

CHAPTER 1: PURPOSE AND INTENT

The improper location, design, installation, use, and maintenance of an individual onsite wastewater system can adversely affect the public health, safety, and general welfare by the discharge of inadequately treated sewage to the public waters, ground surface, surface waters, and ground waters. In accordance with the Administrative Rules of South Dakota, Chapter 74:53:01, the City of Rapid City herein adopts the Onsite Wastewater System Design and Construction Manual to provide the minimum standards and criteria for onsite wastewater systems. The City of Rapid City offers this Manual to aid in reasonably protecting public water, surface and ground water, and to promote public health, safety, and general welfare.

The location and installation of each onsite wastewater system and every part thereof shall be such that, with reasonable maintenance, it will function in a satisfactory manner and will not create a nuisance or source of foulness, pose a threat to public health or safety or the environment, or otherwise adversely affect the quality of surface or ground water.

The proper operation and maintenance of all onsite wastewater systems is essential to their proper functioning, to the avoidance of public health hazards and to the protection of the environment. The Rapid City Onsite Wastewater System Ordinances are intended to ensure the proper operation and maintenance of all systems. Any person owning or operating a facility on which an onsite wastewater system is installed shall be responsible for the inspection and maintenance of, and any necessary upgrades to, the system.

CHAPTER 2: DEFINITIONS

The following terms used in this Manual shall have the meanings given to them. For the purposes of this Manual, certain terms or words used herein shall be interpreted as follows: the words "shall" and "must" are mandatory, the words "should" and "may" are permissive. All distances, unless otherwise specified, shall be measured horizontally. Terms used in this Manual mean:

1. **Absorption bed:** a subsurface absorption system which consists of excavations wider than 3 feet each, containing a minimum depth of 12 inches of clean aggregate, together with a system of absorption lines, through which effluent may seep or leach into the surrounding soils.
2. **Absorption field:** the soil or soils through which wastewater from an absorption system percolates.
3. **Absorption line:** a perforated or open-jointed pipe that is installed in a covered trench or bed for the purpose of distributing wastewater to the surrounding soils through the perforations or the spaces between sections of the pipe.
4. **Absorption system:** a system, which utilizes absorption lines in trenches or beds to distribute wastewater to adjacent soils in an absorption field. This may also include gravelless or chamber systems as approved by the Department.
5. **Absorption trench:** a long, narrow excavation made in soil for the placement of an absorption line.
6. **Adequate wastewater treatment:** the dispersal of wastewater in a manner which does not cause pollution of ground or surface waters or create a public health problem or odors.
7. **Alteration:** any change in the physical configuration of an existing onsite wastewater system or any of its component parts, including replacement, modification, addition or removal of system components such that there will be a change in the location, design, construction, installation, size, capacity, type or number of one or more components. The term "alter" shall be construed accordingly.
8. **Alternative onsite wastewater system:** an onsite wastewater treatment system, other than a conventional septic tank and absorption system, designed to provide adequate wastewater treatment.
9. **Aquifer:** a geologic formation, group of formations, or part of a formation that is capable of yielding potentially usable quantities of potable water from wells or springs.
10. **Aquifer recharge area:** the area in which water enters the formation by surface infiltration.
11. **Bedrock:** the layer of parent material that is composed of consolidated or cemented rock particles or composed of interlocking mineral crystals and is either in a weathered or unweathered condition.
12. **Building or facility sewer:** that part of a drainage system extending from a building or facility, which conveys wastes discharged from the building or facility to a public, or individual wastewater treatment system.
13. **Certificate of Compliance:** a document written after a Compliance Inspection, certifying that an onsite wastewater system is in compliance with applicable requirements at the time of the inspection.

14. **Cesspool:** a covered underground receptacle, which receives untreated domestic wastewater and permits the untreated domestic wastewater to seep into the surrounding soils.
15. **Chamber system:** a system of chambers with each chamber being a molded polyolefin plastic, arch shaped, hollow structure with an exposed bottom area and solid top and louvered sidewall for infiltration of effluent into adjoining bottom and sidewall soil areas. Chamber systems may be of different sizes and configurations to obtain desired surface areas.
16. **Chemical toilet:** a toilet constructed to accept and discharge human excreta into a deodorizing and liquefying chemical solution contained in a watertight tank without the use of water as a transport medium.
17. **Cistern:** a watertight underground receptacle of nontoxic material designed for the storage of potable water.
18. **Compliance Inspection:** an evaluation, investigation, inspection, or other such process for the purpose of issuing a Certificate of Compliance or Notice of Noncompliance.
19. **Conventional individual onsite wastewater system:** an individual onsite wastewater system composed of a septic tank followed by an absorption system.
20. **Department:** the South Dakota Department of Environment and Natural Resources.
21. **Director:** the Rapid City Public Works Director, or a duly authorized representative.
22. **Dispersal system:** a system for the distribution of effluent by such methods as transpiration, evapotranspiration, or soil absorption.
23. **Distribution box:** a watertight chamber below the outlet level of a septic tank or pretreatment unit from which effluent is distributed evenly to various portions of an absorption system.
24. **Domestic wastewater:** wastewater, not including storm water, normally discharged from or similar to that discharged from plumbing fixtures, appliances and devices including, but not limited to sanitary, bath, laundry, dishwashing, garbage disposal and cleaning wastewaters.
25. **Dosing chamber:** a tank that stores pretreated wastewater for periodic pressurized discharges to mounds or absorption fields.
26. **Dwelling:** any building or place used or intended to be used by human occupants as a single-family or multifamily residence producing sewage.
27. **Effluent:** the partially or completely treated liquid waste discharge from a wastewater treatment system.
28. **Effluent filter:** an effluent treatment device installed on the outlet of a septic tank that filters solid materials and prevents the passage of suspended matter from sewage tanks before discharge to a soil treatment system.
29. **Evapotranspiration system:** an imperviously lined dispersal system that uses a process of evaporation and plant transpiration to withdraw water from the soil.
30. **Experimental systems:** a new device or design which needs further testing to provide information before approval.
31. **Failure:** a condition existing within an onsite wastewater system, which prohibits the system from functioning in a sanitary manner, and which results in the discharge of untreated or partially treated wastewater onto ground surface, into

