedrock Restricted permeability	1.00 0.50	Very limited Depth to soft bedrock Seepage Slope	1.00 0.50 0.00
Wh: Wakeen-----	100	Very limited Depth to bedrock Restricted permeability	1.00 0.50	Very limited Depth to soft bedrock Slope Seepage	1.00 0.67 0.50
Wk: Wakeen-----	100	Very limited Depth to bedrock Slope	1.00 0.16	Very limited Depth to soft bedrock Slope Seepage	1.00 1.00 0.50
Wn: Wann-----	100	Very limited Flooding Depth to saturated zone	1.00 1.00	Very limited Flooding Seepage Depth to saturated zone	1.00 1.00 1.00

SANITARY FACILITIES--Continued  
Ellis County, Kansas

(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 potential limitation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Pct of map unit	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
141HM: Harney----- Mento-----	50 50	Not limited Very limited Depth to bedrock Seepage Too clayey	 1.00 1.00 0.50	Not limited Somewhat limited Depth to bedrock	 0.61	Not limited Somewhat limited Depth to bedrock Too clayey	 0.61 0.50
163AU: Armo----- Bogue-----	60 40	Somewhat limited Slope Very limited Depth to bedrock Too clayey Seepage Slope	 0.37 1.00 1.00 1.00 0.63	Somewhat limited Slope Very limited Depth to bedrock Slope	 0.37 1.00 0.63	Somewhat limited Slope Very limited Depth to bedrock Too clayey Hard to compact Slope	 0.37 1.00 1.00 1.00 0.63
163HE: Harney----- Mento-----	55 45	Not limited Very limited Seepage	 1.00	Not limited Not limited		Not limited Not limited	
163IC: Inavale-----	100	Very limited Flooding Seepage Too Sandy	 1.00 1.00 1.00	Very limited Flooding Seepage	 1.00 1.00	Very limited Seepage Too Sandy	 1.00 0.50
163WX: Wakeen-----	100	Very limited Depth to bedrock Seepage Slope Too clayey	 1.00 1.00 0.96 0.50	Very limited Depth to bedrock Slope	 1.00 0.96	Very limited Depth to bedrock Slope Too clayey	 1.00 0.96 0.50
163WY: Wakeen-----  Harney-----	55  45	Very limited Depth to bedrock Seepage Too clayey Somewhat limited Too clayey	 1.00 1.00 0.50 0.50	Very limited Depth to bedrock  Not limited	 1.00  	Very limited Depth to bedrock Too clayey Very limited Hard to compact Too clayey	 1.00 0.50 1.00 0.50
165BO: Bogue-----	100	Very limited Depth to bedrock Seepage Slope	 1.00 1.00 0.04	Very limited Depth to bedrock Slope	 1.00 0.04	Very limited Depth to bedrock Hard to compact Slope	 1.00 1.00 0.04
165NW: Nibson-----  Wakeen-----	55  45	Very limited Depth to bedrock Seepage Slope Too clayey Very limited Depth to bedrock Seepage Slope Too clayey	 1.00 1.00 0.84 0.50 1.00 1.00 0.63 0.50	Very limited Depth to bedrock Slope Very limited Depth to bedrock Slope	 1.00 0.84 0.63	Very limited Depth to bedrock Slope Too clayey Very limited Depth to bedrock Slope Too clayey	 1.00 0.84 0.50 1.00 0.63 0.50
165PE: Penden-----	100	Somewhat limited Too clayey	0.50	Not limited		Somewhat limited Too clayey	0.50
165UB: Uly----- 165UR: Uly-----	100  65	Not limited  Somewhat limited Slope Very limited Flooding	  0.04 1.00	Not limited  Somewhat limited Slope Very limited Flooding	  0.04 1.00	Not limited  Somewhat limited Slope Not limited	  0.04
167CR: Crete-----	100	Somewhat limited Too clayey	0.50	Not limited		Very limited Hard to compact Too clayey	1.00 0.50
167DR: Dorrance-----	100	Very limited Seepage Too Sandy Slope	 1.00 1.00 0.16	Very limited Seepage Slope	 1.00 0.16	Very limited Too Sandy Seepage Slope Gravel content	 1.00 1.00 0.16 0.03
167RC: Roxbury-----	100	Very limited Flooding	1.00	Very limited Flooding	1.00	Not limited	
195BD: Badland-----	70	Not rated		Not rated		Not rated	
Manvel-----	30	Not limited		Not limited		Not limited	

SANITARY FACILITIES--Continued  
Ellis County, Kansas

(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 potential limitation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Pct of map unit	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
195CC: Campus-----	70	Very limited Depth to bedrock Seepage Slope	1.00 1.00 0.37	Very limited Depth to bedrock Slope	1.00 0.37	Very limited Depth to bedrock Slope	1.00 0.37
Canlon-----	30	Very limited Depth to bedrock Slope Seepage	1.00 1.00 1.00	Very limited Depth to bedrock Slope	1.00 1.00	Very limited Depth to bedrock Slope	1.00 1.00
195CF: Carlson-----	100	Somewhat limited Too clayey	0.50	Not limited		Somewhat limited Too clayey	0.50
195HU: Humbarger-----	100	Very limited Flooding	1.00	Very limited Flooding	1.00	Not limited	
195IF: Inavale-----	100	Very limited Flooding Seepage Too Sandy	1.00 1.00 1.00	Very limited Flooding Seepage	1.00 1.00	Very limited Too Sandy Seepage	1.00 1.00
195PF: Penden-----	100	Not limited		Not limited		Not limited	
195PO: Penden-----	100	Somewhat limited Slope	0.37	Somewhat limited Slope	0.37	Somewhat limited Slope	0.37
Ab: Fluvents-----	100	Very limited Flooding	1.00	Very limited Flooding	1.00	Not limited	
Ac: New Cambria-----	100	Very limited Flooding Too clayey	1.00 1.00	Very limited Flooding	1.00	Very limited Too clayey Hard to compact	1.00 1.00
Ad: Fluvaquents-----	100	Very limited Flooding Depth to saturated zone Too clayey	1.00 1.00 0.50	Very limited Flooding Depth to saturated zone	1.00 1.00	Somewhat limited Too clayey Depth to saturated zone	0.50 0.47
Ae: Anselmo-----	100	Very limited Seepage Too Sandy	1.00 1.00	Very limited Seepage	1.00	Very limited Seepage Too Sandy	1.00 0.50
Am: Armo-----	100	Very limited Seepage Too clayey	1.00 0.50	Not limited		Somewhat limited Too clayey	0.50
An: Armo-----	100	Not limited		Not limited		Not limited	
Ao: Armo-----	100	Very limited Seepage Too clayey	1.00 0.50	Not limited		Somewhat limited Too clayey	0.50
Ar: Armo-----	100	Very limited Seepage Too clayey Slope	1.00 0.50 0.37	Somewhat limited Slope	0.37	Somewhat limited Too clayey Slope	0.50 0.37
Bf: Boel-----	100	Very limited Flooding Depth to saturated zone Seepage Too Sandy	1.00 1.00 1.00 1.00	Very limited Flooding Depth to saturated zone Seepage	1.00 1.00 1.00	Very limited Seepage Too Sandy Depth to saturated zone	1.00 0.50 0.44
Bg: Bogue-----	100	Very limited Depth to bedrock Seepage	1.00 1.00	Very limited Depth to bedrock	1.00	Very limited Depth to bedrock Hard to compact	1.00 1.00
Bo: Bogue-----	60	Very limited Depth to bedrock Seepage Slope	1.00 1.00 1.00	Very limited Depth to bedrock Slope	1.00 1.00	Very limited Depth to bedrock Hard to compact Slope	1.00 1.00 1.00
Armo-----	40	Very limited Seepage Too clayey Slope	1.00 0.50 0.16	Somewhat limited Slope	0.16	Somewhat limited Too clayey Slope	0.50 0.16
BOP: Borrow Pits-----	100	Not rated		Not rated		Not rated	

SANITARY FACILITIES--Continued  
Ellis County, Kansas

(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 potential limitation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Pct of map unit	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
Br: Brownell-----	100	Very limited Depth to bedrock Seepage	1.00 1.00	Very limited Depth to bedrock	1.00	Very limited Depth to bedrock Carbonate content Gravel content	1.00 1.00 0.99
Cc: Campus-----	65	Very limited Depth to bedrock Seepage	1.00 1.00	Very limited Depth to bedrock	1.00	Very limited Depth to bedrock	1.00
Carlson-----	35	Somewhat limited Too clayey	0.50	Not limited		Somewhat limited Too clayey	0.50
Cd: Campus-----	55	Very limited Depth to bedrock Seepage Slope	1.00 1.00 0.16	Very limited Depth to bedrock Slope	1.00 0.16	Very limited Depth to bedrock Slope	1.00 0.16
Penden-----	45	Somewhat limited Too clayey Slope	0.50 0.16	Somewhat limited Slope	0.16	Somewhat limited Too clayey Slope	0.50 0.16
Ce: Canlon-----	60	Very limited Depth to bedrock Seepage Slope	1.00 1.00 1.00	Very limited Depth to bedrock Slope	1.00 1.00	Very limited Depth to bedrock Slope	1.00 1.00
Campus-----	40	Very limited Depth to bedrock Seepage Slope	1.00 1.00 0.16	Very limited Depth to bedrock Slope	1.00 0.16	Very limited Depth to bedrock Slope	1.00 0.16
Cm: Corinth-----	100	Very limited Depth to bedrock Seepage Too clayey	1.00 1.00 0.50	Very limited Depth to bedrock	1.00	Very limited Depth to bedrock Hard to compact Too clayey	1.00 1.00 0.50
Cn: Corinth-----	100	Very limited Depth to bedrock Seepage Too clayey	1.00 1.00 0.50	Very limited Depth to bedrock	1.00	Very limited Depth to bedrock Hard to compact Too clayey	1.00 1.00 0.50
Co: Corinth-----	100	Very limited Depth to bedrock Seepage Too clayey Slope	1.00 1.00 0.50 0.37	Very limited Depth to bedrock Slope	1.00 0.37	Very limited Depth to bedrock Hard to compact Too clayey Slope	1.00 1.00 0.50 0.37
Cr: Crete-----	100	Somewhat limited Too clayey	0.50	Not limited		Very limited Hard to compact Too clayey	1.00 0.50
De: Detroit-----	100	Somewhat limited Too clayey Flooding	0.50 0.40	Somewhat limited Flooding	0.40	Somewhat limited Too clayey	0.50
Ee: Eltree-----	100	Somewhat limited Too clayey	0.50	Not limited		Somewhat limited Too clayey	0.50
Ef: Eltree-----	100	Somewhat limited Too clayey	0.50	Not limited		Somewhat limited Too clayey	0.50
Eg: Eltree-----	100	Somewhat limited Too clayey	0.50	Not limited		Somewhat limited Too clayey	0.50
Eh: Eltree-----	100	Somewhat limited Too clayey Slope	0.50 0.37	Somewhat limited Slope	0.37	Somewhat limited Too clayey Slope	0.50 0.37
GRP: Pits-----	100	Not rated		Not rated		Not rated	
Ha: Harney-----	100	Not limited		Not limited		Not limited	
Hb: Harney-----	100	Somewhat limited Too clayey	0.50	Not limited		Very limited Hard to compact Too clayey	1.00 0.50
Hc: Harney-----	100	Somewhat limited Too clayey	0.50	Not limited		Somewhat limited Too clayey	0.50
Hd: Harney-----	100	Somewhat limited		Not limited		Somewhat limited	

