

SANITARY FACILITIES
Barnes County, North Dakota

The following tables show the degree and kind of soil limitations that affect septic tank absorption fields, sewage lagoons, sanitary landfills, and daily cover for landfill. The ratings 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 these uses. 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 limitation 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 limitation 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. Severely 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.

Septic tank absorption fields are areas in which effluent from a septic tank is distributed into the soil through subsurface tiles or perforated pipe. Only that part of the soil between depths of 24 and 60 inches is evaluated. The ratings are based on the soil properties that affect absorption of the effluent, construction and maintenance of the system, and public health. Permeability, depth to a water table, ponding, depth to bedrock or a cemented pan, and flooding affect absorption of the effluent. Stones and boulders, ice, and bedrock or a cemented pan interfere with installation. Subsidence interferes with installation and maintenance. Excessive slope may cause lateral seepage and surfacing of the effluent in downslope areas.

Some soils are underlain by loose sand and gravel or fractured bedrock at a depth of less than 4 feet below the distribution lines. In these soils the absorption field may not adequately filter the effluent, particularly when the system is new. As a result, the ground water may become contaminated.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons should have a nearly level floor surrounded by cut slopes or embankments of compacted soil. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water. Considered in the ratings are slope, permeability, depth to a water table, ponding, depth to bedrock or a cemented pan, flooding, large stones, and content of organic matter.

Soil permeability is a critical property affecting the suitability for sewage lagoons. Most porous soils eventually become sealed when they are used as sites for sewage lagoons. Until sealing occurs, however, the hazard of pollution is severe. Soils that have a permeability rate of more than 2 inches per hour are too porous for the proper functioning of sewage lagoons. In these soils, seepage of the effluent can result in contamination of the ground water. Ground-water contamination is also a hazard if fractured bedrock is within a depth of 40 inches, if the water table is high enough to raise the level of sewage in the lagoon, or if floodwater overtops the lagoon.

A high content of organic matter is detrimental to proper functioning of the lagoon because it inhibits aerobic activity. Slope, bedrock, and cemented pans can cause construction problems, and large stones can hinder compaction of the lagoon floor. If the lagoon is to be uniformly deep throughout, the slope must be gentle enough and the soil material must be thick enough over bedrock or a cemented pan to make land smoothing practical.

A trench sanitary landfill is an area where solid waste is placed in successive layers in an excavated trench. The waste is spread, compacted, and covered daily with a thin layer of soil excavated at the site. When the trench is full, a final cover of soil material at least 2 feet thick is placed over the landfill. The ratings in the table are based on the soil properties that affect the risk of pollution, the ease of excavation, trafficability, and revegetation. These properties include permeability, depth to bedrock or a cemented pan, depth to a water table, ponding, slope, flooding, texture, stones and boulders, highly organic layers, soil reaction, and content of salts and sodium. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet. For deeper trenches, onsite investigation may be needed.

Hard, nonrippable bedrock, creviced bedrock, or highly permeable strata in or directly below the proposed trench bottom can affect the ease of excavation and the hazard of ground-water pollution. Slope affects construction of the trenches and the movement of surface water around the landfill. It also affects the construction and performance of roads in areas of the landfill.

Soil texture and consistence affect the ease with which the trench is dug and the ease with which the soil can be used as daily or final cover. They determine the workability of the soil when dry and when wet. Soils that are plastic and sticky when wet are difficult to excavate, grade, or compact and are difficult to place as a uniformly thick cover over a layer of refuse.

The soil material used as the final cover for a trench landfill should be suitable for plants. It should not have excess sodium or salts and should not be too acid. The surface layer generally has the best workability, the highest content of organic matter, and the best potential for plants. Material from the surface layer should be stockpiled for use as the final cover.

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In an area sanitary landfill, solid waste is placed in successive layers on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil from a source away from the site. A final cover of soil material at least 2 feet thick is placed over the completed landfill. The ratings in the table are based on the soil properties that affect trafficability and the risk of pollution. These properties include flooding, permeability, depth to a water table, ponding, slope, and depth to bedrock or a cemented pan.

Flooding is a serious problem because it can result in pollution in areas downstream from the landfill. If permeability is too rapid or if fractured bedrock, a fractured cemented pan, or the water table is close to the surface, the leachate can contaminate the water supply. Slope is a consideration because of the extra grading required to maintain roads in the steeper areas of the landfill. Also, leachate may flow along the surface of the soils in the steeper areas and cause difficult seepage problems.

Daily cover for landfill is the soil material that is used to cover compacted solid waste in an area sanitary landfill. The soil material is obtained offsite, transported to the landfill, and spread over the waste. The ratings in the table also apply to the final cover for a landfill. They are based on the soil properties that affect workability, the ease of digging, and the ease of moving and spreading the material over the refuse daily during wet and dry periods. These properties include soil texture, depth to a water table, ponding, rock fragments, slope, depth to bedrock or a cemented pan, reaction, and content of salts, sodium, or lime.