- surface water, into ground water or which results in the failure of building plumbing to discharge properly.
32. **Floodplain:** the area covered by a 100-year flood event along lakes, rivers, and streams as published in technical studies by local, state, and federal agencies, or in the absence of these studies, estimates of the 100-year flood boundaries and elevations as developed pursuant to a local unit of government's floodplain or related land use regulations.
 33. **Geotextile fabric:** a woven or spun-bonded sheet material used to impede or prevent the movement of sand, silt and clay through the filter material.
 34. **Gravelless system:** the use of approved perforated 8 inch or 10 inch diameter, filter wrapped, plastic pipe, in lieu of 4-inch pipe and gravel, in subsurface fields and serial distribution systems.
 35. **Graywater:** the wastewater generated by water-using fixtures and appliances, which do not discharge garbage or urinary or fecal wastes.
 36. **Graywater system:** a wastewater system designed to recycle or treat wastes from sinks, lavatories, tubs, showers, washers, or other devices, which do not discharge garbage or urinary or fecal wastes.
 37. **Grease interceptor:** an indoor/outdoor unit similar to a septic tank, used to remove excessive amounts of grease and oils, by flotation, which may interfere with subsequent treatment of the waste.
 38. **Ground water table:** the upper surface of a ground water aquifer in the zone of saturation of a geologic formation.
 39. **Holding tank:** a watertight, covered receptacle, which is designed to receive and store the discharge of domestic wastewater and is accessible for periodic removal of its contents.
 40. **Imminent threat to public health or safety:** situations with the potential to immediately and adversely affect or threaten public health or safety. At a minimum, this includes ground surface or surface water discharges and sewage backup into a dwelling or other establishment.
 41. **Incinerator toilet:** a waste disposal system, which uses natural gas, propane, or electricity to incinerate wastes.
 42. **Individual onsite wastewater system:** a system or facility for treating, neutralizing, stabilizing, or dispersing wastes from one source.
 43. **Installation:** to establish or construct an effluent disposal system in an indicated place.
 44. **Invert elevation:** the lowest portion of the inside of any horizontal pipe.
 45. **Liquid waste hauler:** one who operates a vehicle equipped to pump out liquid waste containers, hold liquid waste in a tank on the vehicle and transport said waste to a final disposal site.
 46. **Local ordinances:** all ordinances such as zoning ordinances, subdivision regulations, municipal code, and either the Rapid City or Pennington County Onsite Wastewater System Ordinance.
 47. **Maintenance:** the regular cleaning of any leaching chamber, septic tank, building sewer, distribution lines or any other component of an onsite wastewater system for the purpose of removing any accumulated liquid, sludge and/or s ludge. The term, "maintenance," shall also be held to include any regularly required servicing or replacement of any related mechanical, electrical, or other equipment.

48. **Mobile Home Park:** means a parcel of land developed for subsequent rental or lease for placement of two (2) or more mobile homes.
49. **No-dak system or mound system:** a shallow wastewater dispersal system constructed partially aboveground, which uses plant transpiration and soil absorption for final treatment of wastes.
50. **Onsite wastewater system:** a sewage treatment system, or part thereof, serving a dwelling, or other establishment, or group thereof, and using sewage tanks followed by soil treatment and disposal or using advanced treatment devices that discharge below final grade. Onsite wastewater systems include holding tanks, subsurface sand chambers, "No-dak" systems, and vault privies.
51. **Onsite Wastewater System Construction Permit:** a permit issued by the Director required for any installation, repair, alteration or upgrade of an onsite wastewater system prior to the start of construction.
52. **Onsite Wastewater System Inspector:** is a person employed by the City and is responsible for the inspection of existing onsite wastewater systems to establish compliance.
53. **Onsite Wastewater System Installer:** any person, certified by the State of South Dakota, who is directly responsible for the supervision of the alteration, repair, construction, and installation of an individual or small onsite wastewater system.
54. **Onsite Wastewater System Operating Permit:** the permit issued by the Director authorizing the use of and requiring the proper operation and maintenance of all onsite wastewater system.
55. **Owner:** a person who is the owner of record of the land on which an individual or small onsite wastewater system is to be or has been designed, constructed, installed, altered, extended, or operated.
56. **Percolation test:** a soil test at the depth of a proposed absorption system to determine the water absorption capability of the soil, the results of which are normally expressed as the rate at which one inch of water is absorbed over an interval of time.
57. **Pit privy:** a structure, which allows for disposal of human excreta into a pit in the soil where a portion of the waste is dispersed by seepage into the surrounding soil.
58. **Platted:** a parcel of land that has been plotted and filed with a local governmental authority.
59. **Potable water:** water that does not contain objectionable pollution, contamination, minerals, or infective agents and is considered satisfactory for domestic consumption.
60. **Private water supply system:** a water supply system that provides water for human consumption to fewer than 15 service connections, that regularly serves fewer than 25 individuals, or that serves 25 or more individuals for no more than 60 days per year.
61. **Public wastewater system:** a facility for the treatment of wastewater owned by the State or any of its political subdivisions.
62. **Public water supply system:** a water supply system that provides water for human consumption to 15 or more service connections or that serves an average of 25 or more individuals for 60 or more days per year.

63. **Receptacle:** a tank, basin, cistern, grease interceptor, or reservoir for the containment of water or wastes or both.
64. **Repair:** to fix, refurbish or replace one or more components of an individual subsurface sewage disposal system in a manner that will restore, preserve and not change the original location, design, construction and installation, size, capacity, type, or number of the components of the system.
65. **Replacement:** the substitution of a properly working component for a component that is no longer in proper working condition.
66. **Reserve area:** an area of land with demonstrated capacity for subsurface sewage disposal upon which no permanent structure shall be constructed and which is intended for replacement of the principal system should it fail.
67. **Sand:** a soil texture composed by weight of at least 25 percent of very coarse, coarse, and medium sand varying in size from 2.0 to 0.25 millimeters, less than 50 percent of fine or very fine sand varying in size from 0.25 to 0.05 millimeters, and no more than 10 percent of particles smaller than 0.05 millimeters.
68. **Seasonal high ground water table:** the highest elevation or level to which a soil is saturated for a week or more as observed as a free water surface in an unlined hole or to which it has been previously saturated as indicated by mottling, whichever is higher.
69. **Secretary:** the Secretary of the Department of Environment and Natural Resources or the Secretary's authorized representative.
70. **Sedimentation tank:** a watertight basin or tank in which liquid waste containing settleable solids and suspended matter are retained for removal by gravity.
71. **Seepage pit:** a subsurface absorption device, which consists of a covered excavation no deeper than 4 feet with open-jointed walls through which effluent, after primary treatment, may seep or leach into the surrounding soil.
72. **Sensitive regional areas:** local areas where one or more of the following features exist:
 - a. Aquifer recharge areas as mapped by the Department;
 - b. The 100-year floodplains as shown by Federal Emergency Management Agency maps; and/or,
 - c. Shallow ground water areas that will include a 250-foot buffer zone on either side of all perennial streams.
73. **Septage:** the liquid and solid material pumped from a septic tank, cesspool, or similar domestic sewage treatment system, or a holding tank when the system is cleaned or maintained.
74. **Septic tank:** a watertight, accessible, covered receptacle which receives domestic wastewater from a building or facility sewer, allows solids to settle from the liquid, provides digestion for organic solids, stores digested solids through a period of retention, and allows clarified liquid to discharge to additional treatment works for final treatment and dispersal.
75. **Serial distribution:** an arrangement of absorption trenches or beds, which retains effluent in each component so as to utilize the total effective absorption area of each component before allowing the effluent to flow into a succeeding component.