SANITARY FACILITIES--Continued  
Ellis County, Kansas

(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 potential limitation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Pct of map unit	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
He:		Too clayey	0.50			Too clayey	0.50
Armo-----	50	Very limited Seepage	1.00	Not limited		Somewhat limited Too clayey	0.50
Harney-----	50	Too clayey Somewhat limited Too clayey	0.50	Not limited		Somewhat limited Too clayey	0.50
Hf:		Somewhat limited Too clayey	0.50	Not limited		Somewhat limited Too clayey	0.50
Carlson-----	50	Somewhat limited Too clayey	0.50	Not limited		Somewhat limited Too clayey	0.50
Harney-----	50	Somewhat limited Too clayey	0.50	Not limited		Somewhat limited Too clayey	0.50
Hg:		Somewhat limited Too clayey	0.50	Not limited		Somewhat limited Too clayey	0.50
Carlson-----	50	Somewhat limited Too clayey	0.50	Not limited		Somewhat limited Too clayey	0.50
Harney-----	50	Not limited		Not limited		Somewhat limited Too clayey	0.50
HGG:		Not limited		Not limited		Not limited	
Harney-----	70	Not limited		Not limited		Not limited	
Mento-----	30	Not limited		Not limited		Not limited	
Hh:		Somewhat limited Too clayey	0.50	Not limited		Somewhat limited Too clayey	0.50
Harney-----	70	Very limited Depth to bedrock Seepage	1.00	Very limited Depth to bedrock	1.00	Very limited Depth to bedrock Too clayey	1.00
Wakeen-----	30	Too clayey	0.50			Too clayey	0.50
Hk:		Not limited		Not limited		Somewhat limited Too clayey	0.50
Harney-----	60	Not limited		Not limited		Somewhat limited Too clayey	0.50
Wakeen-----	40	Very limited Depth to bedrock Seepage	1.00	Very limited Depth to bedrock	1.00	Very limited Depth to bedrock Too clayey	1.00
		Too clayey	0.50			Too clayey	0.50
Hl:		Very limited Seepage	1.00	Somewhat limited Slope	0.63	Somewhat limited Slope	0.63
Armo-----	50	Slope	0.63			Too clayey	0.50
		Too clayey	0.50				
Heizer-----	50	Very limited Depth to bedrock Slope	1.00	Very limited Depth to bedrock Slope	1.00	Very limited Depth to bedrock Slope	1.00
		Seepage	1.00			Carbonate content	1.00
						Gravel content	0.96
HMM:		Very limited Depth to bedrock Slope	1.00	Very limited Depth to bedrock Slope	1.00	Very limited Depth to bedrock Slope	1.00
Heizer-----	60	Seepage	1.00			Carbonate content	1.00
						Gravel content	0.96
Brownell-----	40	Very limited Depth to bedrock Seepage	1.00	Very limited Depth to bedrock Slope	1.00	Very limited Depth to bedrock Carbonate content	1.00
		Slope	0.16		0.16	Gravel content	0.96
						Slope	0.16
Hn:		Very limited Seepage	1.00	Very limited Seepage	1.00	Very limited Seepage	1.00
Dorrance-----	100	Too Sandy	1.00	Slope	0.16	Too Sandy	0.50
		Slope	0.16			Slope	0.16
Ho:		Not limited		Not limited		Not limited	
Holdrege-----	100	Not limited		Not limited		Not limited	
Hp:		Somewhat limited Too clayey	0.50	Not limited		Very limited Hard to compact Too clayey	1.00
Holdrege-----	100						0.50
Hr:		Somewhat limited Flooding	0.40	Somewhat limited Flooding	0.40	Not limited	
Hord-----	100						
In:		Very limited Flooding	1.00	Very limited Flooding	1.00	Very limited Seepage	1.00
Inavale-----	100	Seepage	1.00	Seepage	1.00	Too Sandy	0.50
		Too Sandy	1.00				
Mc:		Somewhat limited Flooding	0.40	Somewhat limited Flooding	0.40	Not limited	
Mccook-----	100						
Md:		Somewhat limited Flooding	0.40	Somewhat limited Flooding	0.40	Not limited	
Mccook-----	100						
Me:		Very limited		Not limited		Somewhat limited	
Mento-----	100						

SANITARY FACILITIES--Continued  
Ellis County, Kansas

(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 potential limitation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Pct of map unit	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
Mf: Mento-----	100	Seepage Too clayey	1.00 0.50			Too clayey	0.50
Mg: Mento-----	100	Very limited Seepage Too clayey	1.00 0.50	Not limited		Somewhat limited Too clayey	0.50
Mo: Mento-----	100	Very limited Seepage Too clayey	1.00 0.50	Not limited		Somewhat limited Too clayey	0.50
Mu: Munjor-----	100	Very limited Seepage Too clayey	1.00 0.50	Not limited		Somewhat limited Too clayey	0.50
Nc: New Cambria-----	100	Very limited Flooding Seepage	1.00 1.00	Very limited Flooding Seepage	1.00 1.00	Somewhat limited Seepage	0.50
Nn: Nibson-----	100	Very limited Depth to bedrock Seepage Too clayey Slope	1.00 1.00 0.50 0.04	Somewhat limited Flooding	0.40	Very limited Too clayey Hard to compact	1.00 1.00
Rb: Roxbury-----	100	Very limited Depth to bedrock Seepage Too clayey Slope	1.00 1.00 0.50 0.04	Very limited Depth to bedrock Slope	1.00 0.04	Very limited Depth to bedrock Too clayey Slope	1.00 0.50 0.04
Rf: Roxbury-----	100	Somewhat limited Flooding	0.40	Somewhat limited Flooding	0.40	Not limited	
RIV: Riverwash And Sandbars-----	100	Very limited Flooding Too clayey	1.00 0.50	Very limited Flooding	1.00	Somewhat limited Too clayey	0.50
Ro: Heizer-----	77	Not rated		Not rated		Not rated	
Brownell-----	23	Very limited Depth to bedrock Slope Seepage	1.00 1.00 1.00	Very limited Depth to bedrock Slope	1.00 1.00	Very limited Depth to bedrock Slope Gravel content	1.00 1.00 0.96
ROO: Roxbury-----	100	Very limited Depth to bedrock Seepage Slope	1.00 1.00 0.00	Very limited Depth to bedrock Slope	1.00 0.00	Very limited Depth to bedrock Gravel content Slope	1.00 0.99 0.00
UCC: Uly-----	100	Very limited Flooding	1.00	Very limited Flooding	1.00	Not limited	
W: Water-----	100	Not limited		Not limited		Not limited	
Wa: Wakeen-----	100	Very limited Slope	1.00	Very limited Slope	1.00	Very limited Slope	1.00
We: Wakeen-----	100	Very limited Depth to bedrock Seepage Too clayey	1.00 1.00 0.50	Very limited Depth to bedrock	1.00	Very limited Depth to bedrock Too clayey	1.00 0.50
Wh: Wakeen-----	100	Very limited Depth to bedrock Seepage Too clayey	1.00 1.00 0.50	Very limited Depth to bedrock	1.00	Very limited Depth to bedrock Too clayey	1.00 0.50
Wk: Wakeen-----	100	Very limited Depth to bedrock Seepage Too clayey Slope	1.00 1.00 0.50 0.16	Very limited Depth to bedrock Slope	1.00 0.16	Very limited Depth to bedrock Too clayey Slope	1.00 0.50 0.16
Wn: Wann-----	100	Very limited Flooding	1.00	Very limited Flooding	1.00	Somewhat limited Seepage	0.50



SANITARY FACILITIES--Continued  
Ellis County, Kansas

(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 potential limitation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Pct of map unit	Trench sanitary landfill		Area sanitary landfill		Daily cover for landfill	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	0.44
		Seepage	1.00	Seepage	1.00		

AGRICULTURAL WASTE MANAGEMENT  
Ellis County, Kansas

The nature of the soil is also important in the application of organic wastes and wastewater to land as fertilizers and irrigation; it is also important when the soil is used as a medium for treatment and disposal of these wastes. Favorable soil properties are required to prevent environmental damage.

The use of organic wastes and wastewater as production resources will result in energy conservation, prevent the waste of these important resources, and prevent problems associated with their disposal. Where disposal is the goal, and a maximum amount is disposed in a minimum area to hold costs to a minimum, risk of environmental damage is the principal constraint. Where the reuse goal is pursued, and a minimum amount is applied to a maximum area to obtain the greatest benefit, environmental damage is unlikely.