Loamy or silty soils that are free of large stones and excess gravel are the best cover for a landfill. Clayey soils may be sticky and difficult to spread; sandy soils are subject to wind erosion.

Slope affects the ease of excavation and of moving the cover material. Also, it can influence runoff, erosion, and reclamation of the borrow area.

After soil material has been removed, the soil material remaining in the borrow area must be thick enough over bedrock, a cemented pan, or the water table to permit revegetation. The soil material used as the final cover for a landfill should be suitable for plants. It should not have excess sodium, salts, or lime and should not be too acid.

SANITARY FACILITIES--continued
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Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
2: Tonka-----	Severe: percs slowly ponding	Severe: ponding	Severe: too clayey ponding	Severe: ponding	Poor: hard to pack too clayey ponding
3: Parnell-----	Severe: percs slowly ponding	Severe: ponding	Severe: too clayey ponding	Severe: ponding	Poor: hard to pack too clayey ponding
6: Southam-----	Severe: percs slowly ponding	Severe: ponding	Severe: too clayey ponding	Severe: ponding	Poor: hard to pack too clayey ponding
9: Nutley-----	Severe: percs slowly	Slight	Severe: too clayey	Slight	Poor: hard to pack too clayey
9B: Nutley-----	Severe: percs slowly	Moderate: slope	Severe: too clayey	Slight	Poor: hard to pack too clayey
9D: Nutley-----	Severe: percs slowly	Severe: slope	Severe: too clayey	Moderate: slope	Poor: hard to pack too clayey
12: Lismore-----	Severe: percs slowly wetness	Moderate: seepage wetness	Severe: wetness	Moderate: wetness	Fair: too clayey
Kranzburg-----	Severe: percs slowly	Moderate: seepage	Moderate: too clayey	Slight	Fair: too clayey
13B: Kranzburg-----	Severe: percs slowly	Moderate: seepage slope	Moderate: too clayey	Slight	Fair: too clayey
Lismore-----	Severe: percs slowly wetness	Moderate: seepage slope wetness	Severe: wetness	Moderate: wetness	Fair: too clayey
14B: Barnes-----	Severe: percs slowly	Moderate: seepage slope	Moderate: too clayey	Slight	Fair: too clayey
Buse-----	Severe: percs slowly	Moderate: seepage slope	Moderate: too clayey	Slight	Fair: too clayey
14C: Barnes-----	Severe: percs slowly	Severe: slope	Moderate: too clayey	Slight	Fair: too clayey
Buse-----	Severe: percs slowly	Severe: slope	Moderate: too clayey	Slight	Fair: too clayey

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Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
14D: Barnes-----	Severe: percs slowly	Severe: slope	Moderate: slope too clayey	Moderate: slope	Fair: slope too clayey
Buse-----	Severe: percs slowly	Severe: slope	Moderate: slope too clayey	Moderate: slope	Fair: slope too clayey
15: Swenoda-----	Severe: percs slowly wetness	Severe: seepage wetness	Moderate: too clayey wetness	Severe: seepage	Fair: too clayey wetness
Lanona-----	Severe: percs slowly	Severe: seepage	Moderate: too clayey	Severe: seepage	Fair: too clayey
15B: Lanona-----	Severe: percs slowly	Severe: seepage	Moderate: too clayey	Severe: seepage	Fair: too clayey
Swenoda-----	Severe: percs slowly wetness	Severe: seepage wetness	Moderate: too clayey wetness	Severe: seepage	Fair: too clayey wetness
15C: Lanona-----	Severe: percs slowly	Severe: seepage slope	Moderate: too clayey	Severe: seepage	Fair: too clayey
Swenoda-----	Severe: percs slowly wetness	Severe: seepage slope wetness	Moderate: too clayey wetness	Severe: seepage	Fair: too clayey wetness
16B: Barnes-----	Severe: percs slowly	Moderate: seepage slope	Moderate: too clayey	Slight	Fair: too clayey
Sioux-----	Severe: poor filter	Severe: seepage	Severe: seepage too sandy	Severe: seepage	Poor: seepage small stones too sandy
16C: Barnes-----	Severe: percs slowly	Severe: slope	Moderate: too clayey	Slight	Fair: too clayey
Sioux-----	Severe: poor filter	Severe: seepage slope	Severe: seepage too sandy	Severe: seepage	Poor: seepage small stones too sandy
16E: Barnes-----	Severe: percs slowly	Severe: slope	Moderate: slope too clayey	Moderate: slope	Fair: slope too clayey
Sioux-----	Severe: slope poor filter	Severe: seepage slope	Severe: seepage slope too sandy	Severe: seepage slope	Poor: seepage small stones too sandy