76. **Sewage:** the waste produced by toilets, bathing, laundry, or culinary operations, or the floor drains associated with these sources. Household cleaners in sewage are restricted to amounts normally used for domestic purposes.
77. **Small onsite wastewater system:** a system or device for the collection, storage, treatment, neutralization, stabilization, and dispersal of wastewater from dwellings or other facilities which serve 30 or fewer individuals or produce 7,500 gallons or less of wastewater per day.
78. **Soil observation pit:** an excavation of an open pit of sufficient size and depth made for the purpose of exposing a soil profile, which is to be described.
79. **Source Water Assessment Area:** the area delineated by the State for a public water supply, whether the source is ground water or surface water or both, as part of the State Source Water Assessment Program approved by the Environmental Protection Agency under Section 1452 of the Safe Drinking Water Act.
80. **State:** the state of South Dakota.
81. **Suitable soil:** a soil that acts as an effective filter in the removal of organisms and suspended solids before the effluent reaches any highly permeable earth formations such as joints in bedrock, gravels, or very coarse soils.
82. **Unconventional system:** a system or device, such as a compost unit, vault privy, or chemical toilet, which receives and treats human excreta without the use of water as a transport medium.
83. **Underground dispersal:** a subsurface infiltration system for the absorption of wastewater by adjacent soils and vegetation.
84. **Upgrade:** the modification of one or more components of an onsite wastewater system or the design and construction of a new onsite wastewater system, which is intended to bring a nonconforming system into conformance with all local ordinances to the maximum feasible extent. An emergency repair is not an upgrade.
85. **Vault privy:** a structure which allows for disposal of human excreta into a watertight vault, provides privacy and shelter, and prevents access to the excreta by flies, rodents, and other animals.

CHAPTER 3: COMPLIANCE CRITERIA

Section 1: Compliance with wastewater system requirements

No person may install, construct, or operate a wastewater treatment or dispersal system or any other system for the treatment or disposal of human excreta, which does not meet the requirements of this Chapter.

Reference: Administrative Rules of South Dakota, Section 74:53:01:02.

Section 2: Onsite wastewater systems to comply with rules

All onsite wastewater systems designed for the reception and treatment of wastewater from premises including but not limited to homes, mobile home parks, commercial establishments, businesses, public parks, and institutions where public wastewater collection and treatment systems are not available, constructed after February 28, 1975, shall be constructed, added to, and altered in accordance with this Chapter. No onsite wastewater system, regardless of when constructed may cause a violation of any existing water quality standard, cause a health hazard, or fail to meet the requirements of ARSD 74:53:01:08 to ARSD 74:53:01:13, inclusive.

Reference: Administrative Rules of South Dakota, Section 74:53:01:06.

Section 3: Onsite wastewater system design and type considerations

The designer of each onsite wastewater treatment system must take into consideration the distance from any producing water well to the proposed septic tank and absorption system, the slope of the site and the gradient from any producing water well to the wastewater treatment system, the seasonal high ground water table, the ground water table, the percolation rate, the lot size, and the type and maximum daily wastewater flow to be treated by the wastewater treatment system.

Reference: Administrative Rules of South Dakota, Section 74:53:01:14.

Section 4: Types of treatment available to onsite wastewater systems

An individual or small onsite wastewater system may use any of the following types of treatment:

- 1. A conventional system consisting of a septic tank with a soil absorption system;**
- 2. An aerobic treatment unit utilizing a sedimentation process in conjunction with a soil absorption system;**
- 3. A septic tank with an evapotranspiration, an evapotranspiration-absorption, or a mound system;**
- 4. A holding tank;**
- 5. A septic tank with a graywater system; or,**
- 6. Stabilization Ponds, if plans and specifications are prepared, submitted, and approved in accordance with Chapter 74:53:03.**

Reference: Administrative Rules of South Dakota, Section 74:53:01:09.

Section 5: Wastewater to receive primary treatment prior to discharge to absorption system

Wastewater shall pass through a septic tank, sedimentation tank, or aerobic system prior to discharge to an absorption system.

Reference: Administrative Rules of South Dakota, Section 74:53:01:08.

Section 6: Acceptable and prohibited discharges

Section 6.1: Wastewater not allowed to surface on ground or enter state waters— Exception

No person may allow wastewater from an onsite system to be deposited upon the ground surface, nor may any person operate an onsite wastewater system, which allows wastewater to surface upon the ground or enter any waters of the State. Graywater systems are exempt from this requirement in locations where they will not create a public nuisance or enter any waters of the State.

Reference: Administrative Rules of South Dakota, Section 74:53:01:12.

Section 6.2: Wastewater not to be discharged into unused wells, gravel pits, or rock formations

Wastewater, treated or untreated, shall not be discharged into any abandoned or unused well, nor shall it be discharged into any crevice, sinkhole, gravel pit, or naturally fissured rock formation, such as limestone.

Reference: Administrative Rules of South Dakota, Section 74:53:01:13.

Section 6.3: Drainage not to enter wastewater systems

Drainage and runoff from footings, roofs, and ground water sump pumps shall not be allowed to enter an onsite wastewater system. Absorption systems shall be located and designed so that surface runoff from drainage ways will not flow into or over the system. Absorption systems may not be located in floodplains without prior written approval of the Secretary.

Reference: Administrative Rules of South Dakota, Section 74:53:01:17.

Section 6.4: Protection of potable water supply

No connection may be made at any time between a tap or outlet furnishing potable water on any premises and a container or equipment holding wastewater by any means other than an open connection or back siphonage protection.

Reference: Administrative Rules of South Dakota, Section 74:53:01:43.

Section 7: Onsite wastewater system prohibited when public wastewater systems are available

No person may construct, install, or operate an onsite wastewater system where a public wastewater system is available. A public wastewater system is considered available to premises under the following circumstances:

1. The structure or wastewater system is located within the jurisdictional boundaries of a municipality or sanitary district; and,
2. The sewer collection system of the public entity exists within 400 feet of the home, mobile home park, commercial establishment, business, public park, or institution; and,
3. The municipality or sanitary district requests to provide service to the premises.

Reference: Administrative Rules of South Dakota, Section 74:53:01:07.

Section 8: Review of plans prior to Onsite Wastewater System Construction Permit approval

Section 8.1: Review of plans and specifications prior to construction by Director

Plans and specifications for all proposed onsite wastewater system installations, repairs, or alterations which receive human excreta, must be submitted to the Director for review and approval prior to beginning construction of said system. Installation, operation and maintenance of these systems shall be in accordance with the approved plans and specifications. Where the owner desires deviation from this Manual, the proposed deviation shall be submitted to the Director for review and approval in accordance with this Manual.

Section 8.2: Review of plans and specifications prior to construction

Plans and specifications for all installations, which receive human excreta, other than a conventional individual onsite wastewater system, must be submitted to the Secretary for review and approval prior to construction. Installation and operation of these systems shall be in accordance with the approved plans and specifications. A conventional individual onsite wastewater system may be designed and installed in accordance with this Chapter without submission of project plans and specifications to the Secretary for review and approval. Where deviation from this Chapter is desired by the owner, the proposed deviation shall be submitted to the Secretary for review and approval in accordance with Chapter 74:53:03 along with plans, specifications, and supporting information prepared by a registered professional engineer or licensed plumber.

Reference: Administrative Rules of South Dakota, Section 74:53:01:03.