Interpretations developed for waste management may include ratings for (1) manure and food processing wastes; (2) municipal sewage sludge; (3) irrigation use of wastewater; or (4) treatment of wastewater by the slow rate process, overland flow process, or rapid infiltration process. If available, these should be located in this subsection.

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.

The Ag-Waste tables show 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. Food-processing 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 these tables, 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, phosphorus, heavy metals, and salts are not added in excessive amounts.

The ratings in the tables are for waste management systems that not only dispose of and treat organic waste or wastewater but also are beneficial to crops (application of manure and food-processing waste, application of sewage sludge, and disposal of wastewater by irrigation) and for waste management systems that are designed only for the purpose of wastewater disposal and treatment (overland flow of wastewater, rapid infiltration of wastewater, and slow rate treatment of wastewater).

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. Slightly limited indicates that the soil has features that are generally favorable for the specified use. The limitations are minor and can be easily overcome. Good performance and 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 0.00 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 either 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 erodibility 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.

AGRICULTURAL WASTE MANAGEMENT  
Ellis County, Kansas

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 erodibility 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.

See the National Soil Handbook, September 1992, Part 620, for criteria used in rating soils for sanitary facilities and waste management.

AGRICULTURAL WASTE MANAGEMENT--Continued  
Ellis County, Kansas

(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 1.00. The larger the value, the greater the potential limitation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Pct of map unit	Application of manure and food- processing waste		Application of sewage sludge		Disposal of wastewater by irrigation	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
141HM: Harney-----	50	Somewhat limited Restricted permeability	0.30	Somewhat limited Restricted permeability	0.22	Somewhat limited Too steep for surface application Restricted permeability	0.31 0.22
Mento-----	50	Very limited Restricted permeability	1.00	Very limited Restricted permeability	1.00	Very limited Restricted permeability Too steep for surface application	1.00 0.31
163AU: Armo-----	60	Somewhat limited Slope	0.37	Somewhat limited Slope	0.37	Very limited Too steep for surface application Too steep for sprinkler application	1.00 0.59
Bogue-----	40	Very limited Restricted permeability Droughty	1.00 0.84	Very limited Restricted permeability Droughty	1.00 0.84	Very limited Restricted permeability Too steep for surface application Droughty	1.00 1.00 0.84
		Slope Runoff limitation	0.63 0.40	Slope Depth to bedrock	0.63 0.06	Too steep for sprinkler application Depth to bedrock	0.77 0.06
163HE: Harney-----	55	Somewhat limited Restricted permeability	0.30	Somewhat limited Restricted permeability	0.22	Somewhat limited Too steep for surface application Restricted permeability	0.31 0.22
Mento-----	45	Very limited Restricted permeability	1.00	Very limited Restricted permeability	1.00	Very limited Restricted permeability Too steep for surface application	1.00 0.31
163IC: Inavale-----	100	Very limited Filtering capacity Flooding	1.00 0.60	Very limited Flooding	1.00 1.00	Very limited Filtering capacity Flooding	1.00 0.60
		Leaching limitation Droughty	0.45 0.14	Filtering capacity Droughty	0.14	Droughty	0.14
163WX: Wakeen-----	100	Somewhat limited Depth to bedrock	0.97	Somewhat limited Depth to bedrock	0.97	Very limited Too steep for surface application Depth to bedrock Too steep for sprinkler application Droughty	1.00 0.97 0.97 0.36
		Slope Droughty	0.96 0.36	Slope Droughty	0.96 0.36		
163WY: Wakeen-----	55	Somewhat limited Depth to bedrock	0.03	Somewhat limited Depth to bedrock	0.03	Somewhat limited Depth to bedrock	0.03
Harney-----	45	Somewhat limited Restricted permeability	0.30	Somewhat limited Restricted permeability	0.22	Somewhat limited Restricted permeability	0.22
165BO: Bogue-----	100	Very limited Restricted permeability Droughty	1.00 1.00	Very limited Droughty Restricted permeability	1.00 1.00	Very limited Droughty Restricted permeability	1.00 1.00

AGRICULTURAL WASTE MANAGEMENT--Continued  
Ellis County, Kansas

(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 1.00. The larger the value, the greater the potential limitation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Pct of map unit	Application of manure and food- processing waste		Application of sewage sludge		Disposal of wastewater by irrigation	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
165NW: Nibson-----	55	Runoff limitation	0.40	Slope	0.04	Too steep for surface application	1.00
		Slope	0.04	Depth to bedrock	0.01	Too steep for sprinkler application	0.22
		Depth to bedrock	0.01			Depth to bedrock	0.01
		Very limited Depth to bedrock	1.00	Very limited Depth to bedrock	1.00	Very limited Depth to bedrock	1.00
		Droughty	0.85	Droughty	0.85	Too steep for surface application	1.00
Wakeen-----	45	Slope	0.84	Slope	0.84	Too steep for sprinkler application	0.89
		Runoff limitation	0.40			Droughty	0.85
		Somewhat limited Slope	0.63	Somewhat limited Slope	0.63	Very limited Too steep for surface application	1.00
165PE: Penden-----	100	Depth to bedrock	0.29	Depth to bedrock	0.29	Too steep for sprinkler application	0.77
						Depth to bedrock	0.29
		Not limited		Not limited		Somewhat limited Too steep for surface application	0.31
165UB: Uly-----	100	Not limited		Not limited		Not limited	
165UR: Uly-----	65	Somewhat limited Slope	0.04	Somewhat limited Slope	0.04	Very limited Too steep for surface application	1.00
						Too steep for sprinkler application	0.22
Roxbury-----	35	Somewhat limited Flooding	0.60	Very limited Flooding	1.00	Somewhat limited Flooding	0.60
167CR: Crete-----	100	Somewhat limited Restricted permeability	0.89	Somewhat limited Restricted permeability	0.78	Somewhat limited Restricted permeability	0.78
		Too acid	0.11	Too acid	0.42	Too acid	0.42
167DR: Dorrance-----	100	Very limited Filtering capacity	1.00	Very limited Filtering capacity	1.00	Very limited Filtering capacity	1.00
		Droughty	0.86	Droughty	0.86	Too steep for surface application	1.00
		Leaching limitation	0.45	Slope	0.16	Droughty	0.86
		Slope	0.16			Too steep for sprinkler application	0.39
167RC: Roxbury-----	100	Very limited Flooding	1.00	Very limited Flooding	1.00	Very limited Flooding	1.00
195BD: Badland-----	70	Not rated		Not rated		Not rated	
Manvel-----	30	Somewhat limited Restricted permeability	0.30	Somewhat limited Restricted permeability	0.22	Somewhat limited Too steep for surface application	0.91
						Restricted permeability	0.22
						Too steep for sprinkler application	0.02
195CC: Campus-----	70	Somewhat limited		Somewhat limited		Very limited	

AGRICULTURAL WASTE MANAGEMENT--Continued  
Ellis County, Kansas

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Map symbol and soil name	Pct of map unit	Application of manure and food- processing waste		Application of sewage sludge		Disposal of wastewater by irrigation	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
Canlon-----	30	Slope	0.37	Slope	0.37	Too steep for surface application	1.00
		Depth to bedrock	0.06	Depth to bedrock	0.06	Too steep for sprinkler application	0.59
		Very limited Depth to bedrock	1.00	Very limited Depth to bedrock	1.00	Depth to bedrock	0.06
		Slope	1.00	Slope	1.00	Very limited Depth to bedrock	1.00
		Droughty	0.93	Droughty	0.93	Too steep for surface application	1.00
		Runoff limitation	0.40			Too steep for sprinkler application	1.00
195CF: Carlson-----	100	Somewhat limited Restricted permeability	0.30	Somewhat limited Restricted permeability	0.22	Droughty	0.93
195HU: Humbarger-----	100	Very limited Flooding	1.00	Very limited Flooding	1.00	Somewhat limited Restricted permeability	0.22
195IF: Inavale-----	100	Very limited Flooding	1.00	Very limited Flooding	1.00	Very limited Flooding	1.00
		Filtering capacity	1.00	Filtering capacity	1.00	Very limited Flooding	1.00
		Leaching limitation	0.45	Droughty	0.20	Filtering capacity	1.00
195PF: Penden-----	100	Droughty	0.20			Droughty	0.20
195PF: Penden-----	100	Not limited		Not limited		Somewhat limited Too steep for surface application	0.31
195PO: Penden-----	100	Somewhat limited Slope	0.37	Somewhat limited Slope	0.37	Very limited Too steep for surface application	1.00
						Too steep for sprinkler application	0.59
Ab: Fluvents-----	100	Very limited Flooding	1.00	Very limited Flooding	1.00	Very limited Flooding Too steep for surface application	1.00 0.31
Ac: New Cambria-----	100	Very limited Flooding Restricted permeability	1.00 1.00	Very limited Flooding Restricted permeability	1.00 1.00	Very limited Flooding Restricted permeability	1.00 1.00
Ad: Fluvaquents-----	100	Somewhat limited Depth to saturated zone	0.86	Very limited Flooding	1.00	Somewhat limited Depth to saturated zone	0.86
		Flooding	0.60	Depth to saturated zone	0.86	Flooding	0.60
		Restricted permeability	0.30	Restricted permeability	0.22	Restricted permeability	0.22
Ae: Anselmo-----	100	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
Am: Armo-----	100	Somewhat limited Filtering capacity	0.00	Somewhat limited Filtering capacity	0.00	Somewhat limited Filtering capacity	0.00
An: Armo-----	100	Not limited		Not limited		Somewhat limited	

