

Building Site Development
Ward County, North Dakota

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.

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. Slight 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. Moderate 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. Severe 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.

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.

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Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
Ad: Channel-----	---	---	---	---	---	---
Alluvial Land-----	Moderate: flooding wetness	Severe: flooding	Severe: flooding	Severe: flooding	Severe: flooding low strength	Moderate: flooding
Svea, loam-----	---	---	---	---	---	---
Lamoure, silt loam, channeled-----	---	---	---	---	---	---
Velva, loam-----	---	---	---	---	---	---
Recent Loamy Alluvial, CHANNELED-----	---	---	---	---	---	---
Af: Arveson, fsl-----	Severe: wetness cutbanks cave	Severe: wetness	Severe: wetness	Severe: wetness	Severe: frost action wetness	Severe: wetness
Arveson, fsl, wet-----	---	---	---	---	---	---
Embden, fsl-----	---	---	---	---	---	---
Lihen, fsl-----	---	---	---	---	---	---
ArA: Arvilla, sl-----	Severe: cutbanks cave	Slight	Slight	Slight	Slight	Moderate: droughty
Sioux, gvly l-----	---	---	---	---	---	---
Divide, l-----	---	---	---	---	---	---
Renshaw, l-----	---	---	---	---	---	---
ArB: Arvilla, sl-----	Severe: cutbanks cave	Slight	Slight	Moderate: slope	Slight	Moderate: droughty
Sioux, gvly l-----	---	---	---	---	---	---
Divide, l-----	---	---	---	---	---	---
Renshaw, l-----	---	---	---	---	---	---
BaA: Barnes, l-----	Slight	Moderate: shrink-swell	Moderate: shrink-swell	Moderate: shrink-swell	Severe: low strength	Slight
Hamerly, l-----	---	---	---	---	---	---
Svea, l-----	---	---	---	---	---	---
Tonka, sil-----	---	---	---	---	---	---
Buse, l-----	---	---	---	---	---	---
BaB: Barnes, l-----	Slight	Moderate: shrink-swell	Moderate: shrink-swell	Moderate: shrink-swell	Severe: low strength	Slight
Hamerly, l-----	---	---	---	---	---	---
Svea, l-----	---	---	---	---	---	---
Buse, l-----	---	---	---	---	---	---
Tonka, sil-----	---	---	---	---	---	---
Parnell, sicl-----	---	---	---	---	---	---

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Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
BaC: Barnes, 1-----	Slight	Moderate: shrink-swell	Moderate: shrink-swell	Moderate: shrink-swell slope	Severe: low strength	Slight
Buse, 1-----	---	---	---	---	---	---
Parnell, sic1-----	---	---	---	---	---	---
Svea, 1-----	---	---	---	---	---	---
Tonka, sil-----	---	---	---	---	---	---
BaD: Barnes, 1-----	Slight	Moderate: shrink-swell	Moderate: shrink-swell	Moderate: shrink-swell slope	Severe: low strength	Slight
Buse, 1-----	---	---	---	---	---	---
Svea, 1-----	---	---	---	---	---	---
Parnell, sic1-----	---	---	---	---	---	---
Tonka, sil-----	---	---	---	---	---	---
BaE: Barnes, 1-----	Moderate: slope	Moderate: shrink-swell slope	Moderate: shrink-swell slope	Severe: slope	Severe: low strength	Moderate: slope
Buse, 1-----	---	---	---	---	---	---
Tonka, sil-----	---	---	---	---	---	---
Parnell, sic1-----	---	---	---	---	---	---
Hamerly, 1-----	---	---	---	---	---	---
BbB: Barnes, 1-----	Slight	Moderate: shrink-swell	Moderate: shrink-swell	Moderate: shrink-swell slope	Severe: low strength	Slight
Buse, 1-----	Slight	Moderate: shrink-swell	Moderate: shrink-swell	Moderate: shrink-swell slope	Severe: low strength	Slight
Svea, 1-----	---	---	---	---	---	---
Tonka, sil-----	---	---	---	---	---	---
Hamerly, 1-----	---	---	---	---	---	---
Vallars, 1-----	---	---	---	---	---	---
BhB: Barnes, 1-----	Slight	Moderate: shrink-swell	Moderate: shrink-swell	Moderate: shrink-swell	Severe: low strength	Slight
Hamerly, 1-----	Severe: wetness	Moderate: shrink-swell wetness	Severe: wetness	Moderate: shrink-swell wetness	Severe: frost action	Moderate: wetness
Parnell, sic1-----	---	---	---	---	---	---
Svea, 1-----	---	---	---	---	---	---
Tonka, sil-----	---	---	---	---	---	---
Buse, 1-----	---	---	---	---	---	---
BlA: Barnes, 1-----	Slight	Moderate: shrink-swell	Moderate: shrink-swell	Moderate: shrink-swell	Severe: low strength	Slight