CHAPTER 4: SITE EVALUATION REQUIREMENTS

The acceptability of a lot or site to support an onsite wastewater system of the type and size as required by this Manual and all applicable local ordinances shall be determined on the basis of the approved soil test data, site conditions, and daily sewage flow quantity and characteristics. Site conditions include, but are not limited to, lot size, slope, restrictive soil layer elevation, rock outcroppings, bedrock elevation, seasonal ground water elevation, sinkholes, surface drainage, or flood prone areas. The Director may conduct a site evaluation, prepare a report of findings, and prescribe the size and location of a conventional onsite wastewater system or repair of such system.

When a site, meeting the requirements of this Manual, has been chosen for location of the proposed onsite wastewater system, the suitability of the soil for treatment and disposal of the effluent shall be determined as prescribed below. This determination shall be made based upon soil characteristics observed by percolation test results, soil observation pits, and/or soil borings, as well as any other related data that may be required by the Director.

Section 1: Separation required above ground water or geological formations

There shall be at least 4 feet of soil between an absorption bed, trench, or seepage pit bottom, the lowest construction joint on a septic tank, or any other component of a subsurface absorption system and the seasonal high ground water table, ground water table, rock formations, or impervious soil strata. Absorption systems shall not be constructed in soils rated as having severe or very severe limitations for underground dispersal by the Soil Conservation Service, U.S. Department of Agriculture, unless that limitation is not present as shown by field investigation or unless prior written approval is granted by the Secretary.

Reference: Administrative Rules of South Dakota, Section 74:53:01:15.

Section 2: Minimum lot size required

A water-carriage wastewater system may not be installed or operated on a lot, which is smaller than 20,000 square feet in surface area. A water-carriage wastewater system may not be installed or operated on a lot, which is smaller than 43,560 square feet (1 acre) when potable water is supplied by a private water supply system located on the lot. A water-carriage wastewater treatment system may be installed and operated on a lot which is 20,000 square feet in surface area or larger if the requirements of ARSD 74:53:01:19 are met and the premises are supplied by a public water supply system, a private water supply system not located on the lot, or by hauling and storage of potable water in a cistern. The requirements of this section do not apply if wastewater is emptied into a holding tank or an unconventional system is used.

Reference: Administrative Rules of South Dakota, Section 74:53:01:16.

Section 3: Distance between onsite wastewater system components and pertinent ground features

All onsite wastewater system components shall be located and maintained in accordance with minimum distance requirements from pertinent ground and terrain features on or near the site of the system. The minimum required horizontal distances, in feet, between system components and pertinent ground features are shown in Table 1 as follows:

TABLE 1

Wastewater System Components	Ground and Terrain Features						
	(A)	(B)	(C)	(D)	(E)	(F)	(G)
Septic tank, aerobic system, or holding tank	50	75	50	50	25	10	10
Absorption field, mound, evapo-transpiration, seepage pit, or graywater system	100	150	100	100	25	20	10
Sewer lines of tightly jointed tile or equivalent material	50	75	50	50	10	0	0
Sewer lines – materials, construction, testing comply with AWWA standards for water mains	30	30	25	3	10	0	0
Unconventional systems	50	75	50	50	25	0	10

- (A) Wells over 100 feet deep
- (B) Wells less than 100 feet deep, springs or water suction lines
- (C) Cisterns or reservoirs
- (D) High-water line of lakes, streams, or impoundments (meandered or ordinary, whichever is higher)
- (E) Pressurized water lines
- (F) Dwelling or occupied building
- (G) Property line – all sides

Reference: Administrative Rules of South Dakota, Section 74:53:01:19.

Section 4: Onsite Wastewater System Construction Permit application requirements

The Director may deny any application for an Onsite Wastewater System Construction Permit if the following information is not submitted in full.

1. A completed Site Plan;
2. A completed Percolation Data Sheet;
3. Soil observation pit or soil boring information as required by the Director;
4. The method used to determine ground water table; and,
5. All other pertinent information as required by the Director.

Note: The Onsite Wastewater System Construction Permit application can be found in Appendix A

Section 4.1: Completed Site Plan

The site plan shall contain the information required for the design and location of the onsite wastewater system. At minimum this will include a completed site plan with the percolation test data. The Director may also require a field evaluation or soil observation pit information prior to the approval of an Onsite Wastewater System Construction Permit. A site plan shall be required as part of each application and shall, as a minimum, provide the information outlined below:

1. Date of evaluation, names of property owners with the legal description, property lines and lot dimensions;
2. A map drawn to scale or dimension, with a north arrow, and including:
 - a. Horizontal and vertical reference point of the proposed soil treatment area or areas, soil observations, soil borings, percolation tests and distances from the proposed onsite wastewater system to all required setbacks, lot improvements, easements, ordinary high water mark of public waters, and percent slope;
 - b. The location of any unsuitable, disturbed or compacted areas; and,
 - c. The access route for tank maintenance;
3. Location of proposed or existing:
 - a. Water supplies within 200 feet of proposed onsite wastewater system;
 - b. Section lines and right of ways on the lot;
 - c. Buildings or improvements on the lot; and,
 - d. Buried water pipes within 25 feet of the proposed system;
4. Estimated depth of seasonally saturated layer or bedrock;
5. Flow determinations for the dwelling or other establishment;
6. Streams, creeks or other drainage channels within property boundaries including any drainage right-of-way and any contemplated diversion thereof;
7. Floodplain designation and flooding elevation from published data or data that is acceptable to and approved by the Director or the Department;
8. Drainfield reserve areas; and,
9. In some cases, where the plat may be large, an inset map showing a detailed description of the proposed onsite wastewater system may be required.

When the Director has determined that he/she does not have sufficient information for evaluation of an application or an onsite wastewater system, he/she may require additional tests or documentation or may deny the application if the prior requirements are not met.

Section 4.2: Percolation tests required prior to approval and installation of absorption system

The owner of the land on which a subsurface absorption system is to be constructed or installed shall ensure that a percolation test is conducted in accordance with ARSD 74:53:01:30 before installation of any such system. Absorption systems shall not be constructed in soils rated as having severe or very severe limitations for subsurface wastewater disposal by the Soil Conservation Service, U. S. Department of Agriculture, unless that limitation is not present as shown by field investigation or prior written approval is granted by the Secretary.

Reference: Administrative Rules of South Dakota, Section 74:53:01:29.

Note: A subsurface absorption system shall be considered the same as an onsite wastewater system.

Manner for conducting percolation test

A soil percolation test shall be made in at least 3 test holes within 5 feet of where the proposed absorption system or shallow wastewater system is to be located. The holes shall be randomly located in soil representative of and similar in character to the rest of the area where the system will be placed. An additional test hole shall be made to a depth of 4 feet beneath the bottom of the proposed absorption system, unless ground water or bedrock is encountered first, to determine the type and depth of absorption system.

The horizontal dimension or diameter of the percolation test hole shall be from 6 to 12 inches and the vertical sides shall extend to the maximum depth of the proposed absorption system or to a depth of at least 30 inches, whichever is greater.