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Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
17B: Barnes-----	Severe: percs slowly	Moderate: seepage slope	Moderate: too clayey	Slight	Fair: too clayey
Svea-----	Severe: percs slowly wetness	Severe: wetness	Severe: wetness	Severe: wetness	Fair: too clayey wetness
18: Bearden-----	Severe: percs slowly wetness	Severe: wetness	Severe: too clayey wetness	Severe: wetness	Poor: hard to pack too clayey
19: Colvin, SALINE-----	Severe: flooding percs slowly wetness	Severe: flooding wetness	Severe: flooding wetness	Severe: flooding wetness	Poor: wetness
23F: Buse-----	Severe: percs slowly slope	Severe: slope	Severe: slope	Severe: slope	Poor: slope
Barnes-----	Severe: percs slowly slope	Severe: slope	Severe: slope	Severe: slope	Poor: slope
26: Colvin-----	Severe: percs slowly wetness	Severe: wetness	Severe: wetness	Severe: wetness	Poor: wetness
27: Divide-----	Severe: wetness poor filter	Severe: seepage wetness	Severe: seepage too sandy wetness	Severe: seepage wetness	Poor: seepage small stones too sandy
31B: Egeland-----	Slight	Severe: seepage	Severe: seepage	Severe: seepage	Fair: too sandy
36: Fargo-----	Severe: percs slowly ponding	Severe: ponding	Severe: too clayey ponding	Severe: ponding	Poor: hard to pack too clayey ponding
40B: Gardena-----	Severe: wetness	Severe: seepage wetness	Severe: seepage wetness	Severe: seepage wetness	Fair: wetness
Zell-----	Moderate: percs slowly	Moderate: seepage slope	Slight	Slight	Good
40C: Zell-----	Moderate: percs slowly	Severe: slope	Slight	Slight	Good
40E: Zell-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Poor: slope

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Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
43: Gardena-----	Severe: wetness	Severe: seepage wetness	Severe: seepage wetness	Severe: seepage wetness	Fair: wetness
46: Gardena-----	Severe: wetness	Severe: seepage wetness	Severe: seepage wetness	Severe: seepage wetness	Fair: wetness
Glyndon-----	Severe: wetness	Severe: seepage wetness	Severe: seepage wetness	Severe: seepage wetness	Fair: thin layer wetness
48: Glyndon-----	Severe: wetness	Severe: seepage wetness	Severe: seepage wetness	Severe: seepage wetness	Fair: thin layer wetness
49: Glyndon, SALINE-----	Severe: wetness poor filter	Severe: seepage wetness	Severe: seepage too sandy wetness	Severe: seepage wetness	Fair: too sandy wetness
50: Hamerly-----	Severe: percs slowly wetness	Severe: wetness	Severe: wetness	Severe: wetness	Fair: too clayey wetness
Tonka-----	Severe: percs slowly ponding	Severe: ponding	Severe: too clayey ponding	Severe: ponding	Poor: hard to pack too clayey ponding
54: Lamoure-----	Severe: flooding percs slowly wetness	Severe: flooding wetness	Severe: flooding wetness	Severe: flooding wetness	Poor: wetness
Lamoure, CHANNELED-----	Severe: flooding percs slowly wetness	Severe: flooding wetness	Severe: flooding wetness	Severe: flooding wetness	Poor: wetness
56: Ladelle-----	Severe: flooding	Severe: flooding	Severe: flooding wetness	Severe: flooding	Poor: hard to pack
62: Overly-----	Severe: percs slowly wetness	Severe: wetness	Severe: wetness	Severe: wetness	Poor: thin layer
Bearden-----	Severe: percs slowly wetness	Severe: wetness	Severe: too clayey wetness	Severe: wetness	Poor: hard to pack too clayey
63: Renshaw-----	Severe: poor filter	Severe: seepage	Severe: seepage too sandy	Severe: seepage	Poor: seepage small stones too sandy

