

BUILDING SITE DEVELOPMENT
Geary County, Kansas

Building Site Development

Soil properties influence the development of building sites, including the selection of the site, the design of the structure, construction, performance after construction, and maintenance. The following tables show the degree and kind of soil limitations that affect dwellings with and without basements, small commercial buildings, local roads and streets, shallow excavations, and lawns and landscaping.

The ratings in the tables are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect building site development. Not limited indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. Slightly limited indicates that the soil has features that are favorable for the specified use. The limitations are minor and can be easily overcome. Good performance and low maintenance can be expected. Somewhat limited indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. Very limited indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical ratings in the tables indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.00 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use (1.00) and the point at which the soil feature is not a limitation (0.00).

Dwellings are single-family houses of three stories or less. For dwellings without basements, the foundation is assumed to consist of spread footings of reinforced concrete built on undisturbed soil at a depth of 2 feet or at the depth of maximum frost penetration, whichever is deeper. For dwellings with basements, the foundation is assumed to consist of spread footings of reinforced concrete built on undisturbed soil at a depth of about 7 feet. The ratings for dwellings are based on the soil properties that affect the capacity of the soil to support a load without movement and on the properties that affect excavation and construction costs. The properties that affect the load-supporting capacity include depth to a water table, ponding, flooding, subsidence, linear extensibility (shrink-swell potential), and compressibility. Compressibility is inferred from the Unified classification. The properties that affect the ease and amount of excavation include depth to a water table, ponding, flooding, slope, depth to bedrock or a cemented pan, hardness of bedrock or a cemented pan, and the amount and size of rock fragments.

Small commercial buildings are structures that are less than three stories high and do not have basements. The foundation is assumed to consist of spread footings of reinforced concrete built on undisturbed soil at a depth of 2 feet or at the depth of maximum frost penetration, whichever is deeper. The ratings are based on the soil properties that affect the capacity of the soil to support a load without movement and on the properties that affect excavation and construction costs. The properties that affect the load-supporting capacity include depth to a water table, ponding, flooding, subsidence, linear extensibility (shrink-swell potential), and compressibility (which is inferred from the Unified classification). The properties that affect the ease and amount of excavation include flooding, depth to a water table, ponding, slope, depth to bedrock or a cemented pan, hardness of bedrock or a cemented pan, and the amount and size of rock fragments.

Local roads and streets have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material; a base of gravel, crushed rock, or soil material stabilized by lime or cement; and a surface of flexible material (asphalt), rigid material (concrete), or gravel with a binder. The ratings are based on the soil properties that affect the ease of excavation and grading and the traffic-supporting capacity. The properties that affect the ease of excavation and grading are depth to bedrock or a cemented pan, hardness of bedrock or a cemented pan, depth to a water table, ponding, flooding, the amount of large stones, and slope. The properties that affect the traffic-supporting capacity are soil strength (as inferred from the AASHTO group index number), subsidence, linear extensibility (shrink-swell potential), the potential for frost action, depth to a water table, and ponding.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for graves, utility lines, open ditches, or other purposes. The ratings are based on the soil properties that influence the ease of digging and the resistance to sloughing. Depth to bedrock or a cemented pan, hardness of bedrock or a cemented pan, the amount of large stones, and dense layers influence the ease of digging, filling, and compacting. Depth to the seasonal high water table, flooding, and ponding may restrict the period when excavations can be made. Slope influences the ease of using machinery. Soil texture, depth to the water table, and linear extensibility (shrink-swell potential) influence the resistance to sloughing.

Lawns and landscaping require soils on which turf and ornamental trees and shrubs can be established and maintained. Irrigation is not considered in the ratings. The ratings are based on the soil properties that affect plant growth and trafficability after vegetation is established. The properties that affect plant growth are reaction; depth to a water table; ponding; depth to bedrock or a cemented pan; the available water capacity in the upper 40 inches; the content of salts, sodium, or calcium carbonate; and sulfidic materials. The properties that affect trafficability are flooding, depth to a water table, ponding, slope, stoniness, and the amount of sand, clay, or organic matter in the surface layer.