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Svea, 1-----	Moderate: wetness	Moderate: shrink-swell	Moderate: shrink-swell wetness	Moderate: shrink-swell	Severe: low strength	Slight
Hamerly, 1-----	---	---	---	---	---	---
Parnell, sic1-----	---	---	---	---	---	---
Tonka, sil-----	---	---	---	---	---	---
BmB: Barnes, 1-----	Slight	Moderate: shrink-swell	Moderate: shrink-swell	Moderate: shrink-swell	Severe: low strength	Slight
Tonka, 1-----	Severe: ponding	Severe: shrink-swell ponding	Severe: shrink-swell ponding	Severe: shrink-swell ponding	Severe: low strength shrink-swell ponding	Severe: ponding
Hamerly, 1-----	---	---	---	---	---	---
Parnell, sic1-----	---	---	---	---	---	---
Svea, 1-----	---	---	---	---	---	---
Buse, 1-----	---	---	---	---	---	---
Bn: Benoit, 1-----	Severe: wetness cutbanks cave	Severe: wetness	Severe: wetness	Severe: wetness	Severe: frost action wetness	Severe: wetness
Colvin, sil-----	---	---	---	---	---	---
Divide, 1-----	---	---	---	---	---	---
Lehr, 1-----	---	---	---	---	---	---
Renshaw, 1-----	---	---	---	---	---	---
BoB: Bowbells, 1-----	Slight	Moderate: shrink-swell	Moderate: shrink-swell	Moderate: shrink-swell	Severe: low strength	Slight
Williams, 1-----	---	---	---	---	---	---
Tonka, sil-----	---	---	---	---	---	---
Hamerly, 1-----	---	---	---	---	---	---
Max, 1-----	---	---	---	---	---	---
Bp: Bowbells, 1-----	Slight	Moderate: shrink-swell	Moderate: shrink-swell	Moderate: shrink-swell	Severe: low strength	Slight
Parnell, sic1-----	Severe: excess humus ponding	Severe: shrink-swell ponding	Severe: shrink-swell ponding	Severe: shrink-swell ponding	Severe: low strength shrink-swell ponding	Severe: ponding
Hamerly, 1-----	---	---	---	---	---	---
Williams, 1-----	---	---	---	---	---	---
Tonka, sil-----	---	---	---	---	---	---
Max, 1-----	---	---	---	---	---	---
Br: Bowbells, 1-----	Slight	Moderate: shrink-swell	Moderate: shrink-swell	Moderate: shrink-swell	Severe: low strength	Slight
Tonka, sil-----	Severe: ponding	Severe: shrink-swell ponding	Severe: shrink-swell ponding	Severe: shrink-swell ponding	Severe: low strength shrink-swell ponding	Severe: ponding

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Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
Hamerly, 1-----	---	---	---	---	---	---
Parnell, sicl-----	---	---	---	---	---	---
Williams, 1-----	---	---	---	---	---	---
BtA: Bowbells, 1-----	Slight	Moderate: shrink-swell	Moderate: shrink-swell	Moderate: shrink-swell	Severe: low strength	Slight
Williams, 1-----	Slight	Moderate: shrink-swell	Moderate: shrink-swell	Moderate: shrink-swell	Severe: low strength	Slight
Hamerly, 1-----	---	---	---	---	---	---
Parnell, sicl-----	---	---	---	---	---	---
Tonka, sil-----	---	---	---	---	---	---
Vallers, 1-----	---	---	---	---	---	---
BuE: Buse, 1-----	Moderate: slope	Moderate: shrink-swell slope	Moderate: shrink-swell slope	Severe: slope	Severe: low strength	Moderate: slope
Barnes, 1-----	---	---	---	---	---	---
Parnell, sicl-----	---	---	---	---	---	---
Hamerly, 1-----	---	---	---	---	---	---
Svea, 1-----	---	---	---	---	---	---
Tonka, sil-----	---	---	---	---	---	---
BvC: Buse, 1-----	Slight	Moderate: shrink-swell	Moderate: shrink-swell	Moderate: shrink-swell slope	Severe: low strength	Slight
Barnes, 1-----	Slight	Moderate: shrink-swell	Moderate: shrink-swell	Moderate: shrink-swell slope	Severe: low strength	Slight
Svea, 1-----	---	---	---	---	---	---
Parnell, sicl-----	---	---	---	---	---	---
Tonka, sil-----	---	---	---	---	---	---
Hamerly, 1-----	---	---	---	---	---	---
BvE: Buse, 1-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: low strength slope	Severe: slope
Barnes, 1-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: low strength slope	Severe: slope
Parnell, sicl-----	---	---	---	---	---	---
Tonka, sil-----	---	---	---	---	---	---
Hamerly, 1-----	---	---	---	---	---	---
Svea, 1-----	---	---	---	---	---	---
Southam, sicl-----	---	---	---	---	---	---
Co: Colvin, sil-----	Severe: wetness	Severe: wetness	Severe: wetness	Severe: wetness	Severe: frost action low strength wetness	Severe: wetness

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Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
Lamoure, sicl-----	---	---	---	---	---	---
Overly, sicl-----	---	---	---	---	---	---
Hegne, sic-----	---	---	---	---	---	---
Cv: Colvin, sicl, vpd-----	Severe: ponding	Severe: ponding	Severe: ponding	Severe: ponding	Severe: frost action low strength ponding	Severe: ponding
Lamoure, sicl, pd-----	---	---	---	---	---	---
Colvin, sicl, pd-----	---	---	---	---	---	---
Hegne, sic, pd-----	---	---	---	---	---	---
Dd: Divide, l-----	Severe: cutbanks cave	Slight	Moderate: wetness	Slight	Moderate: frost action	Slight
Lehr, l-----	---	---	---	---	---	---
Renshaw, l-----	---	---	---	---	---	---
Marysland, l-----	---	---	---	---	---	---
EcB: Egeland, fsl-----	Severe: cutbanks cave	Slight	Slight	Moderate: slope	Moderate: frost action	Slight
Embden, fsl-----	---	---	---	---	---	---
Heimdal, l-----	---	---	---	---	---	---
Eckman, l-----	---	---	---	---	---	---
Telfer, lfs-----	---	---	---	---	---	---
EdA: Egeland, fsl, till substratum-----	Slight	Slight	Moderate: shrink-swell	Slight	Moderate: frost action	Slight
Egeland, fsl-----	---	---	---	---	---	---
Embden, fsl-----	---	---	---	---	---	---
Tonka, sil-----	---	---	---	---	---	---
Parnell, sicl-----	---	---	---	---	---	---
Em: Embden, fsl-----	Severe: cutbanks cave	Slight	Moderate: wetness	Slight	Moderate: frost action	Slight
Emrick, l-----	---	---	---	---	---	---
Egeland, fsl-----	---	---	---	---	---	---
Tonka, sil-----	---	---	---	---	---	---
Parnell, sicl-----	---	---	---	---	---	---
ErA: Emrick, l-----	Slight	Slight	Slight	Slight	Moderate: frost action	Slight
Heimdal, l-----	Slight	Slight	Slight	Slight	Moderate: frost action	Slight
Hamerly, l-----	---	---	---	---	---	---
Parnell, sicl-----	---	---	---	---	---	---
Tonka, sil-----	---	---	---	---	---	---

