

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
Greenwood 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				
015CS:							
Clime-----	20-40	Bedrock (paralithic)	---	Moderately cemented	Moderate	High	Low
Sogn-----	4-20	Bedrock (lithic)	---	Indurated	Moderate	Low	Low
015LD:							
Labette-----	20-40	Bedrock (lithic)	---	Indurated	Moderate	High	Low
Dwight-----	20-40	Bedrock (lithic)	---	Indurated	Moderate	High	Moderate
017IN:							
Irwin, eroded---	---	---	---	---	Moderate	High	Low
031ER:							
Eram-----	20-40	Bedrock (paralithic)	---	Weakly cemented	None	High	Moderate
Collinsville----	4-20	Bedrock (lithic)	---	Strongly cemented	---	Low	Moderate
031ES:							
Eram-----	20-40	Bedrock (paralithic)	---	Weakly cemented	None	High	Moderate
Shidler-----	4-20	Bedrock (lithic)	---	Indurated	---	Moderate	Low
031SA:							
Summit-----	---	---	---	---	None	High	Low
031VC:							
Verdigris-----	---	---	---	---	---	Low	Low
049FM:							
Florence-----	40-60	Bedrock (lithic)	---	Indurated	Moderate	Moderate	Low
Martin-----	---	---	---	---	High	High	Low
049ST:							
Steedman-----	20-40	Bedrock (paralithic)	---	Weakly cemented	None	Moderate	Moderate
111BC:							
Bates-----	20-40	Bedrock (paralithic)	---	Moderately cemented	---	Low	Moderate
Collinsville----	4-20	Bedrock (lithic)	---	---	---	Low	Moderate
111EE:							
Eram-----	20-40	Bedrock (paralithic)	---	---	None	High	Moderate
111EF:							
Eram-----	20-40	Bedrock (paralithic)	---	---	None	High	Moderate
Bates-----	20-40	Bedrock (paralithic)	---	---	---	Low	Moderate
111LD:							
Labette-----	20-40	Bedrock (lithic)	---	Indurated	Moderate	High	Low
Dwight-----	40-60	Bedrock (lithic)	---	Indurated	Moderate	High	Moderate
111OA:							
Olpe-----	---	---	---	---	---	High	Moderate
Kenoma-----	---	---	---	---	---	High	Moderate
111VA:							
Vinland-----	10-20	Bedrock (paralithic)	---	Weakly cemented	Moderate	Low	Moderate
205CA:							
Catoosa-----	20-40	Bedrock (lithic)	---	Indurated	---	Moderate	Moderate
205EB:							
Eram-----	20-40	Bedrock (paralithic)	---	Weakly cemented	None	High	Moderate
205EC:							
Eram-----	20-40	Bedrock (paralithic)	---	Weakly cemented	None	High	Moderate
205ND:							
Niotaze-----	20-40	Bedrock (paralithic)	---	Weakly cemented	None	High	Moderate
Darnell-----	10-20	Bedrock (paralithic)	---	Moderately cemented	None	Low	Moderate
205SF:							
Steedman-----	20-40	Bedrock (paralithic)	---	Weakly cemented	None	Moderate	Moderate
205SM:							
Stephenville----	20-40	Bedrock (paralithic)	---	Weakly cemented	None	Moderate	Moderate
Darnell-----	10-20	Bedrock (paralithic)	---	Moderately cemented	None	Low	Moderate
205ZB:							
Zaar-----	---	---	---	---	---	High	Moderate
207DD:							
Dennis-----	---	---	---	---	---	High	Moderate
207KA:							
Kenoma-----	---	---	---	---	---	High	Moderate
207KO:							
Kenoma-----	---	---	---	---	---	High	Moderate
Olpe-----	---	---	---	---	---	High	Moderate
207VC:							
Verdigris-----	---	---	---	---	---	Low	Low
AED:							
Arents, Earthen Dam-----	---	---	---	---	---	---	---
At:							
Aguents-----	---	---	---	---	---	---	---
Ca:							