BUILDING SITE DEVELOPMENT--Continued
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(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the potential limitation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Pct of map unit	Dwellings without basements		Dwellings with basements		Small commercial buildings	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
Be: Benfield-----	42	Very limited Shrink-swell Slope	1.00 1.00	Very limited Shrink-swell Slope Depth to soft bedrock	1.00 1.00 0.01	Very limited Shrink-swell Slope	1.00 1.00
Florence-----	28	Very limited Shrink-swell Slope	1.00 0.16	Very limited Shrink-swell Slope Depth to hard bedrock	1.00 0.16 0.05	Very limited Shrink-swell Slope	1.00 1.00
Cc: Clime-----	75	Very limited Slope Shrink-swell	1.00 1.00	Very limited Slope Shrink-swell Depth to soft bedrock	1.00 1.00 0.20	Very limited Slope Shrink-swell	1.00 1.00
Cf: Clime-----	60	Very limited Shrink-swell Slope	1.00 0.84	Very limited Shrink-swell Slope Depth to soft bedrock	1.00 0.84 0.46	Very limited Shrink-swell Slope	1.00 1.00
Sogn-----	20	Very limited Depth to hard bedrock Shrink-swell	1.00 0.73	Very limited Depth to hard bedrock Shrink-swell	1.00 0.73	Very limited Depth to hard bedrock Shrink-swell Slope	1.00 0.73 0.12
Cr: Crete-----	90	Very limited Shrink-swell	1.00	Very limited Shrink-swell	1.00	Very limited Shrink-swell	1.00
Cs: Crete-----	90	Very limited Shrink-swell	1.00	Very limited Shrink-swell	1.00	Very limited Shrink-swell	1.00
Ct: Crete-----	90	Very limited Shrink-swell	1.00	Very limited Shrink-swell	1.00	Very limited Shrink-swell Slope	1.00 0.48
Eu: Eudora-----	85	Very limited Flooding	1.00	Very limited Flooding	1.00	Very limited Flooding	1.00
Ge: Geary-----	85	Somewhat limited Shrink-swell	0.82	Somewhat limited Shrink-swell	0.82	Somewhat limited Shrink-swell Slope	0.82 0.48
Gf: Geary-----	85	Somewhat limited Shrink-swell Slope	0.82 0.37	Somewhat limited Shrink-swell Slope	0.82 0.37	Very limited Slope Shrink-swell	1.00 0.82
He: Haynie-----	55	Very limited Flooding	1.00	Very limited Flooding	1.00	Very limited Flooding	1.00
Hf: Hobbs-----	89	Very limited Flooding Shrink-swell	1.00 0.02	Very limited Flooding Shrink-swell	1.00 0.02	Very limited Flooding Shrink-swell	1.00 0.02
Hg: Hobbs-----	89	Very limited Flooding Shrink-swell	1.00 0.02	Very limited Flooding Shrink-swell	1.00 0.02	Very limited Flooding Shrink-swell	1.00 0.02
Hm: Holder-----	95	Somewhat limited Shrink-swell	0.82	Somewhat limited Shrink-swell	0.82	Somewhat limited Shrink-swell	0.82
Ho: Holder-----	75	Somewhat limited Shrink-swell	0.82	Somewhat limited Shrink-swell	0.82	Somewhat limited Shrink-swell Slope	0.82 0.12
Id: Irwin-----	85	Very limited Shrink-swell	1.00	Very limited Shrink-swell	1.00	Very limited Shrink-swell Slope	1.00 0.12
Ka: Kahola-----	75	Very limited Flooding Shrink-swell	1.00 0.00	Very limited Flooding Shrink-swell	1.00 0.22	Very limited Flooding Shrink-swell	1.00 0.00

