

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 In	Thickness In	Hardness		Uncoated Steel	Concrete
027CS: Crete-----	---	---	---	---	Moderate	Moderate	Low
027CX: Crete-----	---	---	---	---	Moderate	Moderate	Low
027HN: Hobbs-----	---	---	---	---	Moderate	Low	Low
027KS: Kipson-----	7-20	Bedrock (paralithic)	---	---	Moderate	Low	Low
Sogn-----	4-20	Bedrock (lithic)	---	---	Moderate	Low	Low
061BE: Benfield-----	20-40	Bedrock (paralithic)	---	Moderately cemented	Low	High	Low
Florence-----	40-60	Bedrock (lithic)	---	Indurated	Low	Moderate	Low
061CF: Clime-----	20-40	Bedrock (paralithic)	---	Moderately cemented	Low	High	Low
Sogn-----	4-20	Bedrock (lithic)	---	Strongly cemented	Moderate	Low	Low
061CR: Crete-----	---	---	---	---	Low	Moderate	Low
061CS: Crete-----	---	---	---	---	Low	Moderate	Low
061EU: Eudora-----	---	---	---	---	High	Low	Low
061HE: Haynie-----	---	---	---	---	High	Low	Low
061KA: Kahola-----	---	---	---	---	Moderate	Low	Low
061KB: Kahola-----	---	---	---	---	Moderate	Low	Low
061RE: Reading-----	---	---	---	---	Moderate	Moderate	Low
061TO: Tully-----	---	---	---	---	Low	High	Low
117PA: Pawnee-----	---	---	---	---	High	High	Low
117PB: Pawnee-----	---	---	---	---	High	High	Low
149HS: Haynie-----	---	---	---	---	High	Low	Low
Sarpy-----	---	---	---	---	Low	Low	Low
149PS: Paxico-----	---	---	---	---	High	High	Low
149SF: Sarpy-----	---	---	---	---	Low	Low	Low
197CM: Clime-----	20-40	Bedrock (paralithic)	---	Weakly cemented	Moderate	High	Low
197FL: Florence-----	40-60	Bedrock (lithic)	---	Indurated	Moderate	Moderate	Low
Labette-----	20-40	Bedrock (lithic)	---	Indurated	Moderate	High	Low
197IB: Irwin-----	---	---	---	---	Moderate	High	Low
197ID: Irwin-----	---	---	---	---	Moderate	High	Low
197IV: Ivan-----	---	---	---	---	Moderate	Low	Low
197IX: Ivan-----	---	---	---	---	Moderate	Low	Low
197PN: Pawnee-----	---	---	---	---	High	High	Low
197WE: Wamego-----	20-40	Bedrock (paralithic)	---	Noncemented	Moderate	Moderate	Moderate
201CS: Crete-----	---	---	---	---	Moderate	Moderate	Low
201CX: Crete, eroded---	---	---	---	---	Moderate	Moderate	Low
201KS: Kipson-----	7-20	Bedrock (paralithic)	---	Weakly cemented	Moderate	Low	Low
Sogn-----	4-20	Bedrock (lithic)	---	Indurated	Moderate	Low	Low
201LC: Lancaster-----	20-40	Bedrock (paralithic)	---	Moderately cemented	Moderate	Low	Moderate
Ad: Ivan-----	---	---	---	---	Moderate	Low	Low
AED: Arents, Earthen Dam-----	---	---	---	---	---	---	---
BE: Benfield-----	20-40	Bedrock (paralithic)	---	Weakly cemented	Moderate	High	Low
Bf: Benfield-----	22-39	Bedrock (paralithic)	---	---	Moderate	High	Low
Florence-----	24-39	Bedrock (lithic)	---	Indurated	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
Bk:		In	In				
Wymore-----	---	---	---	---	High	High	Moderate
Kennebec-----	---	---	---	---	High	Moderate	Low
BOP:							
Borrow Pits-----	---	---	---	---	---	---	---
Ca:							
Carr-----	---	---	---	---	Low	Low	Low
Sarpy-----	---	---	---	---	Low	Low	Low
Ch:							
Chase-----	---	---	---	---	High	High	Low