Test holes shall be located in unfrozen soil and shall be filled at least 50 percent full with water for at least 8 hours but not more than 16 hours before making the soil percolation test. Immediately before making the test, each hole shall be refilled with water to at least 50 percent of its volume. When the water reaches the lower 25 percent of the test hole, the test shall begin. The percolation rate of a test hole shall be expressed in the number of minutes it takes the water level to drop 1 inch. The percolation rate for the area where the subsurface infiltration system is desired is the average percolation rate of all the test holes. The percolation tests shall be conducted for 2 hours unless the percolation rate is slower than 45 minutes per inch, in which case the percolation tests shall be run for at least 4 hours.

Reference: Administrative Rules of South Dakota, Section 74:53:01:30.

Additional requirements for conducting the percolation tests

The following are additional requirements for conducting percolation tests.

- 1. For mound systems, the bottom of each test hole shall be in the upper 12 inches of the original soil. For trenches and seepage beds, the bottom of each test hole shall be at the design depth;**
- 2. The percolation test shall be performed by or under the supervision of a State Certified Onsite Wastewater System Installer or a Registered Professional Engineer and reported to the Director on the Percolation Test Data Sheet located in Appendix A;**
- 3. Soil texture descriptions shall note the depths from the ground surface where texture changes occur. These shall be noted on the Percolation Data Sheet;**
- 4. The bottom and sides of the hole shall be carefully scratched to remove any smearing and to provide a natural soil surface into which water may penetrate;**
- 5. The Director must review percolation holes at the time the Installation Inspection occurs; and,**
- 6. All loose material shall be removed from the bottom of the test hole and 2 inches of one-fourth to three-fourths inch gravel shall be added to protect the bottom from scouring.**

Section 4.3: Soil observation pits and soil borings (if required)

Disposal fields must be designed and constructed in locations with suitable soils. An adequate location with proper drainage and with sufficient distance from the underlying water table is necessary to ensure that the absorption system will operate both properly and in an environmentally sound manner. Soil observation pits may be required prior to the installation of any onsite wastewater system.

Soil observation pits are excavated pits that are necessary to determine the level of the seasonal high water table and/or the depth of impermeable substratum. Soil observations pits shall be excavated prior to any required percolation tests to determine whether the soils are suitable to warrant percolation tests and, if suitable, at what depths percolation tests shall be conducted. A soil observation pit evaluation showing a dry condition estimated or measured to be at least 4 feet below the bottom of a proposed absorption system during the wettest months may be considered adequate evidence that the maximum seasonal ground water table and the bedrock layer will be sufficiently below the bottom of the proposed absorption system. Underground utilities must be located before soil observations are undertaken.

Soil borings shall be made in a manner that will provide a continuous sample of the soil profile without mixing the soil from different depths. Hand augers may be used provided that the hole remains open and does not slump. Partial substitution for soil observation pits may be made using soil borings. Soil borings shall be made to a depth of 8 feet.

Soil observation pit and soil boring procedure

Soil observation pits shall be excavated at the site of each proposed absorption system for the purpose of determining the suitability and distribution of soil types present at the site. At minimum one soil observation pit or three soil borings shall be dug to provide evaluation of the soil profile of the area of the proposed absorption system. The hole may be terminated when ground water or bedrock is encountered.

1. A soil observation pit shall be excavated to a minimum depth of 4 feet below the bottom of the soil absorption system and be 24 to 36 inches wide unless digging is impractical due to bedrock, water, or seasonal wetness.
2. The location of the soil observation pit or the soil borings for disposal fields shall be located at either end of the disposal field, within or no further than 15 feet beyond the boundaries of the disposal field.
3. In addition, the following depths shall be reported for a complete evaluation of the pit: seasonal high water table, observed water table, and impermeable substratum.
4. The depth to the limiting zone shall be measured from the existing ground surface to the top of the limiting zone. In the case of disturbed ground, depth to the limiting zone shall be measured from the preexisting natural ground surface or the existing ground surface, whichever is lowest.
5. The Onsite Wastewater System Installer must request an inspection from the Director during the normal duty day at least 24 hours before the date and time the soil observation pit will be ready for evaluation. These evaluations must be scheduled during normal inspection hours and in conjunction with the inspection schedule of the Director having jurisdiction.

It is recommended that the sides of the soil observation pit be stepped and sloped to prevent caving-in and to allow safe access to the upper portion of the pit. It is also recommended that persons involved with the soil evaluation not enter into portions of a soil observation pit, which have been excavated, to depths greater than 5 feet below the surrounding ground surface. It is the responsibility of persons performing or witnessing soil evaluation to comply with all applicable Federal, State and local laws and regulations governing occupational safety.

Section 4.4: Ground water determination (when required)

An adequate number of observations, excavations, or borings shall be made by the Onsite Wastewater System Installer to clearly establish the elevation of the ground water table in accordance with the procedure outlined above. The ground water table determination should be made when the ground water table is at its highest level. The results of each observation and pertinent information shall be recorded on the Onsite Wastewater System Construction Permit application. The location of the ground water table observations shall be indicated on the preliminary site plan.

Wet season determinations -

The ground water table elevation determination shall be made when the water table is highest; this occurs usually during the months of April through July. In making this determination, it is necessary to bore or dig an adequate number of holes of convenient size in the proposed disposal area to a depth of at least 4 feet below the lowest point of the proposed absorption system. All water table observations should be made no sooner than 24 hours after excavation and shall be witnessed by the Director unless otherwise waived.

Dry season determinations -

Although the ground water table is more accurately measured in the wet season, data may be available to predict the maximum ground water table elevation during the wet season. To make a dry season determination, the applicant shall dig a 10-foot observation pit in the location of the proposed absorption area. All water table observations should be made no sooner than 24 hours after excavation and shall be witnessed by the Director unless otherwise waived.

Section 4.5: Field evaluation

The Director may require that a field evaluation be done on the proposed site. A field evaluation, if required, shall consist of verifying the items described in items 1 through 3 below:

- 1. Identifying lot lines, lot improvements, required setbacks, and easements;**
- 2. Viewing soil observation pits and percolation holes; and,**
- 3. Verifying all other pertinent information related to the approval process for an Onsite Wastewater System Construction Permit.**

Section 5: Site evaluations during the platting stages

Site evaluations may be required prior to approval of platting changes, during developmental stages. This would include but not be limited to:

- 1. Percolations tests may be required for each individual lot;**
- 2. It may be required that reserve areas or soil observations be completed prior to platting approval; and,**
- 3. All other pertinent information as required by the Director.**

CHAPTER 5: SENSITIVE REGIONAL AREAS

Certain areas have been identified as sensitive regional areas, which are deemed particularly sensitive to the detrimental effects of nutrients, pathogenic organisms, organic chemicals and other substances that may be present in effluent from onsite wastewater system and which are in need of special protection from such effects due to the unique and irreplaceable value of the resource such as a public water supply, fisheries habitat and/or public recreation area.

Standards for siting and design of onsite wastewater systems of this Manual are established to enhance the wastewater treatment capability of onsite wastewater system and thereby reduce the potential for adverse effects to critical resources. In areas designated as sensitive regional areas, the standards of this Manual shall supersede

minimum standards wherever applicable. Located in Appendix B are maps of the sensitive regional areas.