AGRICULTURAL WASTE MANAGEMENT--Continued  
Ellis County, Kansas

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Map symbol and soil name	Pct of map unit	Application of manure and food- processing waste		Application of sewage sludge		Disposal of wastewater by irrigation	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
Ao: Armo-----	100	Somewhat limited Filtering capacity	0.00	Somewhat limited Filtering capacity	0.00	Too steep for surface application	0.31
						Somewhat limited Too steep for surface application	0.31
						Filtering capacity	0.00
Ar: Armo-----	100	Somewhat limited Slope	0.37	Somewhat limited Slope	0.37	Very limited Too steep for surface application	1.00
						Too steep for sprinkler application	0.59
		Filtering capacity	0.00	Filtering capacity	0.00	Filtering capacity	0.00
Bf: Boel-----	100	Very limited Filtering capacity	1.00	Very limited Flooding	1.00	Very limited Filtering capacity	1.00
						Depth to saturated zone	0.84
		Flooding	0.60	Depth to saturated zone	0.84	Flooding	0.60
		Leaching limitation Droughty	0.45 0.01	Droughty	0.01	Droughty	0.01
Bg: Bogue-----	100	Very limited Restricted permeability	1.00	Very limited Restricted permeability	1.00	Very limited Restricted permeability	1.00
						Droughty	0.96
		Droughty	0.96	Droughty	0.96	Too steep for surface application	0.66
		Runoff limitation	0.40	Depth to bedrock	0.29	Depth to bedrock	0.29
Bo: Bogue-----	60	Very limited Restricted permeability	1.00	Very limited Droughty	1.00	Too steep for sprinkler application	0.00
						Too steep for sprinkler application	0.00
		Droughty	1.00	Restricted permeability	1.00	Very limited Droughty	1.00
		Slope	1.00	Slope	1.00	Restricted permeability	1.00
Armo-----	40	Depth to bedrock	0.29	Somewhat limited Slope	0.16	Too steep for surface application	1.00
						Too steep for sprinkler application	1.00
		Somewhat limited Slope	0.16	Filtering capacity	0.00	Depth to bedrock	0.29
BOP: Borrow Pits-----	100	Not rated		Not rated		Very limited Too steep for surface application	1.00
						Too steep for sprinkler application	0.39
						Filtering capacity	0.00
Br: Brownell-----	100	Somewhat limited Droughty Depth to bedrock	0.99 0.46	Somewhat limited Droughty Depth to bedrock	0.99 0.46	Somewhat limited Droughty	0.99
						Too steep for surface application	0.66
						Depth to bedrock	0.46

AGRICULTURAL WASTE MANAGEMENT--Continued  
Ellis County, Kansas

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Map symbol and soil name	Pct of map unit	Application of manure and food- processing waste		Application of sewage sludge		Disposal of wastewater by irrigation	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
Cc: Campus-----	65	Somewhat limited Depth to bedrock	0.20	Somewhat limited Depth to bedrock	0.20	Too steep for sprinkler application	0.00
						Somewhat limited Too steep for surface application Depth to bedrock	0.31
Carlson-----	35	Somewhat limited Restricted permeability	0.30	Somewhat limited Restricted permeability	0.22	Somewhat limited Too steep for surface application Restricted permeability	0.20
						Too steep for surface application Restricted permeability	0.31
Cd: Campus-----	55	Somewhat limited Depth to bedrock	0.20	Somewhat limited Depth to bedrock	0.20	Very limited Too steep for surface application	0.22
						Too steep for surface application Too steep for sprinkler application Depth to bedrock	1.00
Penden-----	45	Slope	0.16	Slope	0.16	Too steep for sprinkler application Depth to bedrock	0.39
						Very limited Too steep for surface application Too steep for sprinkler application	0.20
Ce: Canlon-----	60	Very limited Depth to bedrock Droughty Slope	1.00 1.00 1.00	Very limited Droughty Depth to bedrock Slope	1.00 1.00 1.00	Very limited Droughty Depth to bedrock Too steep for surface application	1.00
						Too steep for surface application Too steep for sprinkler application	1.00
Campus-----	40	Somewhat limited Depth to bedrock	0.20	Somewhat limited Depth to bedrock	0.20	Very limited Too steep for surface application	1.00
						Too steep for surface application Too steep for sprinkler application Depth to bedrock	0.39
Cm: Corinth-----	100	Somewhat limited Restricted permeability Depth to bedrock Droughty	0.89 0.46 0.17	Somewhat limited Restricted permeability Depth to bedrock Droughty	0.78 0.46 0.17	Somewhat limited Restricted permeability Depth to bedrock Droughty	0.78
						Depth to bedrock Droughty	0.46 0.17
Cn: Corinth-----	100	Somewhat limited Restricted permeability Depth to bedrock Droughty	0.89 0.46 0.17	Somewhat limited Restricted permeability Depth to bedrock Droughty	0.78 0.46 0.17	Somewhat limited Restricted permeability Depth to bedrock Too steep for surface application Droughty	0.78 0.46 0.31 0.17
						Depth to bedrock Droughty	0.46 0.17
Co: Corinth-----	100	Somewhat limited Restricted permeability	0.89	Somewhat limited Restricted permeability	0.78	Very limited Too steep for surface application	1.00
						Restricted permeability Too steep for sprinkler application Depth to bedrock Droughty	0.78 0.59 0.46 0.17
Cr: Crete-----	100	Somewhat limited	0.17	Somewhat limited	0.17	Depth to bedrock Droughty	0.46 0.17
						Somewhat limited	



AGRICULTURAL WASTE MANAGEMENT--Continued  
Ellis County, Kansas

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Map symbol and soil name	Pct of map unit	Application of manure and food- processing waste		Application of sewage sludge		Disposal of wastewater by irrigation	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
De: Detroit-----	100	Restricted permeability	0.89	Restricted permeability	0.78	Restricted permeability	0.78
		Too acid	0.11	Too acid	0.42	Too acid	0.42
		Very limited Restricted permeability	1.00	Very limited Restricted permeability Flooding	1.00 0.40	Very limited Restricted permeability	1.00
Ee: Eltree-----	100	Not limited		Not limited		Not limited	
Ef: Eltree-----	100	Not limited		Not limited		Not limited	
Eg: Eltree-----	100	Not limited		Not limited		Somewhat limited Too steep for surface application	0.31
Eh: Eltree-----	100	Somewhat limited Slope	0.37	Somewhat limited Slope	0.37	Very limited Too steep for surface application	1.00
						Too steep for sprinkler application	0.59
GRP: Pits-----	100	Not rated		Not rated		Not rated	
Ha: Harney-----	100	Somewhat limited Restricted permeability	0.30	Somewhat limited Restricted permeability	0.22	Somewhat limited Restricted permeability	0.22
Hb: Harney-----	100	Somewhat limited Restricted permeability	0.30	Somewhat limited Restricted permeability	0.22	Somewhat limited Restricted permeability	0.22
Hc: Harney-----	100	Somewhat limited Restricted permeability	0.30	Somewhat limited Restricted permeability	0.22	Somewhat limited Too steep for surface application	0.31
						Restricted permeability	0.22
Hd: Harney-----	100	Somewhat limited Restricted permeability	0.30	Somewhat limited Restricted permeability	0.22	Somewhat limited Restricted permeability	0.22
						Too steep for surface application	0.08
He: Armo-----	50	Somewhat limited Filtering capacity	0.00	Somewhat limited Filtering capacity	0.00	Somewhat limited Too steep for surface application	0.31
Harney-----	50	Somewhat limited Restricted permeability	0.30	Somewhat limited Restricted permeability	0.22	Filtering capacity	0.00
						Somewhat limited Too steep for surface application	0.31
Hf: Carlson-----	50	Somewhat limited Restricted permeability	0.30	Somewhat limited Restricted permeability	0.22	Restricted permeability	0.22
						Somewhat limited Restricted permeability	0.22
Harney-----	50	Somewhat limited Restricted permeability	0.30	Somewhat limited Restricted permeability	0.22	Somewhat limited Restricted permeability	0.22
						Restricted permeability	0.22
Hg: Carlson-----	50	Somewhat limited Restricted permeability	0.30	Somewhat limited Restricted permeability	0.22	Somewhat limited Restricted permeability	0.22
Harney-----	50	Somewhat limited		Somewhat limited		Somewhat limited	