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64: Pits, Gravel-----	Severe: slope poor filter	Severe: seepage slope	Severe: seepage slope too sandy	Severe: seepage slope	Poor: seepage small stones too sandy
65: Svea-----	Severe: percs slowly wetness	Severe: wetness	Severe: wetness	Severe: wetness	Fair: too clayey wetness
Barnes-----	Severe: percs slowly	Moderate: seepage	Moderate: too clayey	Slight	Fair: too clayey
66: Hamerly-----	Severe: percs slowly wetness	Severe: wetness	Severe: wetness	Severe: wetness	Fair: too clayey wetness
Wyard-----	Severe: wetness	Severe: wetness	Severe: wetness	Severe: wetness	Poor: wetness
66B: Hamerly-----	Severe: percs slowly wetness	Severe: wetness	Severe: wetness	Severe: wetness	Fair: too clayey wetness
67C: Renshaw-----	Severe: poor filter	Severe: seepage	Severe: seepage too sandy	Severe: seepage	Poor: seepage small stones too sandy
Sioux-----	Severe: poor filter	Severe: seepage	Severe: seepage too sandy	Severe: seepage	Poor: seepage small stones too sandy
68E: Sioux-----	Severe: slope poor filter	Severe: seepage slope	Severe: seepage slope too sandy	Severe: seepage slope	Poor: seepage small stones too sandy
Renshaw-----	Severe: slope poor filter	Severe: seepage slope	Severe: seepage slope too sandy	Severe: seepage slope	Poor: seepage small stones too sandy
71: Valliers-----	Severe: percs slowly wetness	Severe: wetness	Severe: wetness	Severe: wetness	Poor: wetness
Parnell-----	Severe: percs slowly ponding	Severe: ponding	Severe: too clayey ponding	Severe: ponding	Poor: hard to pack too clayey ponding
77: Valliers, SALINE-----	Severe: percs slowly wetness	Severe: wetness	Severe: wetness	Severe: wetness	Poor: wetness

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80: Marysland-----	Severe: percs slowly wetness	Severe: seepage wetness	Severe: seepage wetness	Severe: seepage wetness	Poor: seepage small stones too sandy
81B: Edgeley-----	Severe: depth to rock	Severe: depth to rock	Severe: depth to rock	Severe: depth to rock	Poor: hard to pack depth to rock
82: Sinai-----	Severe: percs slowly	Slight	Severe: too clayey	Slight	Poor: hard to pack too clayey
82B: Sinai-----	Severe: percs slowly	Moderate: slope	Severe: too clayey	Slight	Poor: hard to pack too clayey
83F: Kloten-----	Severe: seepage slope thin layer	Severe: seepage slope	Severe: seepage slope	Severe: seepage slope	Poor: area reclaim slope thin layer
Buse-----	Severe: percs slowly slope	Severe: slope	Severe: slope	Severe: slope	Poor: slope
84: Easby-----	Severe: percs slowly wetness	Severe: wetness	Severe: excess salt wetness	Severe: wetness	Poor: excess salt hard to pack wetness
85: Exline-----	Severe: percs slowly wetness	Slight	Severe: too clayey too sandy wetness	Severe: wetness	Poor: excess sodium hard to pack too clayey
86: Overly-----	Severe: percs slowly wetness	Severe: wetness	Severe: wetness	Severe: wetness	Poor: thin layer
Nahon-----	Severe: percs slowly wetness	Slight	Severe: excess sodium too clayey wetness	Moderate: wetness	Poor: excess sodium hard to pack too clayey
87: Svea-----	Severe: percs slowly wetness	Severe: wetness	Severe: wetness	Severe: wetness	Fair: too clayey wetness
Cavour-----	Severe: percs slowly	Slight	Severe: excess sodium wetness	Moderate: wetness	Poor: excess sodium hard to pack

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Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
88: Manfred, EXTREMELY STONY-----	Severe: percs slowly ponding	Severe: ponding	Severe: excess sodium ponding	Severe: ponding	Poor: excess sodium hard to pack ponding
Vallers, EXTREMELY STONY-----	Severe: percs slowly wetness	Severe: wetness	Severe: wetness	Severe: wetness	Poor: wetness
89: Fordville-----	Severe: poor filter	Severe: seepage	Severe: seepage too sandy	Severe: seepage	Poor: seepage small stones too sandy
90: Dovray-----	Severe: percs slowly ponding	Severe: ponding	Severe: too clayey ponding	Severe: ponding	Poor: hard to pack too clayey ponding
91: Arveson-----	Severe: wetness poor filter	Severe: seepage wetness	Severe: seepage too sandy wetness	Severe: seepage wetness	Poor: seepage too sandy wetness
92B: Barnes-----	Severe: percs slowly	Moderate: seepage slope	Moderate: too clayey	Slight	Fair: too clayey
Cavour-----	Severe: percs slowly	Moderate: slope	Severe: excess sodium wetness	Moderate: wetness	Poor: excess sodium hard to pack
98B: Barnes, EXTREMELY STONY	Severe: percs slowly	Moderate: large stones seepage slope	Moderate: too clayey	Slight	Fair: large stones too clayey
Svea, EXTREMELY STONY--	Severe: percs slowly	Moderate: seepage slope wetness	Severe: wetness	Moderate: wetness	Fair: too clayey
W: Water-----	---	---	---	---	---