Chase-----	---	---	---	---	High	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
Ce: Clime-----	20-40	In Bedrock (paralithic)	---	Moderately cemented	Moderate	High	Low
Cm: Clime-----	20-40	Bedrock (paralithic)	---	Moderately cemented	Moderate	High	Low
Cs: Clime-----	20-40	Bedrock (paralithic)	---	Moderately cemented	Moderate	High	Low
Sogn-----	4-20	Bedrock (lithic)	---	Indurated	Moderate	Low	Low
De: Dennis-----	---	---	---	---	---	High	Moderate
Dn: Dennis-----	---	---	---	---	---	High	Moderate
Ds: Dennis, eroded--	---	---	---	---	---	High	Moderate
Dw: Dwight-----	40-60	Bedrock (lithic)	---	Indurated	Moderate	High	Moderate
Eb: Eram-----	20-40	Bedrock (paralithic)	---	Weakly cemented	None	High	Moderate
Ec: Eram-----	20-40	Bedrock (paralithic)	---	Weakly cemented	None	High	Moderate
Eh: Eram, eroded----	20-40	Bedrock (paralithic)	---	Weakly cemented	None	High	Moderate
Ft: Florence-----	40-60	Bedrock (lithic)	---	Indurated	Moderate	Moderate	Low
Labette-----	20-40	Bedrock (lithic)	---	Indurated	Moderate	High	Low
IBB: Irwin-----	---	---	---	---	Moderate	High	Low
Ic: Ivan-----	---	---	---	---	Moderate	Low	Low
If: Ivan-----	---	---	---	---	Moderate	Low	Low
Ka: Kenoma-----	---	---	---	---	---	High	Moderate
KAA: Kenoma-----	---	---	---	---	---	High	Moderate
Ke: Kenoma, eroded--	---	---	---	---	---	High	Moderate
La: Labette-----	20-40	Bedrock (lithic)	---	Indurated	Moderate	High	Low
LAA: Labette-----	20-40	Bedrock (lithic)	---	Indurated	Moderate	High	Low
Ld: Labette-----	20-40	Bedrock (lithic)	---	Indurated	Moderate	High	Low
Dwight-----	40-60	Bedrock (lithic)	---	Indurated	Moderate	High	Moderate
Ls: Labette-----	20-40	Bedrock (lithic)	---	Indurated	Moderate	High	Low
Sogn-----	4-20	Bedrock (lithic)	---	Indurated	Moderate	Low	Low
LUU: Lula-----	40-60	Bedrock (lithic)	---	Indurated	---	Moderate	Moderate
M-W: Miscellaneous Water-----	---	---	---	---	---	---	---
Ma: Martin-----	---	---	---	---	Moderate	High	Low
Mb: Martin-----	---	---	---	---	High	High	Low
Me: Martin, eroded--	---	---	---	---	High	High	Low
MSS: Mason-----	---	---	---	---	---	Moderate	Moderate
Na: Newtonia-----	---	---	---	---	---	Moderate	Moderate
Nd: Niotaze-----	20-40	Bedrock (paralithic)	---	Weakly cemented	---	High	Moderate
Darnell-----	10-20	Bedrock (paralithic)	---	Moderately cemented	None	Low	Moderate
Nz: Niotaze-----	20-40	Bedrock (paralithic)	---	Weakly cemented	---	High	Moderate
Darnell-----	10-20	Bedrock (paralithic)	---	Moderately cemented	---	Low	Moderate
Od: Oil Waste Land--	---	---	---	---	---	---	---
Op: Olpe-----	---	---	---	---	---	High	Moderate
Os: Osage-----	---	---	---	---	---	High	Moderate
Pt: Pits, Quarries--	---	---	---	---	---	---	---
Re: Reading-----	---	---	---	---	Moderate	Moderate	Low

Map symbol and soil name	Restrictive layer				Potential for Frost action	Risk of corrosion	
	Kind	Depth to top	Thickness	Hardness		Uncoated Steel	Concrete
St: Steedman-----	20-40	In Bedrock (paralithic)	---	Weakly cemented	---	Moderate	Moderate
W: Water (> 40 Acres)-----	---	---	---	---	---	---	---
Wo: Woodson-----	---	---	---	---	Low	High	Moderate
Za: Zaar-----	---	---	---	---	---	High	Moderate