AGRICULTURAL WASTE MANAGEMENT--Continued  
Ellis County, Kansas

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Map symbol and soil name	Pct of map unit	Application of manure and food- processing waste		Application of sewage sludge		Disposal of wastewater by irrigation	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
HGG:		Restricted permeability	0.30	Restricted permeability	0.22	Restricted permeability	0.22
Harney-----	70	Somewhat limited Restricted permeability	0.30	Somewhat limited Restricted permeability	0.22	Somewhat limited Restricted permeability	0.22
Mento-----	30	Very limited Restricted permeability	1.00	Very limited Restricted permeability	1.00	Very limited Restricted permeability	1.00
Hh:		Somewhat limited Restricted permeability	0.30	Somewhat limited Restricted permeability	0.22	Somewhat limited Restricted permeability	0.22
Harney-----	70	Somewhat limited Restricted permeability	0.30	Somewhat limited Restricted permeability	0.22	Somewhat limited Restricted permeability	0.22
Wakeen-----	30	Somewhat limited Depth to bedrock	0.06	Somewhat limited Depth to bedrock	0.06	Somewhat limited Depth to bedrock	0.06
Hk:		Somewhat limited Restricted permeability	0.30	Somewhat limited Restricted permeability	0.22	Somewhat limited Restricted permeability	0.22
Harney-----	60	Somewhat limited Restricted permeability	0.30	Somewhat limited Restricted permeability	0.22	Somewhat limited Restricted permeability	0.22
Wakeen-----	40	Somewhat limited Depth to bedrock	0.06	Somewhat limited Depth to bedrock	0.06	Somewhat limited Depth to bedrock	0.06
Hl:		Somewhat limited Slope	0.63	Somewhat limited Slope	0.63	Very limited Too steep for surface application	1.00
Armo-----	50	Filtering capacity	0.00	Filtering capacity	0.00	Too steep for sprinkler application	0.77
						Filtering capacity	0.00
Heizer-----	50	Very limited Depth to bedrock	1.00	Very limited Droughty	1.00	Very limited Droughty	1.00
		Droughty	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Slope	1.00	Slope	1.00	Too steep for surface application	1.00
		Runoff limitation	0.40			Too steep for sprinkler application	1.00
HMM:		Very limited Depth to bedrock	1.00	Very limited Droughty	1.00	Very limited Droughty	1.00
Heizer-----	60	Droughty	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Slope	1.00	Slope	1.00	Too steep for surface application	1.00
		Runoff limitation	0.40			Too steep for sprinkler application	1.00
Brownell-----	40	Very limited Droughty	1.00	Very limited Droughty	1.00	Very limited Droughty	1.00
		Depth to bedrock	0.90	Depth to bedrock	0.90	Too steep for surface application	1.00
		Slope	0.16	Slope	0.16	Depth to bedrock	0.90
						Too steep for sprinkler application	0.39
Hn:		Very limited Filtering capacity	1.00	Very limited Filtering capacity	1.00	Very limited Filtering capacity	1.00
Dorrance-----	100	Droughty	0.77	Droughty	0.77	Too steep for surface application	1.00
		Leaching limitation	0.45	Slope	0.16	Droughty	0.77
		Slope	0.16			Too steep for sprinkler application	0.39
Ho:		Not limited		Not limited		Not limited	
Holdrege-----	100	Not limited		Not limited		Not limited	
Hp:		Not limited		Not limited		Not limited	
Holdrege-----	100	Not limited		Not limited		Not limited	
Hr:		Not limited		Somewhat limited Flooding	0.40	Not limited	
Hord-----	100	Not limited					

AGRICULTURAL WASTE MANAGEMENT--Continued  
Ellis County, Kansas

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Map symbol and soil name	Pct of map unit	Application of manure and food- processing waste		Application of sewage sludge		Disposal of wastewater by irrigation	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
In: Inavale-----	100	Very limited Filtering capacity Flooding Leaching limitation Droughty	1.00 0.60 0.45 0.11	Very limited Flooding Filtering capacity Droughty	1.00 1.00 0.11	Very limited Filtering capacity Flooding Too steep for surface application Droughty	1.00 0.60 0.31 0.11
Mc: Mccook-----	100	Somewhat limited Filtering capacity	0.00	Somewhat limited Flooding Filtering capacity	0.40 0.00	Somewhat limited Filtering capacity	0.00
Md: Mccook-----	100	Not limited		Somewhat limited Flooding	0.40	Not limited	
Me: Mento-----	100	Very limited Restricted permeability	1.00	Very limited Restricted permeability	1.00	Very limited Restricted permeability	1.00
Mf: Mento-----	100	Very limited Restricted permeability	1.00	Very limited Restricted permeability	1.00	Very limited Restricted permeability	1.00
Mg: Mento-----	100	Very limited Restricted permeability	1.00	Very limited Restricted permeability	1.00	Very limited Restricted permeability	1.00
Mo: Mento-----	100	Very limited Restricted permeability	1.00	Very limited Restricted permeability	1.00	Very limited Restricted permeability Too steep for surface application	1.00 0.31
Mu: Munjor-----	100	Very limited Flooding Filtering capacity	1.00 1.00	Very limited Flooding Filtering capacity	1.00 1.00	Very limited Flooding Filtering capacity	1.00 1.00
Nc: New Cambria-----	100	Very limited Restricted permeability	1.00	Very limited Restricted permeability Flooding	1.00 0.40	Very limited Restricted permeability	1.00
Nn: Nibson-----	100	Very limited Depth to bedrock Droughty Runoff limitation Slope	1.00 0.79 0.40 0.04	Very limited Depth to bedrock Droughty Slope	1.00 0.79 0.04	Very limited Depth to bedrock Too steep for surface application Droughty Too steep for sprinkler application	1.00 1.00 0.79 0.22
Rb: Roxbury-----	100	Not limited		Somewhat limited Flooding	0.40	Not limited	
Rf: Roxbury-----	100	Somewhat limited Flooding	0.60	Very limited Flooding	1.00	Somewhat limited Flooding	0.60
RIV: Riverwash And Sandbars-----	100	Not rated		Not rated		Not rated	
Ro: Heizer-----	77	Very limited Depth to bedrock Droughty Slope	1.00 1.00 1.00	Very limited Droughty Depth to bedrock Slope	1.00 1.00 1.00	Very limited Droughty Depth to bedrock Too steep for surface application	1.00 1.00 1.00

AGRICULTURAL WASTE MANAGEMENT--Continued  
Ellis County, Kansas

(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 1.00. The larger the value, the greater the potential limitation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Pct of map unit	Application of manure and food- processing waste		Application of sewage sludge		Disposal of wastewater by irrigation	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
Brownell-----	23	Runoff limitation	0.40			Too steep for sprinkler application	1.00
		Somewhat limited Droughty	0.95	Somewhat limited Droughty	0.95	Very limited Too steep for surface application	1.00
		Depth to bedrock Slope	0.29 0.00	Depth to bedrock Slope	0.29 0.00	Droughty Depth to bedrock Too steep for sprinkler application	0.95 0.29 0.10
ROO: Roxbury-----	100	Somewhat limited Flooding	0.60	Very limited Flooding	1.00	Somewhat limited Flooding	0.60
UCC: Uly-----	100	Not limited		Not limited		Somewhat limited Too steep for surface application	0.31
W: Water-----	100	Very limited Slope	1.00	Very limited Low adsorption Slope	1.00	Very limited Low adsorption Too steep for surface application	1.00
		Low adsorption	1.00			Too steep for sprinkler application	1.00
Wa: Wakeen-----	100	Somewhat limited Depth to bedrock	0.35	Somewhat limited Depth to bedrock	0.35	Somewhat limited Depth to bedrock	0.35
We: Wakeen-----	100	Somewhat limited Depth to bedrock	0.46	Somewhat limited Depth to bedrock	0.46	Somewhat limited Depth to bedrock	0.46
Wh: Wakeen-----	100	Somewhat limited Depth to bedrock	0.46	Somewhat limited Depth to bedrock	0.46	Somewhat limited Depth to bedrock Too steep for surface application	0.46 0.31
Wk: Wakeen-----	100	Somewhat limited Depth to bedrock	0.97	Somewhat limited Depth to bedrock	0.97	Very limited Too steep for surface application	1.00
		Droughty Slope	0.36 0.16	Droughty Slope	0.36 0.16	Depth to bedrock Too steep for sprinkler application Droughty	0.97 0.39 0.36
Wn: Wann-----	100	Somewhat limited Depth to saturated zone	0.84	Very limited Flooding	1.00	Somewhat limited Depth to saturated zone	0.84
		Flooding	0.60	Depth to saturated zone	0.84	Flooding	0.60
		Filtering capacity	0.00	Filtering capacity	0.00	Filtering capacity	0.00

WIN-PST SPISP II  
SOIL SENSITIVITY TO PESTICIDE LOSS RATING REPORT

Soils Data Table: SOIL\_KS Sort Order: MUSYM

Ellis County, Kansas: KS051

						SPISP II Ratings		
MUSYM/SEQ#	COMPONENT/TEXTURE/MU%	HYD	KFACT	SURFACE DEPTH	% OM	Solution Adsorbed		
						Leaching (SLP)	Runoff (SSRP)	Runoff (SARP)
141HM 1	HARNEY SIL 50%	B	0.32	10"	3.0%	I	I	I
141HM 2	MENTO SICL 50%	C	0.37	6"	2.0%	L	H	H
163AU 1	ARMO L 60%	B	0.28	12"	2.0%	I	I	I
163AU 2	BOGUE C 40%	D	0.28	7"	0.8%	V	H	H
163HE 1	HARNEY SIL 55%	B	0.32	9"	3.0%	I	I	I
163HE 2	MENTO SIL 45%	C	0.37	5"	2.0%	L	H	H
163IC 1	INAVALE FS 100%	A	0.15	8"	0.8%	H	L	L
163WX 1	WAKEEN SIL 100%	B	0.32	8"	2.0%	I	I	H (s)
163WY 1	WAKEEN SIL 55%	B	0.32	12"	2.0%	I	I	I
163WY 2	HARNEY SIL 45%	B	0.32	10"	3.0%	I	I	I
165BO 1	BOGUE C 100%	D	0.28	5"	0.8%	V	H	H
165NW 1	NIBSON SIL 55%	D	0.32	7"	2.0%	V	H	H (s)
165NW 2	WAKEEN SIL 45%	B	0.32	8"	2.0%	I	I	H (s)
165PE 1	PENDEN CL 100%	B	0.28	14"	1.5%	I	I	I
165UB 1	ULY SIL 100%	B	0.32	6"	2.0%	I	I	I
165UR 1	ULY SIL 65%	B	0.32	6"	2.0%	I	I	I
165UR 2	ROXBURY SIL 35%	B	0.32	16"	3.0%	L	I	I
167CR 1	CRETE SIL 100%	C	0.37	6"	3.0%	L	H	H
167DR 1	DORRANCE GR-SL 100%	A	0.20	11"	2.0%	H	L	L
167RC 1	ROXBURY SIL 100%	B	0.32	26"	3.0%	L	I	I
195BD 1	BADLAND SIL 70%		0.00	1"	0.0%	?	?	?
195BD 2	MANVEL SIL 30%	B	0.37	3"	1.3%	H	I	I
195CC 1	CAMPUS L 70%	B	0.28	7"	1.5%	I	I	I
195CC 2	CANLON L 30%	D	0.32	8"	1.3%	V	H	H (s)
195CF 1	CARLSON SIL 100%	B	0.32	4"	2.0%	H	I	I
195HU 1	HUMBARGER L 100%	B	0.28	28"	2.0%	L	I	I
195IF 1	INAVALE LS 100%	A	0.17	6"	0.8%	H	L	L
195PF 1	PENDEN CL 100%	B	0.28	10"	2.5%	I	I	I