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Map symbol and soil name	Pct of map unit	Dwellings without basements		Dwellings with basements		Small commercial buildings	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
Kb: Kahola-----	75	Very limited Flooding Shrink-swell	1.00 0.00	Very limited Flooding Shrink-swell	1.00 0.22	Very limited Flooding Shrink-swell	1.00 0.00
Ko: Konza-----	85	Very limited Shrink-swell	1.00	Very limited Shrink-swell	1.00	Very limited Shrink-swell	1.00
Lm: Ladysmith-----	90	Very limited Shrink-swell	1.00	Very limited Shrink-swell	1.00	Very limited Shrink-swell	1.00
Lo: Longford-----	85	Very limited Shrink-swell	1.00	Very limited Shrink-swell	1.00	Very limited Shrink-swell	1.00
M-W: Miscellaneous Water-	100	Not rated		Not rated		Not rated	
Mb: Mccook-----	85	Very limited Flooding	1.00	Very limited Flooding	1.00	Very limited Flooding	1.00
Mc: Mccook-----	85	Very limited Flooding	1.00	Very limited Flooding	1.00	Very limited Flooding	1.00
Mk: Mccook-----	63	Very limited Flooding	1.00	Very limited Flooding	1.00	Very limited Flooding	1.00
Smokyhill-----	25	Very limited Flooding Shrink-swell Ponding	1.00 1.00 1.00	Very limited Flooding Ponding	1.00 1.00	Very limited Flooding Shrink-swell Ponding	1.00 1.00 1.00
Mu: Muir-----	94	Very limited Flooding Shrink-swell	1.00 0.00	Very limited Flooding	1.00	Very limited Flooding Shrink-swell	1.00 0.00
Oc: Orthents-----	100	Not limited		Not limited		Somewhat limited Slope	0.00
Or: Orthents, Earthen Dam-----	100	Not rated		Not rated		Not rated	
Pt: Pits, Quarries-----	100	Not rated		Not rated		Not rated	
Ra: Reading-----	85	Very limited Flooding Shrink-swell	1.00 0.82	Very limited Flooding Shrink-swell	1.00 0.82	Very limited Flooding Shrink-swell	1.00 0.82
Re: Reading-----	85	Very limited Flooding Shrink-swell	1.00 0.82	Very limited Flooding Shrink-swell	1.00 0.82	Very limited Flooding Shrink-swell	1.00 0.82
Sa: Sarpy-----	90	Very limited Flooding	1.00	Very limited Flooding	1.00	Very limited Flooding	1.00
Sc: Sarpy-----	90	Very limited Flooding	1.00	Very limited Flooding	1.00	Very limited Flooding	1.00
Sh: Solomon-----	85	Very limited Flooding Shrink-swell Ponding	1.00 1.00 1.00	Very limited Flooding Shrink-swell Ponding	1.00 1.00 1.00	Very limited Flooding Shrink-swell Ponding	1.00 1.00 1.00
St: Sutphen-----	80	Very limited Flooding Shrink-swell Ponding	1.00 1.00 1.00	Very limited Flooding Shrink-swell Ponding	1.00 1.00 1.00	Very limited Flooding Shrink-swell Ponding	1.00 1.00 1.00
Tn: Tully-----	85	Very limited Shrink-swell	1.00	Very limited Shrink-swell	1.00	Very limited Shrink-swell	1.00
To: Tully-----	85	Very limited Shrink-swell	1.00	Very limited Shrink-swell	1.00	Very limited Shrink-swell Slope	1.00 0.48
Vc: Valentine-----	85	Somewhat limited Slope	0.16	Somewhat limited Slope	0.16	Very limited Slope	1.00

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Map symbol and soil name	Pct of map unit	Dwellings without basements		Dwellings with basements		Small commercial buildings	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
W: Water-----	100	Not rated		Not rated		Not rated	
We: Wells-----	50	Somewhat limited Shrink-swell	0.73	Somewhat limited Shrink-swell	0.73	Somewhat limited Shrink-swell	0.73
Ortello-----	30	Not limited		Not limited		Not limited	
Wf: Wells-----	50	Somewhat limited Shrink-swell	0.73	Somewhat limited Shrink-swell	0.73	Somewhat limited Shrink-swell	0.73
						Slope	0.48
Ortello-----	30	Not limited		Not limited		Somewhat limited Slope	0.48