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Fc: Fargo, sic-----	Severe: wetness cutbanks cave	Severe: shrink-swell wetness	Severe: shrink-swell wetness	Severe: shrink-swell wetness	Severe: low strength shrink-swell wetness	Severe: too clayey wetness
Overly, sic1-----	---	---	---	---	---	---
Ludden, sic1-----	---	---	---	---	---	---
Hegne, sic-----	---	---	---	---	---	---
Fw: Freshwater Marsh-----	Severe: ponding	Severe: shrink-swell ponding	Severe: shrink-swell ponding	Severe: shrink-swell ponding	Severe: low strength shrink-swell ponding	Severe: ponding
Southam, sic1-----	---	---	---	---	---	---
Water-----	---	---	---	---	---	---
Gp: Gravel Pits-----	Severe: slope cutbanks cave	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope small stones droughty
Hf: Hamerly, l-----	Severe: wetness	Moderate: shrink-swell wetness	Severe: wetness	Moderate: shrink-swell wetness	Severe: frost action	Slight
Barnes, l-----	---	---	---	---	---	---
Tonka, sil-----	---	---	---	---	---	---
Vallers, l-----	---	---	---	---	---	---
Parnell, sic1-----	---	---	---	---	---	---
Svea, l-----	---	---	---	---	---	---
Hh: Harriet, l-----	Severe: wetness	Severe: flooding wetness	Severe: flooding wetness	Severe: flooding wetness	Severe: flooding low strength wetness	Severe: excess sodium wetness
Velva, l-----	---	---	---	---	---	---
Vallers, l-----	---	---	---	---	---	---
Channel-----	---	---	---	---	---	---
Harriet, l, saline-----	---	---	---	---	---	---
Harriet, cl, saline-----	---	---	---	---	---	---
Hk: Harriet, l, STRONGLY SALINE-----	Severe: wetness	Severe: flooding wetness	Severe: flooding wetness	Severe: flooding wetness	Severe: flooding low strength wetness	Severe: excess sodium wetness
Vallers, l, STRONGLY SALINE-----	Severe: wetness	Severe: flooding wetness	Severe: flooding wetness	Severe: flooding wetness	Severe: frost action low strength wetness	Severe: excess salt wetness
Harriet, l-----	---	---	---	---	---	---
Vallers, l-----	---	---	---	---	---	---

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Hr: Hegne, sic-----	Severe: wetness cutbanks cave	Severe: shrink-swell wetness	Severe: shrink-swell wetness	Severe: shrink-swell wetness	Severe: low strength shrink-swell wetness	Severe: too clayey wetness
Fargo, sic-----	---	---	---	---	---	---
Overly, sicl-----	---	---	---	---	---	---
Makoti, sicl-----	---	---	---	---	---	---
Hs: Heil, sicl-----	Severe: ponding cutbanks cave	Severe: shrink-swell ponding	Severe: shrink-swell ponding	Severe: shrink-swell ponding	Severe: low strength shrink-swell ponding	Severe: excess sodium ponding
Makoti, sicl-----	---	---	---	---	---	---
Tansem, sil-----	---	---	---	---	---	---
HtB: Heimdahl, l-----	Slight	Slight	Slight	Moderate: slope	Moderate: frost action	Slight
Buse, l-----	---	---	---	---	---	---
Emrick, l-----	---	---	---	---	---	---
Tonka, sil-----	---	---	---	---	---	---
Parnell, sicl-----	---	---	---	---	---	---
Lc: Colvin, sil-----	Severe: wetness	Severe: wetness	Severe: wetness	Severe: wetness	Severe: frost action low strength wetness	Severe: wetness
Lamoure, sicl-----	Severe: wetness	Severe: flooding wetness	Severe: flooding wetness	Severe: flooding wetness	Severe: flooding low strength wetness	Severe: wetness
Marysland, sil, poorly dr.-----	---	---	---	---	---	---
Arveson, Vpd, fsl-----	---	---	---	---	---	---
Channel-----	---	---	---	---	---	---
Vallers, l-----	---	---	---	---	---	---
LeA: Lehr, l-----	Severe: cutbanks cave	Slight	Slight	Slight	Slight	Moderate: droughty
Renshaw, l-----	---	---	---	---	---	---
Divide, l-----	---	---	---	---	---	---
Manning, sl-----	---	---	---	---	---	---
Stady, l-----	---	---	---	---	---	---
Wabek, gvly sl-----	---	---	---	---	---	---
LeB: Lehr, l-----	Severe: cutbanks cave	Slight	Slight	Moderate: slope	Slight	Moderate: droughty
Divide, l-----	---	---	---	---	---	---
Manning, sl-----	---	---	---	---	---	---
Wabek, gvly sl-----	---	---	---	---	---	---

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Parnell, sicl-----	---	---	---	---	---	---
Renshaw, l-----	---	---	---	---	---	---
Stady, l-----	---	---	---	---	---	---
LfA:						
Lihen, fsl-----	Severe: cutbanks cave	Slight	Slight	Slight	Slight	Moderate: droughty
Telfer, fsl-----	Severe: cutbanks cave	Slight	Slight	Slight	Slight	Moderate: droughty
Hecla, lfs-----	---	---	---	---	---	---
Manning, sl-----	---	---	---	---	---	---
Seroco, fs-----	---	---	---	---	---	---
Tonka, sil-----	---	---	---	---	---	---
LfB:						
Lihen, fsl-----	Severe: cutbanks cave	Slight	Slight	Moderate: slope	Slight	Moderate: droughty
Telfer, fsl-----	Severe: cutbanks cave	Slight	Slight	Moderate: slope	Slight	Moderate: droughty
Manning, sl-----	---	---	---	---	---	---
Seroco, fs-----	---	---	---	---	---	---
Hecla, lfs-----	---	---	---	---	---	---
Tonka, sil-----	---	---	---	---	---	---
LhA:						
Lihen, fsl, Till Substratum-----	Severe: cutbanks cave	Slight	Slight	Slight	Slight	Moderate: droughty
Telfer, fsl, Till substratum-----	Severe: cutbanks cave	Slight	Slight	Slight	Slight	Moderate: droughty
Hecla, lfs-----	---	---	---	---	---	---
Lihen, fsl-----	---	---	---	---	---	---
Manning, sl-----	---	---	---	---	---	---
Telfer, fsl-----	---	---	---	---	---	---
LhB:						
Lihen, fsl, Till Substratum-----	Severe: cutbanks cave	Slight	Slight	Moderate: slope	Slight	Moderate: droughty
Telfer, fsl, Till Substratum-----	Severe: cutbanks cave	Slight	Slight	Moderate: slope	Slight	Moderate: droughty
Telfer, fsl-----	---	---	---	---	---	---
Lihen, fsl-----	---	---	---	---	---	---
Seroco, fs-----	---	---	---	---	---	---
LlB:						
Lihen, lfs-----	Severe: cutbanks cave	Slight	Slight	Slight	Slight	Moderate: droughty
Telfer, lfs-----	Severe: cutbanks cave	Slight	Slight	Slight	Slight	Moderate: droughty
Embdgen, fsl-----	---	---	---	---	---	---

