

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
017IN: Irwin, eroded---	---	In	In	---	Moderate	High	Low
017IR: Irwin-----	---	---	---	---	Moderate	High	Low
017IS: Irwin, eroded---	---	---	---	---	Moderate	High	Low
031CS: Clareson-----	20-40	Bedrock (lithic)	---	Indurated	None	High	Moderate
Shidler-----	4-20	Bedrock (lithic)	---	Indurated	None	Moderate	Low
031DE: Dennis, eroded--	---	---	---	---	---	High	Moderate
031ES: Eram-----	20-40	Bedrock (paralithic)	---	Weakly cemented	None	High	Moderate
Shidler-----	4-20	Bedrock (lithic)	---	Indurated	---	Moderate	Low
031LU: Lula-----	40-60	Bedrock (lithic)	---	Indurated	---	Moderate	Moderate
031SA: Summit-----	---	---	---	---	---	High	Low
031SC: Summit-----	---	---	---	---	None	High	Low
073DN: Dennis-----	---	---	---	---	---	High	Moderate
073DS: Dennis, eroded--	---	---	---	---	---	High	Moderate
073EC: Eram-----	20-40	Bedrock (paralithic)	---	Weakly cemented	None	High	Moderate
127IN: Irwin, eroded---	---	---	---	---	Moderate	High	Low
127SN: Smolan, eroded--	---	---	---	---	Moderate	Moderate	Low
139EN: Eram-----	20-40	Bedrock (paralithic)	---	Weakly cemented	None	High	Moderate
139LS: Lebo-----	20-40	Bedrock (paralithic)	---	Weakly cemented	None	Moderate	Low
Summit-----	---	---	---	---	---	High	Low
139LU: Lula-----	40-60	Bedrock (lithic)	---	Indurated	Moderate	High	Moderate
139SN: Summit-----	---	---	---	---	---	High	Low
139SO: Summit-----	---	---	---	---	---	High	Low
197CM: Clime-----	20-40	Bedrock (paralithic)	---	Weakly cemented	Moderate	High	Low
197EO: Elmont-----	40-60	Bedrock (paralithic)	---	Weakly cemented	High	Moderate	Low
197ID: Irwin-----	---	---	---	---	Moderate	High	Low
197IX: Ivan-----	---	---	---	---	Moderate	Low	Low
197LA: Labette-----	20-40	Bedrock (lithic)	---	Indurated	Moderate	High	Low
197WE: Wamego-----	20-40	Bedrock (paralithic)	---	Weakly cemented	Moderate	Moderate	Moderate
197WF: Wamego-----	20-40	Bedrock (paralithic)	---	Weakly cemented	Moderate	Moderate	Moderate
AED: Arents, Earthen Dam-----	---	---	---	---	---	---	---
Ba: Bates-----	20-40	Bedrock (paralithic)	---	---	---	Low	Moderate
Bb: Bates-----	20-40	Bedrock (paralithic)	---	---	---	Low	Moderate
Bc: Bates-----	20-40	Bedrock (paralithic)	---	Moderately cemented	---	Low	Moderate
Collinsville----	4-20	Bedrock (lithic)	---	---	---	Low	Moderate
Ca: Chase-----	---	---	---	---	High	High	Low
Cb: Clime-----	20-40	Bedrock (paralithic)	---	Weakly cemented	Moderate	High	Low
Cc: Clime-----	20-40	Bedrock (paralithic)	---	Weakly cemented	Moderate	High	Low

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	Kind	Depth to top	Thickness	Hardness		Uncoated Steel	Concrete
Cd:		In	In				
Clime-----	20-40	Bedrock (paralithic)	---	Weakly cemented	Moderate	High	Low
Sogn-----	4-20	Bedrock (lithic)	---	---	Moderate	Low	Low
DE:							
Dennis-----	---	---	---	---	---	High	Moderate
Ea:							
Elmont-----	40-60	Bedrock (paralithic)	---	---	High	Moderate	Low
Eb:							
Elmont-----	40-60	Bedrock (paralithic)	---	---	High	Moderate	Low
Ec:							
Elmont, eroded--	40-60	Bedrock (paralithic)	---	---	High	Moderate	Low
Ed:							
Eram-----	20-40	Bedrock (paralithic)	---	---	None	High	Moderate
Ee:							
Eram-----	20-40	Bedrock (paralithic)	---	---	None	High	Moderate
Ef:							
Eram-----	20-40	Bedrock (paralithic)	---	---	None	High	Moderate
Bates-----	20-40	Bedrock (paralithic)	---	---	---	Low	Moderate
Fa:							
Florence-----	40-60	Bedrock (lithic)	---	Indurated	Moderate	Moderate	Low
Labette-----	20-40	Bedrock (lithic)	---	Indurated	Moderate	High	Low
Ia:							
Ivan-----	---	---	---	---	Moderate	Low	Low
Ib:							
Ivan-----	---	---	---	---	Moderate	Low	Low
INT:							
Aquolls-----	---	---	---	---	Low	---	---
IR:							
Irwin-----	---	---	---	---	Moderate	High	Low
Ka:							
Kenoma-----	---	---	---	---	---	High	Moderate
Kb:							
Kenoma-----	---	---	---	---	---	High	Moderate
Kc:							
Kenoma-----	---	---	---	---	---	High	Moderate
Kd:							
Kenoma-----	---	---	---	---	---	High	Moderate
La:							
Labette-----	20-40	Bedrock (lithic)	---	Indurated	Moderate	High	Low
Lb:							
Labette-----	20-40	Bedrock (lithic)	---	Indurated	Moderate	High	Low
Lc:							
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
Le:							
Ladysmith-----	---	---	---	---	Moderate	High	Low
M-W:							
Miscellaneous	---	---	---	---	---	---	---
Water-----							
Ma:							
Martin-----	40-60	Bedrock (paralithic)	---	Weakly cemented	High	High	Low
Mb:							
Martin-----	---	---	---	---	High	High	Low
Mc:							
Martin-----	---	---	---	---	High	High	Low
MS:							
Mason-----	---	---	---	---	---	Moderate	Moderate
Oa:							
Olpe-----	---	---	---	---	---	High	Moderate
Kenoma-----	---	---	---	---	---	High	Moderate
Ob:							
Orthents-----	---	---	---	---	---	---	---
Oc:							
Osage-----	---	---	---	---	---	High	Moderate
QUA:							
Quarries-----	---	---	---	---	---	---	---
Ra:							
Reading-----	---	---	---	---	High	Moderate	Low
Ta:							
Tully-----	---	---	---	---	Moderate	High	Low
Tb:							
Tully-----	---	---	---	---	Moderate	High	Low
Tc:							
Tully-----	---	---	---	---	Moderate	High	Low
Clime-----	20-40	Bedrock (paralithic)	---	Weakly cemented	Moderate	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
Va: Vinland-----	10-20	In Bedrock (paralithic)	---	Weakly cemented	Moderate	Low	Moderate
VB: Verdigris-----	---	---	---	---	---	Low	Low
VC: Verdigris-----	---	---	---	---	---	Low	Low
W: Water-----	---	---	---	---	Low	---	---
WO: Woodson-----	---	---	---	---	Low	High	Moderate
Za: Zaar-----	---	---	---	---	---	High	Moderate