When specific evidence suggests undesirable subsurface conditions exist, additional hydrological, geological, engineering or other information provided by a registered professional engineer or geologist may be required to be submitted by the applicant. This requirement shall not prejudice the right of the Director to develop their own information from their own source.

Section 1: Alterations in sensitive areas

No alteration of a building served by an onsite wastewater system shall be approved in a sensitive regional area which will result in an increase in flow or change in type of wastewater discharged unless after such improvements to the building on the lot satisfies, to the maximum extent possible, all design and siting requirements of the regulations in effect at the time of an Onsite Wastewater System Construction Permit application. If the lot does not satisfy all current requirements, the alteration may only be approved if the onsite wastewater system is brought into complete compliance with all local ordinances.

Section 2: Design criteria for sensitive regional areas for new or repaired onsite wastewater systems

Upon review of the Onsite Wastewater System Construction Permit application, the Director may require that:

1. The lot sizes be larger than the minimum district lot sizes in order to protect the public health;
2. Due to the sensitivity of the aquifer recharge areas locally, a form of secondary treatment may be required in the aquifer recharge areas or areas where the ground water table is a concern.
3. When an existing onsite wastewater system has been previously installed in a 100-year floodplain then the new or repaired system shall meet or exceed the requirements of this Manual and all local ordinances. The system as approved by the Director shall be designed to minimize or eliminate infiltration of floodwaters into the system, and discharge of the system into the floodwaters.
4. It may required that a registered professional engineer or soil scientist perform the percolation tests or other soil evaluations, due to the lot being located in one of areas classified as a the sensitive regional areas
5. The onsite wastewater system be designed by a registered professional engineer;
6. The septic tank will be required to be a multi-compartmental with a minimum capacity of 1500 gallons;
7. Horizontal separation distances from onsite wastewater systems and other pertinent ground features shall be 1.5 times the minimum distances required in Chapter 5, Section 3;
8. All new, repaired, or upgraded onsite wastewater systems within a sensitive regional area will be required to meet, at minimum, the requirements listed in Chapter 6, Section 2 for calculating the design flow;
9. Drainfields in the sensitive regional areas, whether absorption trench systems or beds are used, may not be allowed to receive credit reductions when they are being sized;

10. Onsite wastewater systems shall not be permitted in highly permeable soils (percolation rate faster than 5 minutes per inch) except where the site evaluation has demonstrated that surface and ground water quality will be protected;
11. Existing systems may be required to be retrofitted with an effluent filter; and/or,
12. Existing onsite wastewater systems, which conform to this Manual, ARSD Chapter 74:53:01, and all applicable local ordinances, shall be permitted to remain as installed unless the onsite wastewater system is found to be in noncompliance.

Note: See maps in appendix "B"

CHAPTER 6: DESIGN FLOW DETERMINATION

Section 1: System sizing

The onsite wastewater system shall be designed to accommodate additional capacity if any or all of the following can be reasonably anticipated:

1. The construction of additional bedrooms such as where levels of new homes may be finished at a later time;
2. The installation of water-using devices; or,
3. Other factors likely to affect the operation of the onsite wastewater system.

Section 2: Design flow

The average design flow shall be used to size soil treatment systems. The estimated average design flow for any dwelling shall provide for at least 3 bedrooms. For multifamily dwellings, the average design flow shall consist of the sum of the average design flows for each individual unit. These design flows are listed in Table 1b:

TABLE 1b

Number of Bedrooms	Flow Volume (gpd)	
	Class I	Class II
3	360	450
4	480	600
5	600	750
6	720	900

These design flows are based on the following formulas:

Classification I: Classification I dwellings correspond with the minimum standards allowed the Administrative Rules of South Dakota, Section 74:53:01:31.

Classification II: Classification II dwellings are those with more than 800 square feet per bedroom, when the dwelling's total floor area is divided by the number of bedrooms, or more than 2 of the following water-use appliances are installed or anticipated: automatic washer, dishwasher, water conditioning unit, whirlpool bath, or self-cleaning humidifier in furnace. The average design flow for Classification II dwellings is determined by multiplying the number of bedrooms by 150.

Section 3: Wastewater flow capacity requirements of residential and non-residential establishments

All individual or small onsite wastewater treatment systems shall be designed to have a capacity at least equal to the anticipated maximum daily flow. For existing facilities where the average daily flow is measured, the anticipated maximum daily wastewater flow shall be assumed to be 150 percent of the average daily flow as the basis for the design of the system. In other cases, the anticipated maximum daily flow capacity shall be determined according to the type of facility as set forth in Table 2.

TABLE 2

<u>Flow</u>	<u>Maximum Daily</u> Gallons/Person/Day * Gallons/Unit/Day
<u>Residential</u>	
Boarding Houses (with food service)	50
Hotels and Motels (without private baths)	40
Hotels and Motels (with private baths)	50
Luxury Residences and Estates	150
Mobile Home Parks (minimum of 3.5 persons)	75
Mobile Home Parks (per space)	*250
Motels (with private baths and kitchenettes or laundry)	60
Multiple Family Dwellings or Apartments	75
Rooming Houses (rooms with baths)	40
Single Family Dwellings Class I (minimum of 3.5 persons, or 120 gallons per bedroom, whichever is greater)	75
<u>Commercial</u>	
Airport (per passenger, without food service)	5
Airport (per public toilet room)	*500
Automobile Service Station (per toilet room)	*500
Automobile Service Station (per vehicle served)	*10
Bars and Cocktail Lounges (per patron)	2
Bars and Cocktail Lounges (per seat)	*20
Bus Stations (without food service)	5
Commercial Employees (except factory, plant, or office)	10
Factories and Plants (exclusive of industrial waste)	35
Laundries, Self Service (per washer)	*600
Offices (per employee)	15
Restaurants (kitchen wastes per patron)	3
Restaurants, on Interstate or Through Highways (per seat)	*180
Restaurants, (per seat)	*35
Restaurants (toilet and kitchen wastes per patron)	10
Restaurants (with paper service per patron)	1.5
Shopping Centers (per parking space)	2
Stores (per public toilet room)	*500
Theaters, Drive-in (not including food, per car space)	*10
Theaters, Movie, Auditorium Type (not including food, per seat)	*5
Work or Construction Camps (semi-permanent, with flush toilets)	50
Work or Construction Camps (semi-permanent, without flush toilets)	25
<u>Institutional</u>	
Hospitals (per bed space)	250
Institutional and School Employees	15
Institutions Other Than Hospitals (per bed space)	125
Nursing or Rest Homes (per bed space)	100
Schools, Boarding	100
Schools, Day (without cafeteria, gym, or showers)	15
Schools, Day (with cafeteria, but not gym or showers)	20

Schools, Day (with cafeteria, gym, and showers)	25
<u>Recreational, Seasonal, or Other</u>	
Assembly or Dance Halls	2
Bowling Alleys (per lane)	*75
Bowling Alleys (with restaurant, per lane)	*100
Cabins, Resort	60
Campgrounds, Developed	30
Camps, Day (no meals served)	15
Camps, Luxury Resort	125
Churches (per sanctuary seat)	*5
Churches (with kitchens, per sanctuary seat)	*7
Cottages and Small Dwellings (seasonal occupancy)	50
Country Clubs, Employees	15
Country Clubs (per guest)	25
Country Clubs (per resident member)	100
Interstate Rest Areas	5
Parks, Picnic (toilet waste only)	5
Parks, Picnic (with bath houses, showers, and flush toilets)	15
Parks, Recreational Vehicles (with individual water and sewer hook-ups, per space)	*100
Parks, Recreational Vehicles (without individual water and sewer hook-ups, per space)	*50
Parks (with central toilet and shower facilities, per space)	*75
Store, Resort	3
Swimming Pools with Bath Houses	10
Visitor Center	5

Reference: Administrative Rules of South Dakota, Section 74:53:01:20.