Building Site Development--Continued
Ward County, North Dakota

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. See text for definitions of terms used in this table. Absence of an entry indicates that no rating is applicable.)

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
Seroco, fs-----	---	---	---	---	---	---
Tonka, sil-----	---	---	---	---	---	---
Lo: Loamy Lake Beaches (mauvais), L-----	Severe: wetness	Severe: wetness	Severe: wetness	Severe: wetness	Severe: frost action low strength	Moderate: excess salt wetness
Lihen, lfs-----	---	---	---	---	---	---
Sioux, gvly l-----	---	---	---	---	---	---
Arveson, fsl-----	---	---	---	---	---	---
Ls: Ludden, sicl-----	Severe: ponding cutbanks cave	Severe: flooding ponding	Severe: flooding ponding	Severe: flooding ponding	Severe: low strength ponding	Severe: flooding ponding
Lamoure, sicl-----	---	---	---	---	---	---
Channel-----	---	---	---	---	---	---
Parnell, sicl-----	---	---	---	---	---	---
Velva, l-----	---	---	---	---	---	---
Lt: Ludden, c-----	Severe: ponding cutbanks cave	Severe: flooding shrink-swell ponding	Severe: flooding shrink-swell ponding	Severe: flooding shrink-swell ponding	Severe: low strength shrink-swell ponding	Severe: flooding too clayey ponding
Lamoure, sicl-----	---	---	---	---	---	---
Channel-----	---	---	---	---	---	---
Colvin, sil-----	---	---	---	---	---	---
Parnell, sicl-----	---	---	---	---	---	---
Lu: Ludden, c-----	Severe: ponding cutbanks cave	Severe: flooding shrink-swell ponding	Severe: flooding shrink-swell ponding	Severe: flooding shrink-swell ponding	Severe: low strength shrink-swell ponding	Severe: flooding too clayey ponding
Channel-----	---	---	---	---	---	---
Parnell, sicl-----	---	---	---	---	---	---
Lamoure, sicl-----	---	---	---	---	---	---
Colvin, Vpd, sil-----	---	---	---	---	---	---
MAA: Makoti, sicl-----	Moderate: wetness	Moderate: shrink-swell	Moderate: shrink-swell wetness	Moderate: shrink-swell	Severe: low strength	Slight
Roseglen, sil-----	---	---	---	---	---	---
Tansem, sil-----	---	---	---	---	---	---
Tonka, sil-----	---	---	---	---	---	---
MGA: Manning, sl-----	Severe: cutbanks cave	Slight	Slight	Slight	Slight	Moderate: droughty
Wabek, sl-----	---	---	---	---	---	---
Lehr, l-----	---	---	---	---	---	---
Divide, l-----	---	---	---	---	---	---

Building Site Development--Continued
Ward County, North Dakota

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. See text for definitions of terms used in this table. Absence of an entry indicates that no rating is applicable.)

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
MgB:						
Manning, sl-----	Severe: cutbanks cave	Slight	Slight	Moderate: slope	Slight	Moderate: droughty
Wabek, l-----	---	---	---	---	---	---
Lehr, l-----	---	---	---	---	---	---
Divide, l-----	---	---	---	---	---	---
Lihen, fsl-----	---	---	---	---	---	---
MhC:						
Manning, sl-----	Severe: cutbanks cave	Moderate: slope	Moderate: slope	Severe: slope	Moderate: slope	Moderate: slope droughty
Wabek, sl-----	Severe: cutbanks cave	Moderate: slope	Moderate: slope	Severe: slope	Moderate: slope	Severe
Lehr, l-----	---	---	---	---	---	---
Divide, l-----	---	---	---	---	---	---
Lihen, fsl-----	---	---	---	---	---	---
Telfer, fsl-----	---	---	---	---	---	---
Tonka, sil-----	---	---	---	---	---	---
ME:						
Max, l-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
Bowbells, l-----	Slight	Moderate: shrink-swell	Moderate: shrink-swell	Moderate: shrink-swell	Severe: low strength	Slight
Zahl, l-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: low strength slope	Severe: slope
Williams, l-----	---	---	---	---	---	---
Hamerly, l-----	---	---	---	---	---	---
Parnell, sicl-----	---	---	---	---	---	---
Tonka, sil-----	---	---	---	---	---	---
MmB:						
Max, l-----	Slight	Moderate: shrink-swell	Moderate: shrink-swell	Moderate: shrink-swell slope	Moderate: low strength shrink-swell	Slight
Williams, l-----	Slight	Moderate: shrink-swell	Moderate: shrink-swell	Moderate: shrink-swell slope	Severe: low strength	Slight
Lehr, l-----	---	---	---	---	---	---
Wabek, sl-----	---	---	---	---	---	---
Tansem, sil-----	---	---	---	---	---	---
Tonka, sil-----	---	---	---	---	---	---
MmC:						
Max, l-----	Slight	Moderate: shrink-swell	Moderate: shrink-swell	Moderate: shrink-swell slope	Moderate: low strength shrink-swell	Slight
Williams, l-----	Slight	Moderate: shrink-swell	Moderate: shrink-swell	Moderate: shrink-swell slope	Severe: low strength	Slight
Bowbells, l-----	---	---	---	---	---	---

Building Site Development--Continued
Ward County, North Dakota

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. See text for definitions of terms used in this table. Absence of an entry indicates that no rating is applicable.)