WIN-PST SPISP II  
SOIL SENSITIVITY TO PESTICIDE LOSS RATING REPORT

Soils Data Table: SOIL\_KS Sort Order: MUSYM

Ellis County, Kansas: KS051

195PO 1	PENDEN L 100%	B	0.28	14"	2.5% I	I	I
Ab 1	ALLUVIAL LAND SIL 100%	B	0.37	6"	1.3% H	I	I
Ac 1	ALLUVIAL LAND SIC 100%	C	0.28	9"	3.0% L	H	H
Ad 1	ALLUVIAL LAND SICL 100%	C	0.28	18"	2.5% H (w)	H	H
Ae 1	ANSELMO FSL 100%	B	0.20	10"	1.5% H	I	I
Am 1	ARMO L 100%	B	0.28	17"	2.0% I	I	I
An 1	ARMO L 100%	B	0.28	19"	2.0% I	I	I
Ao 1	ARMO L 100%	B	0.28	5"	2.0% I	I	I
Ar 1	ARMO L 100%	B	0.28	10"	2.0% I	I	I
Bf 1	BOEL FSL 100%	A	0.20	10"	1.5% H (w)	L	L
Bg 1	BOGUE C 100%	D	0.28	6"	2.0% V	H	H
Bo 1	BOGUE C 60%	D	0.28	6"	0.8% V	H	H (s)
Bo 2	ARMO L 40%	B	0.28	15"	2.0% I	I	I
BOP 1	BORROW PITS 100%		0.00	0"	0.0% ?	?	?
Br 1	BROWNELL GR-L 100%	B	0.20	7"	1.5% H	I	I
Cc 1	CAMPUS L 65%	B	0.28	9"	1.5% I	I	I
Cc 2	CARLSON SIL 35%	B	0.32	8"	2.0% I	I	I
Cd 1	CAMPUS L 55%	B	0.28	9"	1.5% I	I	I
Cd 2	PENDEN CL 45%	B	0.28	14"	2.5% I	I	I
Ce 1	CANLON L 60%	D	0.32	4"	0.8% V	H	H (s)
Ce 2	CAMPUS L 40%	B	0.28	9"	1.5% I	I	I
Cm 1	CORINTH SICL 100%	C	0.37	9"	0.8% L	H	H
Cn 1	CORINTH SICL 100%	C	0.37	9"	0.8% L	H	H
Co 1	CORINTH SICL 100%	C	0.37	9"	0.8% L	H	H
Cr 1	CRETE SICL 100%	C	0.37	16"	3.0% L	H	H
De 1	DETROIT SIL 100%	C	0.37	12"	3.0% L	H	H
Ee 1	ELTREE SIL 100%	B	0.32	26"	2.0% L	I	I
Ef 1	ELTREE SIL 100%	B	0.32	26"	2.0% L	I	I
Eg 1	ELTREE SIL 100%	B	0.32	26"	2.0% L	I	I
Eh 1	ELTREE SIL 100%	B	0.32	26"	2.0% L	I	I

WIN-PST SPISP II  
SOIL SENSITIVITY TO PESTICIDE LOSS RATING REPORT

Soils Data Table: SOIL\_KS Sort Order: MUSYM

Ellis County, Kansas: KS051

GRP 1	PITS GR-S 100%	A	0.10	60"	0.3% H	L	I (s)
Ha 1	HARNEY SIL 100%	B	0.32	10"	2.0% I	I	I
Hb 1	HARNEY SIL 100%	B	0.32	12"	3.0% I	I	I
Hc 1	HARNEY SIL 100%	B	0.32	6"	3.0% I	I	I
Hd 1	HARNEY SICL 100%	B	0.32	6"	3.0% I	I	I
He 1	ARMO L 50%	B	0.28	5"	2.0% I	I	I
He 2	HARNEY SIL 50%	B	0.32	6"	3.0% I	I	I
Hf 1	CARLSON SIL 50%	B	0.32	8"	2.0% I	I	I
Hf 2	HARNEY SIL 50%	B	0.32	6"	3.0% I	I	I
Hg 1	CARLSON SIL 50%	B	0.32	8"	2.0% I	I	I
Hg 2	HARNEY SIL 50%	B	0.32	6"	3.0% I	I	I
HGG 1	HARNEY SIL 70%	B	0.32	11"	3.0% I	I	I
HGG 2	MENTO SIL 30%	C	0.37	8"	2.0% L	H	H
Hh 1	HARNEY SIL 70%	B	0.32	6"	3.0% I	I	I
Hk 1	HARNEY SIL 60%	B	0.32	6"	3.0% I	I	I
Hk 2	WAKEEN SIL 40%	B	0.32	5"	2.0% I	I	I
Hl 1	ARMO L 50%	B	0.28	15"	2.0% I	I	I
Hl 2	HEIZER GR-L 50%	D	0.20	6"	0.0% V	H	H (s)
HMM 1	HEIZER GR-L 60%	D	0.20	6"	1.5% V	H	H (s)
HMM 2	BROWNELL GR-L 40%	B	0.20	9"	1.5% H	I	I
Hn 1	HILLY LAND SL 100%	A	0.20	11"	2.0% H	L	L
Ho 1	HOLDREGE SIL 100%	B	0.32	14"	2.0% I	I	I
Hp 1	HOLDREGE SIL 100%	B	0.32	11"	2.0% I	I	I
Hr 1	HORD SIL 100%	B	0.32	13"	3.0% I	I	I
In 1	INAVALE LS 100%	A	0.17	14"	0.8% H	L	L
Mc 1	MCCOOK FSL 100%	B	0.20	14"	1.5% I	I	I
Md 1	MCCOOK SIL 100%	B	0.32	11"	3.0% I	I	I
Me 1	MENTO SIL 100%	C	0.37	9"	2.0% L	H	H
Mf 1	MENTO SIL 100%	C	0.37	9"	2.0% L	H	H
Mg 1	MENTO SICL 100%	C	0.37	6"	2.0% L	H	H

WIN-PST SPISP II  
SOIL SENSITIVITY TO PESTICIDE LOSS RATING REPORT

Soils Data Table: SOIL\_KS Sort Order: MUSYM

Ellis County, Kansas: KS051

Mo 1	MENTO SICL 100%	C	0.37	6"	2.0% L	H	H
Mu 1	MUNJOR SL 100%	B	0.24	6"	0.8% H	I	I
Nc 1	NEW CAMBRIA SIC 100%	C	0.28	9"	3.0% L	H	H
Nn 1	NIBSON SIL 100%	D	0.32	7"	2.0% V	H	H
Rb 1	ROXBURY SIL 100%	B	0.32	29"	3.0% L	I	I
Rf 1	ROXBURY SIL 100%	B	0.32	24"	3.0% L	I	I
RIV 1	RIVERWASH AND SANDBARS SIL 100%		0.37	6"	1.3% ?	?	?
Ro 1	ROUGH BROKEN LAND GR-L 77%	D	0.20	6"	1.3% V	H	H (s)
ROO 1	ROXBURY SIL 100%	B	0.32	16"	3.0% L	I	I
UCC 1	ULY SIL 100%	B	0.32	6"	2.0% I	I	I
W 1	WATER 100%		0.00	0"	0.0% ?	?	?
Wa 1	WAKEEN SIL 100%	B	0.32	10"	2.0% I	I	I
We 1	WAKEEN SIL 100%	B	0.32	11"	2.0% I	I	I
Wh 1	WAKEEN SIL 100%	B	0.32	11"	2.0% I	I	I
Wk 1	WAKEEN SIL 100%	B	0.32	8"	2.0% I	I	I
Wn 1	WANN L 100%	B	0.28	13"	1.5% H (w)	I	I

(.\REPORTS\SOILS.TXT generated on 12/12/01 at 12:11:15)

H -- High  
I -- Intermediate  
L -- Low  
V -- Very Low

Conditions that affect ratings:

- m -- There are macropores in the surface horizon deeper than 24"
- w -- The high water table comes within 24" of the surface during the growing season
- s -- The field slope is greater than 15%

SPISP II S-Ratings:

- SLP -- Soil Leaching Potential
- SSRP -- Soil Solution Runoff Potential
- SARP -- Soil Adsorbed Runoff Potential



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

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

The NTCHS definition identifies general soil properties that are associated with wetness. In order to determine whether a specific soil is a hydric soil or nonhydric soil, however, more specific information, such as information about the depth and duration of the water table, is needed. Thus, criteria that identify those estimated soil properties unique to hydric soils have been established (Federal Register, 1995). These criteria are used to identify a phase of a soil series that normally is associated with wetlands. The criteria used are selected estimated soil properties that are described in "Soil Taxonomy" (USDA, 1999) and "Keys to Soil Taxonomy" (USDA, 1998) and in the "Soil Survey Manual" (USDA, 1993).

If soils are wet enough for a long enough period to be considered hydric, they should exhibit certain properties that can be easily observed in the field. These visible properties are indicators of hydric soils. The indicators used to make onsite determinations of hydric soils in this survey area are specified in "Field Indicators of Hydric Soils in the United States" (Hurt and others, 1996).

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

Map units in the Hydric Soil Interpretations table meet the definition of hydric soils and, in addition, have at least one of the hydric soil indicators. This list can help in planning land uses; however, onsite investigation is recommended to determine the hydric soils on a specific site (National Research Council, 1995; Hurt and others, 1996).

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

These map units, in general, do not meet the definition of hydric soils because they do not have one of the hydric soil indicators. A portion of these map units, however, may include hydric soils. Onsite investigation is recommended to determine whether hydric soils occur and the location of the included hydric soils.