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Map symbol and soil name	Pct of map unit	Local roads and streets		Shallow excavations		Lawns and landscaping	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
Be: Benfield-----	42	Very limited Low strength Shrink-swell Slope	1.00 1.00 1.00	Very limited Slope Too clayey Cutbanks cave Depth to soft bedrock	1.00 0.50 0.10 0.01	Very limited Slope Depth to bedrock	1.00 0.01
Florence-----	28	Very limited Shrink-swell Low strength Slope	1.00 1.00 0.16	Very limited Too clayey Slope Cutbanks cave Depth to hard bedrock	1.00 0.16 0.10 0.05	Somewhat limited Gravel content Droughty Slope Content of large stones	0.54 0.22 0.16 0.00
Cc: Clime-----	75	Very limited Slope Low strength Shrink-swell	1.00 1.00 1.00	Very limited Slope Too clayey Depth to soft bedrock Cutbanks cave	1.00 0.28 0.20 0.10	Very limited Slope Depth to bedrock Content of large stones	1.00 0.20 0.03
Cf: Clime-----	60	Very limited Low strength Shrink-swell Slope	1.00 1.00 0.84	Somewhat limited Slope Depth to soft bedrock Too clayey Cutbanks cave	0.84 0.46 0.28 0.10	Somewhat limited Slope Depth to bedrock	0.84 0.46
Sogn-----	20	Very limited Depth to hard bedrock Low strength Shrink-swell Frost action	1.00 1.00 0.73 0.50	Very limited Depth to hard bedrock Cutbanks cave	1.00 0.10	Very limited Depth to bedrock Droughty Content of large stones	1.00 1.00 0.00
Cr: Crete-----	90	Very limited Shrink-swell Low strength	1.00 1.00	Somewhat limited Too clayey Cutbanks cave	0.12 0.10	Not limited	
Cs: Crete-----	90	Very limited Shrink-swell Low strength	1.00 1.00	Somewhat limited Too clayey Cutbanks cave	0.12 0.10	Not limited	
Ct: Crete-----	90	Very limited Low strength Shrink-swell	1.00 1.00	Somewhat limited Too clayey Cutbanks cave	0.12 0.10	Not limited	
Eu: Eudora-----	85	Very limited Frost action Flooding	1.00 1.00	Somewhat limited Flooding Cutbanks cave	0.60 0.10	Somewhat limited Flooding	0.60
Ge: Geary-----	85	Very limited Low strength Shrink-swell Frost action	1.00 0.82 0.50	Somewhat limited Cutbanks cave	0.10	Not limited	
Gf: Geary-----	85	Very limited Low strength Shrink-swell Frost action Slope	1.00 0.82 0.50 0.37	Somewhat limited Slope Cutbanks cave	0.37 0.10	Somewhat limited Slope	0.37
He: Haynie-----	55	Very limited Frost action Flooding Low strength	1.00 1.00 0.22	Somewhat limited Flooding Cutbanks cave	0.80 0.10	Very limited Flooding	1.00
Hf: Hobbs-----	89	Very limited Flooding Low strength Frost action Shrink-swell	1.00 1.00 0.50 0.02	Somewhat limited Flooding Cutbanks cave	0.80 0.10	Very limited Flooding	1.00
Hg: Hobbs-----	89	Very limited Flooding Low strength Frost action Shrink-swell	1.00 1.00 0.50 0.02	Somewhat limited Flooding Cutbanks cave	0.60 0.10	Somewhat limited Flooding	0.60

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Map symbol and soil name	Pct of map unit	Local roads and streets		Shallow excavations		Lawns and landscaping	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
Hm: Holder-----	95	Very limited Low strength Shrink-swell Frost action	1.00 0.82 0.50	Somewhat limited Cutbanks cave	0.10	Not limited	
Ho: Holder-----	75	Very limited Low strength Shrink-swell Frost action	1.00 0.82 0.50	Somewhat limited Cutbanks cave	0.10	Not limited	
Id: Irwin-----	85	Very limited Shrink-swell Low strength Frost action	1.00 1.00 0.50	Somewhat limited Too clayey Cutbanks cave	0.50 0.10	Not limited	
Ka: Kahola-----	75	Very limited Flooding Low strength Frost action Shrink-swell	1.00 1.00 0.50 0.00	Somewhat limited Flooding Cutbanks cave	0.80 0.10	Very limited Flooding	1.00
Kb: Kahola-----	75	Very limited Flooding Low strength Frost action Shrink-swell	1.00 1.00 0.50 0.00	Somewhat limited Flooding Cutbanks cave	0.60 0.10	Somewhat limited Flooding	0.60
Ko: Konza-----	85	Very limited Shrink-swell Low strength Frost action	1.00 1.00 0.50	Somewhat limited Too clayey Cutbanks cave	0.50 0.10	Not limited	
Lm: Ladysmith-----	90	Very limited Shrink-swell Low strength Frost action	1.00 1.00 0.50	Somewhat limited Too clayey Cutbanks cave	0.50 0.10	Not limited	
Lo: Longford-----	85	Very limited Low strength Shrink-swell Frost action	1.00 1.00 0.50	Somewhat limited Cutbanks cave	0.10	Not limited	
M-W: Miscellaneous Water-	100	Not rated		Not rated		Not rated	
Mb: Mccook-----	85	Very limited Flooding Frost action	1.00 0.50	Somewhat limited Flooding Cutbanks cave	0.60 0.10	Somewhat limited Flooding	0.60
Mc: Mccook-----	85	Somewhat limited Frost action Flooding	0.50 0.40	Somewhat limited Cutbanks cave	0.10	Not limited	
Mk: Mccook-----	63	Very limited Flooding Frost action	1.00 0.50	Somewhat limited Flooding Cutbanks cave	0.60 0.10	Somewhat limited Flooding	0.60
Smokyhill-----	25	Very limited Flooding Low strength Shrink-swell Ponding	1.00 1.00 1.00 1.00	Very limited Ponding Flooding Cutbanks cave	1.00 0.60 0.10	Very limited Ponding Flooding	1.00 0.60
Mu: Muir-----	94	Very limited Low strength Frost action Flooding Shrink-swell	1.00 0.50 0.40 0.00	Somewhat limited Cutbanks cave	0.10	Not limited	
Oc: Orthents-----	100	Very limited Low strength	1.00	Somewhat limited Cutbanks cave	0.10	Not limited	
Or: Orthents, Earthen Dam-----	100	Not rated		Not rated		Not rated	