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
Parnell, sicl-----	---	---	---	---	---	---
Zahl, l-----	---	---	---	---	---	---
MmD: Max, l-----	Moderate: slope	Moderate: shrink-swell slope	Moderate: shrink-swell slope	Severe: slope	Moderate: low strength shrink-swell slope	Moderate: slope
Williams, l-----	Moderate: slope	Moderate: shrink-swell slope	Moderate: shrink-swell slope	Severe: slope	Severe: low strength	Moderate: slope
Bowbells, l-----	---	---	---	---	---	---
Zahl, l-----	---	---	---	---	---	---
Parnell, sicl-----	---	---	---	---	---	---
Hamerly, l-----	---	---	---	---	---	---
Tonka, sil-----	---	---	---	---	---	---
MnC: Max, stony l-----	Moderate: large stones slope	Moderate: large stones shrink-swell slope	Moderate: large stones shrink-swell slope	Severe: slope	Moderate: low strength shrink-swell slope	Severe: large stones
Zahl, stony l-----	Moderate: slope	Moderate: shrink-swell slope	Moderate: shrink-swell slope	Severe: slope	Severe: low strength	Severe: large stones
Williams, stony l-----	---	---	---	---	---	---
Hamerly, l-----	---	---	---	---	---	---
Parnell, sicl-----	---	---	---	---	---	---
Bowbells, l-----	---	---	---	---	---	---
Tonka, sil-----	---	---	---	---	---	---
MoC: Max, l-----	Moderate: slope	Moderate: shrink-swell slope	Moderate: shrink-swell slope	Severe: slope	Moderate: low strength shrink-swell slope	Moderate: slope
Zahl, l-----	Moderate: slope	Moderate: shrink-swell slope	Moderate: shrink-swell slope	Severe: slope	Severe: low strength	Moderate: slope
Bowbells, l-----	---	---	---	---	---	---
Williams, l-----	---	---	---	---	---	---
Hamerly, l-----	---	---	---	---	---	---
Parnell, sicl-----	---	---	---	---	---	---
Tonka, sil-----	---	---	---	---	---	---
Mp: Dumps-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: low strength slope	Severe: slope
Mine Pits-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: low strength slope	Severe: slope
Buse, l-----	---	---	---	---	---	---
Sioux, gvly l-----	---	---	---	---	---	---

Building Site Development--Continued
Ward County, North Dakota

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. See text for definitions of terms used in this table. Absence of an entry indicates that no rating is applicable.)

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
Nm: Noonan, 1-----	Moderate: wetness	Moderate: shrink-swell	Moderate: shrink-swell wetness	Moderate: shrink-swell	Severe: low strength	Severe: excess sodium
Miranda, 1-----	Moderate: wetness	Moderate: shrink-swell	Moderate: shrink-swell wetness	Moderate: shrink-swell	Severe: low strength	Severe: excess sodium
Niobell, 1-----	---	---	---	---	---	---
Williams, 1-----	---	---	---	---	---	---
Zahl, 1-----	---	---	---	---	---	---
Parnell, sicl-----	---	---	---	---	---	---
Tonka, sil-----	---	---	---	---	---	---
Nn: Noonan, 1-----	Moderate: wetness	Moderate: shrink-swell	Moderate: shrink-swell wetness	Moderate: shrink-swell	Severe: low strength	Severe: excess sodium
Niobell, 1-----	Moderate: wetness	Moderate: shrink-swell	Moderate: shrink-swell wetness	Moderate: shrink-swell	Moderate: frost action low strength shrink-swell	Severe: excess sodium
Williams, 1-----	---	---	---	---	---	---
Bowbells, 1-----	---	---	---	---	---	---
Miranda, 1-----	---	---	---	---	---	---
Hamerly, 1-----	---	---	---	---	---	---
Tonka, sil-----	---	---	---	---	---	---
NtB: Nutley, sic-----	Moderate: too clayey	Severe: shrink-swell	Severe: shrink-swell	Severe: shrink-swell	Severe: low strength shrink-swell	Severe: too clayey
Sinai, sicl-----	---	---	---	---	---	---
Overly, Mottled, sicl---	---	---	---	---	---	---
Williams, 1-----	---	---	---	---	---	---
NuA: Nutley, sic-----	Moderate: too clayey	Severe: shrink-swell	Severe: shrink-swell	Severe: shrink-swell	Severe: low strength shrink-swell	Severe: too clayey
Sinai, sic-----	Severe: cutbanks cave	Severe: shrink-swell	Severe: shrink-swell	Severe: shrink-swell	Severe: low strength shrink-swell	Severe: too clayey
Overly, sicl-----	---	---	---	---	---	---
Tonka, sil-----	---	---	---	---	---	---
Williams, 1-----	---	---	---	---	---	---
Ov: Overly, sicl, varient---	Moderate: too clayey wetness	Moderate: shrink-swell	Moderate: shrink-swell wetness	Moderate: shrink-swell	Severe: frost action low strength	Slight
Fargo, sic-----	---	---	---	---	---	---
Nutley, sic-----	---	---	---	---	---	---
Parnell, sicl-----	---	---	---	---	---	---
Emrick, 1-----	---	---	---	---	---	---

Building Site Development--Continued
Ward County, North Dakota

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. See text for definitions of terms used in this table. Absence of an entry indicates that no rating is applicable.)