Note: In addition to the above table the following will also be considered.

1. *Bed and breakfasts shall be designed with an anticipated maximum daily flow capacity of 50 gallons per person per day; and,*
2. *Single Family Dwellings Class II (minimum of 3.5 persons, or 150 gallons per bedroom, whichever is greater) shall be designed with an anticipated maximum daily flow capacity of 90 gallons per person per day.*

Section 4: Alternative method of determining wastewater flow capacity requirements for commercial or public service establishments

In lieu of calculating the wastewater flow capacity required pursuant to ARSD 74:53:01:20, Table 3 may be used to determine wastewater flow capacity for specific commercial or public service establishments when the amount of usage cannot be accurately determined. Flow projections, expressed as gallons per day (gpd), shall be calculated by multiplying total floor area in square feet of the commercial or public service establishment by the statistical factor given in Table 3.

TABLE 3

Establishment	Statistical Factor
Banks	0.04
Barber Shops	0.20
Beauty Salons	0.20
Car Wash without Recycling Equipment	4.90
Department Store with Lunch Counter	0.08
Department Store without Lunch Counter	0.04
Drug Stores	0.13
Dry Goods Stores	0.05
Hotels	0.25
Laundries and Cleaners	0.31
Laundromats	3.68
Medical Office Buildings	0.62
Motels	0.23
Office Buildings	0.09
Retail Stores	0.05
Service Stations	0.18
Shopping Centers	0.18
Supermarkets	0.20
Warehouses	0.03

Reference: Administrative Rules of South Dakota, Section 74:53:01:21.

Section 5: Alternative method of determining wastewater flow capacity requirements for public parks and marinas

In lieu of calculating the wastewater flow capacity required pursuant to ARSD 74:53:01:20, Table 4 may be used to determine wastewater flow capacity for public parks and marinas when the usage cannot be accurately determined. Flow projections, expressed as gallons per fixture per hour, are based on the related statistical flow figures per unit of plumbing fixture. To determine the flow capacity of the system, multiply the number of hours the facility is open by the flow figure for each fixture available as given in Table 4.

TABLE 4

Type of Fixture	Gallons/Hour
Faucets	15
Flush Toilets	35
Showers	100
Urinals	10

Reference: Administrative Rules of South Dakota, Section 74:53:01:22.

CHAPTER 7: SEPTIC TANKS

Section 1: Design and construction requirements for septic tanks

The minimum design and construction requirements for septic tanks are as follows:

1. Septic tanks shall be watertight and constructed of durable materials designed to withstand expected physical loads. Such tanks shall be capable of supporting a static vertical load of at least 1,000 pounds per square foot when bedded and backfilled to the top of the tank. The septic tank, including baffles or tees, shall be constructed of materials resistant to acid, decay, and corrosion. Prefabricated, coated metal tanks shall meet the requirements of the Plumbing Code, ARSD 20:54:03:03. Coated metal tanks are not permitted for wastewater systems when the usage will be longer than seven years. Concrete septic tanks shall be constructed of Portland type II sulfate-resistant cement with a minimum strength of 3,000 pounds per square inch. The walls, floors, and covers of concrete septic tanks poured onsite shall be at least 3 1/2 inches thick with reinforcing bars and welded wire mesh. Fiberglass or plastic septic tanks shall have a minimum wall thickness of 1/4-inch. All special reinforced precast concrete, concrete block, plastic, or fiberglass septic tanks shall meet the minimum static vertical load requirement of 1,000 pounds per square foot when bedded and backfilled to the top of the tank. The interior of concrete block septic tanks shall be surfaced with two 1/4-inch coats of Portland cement-sand plaster and shall have mortar joints. Septic tank keyways or construction joints shall be made watertight by grouting with cement or corrosion-resistant sealants;
2. Septic tanks larger than 3,000 gallon capacity and fabricated as a single unit shall consist of two or more compartments, with 1/2 to 2/3 of the tank capacity in the first compartment. The minimum dimension of any interior compartment shall be 2 feet. Each compartment shall have at least one access hole with a minimum dimension of 20 inches located within 6 feet of all walls of the tank. The access holes shall extend through the top of the tank to a point within 12 inches but not closer than 6 inches below finished grade, and the access hole covers shall be covered with at least 6 inches of earth unless the cover is airtight and equipped with a hasp and lock, in which case the cover may be shallower or above grade. If the access hole to the tank is covered with more than 12 inches of earth backfill, the access hole shall be extended to within 6 inches of the finished grade;
3. There shall be inspection pipes of at least 4 inches diameter over both the inlet and outlet devices. The inspection pipes shall extend through the top of the tank and be capped flush or above finished grade with a removable watertight cap or cover. A downward projection of the centerline of the inspection pipes shall be directly in line with the centerline of the inlet or outlet device. The tank inlet and outlet devices shall consist of baffles or sanitary tees;
4. The minimum dimension or diameter of septic tanks shall be 4 feet. The tank shall have a liquid depth of between 30 inches and 72 inches and shall have a uniform horizontal flow throughout its length;
5. The inlet elevation shall be at least 3 inches higher than the outlet elevation of the tank. The outlet elevation shall be at least 9 inches beneath the underside of the top of the tank or 20 percent of the total liquid depth whichever is greater. The inlet baffle or tee shall penetrate at least 6 inches, but not more than 20 percent of the total liquid depth below the liquid level in the tank and not lower than the outlet baffle or tee. The outlet baffle or tee shall penetrate at least 12 inches, but

not more than 35 percent of the total liquid depth in horizontal cylindrical tanks or 40 percent of the total liquid depth in rectangular tanks, below the liquid level in the tank. The inlet and outlet baffle or tee devices shall extend above the liquid level at least 8 inches or to within approximately 1 inch of the underside of the tank top. At least 1 inch of vent space shall be provided between the baffle or tee devices and the underside of the top of the tank. The separation distance between the inlet or outlet opening at the tank wall to the nearest point on baffles or tees shall not be less than 6 inches nor more than 12 inches;

6. When a partition wall is used to form a multi-compartment tank, the partition wall opening shall be not less than 4 inches in diameter and not smaller than the diameter of the influent and effluent pipes. The opening shall be located at the same elevation as the effluent pipe with sanitary tees or baffles having the same size and location requirements as for the inlet and outlet devices. The top of the partition wall, including baffles or tees, shall be set at least 1 inch below the underside of the tank top to provide adequate venting. All partitions, tees, and baffles shall be permanently and securely attached to the tank; and,
7. The effluent pipe exiting the unit shall be at least 6 feet in length and unperforated until the first tee, distribution box, or drop box before the absorption field is encountered.

