

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.

SOIL FEATURES--Continued
Dickinson County, Kansas

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				
027KS: Kipson-----	7-20	Bedrock (paralithic)	---	---	Moderate	Low	Low
Sogn-----	4-20	Bedrock (lithic)	---	Strongly cemented	Moderate	Low	Low
027LH: Lancaster-----	20-40	Bedrock (paralithic)	---	Moderately cemented	Moderate	Low	Moderate
Hedville-----	4-20	Bedrock (lithic)	---	Strongly cemented	Low	Low	Moderate
061CF: Clime-----	20-40	Bedrock (paralithic)	---	Moderately cemented	Low	High	Low
Sogn-----	4-20	Bedrock (lithic)	---	Strongly cemented	Moderate	Low	Low
061HE: Haynie-----	---	---	---	---	High	Low	Low
061KO: Konza-----	---	---	---	---	Moderate	High	Moderate
061MK: Mccook-----	---	---	---	---	Moderate	Low	Low
Smokyhill-----	---	---	---	---	Low	High	Low
061TN: Tully-----	---	---	---	---	Low	High	Low
061TO: Tully-----	---	---	---	---	Low	High	Low
061WE: Wells-----	---	---	---	---	Moderate	Low	Moderate
Ortello-----	---	---	---	---	Moderate	Moderate	Low
115CM: Clime-----	20-40	Bedrock (paralithic)	---	Weakly cemented	Moderate	High	Low
115CS: Clime-----	20-40	Bedrock (paralithic)	---	Weakly cemented	Moderate	High	Low
Sogn-----	4-20	Bedrock (lithic)	---	Indurated	Moderate	Low	Low
115LM: Ladysmith-----	---	---	---	---	Moderate	High	Low
115LV: Lancaster-----	20-40	Bedrock (paralithic)	---	Moderately cemented	Moderate	Low	Moderate
Hedville-----	4-20	Bedrock (lithic)	---	Strongly cemented	Moderate	Low	Moderate
127TS: Tully-----	---	---	---	---	Moderate	High	Low
169CR: Crete-----	---	---	---	---	Moderate	Moderate	Low
169CS: Crete-----	---	---	---	---	Moderate	Moderate	Low
169DE: Detroit-----	---	---	---	---	Low	High	Low
169KC: Kipson-----	7-20	Bedrock (paralithic)	---	---	Moderate	Low	Low
Clime-----	20-40	Bedrock (paralithic)	---	Weakly cemented	Moderate	High	Low
169OT: Ortello-----	---	---	---	---	Moderate	Moderate	Low
169TO: Tobin-----	---	---	---	---	Low	Low	Low
AED: Arents, Earthen Dam-----	---	---	---	---	---	---	---
Ca: Carwile-----	---	---	---	---	---	High	Moderate
Cb: Clime-----	20-40	Bedrock (paralithic)	---	Moderately cemented	Moderate	High	Low
Cc: Clime-----	20-40	Bedrock (paralithic)	---	Moderately cemented	Moderate	High	Low
Cd: Clime-----	20-40	Bedrock (paralithic)	---	Moderately cemented	Moderate	High	Low
Sogn-----	4-20	Bedrock (lithic)	---	Strongly cemented	Moderate	Low	Low
Ce: Crete-----	---	---	---	---	Moderate	Moderate	Low
Cf: Crete-----	---	---	---	---	Moderate	Moderate	Low
Cg: Crete-----	---	---	---	---	Moderate	Moderate	Low
Da: Detroit-----	---	---	---	---	Low	High	Low
Ea: Elsmere-----	---	---	---	---	Moderate	Moderate	Low
Fa: Fluvaquents-----	---	---	---	---	---	High	Low
Ga: Geary-----	---	---	---	---	High	Low	Low
Ha: Hobbs-----	---	---	---	---	Moderate	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				
Hb:							
Hobbs-----	---	---	---	---	Moderate	Low	Low
Ia:							
Irwin-----	---	---	---	---	Moderate	High	Low
Ib:							
Irwin-----	---	---	---	---	Moderate	High	Low
La:							
Lancaster-----	20-40	Bedrock (paralithic)	---	Moderately cemented	Moderate	Low	Moderate
Hedville-----	4-20	Bedrock (lithic)	---	Strongly cemented	Moderate	Low	Moderate
M-W:							
Miscellaneous	---	---	---	---	---	---	---
Water-----							
Ma:							
Mccook-----	---	---	---	---	Moderate	Low	Low
Mb:							
Muir-----	---	---	---	---	Moderate	Low	Moderate
Oa:							
Ortello-----	---	---	---	---	Moderate	Moderate	Low
Wells-----	---	---	---	---	Moderate	Low	Moderate
Qa:							
Quarries-----	---	---	---	---	---	---	---
Sb:							
Solomon-----	---	---	---	---	Moderate	High	Low
Sc:							
Sutphen-----	---	---	---	---	Low	High	Low
Sd:							
Sutphen-----	---	---	---	---	Low	High	Low
Va:							
Valentine-----	---	---	---	---	Low	Low	Low
Vb:							
Valentine-----	---	---	---	---	Low	Low	Low
W:							
Water-----	---	---	---	---	Low	---	---
Wa:							
Wells-----	---	---	---	---	Moderate	Low	Moderate