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
Pa: Parnell, sicl-----	Severe: excess humus ponding	Severe: shrink-swell ponding	Severe: shrink-swell ponding	Severe: shrink-swell ponding	Severe: low strength shrink-swell ponding	Severe: ponding
Tonka, sil-----	---	---	---	---	---	---
Hamerly, l-----	---	---	---	---	---	---
Southam, sicl-----	---	---	---	---	---	---
Vallers, l-----	---	---	---	---	---	---
Colvin, sil-----	---	---	---	---	---	---
Pe: Parnell, sicl-----	Severe: excess humus ponding	Severe: shrink-swell ponding	Severe: shrink-swell ponding	Severe: shrink-swell ponding	Severe: low strength shrink-swell ponding	Severe: ponding
Loamy Beaches (mauvais), l-----	---	---	---	---	---	---
Southam, sicl-----	---	---	---	---	---	---
Vallers, l-----	---	---	---	---	---	---
Tonka, sil-----	---	---	---	---	---	---
ReA: Renshaw, L-----	Severe: cutbanks cave	Slight	Slight	Slight	Slight	Moderate: droughty
Divide, L-----	---	---	---	---	---	---
Arvilla, SL-----	---	---	---	---	---	---
Sioux, gvly l-----	---	---	---	---	---	---
RtA: Roseglen, sil-----	Slight	Moderate: shrink-swell	Moderate: shrink-swell	Moderate: shrink-swell	Severe: low strength	Slight
Tansem, sil-----	Severe: cutbanks cave	Slight	Slight	Slight	Moderate: frost action low strength	Slight
Makoti, sicl-----	---	---	---	---	---	---
Tonka, sil-----	---	---	---	---	---	---
Sa: Salt Water Marsh-----	Severe: ponding cutbanks cave	Severe: ponding	Severe: ponding	Severe: ponding	Severe: frost action low strength ponding	Severe: excess salt ponding
SeC: Seroco, fs, hummocky----	Severe: cutbanks cave	Slight	Slight	Slight	Slight	Moderate: droughty
Hecla, lfs-----	---	---	---	---	---	---
Lihen, fsl-----	---	---	---	---	---	---
Telfer, fsl-----	---	---	---	---	---	---
Tonka, sil-----	---	---	---	---	---	---
SgB: Sinai, sicl-----	Severe: cutbanks cave	Severe: shrink-swell	Severe: shrink-swell	Severe: shrink-swell	Severe: low strength shrink-swell	Slight
Nutley, sic-----	---	---	---	---	---	---

Building Site Development--Continued
Ward County, North Dakota

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. See text for definitions of terms used in this table. Absence of an entry indicates that no rating is applicable.)

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
Makoti, sicl-----	---	---	---	---	---	---
Bowbells, l-----	---	---	---	---	---	---
SoA: Sinai, sic-----	Severe: cutbanks cave	Severe: shrink-swell	Severe: shrink-swell	Severe: shrink-swell	Severe: low strength shrink-swell	Severe: too clayey
Makoti, sicl-----	---	---	---	---	---	---
Nutley, sic-----	---	---	---	---	---	---
Overly, sicl-----	---	---	---	---	---	---
SoB: Sioux, gvly l-----	Severe: cutbanks cave	Slight	Slight	Slight	Slight	Severe: droughty
Arvilla, sl-----	---	---	---	---	---	---
Renshaw, l-----	---	---	---	---	---	---
Divide, l-----	---	---	---	---	---	---
SoA: Svea, l-----	Moderate: wetness	Moderate: shrink-swell	Moderate: shrink-swell wetness	Moderate: shrink-swell	Severe: low strength	Slight
Hamerly, l-----	---	---	---	---	---	---
Tonka, sil-----	---	---	---	---	---	---
Barnes, l-----	---	---	---	---	---	---
Parnell, sicl-----	---	---	---	---	---	---
SoB: Svea, l-----	Moderate: wetness	Moderate: shrink-swell	Moderate: shrink-swell wetness	Moderate: shrink-swell	Severe: low strength	Slight
Barnes, l-----	---	---	---	---	---	---
Parnell, sicl-----	---	---	---	---	---	---
Hamerly, l-----	---	---	---	---	---	---
Tonka, sil-----	---	---	---	---	---	---
SoA: Svea, l, fans-----	Moderate: wetness	Moderate: shrink-swell	Moderate: shrink-swell wetness	Moderate: shrink-swell	Severe: low strength	Slight
Lamoure, sicl-----	---	---	---	---	---	---
Hamerly, l-----	---	---	---	---	---	---
Tonka, sil-----	---	---	---	---	---	---
Parnell, sicl-----	---	---	---	---	---	---
SoB: Svea, l, fans-----	Moderate: wetness	Moderate: shrink-swell	Moderate: shrink-swell wetness	Moderate: shrink-swell slope	Severe: low strength	Slight
Lamoure, sicl-----	---	---	---	---	---	---
Hamerly, l-----	---	---	---	---	---	---
Barnes, l-----	---	---	---	---	---	---
Parnell, sicl-----	---	---	---	---	---	---

Building Site Development--Continued
Ward County, North Dakota

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. See text for definitions of terms used in this table. Absence of an entry indicates that no rating is applicable.)

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
Tonka, sil-----	---	---	---	---	---	---
Sx: Svea, l-----	Moderate: wetness	Moderate: shrink-swell	Moderate: shrink-swell wetness	Moderate: shrink-swell	Severe: low strength	Slight
Hamerly, l-----	Severe: wetness	Moderate: shrink-swell wetness	Severe: wetness	Moderate: shrink-swell wetness	Severe: frost action	Moderate: wetness
Tonka, sil-----	Severe: ponding	Severe: shrink-swell ponding	Severe: shrink-swell ponding	Severe: shrink-swell ponding	Severe: low strength shrink-swell ponding	Severe: ponding
Parnell, sicl-----	---	---	---	---	---	---
Barnes, l-----	---	---	---	---	---	---
Lamoure, sicl-----	---	---	---	---	---	---
Sy: Svea, l-----	Moderate: wetness	Moderate: shrink-swell	Moderate: shrink-swell wetness	Moderate: shrink-swell	Severe: low strength	Slight
Lamoure, sicl-----	Severe: wetness	Severe: flooding wetness	Severe: flooding wetness	Severe: flooding wetness	Severe: flooding low strength wetness	Severe: wetness
Hamerly, l-----	---	---	---	---	---	---
Barnes, l-----	---	---	---	---	---	---
Tonka, sil-----	---	---	---	---	---	---
Sz: Svea, l-----	Moderate: wetness	Moderate: shrink-swell	Moderate: shrink-swell wetness	Moderate: shrink-swell	Severe: low strength	Slight
Tonka, sil-----	Severe: ponding	Severe: shrink-swell ponding	Severe: shrink-swell ponding	Severe: shrink-swell ponding	Severe: low strength shrink-swell ponding	Severe: ponding
Hamerly, l-----	---	---	---	---	---	---
Vallers, l-----	---	---	---	---	---	---
Parnell, sicl-----	---	---	---	---	---	---
TLC: Telfer, lfs-----	Severe: cutbanks cave	Moderate: slope	Moderate: slope	Severe: slope	Moderate: slope	Moderate: slope droughty
Lihen, lfs-----	Severe: cutbanks cave	Moderate: slope	Moderate: slope	Severe: slope	Moderate: slope	Moderate: slope droughty
Seroco, fs-----	---	---	---	---	---	---
Hecla, lfs-----	---	---	---	---	---	---
Embden, fsl-----	---	---	---	---	---	---
Manning, sl-----	---	---	---	---	---	---
Tonka, sil-----	---	---	---	---	---	---

Building Site Development--Continued
Ward County, North Dakota

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. See text for definitions of terms used in this table. Absence of an entry indicates that no rating is applicable.)

