

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
Crawford 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				
011BH: Bolivar-----	20-40	Bedrock (paralithic)	---	Moderately cemented	---	Low	Moderate
Hector-----	10-20	Bedrock (lithic)	---	Strongly cemented	---	Low	Moderate
011EC: Eram-----	20-40	Bedrock (paralithic)	---	Weakly cemented	---	High	Moderate
Collinsville----	4-20	Bedrock (lithic)	---	Strongly cemented	---	Low	Moderate
011LE: Leanna-----	---	---	---	---	---	High	Moderate
011MA: Mason-----	---	---	---	---	---	Moderate	Moderate
011RC: Ringo-----	20-40	Bedrock (paralithic)	---	Weakly cemented	---	High	Low
Clareson-----	20-40	Bedrock (lithic)	---	Indurated	---	High	Moderate
011ZB: Zaar-----	---	---	---	---	---	High	Moderate
021ES: Eram-----	20-40	Bedrock (paralithic)	---	Moderately cemented	---	High	Moderate
Shidler-----	10-20	Bedrock (lithic)	---	Indurated	---	Moderate	Low
021OS: Osage-----	---	---	---	---	---	High	Moderate
133EB: Eram-----	20-40	Bedrock (paralithic)	---	Weakly cemented	---	High	Moderate
133ET: Eram-----	20-40	Bedrock (paralithic)	---	Weakly cemented	---	High	Moderate
Lebo-----	20-40	Bedrock (paralithic)	---	Weakly cemented	---	Moderate	Low
AED: Arents, Earthen Dam-----	---	---	---	---	---	---	---
Ba: Bates-----	20-40	Bedrock (paralithic)	---	Moderately cemented	---	Low	Moderate
Bb: Bates-----	20-40	Bedrock (paralithic)	---	Moderately cemented	---	Low	Moderate
Bc: Bates-----	20-40	Bedrock (paralithic)	---	Moderately cemented	---	Low	Moderate
Bd: Bates-----	20-40	Bedrock (paralithic)	---	Moderately cemented	---	Low	Moderate
Be: Bolivar-----	20-40	Bedrock (paralithic)	---	Moderately cemented	---	Low	Moderate
Hector-----	10-20	Bedrock (lithic)	---	Strongly cemented	---	Low	Moderate
Bk: Hepler, frequently flooded-----	---	---	---	---	---	High	Moderate
CA: Catoosa-----	20-40	Bedrock (lithic)	---	Indurated	---	Moderate	Moderate
Ce: Cherokee-----	---	---	---	---	---	High	Moderate
Cf: Clareson-----	20-40	Bedrock (lithic)	---	Indurated	---	High	Moderate
De: Dennis-----	---	---	---	---	---	High	Moderate
Df: Dennis-----	---	---	---	---	---	High	Moderate
Dg: Dennis-----	---	---	---	---	---	High	Moderate
Dh: Dennis-----	---	---	---	---	---	High	Moderate
Dp: Dennis-----	---	---	---	---	---	High	Moderate
Parsons-----	---	---	---	---	---	High	Moderate
EC: Eram-----	20-40	Bedrock (paralithic)	---	Weakly cemented	---	High	Moderate
Er: Dennis, severely eroded-----	---	---	---	---	---	High	Moderate
Gd: Girard-----	20-40	Bedrock (lithic)	---	Indurated	---	High	Low
He: Hepler-----	---	---	---	---	---	High	Moderate
KA: Kenoma-----	---	---	---	---	---	High	Moderate
LA: Lanton-----	---	---	---	---	---	High	Moderate

Map symbol and soil name	Restrictive layer				Potential for Frost action	Risk of corrosion	
	Kind	Depth to top	Thickness	Hardness		Uncoated Steel	Concrete
Ls:		In	In				
Lula-----	40-60	Bedrock (lithic)	---	Indurated	---	Moderate	Moderate
Lt:							
Lula-----	40-60	Bedrock (lithic)	---	Indurated	---	Moderate	Moderate
Lu:							
Clareson-----	20-40	Bedrock (lithic)	---	Indurated	---	High	Moderate
Lula-----	40-60	Bedrock (lithic)	---	Indurated	---	Moderate	Moderate
M-W:							
Miscellaneous	---	---	---	---	---	---	---
Water-----							
Mc:							
Mccune-----	---	---	---	---	---	High	Moderate
Md:							
Kanima-----	---	---	---	---	---	Moderate	Low
Os:							
Osage-----	---	---	---	---	---	High	Moderate
Pa:							
Parsons-----	---	---	---	---	---	High	Moderate
Pb:							
Parsons-----	---	---	---	---	---	High	Moderate
Pc:							
Parsons-----	---	---	---	---	---	High	Moderate
Ra:							
Radley-----	---	---	---	---	---	Low	Low
Rh:							
Radley-----	---	---	---	---	---	Low	Low
Hepler-----	---	---	---	---	---	High	Moderate
Rn:							
Ringo-----	20-40	Bedrock (paralithic)	---	Weakly cemented	---	High	Low
Ro:							
Ringo-----	20-40	Bedrock (paralithic)	---	Weakly cemented	---	High	Low
Rp:							
Ringo-----	20-40	Bedrock (paralithic)	---	Weakly cemented	---	High	Low
Clareson-----	16-40	Bedrock (lithic)	---	Indurated	---	High	Moderate
SC:							
Shidler-----	4-20	Bedrock (lithic)	---	Indurated	---	Moderate	Low
Catoosa-----	20-40	Bedrock (lithic)	---	Indurated	---	Moderate	Moderate
VA:							
Verdigris-----	---	---	---	---	---	Low	Low
VB:							
Verdigris, channeled-----	---	---	---	---	---	Low	Low
W:							
Water-----	---	---	---	---	Low	---	---
Za:							
Zaar-----	---	---	---	---	---	High	Moderate
ZAA:							
Zaar-----	---	---	---	---	---	High	Moderate