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Map symbol and soil name	Pct of map unit	Local roads and streets		Shallow excavations		Lawns and landscaping	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
Pt: Pits, Quarries-----	100	Not rated		Not rated		Not rated	
Ra: Reading-----	85	Very limited Low strength Shrink-swell Frost action Flooding	1.00 0.82 0.50 0.40	Somewhat limited Cutbanks cave	0.10	Not limited	
Re: Reading-----	85	Very limited Low strength Shrink-swell Frost action Flooding	1.00 0.82 0.50 0.40	Somewhat limited Cutbanks cave	0.10	Not limited	
Sa: Sarpy-----	90	Very limited Flooding	1.00	Very limited Cutbanks cave Flooding	1.00 0.60	Somewhat limited Flooding Droughty	0.60 0.36
Sc: Sarpy-----	90	Very limited Flooding	1.00	Very limited Cutbanks cave Flooding	1.00 0.60	Very limited Droughty Flooding Too sandy Gravel content	1.00 0.60 0.50 0.08
Sh: Solomon-----	85	Very limited Shrink-swell Flooding Low strength Ponding Frost action	1.00 1.00 1.00 1.00 0.50	Very limited Ponding Flooding Too clayey Cutbanks cave	1.00 0.60 0.50 0.10	Very limited Too clayey Ponding Flooding	1.00 1.00 0.60
St: Sutphen-----	80	Very limited Shrink-swell Flooding Low strength Ponding	1.00 1.00 1.00 1.00	Very limited Ponding Flooding Too clayey Cutbanks cave	1.00 0.60 0.24 0.10	Very limited Too clayey Ponding Flooding	1.00 1.00 0.60
Tn: Tully-----	85	Very limited Shrink-swell Low strength	1.00 1.00	Somewhat limited Too clayey Cutbanks cave	0.24 0.10	Not limited	
To: Tully-----	85	Very limited Shrink-swell Low strength	1.00 1.00	Somewhat limited Too clayey Cutbanks cave	0.24 0.10	Not limited	
Vc: Valentine-----	85	Somewhat limited Slope	0.16	Very limited Cutbanks cave Depth to dense layer Slope	1.00 0.50 0.16	Somewhat limited Slope	0.16
W: Water-----	100	Not rated		Not rated		Not rated	
We: Wells-----	50	Very limited Low strength Shrink-swell Frost action	1.00 0.73 0.50	Somewhat limited Cutbanks cave	0.10	Not limited	
Ortello-----	30	Somewhat limited Frost action	0.50	Somewhat limited Cutbanks cave	0.10	Not limited	
Wf: Wells-----	50	Very limited Low strength Shrink-swell Frost action	1.00 0.73 0.50	Somewhat limited Cutbanks cave	0.10	Not limited	
Ortello-----	30	Somewhat limited Frost action	0.50	Somewhat limited Cutbanks cave	0.10	Not limited	