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
To: Tonka, sil-----	Severe: ponding	Severe: shrink-swell ponding	Severe: shrink-swell ponding	Severe: shrink-swell ponding	Severe: low strength shrink-swell ponding	Severe: ponding
Vallers, l-----	---	---	---	---	---	---
Parnell, sicl-----	---	---	---	---	---	---
Hamerly, l-----	---	---	---	---	---	---
Va: Vallers, l, saline----	Severe: wetness	Severe: wetness	Severe: wetness	Severe: wetness	Severe: frost action low strength wetness	Severe: excess salt wetness
Hamerly, l-----	---	---	---	---	---	---
Colvin, sil-----	---	---	---	---	---	---
Parnell, sicl-----	---	---	---	---	---	---
Tonka, sil-----	---	---	---	---	---	---
Harriet, l-----	---	---	---	---	---	---
Ve: Velva, fine sandy loam--	Moderate: flooding	Severe: flooding	Severe: flooding	Severe: flooding	Severe: flooding	Moderate: flooding
Channel-----	---	---	---	---	---	---
Harriet, loam-----	---	---	---	---	---	---
Ludden, clay-----	---	---	---	---	---	---
Svea, l-----	---	---	---	---	---	---
Vh: Velva, loam-----	Moderate: flooding	Severe: flooding	Severe: flooding	Severe: flooding	Severe: flooding	Moderate: flooding
Channel-----	---	---	---	---	---	---
Ludden, clay-----	---	---	---	---	---	---
Svea, l-----	---	---	---	---	---	---
Harriet, l-----	---	---	---	---	---	---
Velva, sicl-----	---	---	---	---	---	---
Vk: Velva, loam, alkali varient-----	Moderate: flooding wetness	Severe: flooding	Severe: flooding	Severe: flooding	Severe: flooding	Severe: excess salt
Ludden, l-----	---	---	---	---	---	---
Channel-----	---	---	---	---	---	---
Harriet, l-----	---	---	---	---	---	---
Lamoure, sicl-----	---	---	---	---	---	---
W: Water-----	---	---	---	---	---	---
WaB: Wabek, gvly sandy loam--	Severe: cutbanks cave	Slight	Slight	Slight	Slight	Severe
Manning, sandy loam----	---	---	---	---	---	---

Building Site Development--Continued
Ward County, North Dakota

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. See text for definitions of terms used in this table. Absence of an entry indicates that no rating is applicable.)

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
Lehr, loam-----	---	---	---	---	---	---
Divide, loam-----	---	---	---	---	---	---
WaE: Wabek, gvly sl-----	Severe: cutbanks cave	Moderate: slope	Moderate: slope	Severe: slope	Moderate: slope	Severe
Divide, l-----	---	---	---	---	---	---
Lehr, l-----	---	---	---	---	---	---
Manning, sl-----	---	---	---	---	---	---
Parnell, sicl-----	---	---	---	---	---	---
WeC: Max, stony loam-----	Moderate: large stones slope	Moderate: large stones shrink-swell slope	Moderate: large stones shrink-swell slope	Severe: slope	Moderate: low strength shrink-swell slope	Severe: large stones
Wabek, stony loam-----	Severe: cutbanks cave	Moderate: slope	Moderate: slope	Severe: slope	Moderate: slope	Severe: large stones
Zahl, stony loam-----	Moderate: slope	Moderate: shrink-swell slope	Moderate: shrink-swell slope	Severe: slope	Severe: low strength	Severe: large stones
Bowbells, l-----	---	---	---	---	---	---
Williams, l-----	---	---	---	---	---	---
Divide, l-----	---	---	---	---	---	---
Lehr, l-----	---	---	---	---	---	---
Parnell, sicl-----	---	---	---	---	---	---
Tonka, sil-----	---	---	---	---	---	---
WLA: Williams, l-----	Slight	Moderate: shrink-swell	Moderate: shrink-swell	Moderate: shrink-swell	Severe: low strength	Slight
Bowbells, l-----	---	---	---	---	---	---
Zahl, l-----	---	---	---	---	---	---
Hamerly, l-----	---	---	---	---	---	---
Max, l-----	---	---	---	---	---	---
Tonka, sil-----	---	---	---	---	---	---
WLB: Williams, l-----	Slight	Moderate: shrink-swell	Moderate: shrink-swell	Moderate: shrink-swell	Severe: low strength	Slight
Bowbells, l-----	---	---	---	---	---	---
Zahl, l-----	---	---	---	---	---	---
Max, l-----	---	---	---	---	---	---
Tonka, sil-----	---	---	---	---	---	---
WLC: Williams, l-----	Slight	Moderate: shrink-swell	Moderate: shrink-swell	Moderate: shrink-swell slope	Severe: low strength	Slight
Bowbells, l-----	---	---	---	---	---	---
Max, l-----	---	---	---	---	---	---
Zahl, l-----	---	---	---	---	---	---

Building Site Development--Continued
Ward County, North Dakota

(The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. See text for definitions of terms used in this table. Absence of an entry indicates that no rating is applicable.)