HYDRIC SOIL INTERPRETATIONS  
HYDRIC SOILS LIST  
Ellis County, Kansas

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All mapunits are displayed regardless of hydric status and are listed in alpha-numeric order by mapunit symbol. The "Hydric Soils Criteria" columns indicate the conditions that caused the mapunit component to be classified as "Hydric" or "Non-Hydric". These criteria are defined in "Hydric Soils of the United States" (USDA Miscellaneous Publication No. 1491, June, 1991). See the "Criteria for Hydric Soils" endnote to determine the meaning of these columns. Spot symbols are footnoted at the end of the table.

Map symbol and map unit name	Component	Hydric	Local landform	Hydric soils criteria			
				Hydric criteria code	Meets saturation criteria	Meets flooding criteria	Meets ponding criteria
141HM: HARNEY-MENTO COMPLEX, 3 TO 7 PERCENT SLOPES	HARNEY	No	hillslope	---	---	---	---
	MENTO	No	hillslope	---	---	---	---
163AU: ARMO-BOGUE COMPLEX, 7 TO 15 PERCENT SLOPES	ARMO	No	hillslope	---	---	---	---
	BOGUE	No	hillslope	---	---	---	---
163HE: HARNEY-MENTO SILT LOAMS, 3 TO 7 PERCENT SLOPES	HARNEY	No	plain	---	---	---	---
	MENTO	No	divide	---	---	---	---
163IC: INAVALE FINE SAND, CHANNELED, OCCASIONALLY FLOODED	INAVALE	No	flood plain	---	---	---	---
163WX: WAKEEN SILT LOAM, 7 TO 20 PERCENT SLOPES	WAKEEN	No	hillslope	---	---	---	---
	UNNAMED HYDRIC SOILS	Yes	terrace	2A	YES	NO	NO
163WY: WAKEEN-HARNEY SILT LOAMS, 1 TO 3 PERCENT SLOPES	WAKEEN	No	hillslope	---	---	---	---
	HARNEY	No	plain	---	---	---	---
165BO: BOGUE CLAY, 3 TO 15 PERCENT SLOPES	BOGUE	No	hillslope	---	---	---	---
165NW: NIBSON-WAKEEN SILT LOAMS, 3 TO 20 PERCENT SLOPES	NIBSON	No	hillslope	---	---	---	---
	WAKEEN	No	hillslope	---	---	---	---
165PE: PENDEN CLAY LOAM, 3 TO 6 PERCENT SLOPES	PENDEN	No	plain	---	---	---	---
165UB: ULY SILT LOAM, 1 TO 3 PERCENT SLOPES	ULY	No	hillslope	---	---	---	---
165UR: ULY-ROXBURY SILT LOAMS, 0 TO 15 PERCENT SLOPES	ULY	No	drainageway	---	---	---	---
	ROXBURY	No	flood plain	---	---	---	---
167CR: CRETE SILT LOAM, 0 TO 1 PERCENT SLOPES	CRETE	No	plain	---	---	---	---
	NESS	Yes	terrace	3	NO	NO	YES
167DR: DORRANCE GRAVELLY SANDY LOAM, 4 TO 15 PERCENT SLOPES	DORRANCE	No	hillslope	---	---	---	---
167RC: ROXBURY SILT LOAM, CHANNELED	ROXBURY	No	flood plain	---	---	---	---
	UNNAMED HYDRIC SOILS	Yes	terrace	2A	YES	NO	NO
195BD: BADLAND-MANVEL COMPLEX, 3 TO 20 PERCENT SLOPES	BADLAND	Unranked	erosion remnant	---	---	---	---
	MANVEL	No	fan	---	---	---	---
195CC: CAMPUS-CANLON LOAMS, 6 TO 30 PERCENT SLOPES	CAMPUS	No	hillslope	---	---	---	---
	CANLON	No	escarpment	---	---	---	---
	UNNAMED HYDRIC SOILS	Yes	terrace	2A	YES	NO	NO
195CF: CARLSON SILT LOAM, 1 TO 3 PERCENT SLOPES	CARLSON	No	ridge	---	---	---	---
195HU: HUMBARGER LOAM, CHANNELED	HUMBARGER	No	flood plain	---	---	---	---
	UNNAMED HYDRIC SOILS	Yes	terrace	4,2B3	YES	YES	NO
195IF: INAVALE LOAMY SAND, CHANNELED	INAVALE	No	flood plain	---	---	---	---
195PF: PENDEN CLAY LOAM, 3 TO 7 PERCENT SLOPES	PENDEN	No	hillslope	---	---	---	---

HYDRIC SOIL INTERPRETATIONS  
HYDRIC SOILS LIST  
Ellis County, Kansas

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All mapunits are displayed regardless of hydric status and are listed in alpha-numeric order by mapunit symbol. The "Hydric Soils Criteria" columns indicate the conditions that caused the mapunit component to be classified as "Hydric" or "Non-Hydric". These criteria are defined in "Hydric Soils of the United States" (USDA Miscellaneous Publication No. 1491, June, 1991). See the "Criteria for Hydric Soils" endnote to determine the meaning of these columns. Spot symbols are footnoted at the end of the table.

Map symbol and map unit name	Component	Hydric	Local landform	Hydric soils criteria			
				Hydric criteria code	Meets saturation criteria	Meets flooding criteria	Meets ponding criteria
195PO: PENDEN LOAM, 7 TO 15 PERCENT SLOPES	PENDEN	No	hillslope	---	---	---	---
Ab: FLUVENTS, FREQUENTLY FLOODED	Fluvents	Unranked	flood plain	---	---	---	---
	UNNAMED HYDRIC SOILS	Yes	terrace	4,2B3	YES	YES	NO
Ac: NEW CAMBRIA SILTY CLAY, FREQUENTLY FLOODED	New Cambria	No	terrace	---	---	---	---
Ad: FLUVAQUENTS, OCCASIONALLY FLOODED	Fluvaquents	No	terrace	---	---	---	---
	UNNAMED HYDRIC SOILS	Yes	terrace	2B3	YES	NO	NO
Ae: ANSELMO FINE SANDY LOAM, 2 TO 6 PERCENT SLOPES	ANSELMO	No	valley side	---	---	---	---
Am: ARMO LOAM, 1 TO 3 PERCENT SLOPES	ARMO	No	hillslope	---	---	---	---
An: ARMO LOAM, 3 TO 7 PERCENT SLOPES	ARMO	No	hillslope	---	---	---	---
Ao: ARMO LOAM, 3 TO 7 PERCENT SLOPES, ERODED	ARMO	No	hillslope	---	---	---	---
Ar: ARMO LOAM, 7 TO 15 PERCENT SLOPES	ARMO	No	hillslope	---	---	---	---
Bf: BOEL FINE SANDY LOAM, OCCASIONALLY FLOODED	BOEL	No	flood plain	---	---	---	---
	UNNAMED HYDRIC SOILS	Yes	terrace	2B3	YES	NO	NO
Bg: BOGUE CLAY, 3 TO 8 PERCENT SLOPES	BOGUE	No	hillslope	---	---	---	---
	---	---	terrace	---	---	---	---
Bo: BOGUE-ARMO COMPLEX, 5 TO 25 PERCENT SLOPES	BOGUE	No	hillslope	---	---	---	---
	ARMO	No	hillslope	---	---	---	---
BOP: BORROW PITS	BORROW PITS	Unranked	---	---	---	---	---
Br: BROWNELL GRAVELLY LOAM, 2 TO 10 PERCENT SLOPES	BROWNELL	No	hillslope	---	---	---	---
Cc: CAMPUS-CARLSON COMPLEX, 3 TO 7 PERCENT SLOPES	CAMPUS	No	hillslope	---	---	---	---
	CARLSON UNNAMED HYDRIC SOILS	No Yes	ridge terrace	2A ---	--- YES	--- NO	--- NO
Cd: CAMPUS-PENDEN COMPLEX, 5 TO 15 PERCENT SLOPES	CAMPUS	No	hillslope	---	---	---	---
	PENDEN UNNAMED HYDRIC SOILS	No Yes	hillslope terrace	--- 2A	--- YES	--- NO	--- NO
Ce: CANLON COMPLEX, 5 TO 25 PERCENT SLOPES	CANLON	No	escarpment	---	---	---	---
	CAMPUS	No	hillslope	---	---	---	---
Cm: CORINTH SILTY CLAY LOAM, 1 TO 3 PERCENT SLOPES	CORINTH	No	hillslope	---	---	---	---
Cn: CORINTH SILTY CLAY LOAM, 3 TO 7 PERCENT SLOPES	CORINTH	No	hillslope	---	---	---	---
Co: CORINTH SILTY CLAY LOAM, 7 TO 15 PERCENT SLOPES	CORINTH	No	hillslope	---	---	---	---

HYDRIC SOIL INTERPRETATIONS  
HYDRIC SOILS LIST  
Ellis County, Kansas

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All mapunits are displayed regardless of hydric status and are listed in alpha-numeric order by mapunit symbol. The "Hydric Soils Criteria" columns indicate the conditions that caused the mapunit component to be classified as "Hydric" or "Non-Hydric". These criteria are defined in "Hydric Soils of the United States" (USDA Miscellaneous Publication No. 1491, June, 1991). See the "Criteria for Hydric Soils" endnote to determine the meaning of these columns. Spot symbols are footnoted at the end of the table.