Cs:							
Clime-----	20-40	Bedrock (paralithic)	---	Weakly cemented	Moderate	High	Low
Sogn-----	4-20	Bedrock (lithic)	---	Indurated	Moderate	Low	Low
CT:							
Crete-----	---	---	---	---	Moderate	Moderate	Low
Dr:							
Dwight-----	40-60	Bedrock (lithic)	---	---	Moderate	High	Moderate
Irwin-----	40-60	Bedrock (paralithic)	---	---	Moderate	High	Low
Dw:							
Dwight-----	40-60	Bedrock (lithic)	---	---	Moderate	High	Moderate
Irwin-----	40-60	Bedrock (paralithic)	---	---	Moderate	High	Low
Em:							
Elmont-----	40-60	Bedrock (paralithic)	---	---	High	Moderate	Low
En:							
Elmont-----	40-60	Bedrock (paralithic)	---	---	High	Moderate	Low
Clime-----	20-40	Bedrock (paralithic)	---	---	Moderate	High	Low
Eu:							
Eudora-----	---	---	---	---	High	Low	Low
Ga:							
Geary-----	---	---	---	---	High	Low	Low
Ge:							
Geary-----	---	---	---	---	High	Low	Low
Ha:							
Haynie-----	---	---	---	---	High	Low	Low
HO:							
Hobbs-----	---	---	---	---	Moderate	Low	Low
Ic:							
Irwin-----	40-60	Bedrock (paralithic)	---	Weakly cemented	Moderate	High	Low
Id:							
Irwin, eroded---	40-60	Bedrock (paralithic)	---	Weakly cemented	Moderate	High	Low
Ie:							
Ivan-----	---	---	---	---	Moderate	Low	Low
Iv:							
Ivan-----	---	---	---	---	Moderate	Low	Low
Kennebec-----	---	---	---	---	High	Moderate	Low
Ka:							
Kahola-----	---	---	---	---	Moderate	Low	Low
Ke:							
Kenesaw-----	---	---	---	---	Moderate	Moderate	Low
Kf:							
Kenesaw-----	---	---	---	---	Moderate	Moderate	Low
KN:							
Kennebec-----	---	---	---	---	High	Moderate	Low
M-W:							
Miscellaneous Water-----	---	---	---	---	---	---	---
Ma:							
Mayberry-----	---	---	---	---	High	High	Low
Mb:							
Mayberry-----	---	---	---	---	High	High	Low
Mu:							
Muir-----	---	---	---	---	Moderate	Low	Moderate
QUA:							
Quarries-----	---	---	---	---	---	---	---
Rd:							
Reading-----	---	---	---	---	High	Moderate	Low
Re:							
Reading-----	---	---	---	---	High	Moderate	Low
Sa:							
Sarpy-----	---	---	---	---	Low	Low	Low
Sm:							
Smolan-----	---	---	---	---	Moderate	Moderate	Low
Sn:							
Smolan-----	---	---	---	---	Moderate	Moderate	Low
So:							
Smolan, eroded--	---	---	---	---	Moderate	Moderate	Low
St:							
Clime-----	20-40	Bedrock (paralithic)	---	Moderately cemented	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
Su:		In	In				
Sutphen-----	---	---	---	---	Low	High	Low
Ts:							
Tully-----	---	---	---	---	Low	High	Low
Tt:							
Tully, eroded---	---	---	---	---	Moderate	High	Low
Tu:							
Tully-----	---	---	---	---	Moderate	High	Low
Tv:							
Tully, eroded---	---	---	---	---	Moderate	High	Low
W:							
Water-----	---	---	---	---	Low	---	---
Wm:							
Wymore-----	---	---	---	---	High	High	Moderate
Wn:							
Wymore-----	---	---	---	---	High	High	Moderate
Wo:							
Wymore, eroded--	---	---	---	---	High	High	Moderate
Wr:							
Wymore-----	---	---	---	---	High	High	Moderate
Ws:							
Wymore, eroded--	---	---	---	---	High	High	Moderate