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
Tonka, sil-----	---	---	---	---	---	---
WLD: Williams, l-----	Slight	Moderate: shrink-swell	Moderate: shrink-swell	Moderate: shrink-swell slope	Severe: low strength	Slight
Bowbells, l-----	---	---	---	---	---	---
Max, l-----	---	---	---	---	---	---
Zahl, l-----	---	---	---	---	---	---
Parnell, sicl-----	---	---	---	---	---	---
Tonka, sil-----	---	---	---	---	---	---
WmA: Williams, cl-----	Slight	Moderate: shrink-swell	Moderate: shrink-swell	Moderate: shrink-swell	Severe: low strength	Slight
Bowbells, l-----	---	---	---	---	---	---
Tonka, sil-----	---	---	---	---	---	---
Parnell, sicl-----	---	---	---	---	---	---
WmB: Williams, cl-----	Slight	Moderate: shrink-swell	Moderate: shrink-swell	Moderate: shrink-swell slope	Severe: low strength	Slight
Bowbells, l-----	---	---	---	---	---	---
Tonka, sil-----	---	---	---	---	---	---
Parnell, sicl-----	---	---	---	---	---	---
WmC: Williams, cl-----	Slight	Moderate: shrink-swell	Moderate: shrink-swell	Moderate: shrink-swell slope	Severe: low strength	Slight
Tonka, sil-----	---	---	---	---	---	---
Bowbells, l-----	---	---	---	---	---	---
Parnell, sicl-----	---	---	---	---	---	---
Max, l-----	---	---	---	---	---	---
Zahl, l-----	---	---	---	---	---	---
WmD: Williams, cl-----	Moderate: slope	Moderate: shrink-swell slope	Moderate: shrink-swell slope	Severe: slope	Severe: low strength	Moderate: slope
Parnell, sicl-----	---	---	---	---	---	---
Bowbells, l-----	---	---	---	---	---	---
Zahl, l-----	---	---	---	---	---	---
Tonka, sil-----	---	---	---	---	---	---
Max, l-----	---	---	---	---	---	---
Southam, sicl-----	---	---	---	---	---	---
WoA: Williams, l-----	Slight	Moderate: shrink-swell	Moderate: shrink-swell	Moderate: shrink-swell	Severe: low strength	Slight
Bowbells, l-----	Slight	Moderate: shrink-swell	Moderate: shrink-swell	Moderate: shrink-swell	Severe: low strength	Slight

Building Site Development--Continued
Ward County, North Dakota

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Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
Tonka, 1-----	Severe: ponding	Severe: shrink-swell ponding	Severe: shrink-swell ponding	Severe: shrink-swell ponding	Severe: low strength shrink-swell ponding	Severe: ponding
Parnell, sic1-----	---	---	---	---	---	---
Max, 1-----	---	---	---	---	---	---
Zahl, 1-----	---	---	---	---	---	---
WrB: Williams, 1-----	Slight	Moderate: shrink-swell	Moderate: shrink-swell	Moderate: shrink-swell slope	Severe: low strength	Slight
Hamerly, 1-----	Severe: wetness	Moderate: shrink-swell wetness	Severe: wetness	Moderate: shrink-swell slope wetness	Severe: frost action	Slight
Bowbells, 1-----	---	---	---	---	---	---
Vallers, 1-----	---	---	---	---	---	---
Parnell, sic1-----	---	---	---	---	---	---
Tonka, sil-----	---	---	---	---	---	---
Zahl, 1-----	---	---	---	---	---	---
WsA: Williams, 1-----	Slight	Moderate: shrink-swell	Moderate: shrink-swell	Moderate: shrink-swell	Severe: low strength	Slight
Niobell, 1-----	Moderate: wetness	Moderate: shrink-swell	Moderate: shrink-swell wetness	Moderate: shrink-swell	Moderate: frost action low strength shrink-swell	Severe: excess sodium
Bowbells, 1-----	---	---	---	---	---	---
Miranda, 1-----	---	---	---	---	---	---
Noonan, 1-----	---	---	---	---	---	---
Tonka, sil-----	---	---	---	---	---	---
Parnell, sic1-----	---	---	---	---	---	---
Zahl, 1-----	---	---	---	---	---	---
ZaE: Zahl, 1-----	Moderate: slope	Moderate: shrink-swell slope	Moderate: shrink-swell slope	Severe: slope	Severe: low strength	Moderate: slope
Max, 1-----	---	---	---	---	---	---
Williams, 1-----	---	---	---	---	---	---
ZmC: Zahl, 1-----	Slight	Moderate: shrink-swell	Moderate: shrink-swell	Moderate: shrink-swell slope	Severe: low strength	Slight
Max, 1-----	Slight	Moderate: shrink-swell	Moderate: shrink-swell	Moderate: shrink-swell slope	Moderate: low strength shrink-swell	Slight
Williams, 1-----	---	---	---	---	---	---
Bowbells, 1-----	---	---	---	---	---	---
Parnell, sic1-----	---	---	---	---	---	---
Tonka, sil-----	---	---	---	---	---	---

Building Site Development--Continued
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Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
ZmE: Zahl, 1-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: low strength slope	Severe: slope
Max, 1-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
Parnell, sicl-----	---	---	---	---	---	---
Tonka, sil-----	---	---	---	---	---	---
Bowbells, 1-----	---	---	---	---	---	---
Williams, 1-----	---	---	---	---	---	---
ZmF: Zahl, 1-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: low strength slope	Severe: slope
Max, 1-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
Parnell, sicl-----	---	---	---	---	---	---
Tonka, sil-----	---	---	---	---	---	---
Williams, 1-----	---	---	---	---	---	---
ZnE: Zahl, 1-----	Moderate: slope	Moderate: shrink-swell slope	Moderate: shrink-swell slope	Severe: slope	Severe: low strength	Moderate: slope
Miranda, 1-----	Moderate: wetness	Moderate: shrink-swell	Moderate: shrink-swell wetness	Moderate: shrink-swell slope	Severe: low strength	Severe: excess sodium
Noonan, 1-----	---	---	---	---	---	---
Williams, 1-----	---	---	---	---	---	---
Bowbells, 1-----	---	---	---	---	---	---
Niobell, 1-----	---	---	---	---	---	---
Parnell, sicl-----	---	---	---	---	---	---
Tonka, sil-----	---	---	---	---	---	---