Map symbol and map unit name	Component	Hydric	Local landform	Hydric soils criteria			
				Hydric criteria code	Meets saturation criteria	Meets flooding criteria	Meets ponding criteria
Cr: CRETE SILTY CLAY LOAM, 0 TO 1 PERCENT SLOPES	CRETE	No	plain	---	---	---	---
	UNNAMED HYDRIC SOILS	Yes	terrace	3	NO	NO	YES
De: DETROIT SILT LOAM, RARELY FLOODED	DETROIT	No	stream terrace	---	---	---	---
Ee: ELTREE SILT LOAM, 0 TO 1 PERCENT SLOPES	ELTREE	No	terrace	---	---	---	---
Ef: ELTREE SILT LOAM, 1 TO 3 PERCENT SLOPES	ELTREE	No	terrace	---	---	---	---
Eg: ELTREE SILT LOAM, 3 TO 7 PERCENT SLOPES	ELTREE	No	terrace	---	---	---	---
Eh: ELTREE SILT LOAM, 7 TO 15 PERCENT SLOPES	ELTREE	No	terrace	---	---	---	---
GRP: GRAVEL PITS	PITS	Unranked	---	---	---	---	---
Ha: HARNEY SILT LOAM, 0 TO 1 PERCENT SLOPES	HARNEY	No	divide	---	---	---	---
	NESS Unnamed wet soils	Yes Yes	playa depression	3,2B3 2B3,2A,3,4	YES YES	NO YES	YES YES
Hb: HARNEY SILT LOAM, 1 TO 3 PERCENT SLOPES	HARNEY	No	plain	---	---	---	---
Hc: HARNEY SILT LOAM, 3 TO 7 PERCENT SLOPES	HARNEY	No	plain	---	---	---	---
Hd: HARNEY SILTY CLAY LOAM, 2 TO 5 PERCENT SLOPES, ERODED	HARNEY	No	plain	---	---	---	---
He: HARNEY-ARMO COMPLEX, 3 TO 7 PERCENT SLOPES, ERODED	ARMO	No	hillslope	---	---	---	---
	HARNEY	No	plain	---	---	---	---
Hf: HARNEY-CARLSON SILT LOAMS, 0 TO 1 PERCENT SLOPES	CARLSON	No	ridge	---	---	---	---
	HARNEY	No	plain	---	---	---	---
Hg: HARNEY-CARLSON SILT LOAMS, 1 TO 3 PERCENT SLOPES	CARLSON	No	ridge	---	---	---	---
	HARNEY	No	plain	---	---	---	---
HGG: HARNEY-MENTO SILT LOAMS, 1 TO 3 PERCENT SLOPES	HARNEY	No	plain	---	---	---	---
	MENTO	No	divide	---	---	---	---
Hh: HARNEY-WAKEEN SILT LOAMS, 0 TO 1 PERCENT SLOPES	HARNEY	No	plain	---	---	---	---
	WAKEEN	No	hillslope	---	---	---	---
Hk: HARNEY-WAKEEN SILT LOAMS, 1 TO 3 PERCENT SLOPES	HARNEY	No	plain	---	---	---	---
	WAKEEN	No	hillslope	---	---	---	---
Hl: HEIZER-ARMO COMPLEX, 8 TO 25 PERCENT SLOPES	ARMO	No	hillslope	---	---	---	---
	HEIZER	No	hillslope	---	---	---	---
HMM: HEIZER-BROWNELL GRAVELLY LOAMS, 5 TO 30 PERCENT SLOPES	HEIZER	No	hillslope	---	---	---	---
	BROWNELL	No	hillslope	---	---	---	---
Hn: DORRANCE SANDY LOAM, 5 TO 20 PERCENT SLOPES	Dorrance	No	terrace	---	---	---	---
Ho: HOLDREGE SILT LOAM, 0 TO 1 PERCENT SLOPES	HOLDREGE	No	plain	---	---	---	---
	NESS	Yes	terrace	3	NO	NO	YES

HYDRIC SOIL INTERPRETATIONS  
HYDRIC SOILS LIST  
Ellis County, Kansas

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All mapunits are displayed regardless of hydric status and are listed in alpha-numeric order by mapunit symbol. The "Hydric Soils Criteria" columns indicate the conditions that caused the mapunit component to be classified as "Hydric" or "Non-Hydric". These criteria are defined in "Hydric Soils of the United States" (USDA Miscellaneous Publication No. 1491, June, 1991). See the "Criteria for Hydric Soils" endnote to determine the meaning of these columns. Spot symbols are footnoted at the end of the table.

Map symbol and map unit name	Component	Hydric	Local landform	Hydric soils criteria			
				Hydric criteria code	Meets saturation criteria	Meets flooding criteria	Meets ponding criteria
Hp: HOLDREGE SILT LOAM, 1 TO 3 PERCENT SLOPES	HOLDREGE	No	plain	---	---	---	---
Hr: HORD SILT LOAM, RARELY FLOODED	HORD	No	terrace	---	---	---	---
In: INAVALE LOAMY SAND, OCCASIONALLY FLOODED	INAVALE	No	flood plain	---	---	---	---
	UNNAMED HYDRIC SOILS	Yes	terrace	2B3,4	YES	YES	NO
Mc: MCCOOK FINE SANDY LOAM, RARELY FLOODED	MCCOOK	No	stream terrace	---	---	---	---
Md: MCCOOK SILT LOAM, RARELY FLOODED	MCCOOK	No	stream terrace	---	---	---	---
Me: MENTO SILT LOAM, 0 TO 1 PERCENT SLOPES	MENTO	No	divide	---	---	---	---
Mf: MENTO SILT LOAM, 1 TO 3 PERCENT SLOPES	MENTO	No	divide	---	---	---	---
Mg: MENTO SILTY CLAY LOAM, 1 TO 3 PERCENT SLOPES, ERODED	MENTO	No	divide	---	---	---	---
Mo: MENTO SOILS, 3 TO 7 PERCENT SLOPES, ERODED	MENTO	No	divide	---	---	---	---
Mu: MUNJOR SANDY LOAM, FREQUENTLY FLOODED	MUNJOR	No	flood plain	---	---	---	---
	UNNAMED HYDRIC SOILS	Yes	drainageway	4,2B3	YES	YES	NO
Nc: NEW CAMBRIA SILTY CLAY, RARELY FLOODED	NEW CAMBRIA	No	stream terrace	---	---	---	---
Nn: NIBSON SILT LOAM, 5 TO 12 PERCENT SLOPES	NIBSON	No	hillslope	---	---	---	---
Rb: ROXBURY SILT LOAM, RARELY FLOODED	ROXBURY	No	stream terrace	---	---	---	---
Rf: ROXBURY SILT LOAM, FREQUENTLY FLOODED	ROXBURY	No	stream terrace	---	---	---	---
	UNNAMED HYDRIC SOILS	Yes	terrace	2B3,4	YES	YES	NO
RIV: RIVERS	RIVERWASH AND SANDBARS	Unranked	---	---	---	---	---
	UNNAMED HYDRIC SOILS	Yes	drainageway	4,2B3	YES	YES	NO
Ro: HEIZER-BROWNELL COMPLEX, 7 TO 30 PERCENT SLOPES	Heizer	No	hillslope	---	---	---	---
	BROWNELL	No	hillslope	---	---	---	---
ROO: ROXBURY SILT LOAM, OCCASIONALLY FLOODED	ROXBURY	No	flood plain	---	---	---	---
	UNNAMED HYDRIC SOILS	Yes	drainageway	3,2B3,2A	YES	NO	YES
UCC: ULY SILT LOAM, 3 TO 6 PERCENT SLOPES	ULY	No	hillslope	---	---	---	---
W: WATER	WATER	Unranked	---	---	---	---	---
Wa: WAKEEN SILT LOAM, 1 TO 3 PERCENT SLOPES	WAKEEN	No	hillslope	---	---	---	---
We: WAKEEN SILT LOAM, 1 TO 3 PERCENT SLOPES, ERODED	WAKEEN	No	hillslope	---	---	---	---
Wh: WAKEEN SILT LOAM, 3 TO 7 PERCENT SLOPES	WAKEEN	No	hillslope	---	---	---	---
	SIDEHILL SEEP	Yes	terrace	2B3	YES	NO	NO

HYDRIC SOIL INTERPRETATIONS  
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All mapunits are displayed regardless of hydric status and are listed in alpha-numeric order by mapunit symbol. The "Hydric Soils Criteria" columns indicate the conditions that caused the mapunit component to be classified as "Hydric" or "Non-Hydric". These criteria are defined in "Hydric Soils of the United States" (USDA Miscellaneous Publication No. 1491, June, 1991). See the "Criteria for Hydric Soils" endnote to determine the meaning of these columns. Spot symbols are footnoted at the end of the table.

Map symbol and map unit name	Component	Hydric	Local landform	Hydric soils criteria			
				Hydric criteria code	Meets saturation criteria	Meets flooding criteria	Meets ponding criteria
Wk: WAKEEN SILT LOAM, 5 TO 15 PERCENT SLOPES, ERODED  Wn: WANN LOAM, OCCASIONALLY FLOODED	WAKEEN	No	hillslope	---	---	---	---
	UNNAMED HYDRIC SOILS	Yes	terrace	2A	YES	NO	NO
	WANN	No	flood plain	---	---	---	---

FOOTNOTE: There may be small areas of included soils or miscellaneous areas that are significant to use and management of the soil; yet are too small to delineate on the soil map at the map's original scale. These may be designated as spot symbols and are defined in the published Soil Survey Report or the USDA-NRCS Technical Guide, Part II. Areas mapped as water or any map unit that contains one of the following conventional symbols is considered a hydric soil map unit: marshes or swamps; wet spots; depressions; streams, lakes and ponds.

1. All Histosols except Folists, or
2. Soils in Aquic suborders, great groups, or subgroups, Albolls suborder, Aquisalids, Pachic subgroups, or Cumulic subgroups that are:
  - a. Somewhat poorly drained with a water table equal to 0.0 foot (ft) from the surface during the growing season, or
  - b. poorly drained or very poorly drained and have either:
    - (1) water table equal to 0.0 ft during the growing season if textures are coarse sand, sand, or fine sand in all layers within 20 inches (in),  
or for other soils
    - (2) water table at less than or equal to 0.5 ft from the surface during the growing season if permeability is equal to or greater than 6.0 in/hour (h) in all layers within 20 in, or
    - (3) water table at less than or equal to 1.0 ft from the surface during the growing season if permeability is less than 6.0 in/h in any layer within 20 in, or
3. Soils that are frequently ponded for long duration or very long duration during the growing season, or
4. Soils that are frequently flooded for long duration or very long duration during the growing season.