Reference: Administrative Rules of South Dakota, Chapter 74:53:01:23.

Note: For number 1 above, under the requirements of this Manual, metal tanks, concrete block tanks or concrete tanks that are poured onsite are no longer considered acceptable types of septic tanks. All tanks shall be precast concrete tanks. Fiberglass or plastic septic tanks are considered acceptable when properly used.

Note: For number 3 above, the inspection pipe may not be required. The access hole, as outlined in Number 2 above, can account for the inspection pipes.

Note: State Plumbing Code may not be as stringent as local Plumbing Code. Therefore where State Plumbing Code is referenced, the local code may apply.

Section 2: Minimum capacities for septic tanks

The minimum capacities for septic tanks serving individual or small onsite systems shall be determined as follows:

1. All septic tanks receiving wastewater flows of 750 gallons per day or less shall have a minimum capacity of at least 1,000 gallons of liquid before there will be an overflow into the septic tank outlet. When a housing unit or units served by a septic tank contains more than three bedrooms, each bedroom in excess of three shall require an additional 250-gallon increase in the capacity of the septic tank beyond the 1,000 gallons. If a septic tank receives wastes from a garbage disposal, the overall capacity of the tank shall be increased by an additional 20 percent;
2. Septic tanks serving premises other than housing units or receiving wastewater flows of more than 750 gallons per day but equal to or less than 1,500 gallons per day shall have a minimum liquid volume capacity to permit retention of incoming sewage at 150 percent of the average daily flow;
3. Septic tanks receiving wastewater flows greater than 1,500 gallons per day shall have a minimum liquid volume capacity (V) equal to at least 1,125 gallons plus 75 percent of the daily wastewater flow (Q), or $V = 1,125 + 0.75Q$; and,
4. Septic tanks serving premises where high amounts of oil or grease are anticipated shall be preceded by grease interceptors. Wastewater from garbage disposals

may not be discharged to grease interceptors. Grease interceptors shall have a grease retention capacity of not less than 2 pounds for each gallon per minute of flow. The minimum size of grease interceptors shall be 750 gallons. Construction and installation of interceptors shall meet the requirements of the Chapter 20:54:06 of the South Dakota State Plumbing Code.

Reference: Administrative Rules of South Dakota, Section 74:53:01:25.

Note: For Number 1 above, under the requirements of this Manual, if a garbage disposal is anticipated or installed in a dwelling, the septic tank capacity at least 20 percent greater than that required in Number 1, above, and must include either multiple compartments or multiple tanks must be provided.

Section 3: Installation requirements for septic tanks

The installation requirements for septic tanks are as follows:

- 1. Septic tanks shall be installed on a solid, level base, with access hole covers 6 inches to 12 inches below the finished grade. If the cover is airtight, equipped with a hasp, and kept locked to prevent unauthorized access, the cover may be shallower or above grade. The tanks shall be installed at a depth that provides adequate gravity flow from the building or facility sewer which meets the requirements of the South Dakota State Plumbing Code, ARSD 20:54:11:09;**
- 2. The tank shall be installed on undisturbed soil. If over-excavation occurs, it shall be backfilled with sand to the correct elevation and compacted. Backfilling around the tank shall be accomplished in a manner to prevent settlement and to prevent undue stresses on the tank and to the inlet and outlet pipes;**
- 3. When multiple tanks are used to obtain the required liquid volume capacity, the tanks shall be connected in series. The interconnecting pipes between tanks shall be at least 6 feet in length and unperforated. No more than 4 tanks in series are permitted to obtain the required liquid volume capacity. The first tank shall not be smaller than any of the subsequent tanks in the series;**
- 4. All tanks shall be located in an area, which is accessible for the pumping of their contents. There shall be no constructed building or facility of any kind covering any of the tanks;**
- 5. Flotation collars shall be used in areas with high ground water potential;**
- 6. The inlet and outlet pipes shall be made watertight by grouting with cement or corrosion-resistant sealants. The pipes shall be supported on the outside of the tank to prevent failures due to settling. The pipes connecting septic tanks installed in series shall be Schedule 40 PVC soil pipe of 4 inch minimum diameter; and,**
- 7. During installation, any damage to the watertight coating or interior of a tank shall be repaired and tested by filling with water.**

Reference: Administrative Rules of South Dakota, Section 74:53:01:24.

CHAPTER 8: TREATMENT OF EFFLUENT

Section 1: Distribution of septic tank effluent to absorption fields

The pretreated effluent from a septic tank shall be distributed to the absorption field using the following criteria:

1. On relatively flat terrain where the elevation difference of the ground surface does not exceed 6 inches in any direction within the absorption field, the septic tank effluent may be directed to the absorption field through a system of interconnecting distribution pipes;
2. On slightly sloping terrain where the elevation difference of the ground surface does not exceed 28 inches in any direction within the absorption field, the septic tank effluent may be distributed by a distribution box provided the final ground surface elevation of the lowest trench is at least one foot higher than the invert elevation of the outlets of the distribution box. The inverts of all outlets shall be at the same elevation as measured from a liquid surface, which is at least 4 inches above the distribution box floor. The inlet pipe invert shall be at least 1 inch higher than outlet inverts. Each absorption line shall be connected separately to the distribution box and shall not be subdivided. When the septic tank effluent is pumped to the distribution box, either a baffle wall shall be installed in the distribution box or the pump discharge shall be directed against a wall of the box on which there is no outlet. The baffle shall be secured to the box and shall extend at least 1 inch above the crown of the inlet pipe. The distribution box shall be watertight with a removable cover, constructed of durable materials resistant to corrosion or decay and shall have sufficient capacity to handle the maximum daily flow rate; and,
3. On sloping terrain where the elevation difference of the ground surface exceeds 28 inches in any direction within the absorption field, a serial distribution system shall be installed. The serial distribution system shall be connected with drop boxes or closed pipe relief lines in such a manner that each trench is completely filled with septic tank effluent to the full depth of the gravel before effluent flows to succeeding trenches. The drop boxes or relief lines shall be placed on an undisturbed section of ground. The first drop box or relief pipe arrangement encountered shall not have the crown of the outlet pipe at its highest point above the invert of the septic tank outlet. At each drop box or relief arrangement, the invert of the inlet pipe shall be between 1 and 2 inches higher than the invert of the outlet pipe to the succeeding trench. The slope of the trench between the invert of the outlet and the invert of the inlet of successive drop box or relief pipe arrangements shall be 1 inch per 100 feet. When septic effluent is delivered to the drop box by a pump, the pump discharge shall be directed against a baffle wall or against a wall of the box on which there is no outlet. The drop box shall be watertight with a removable cover, constructed of durable materials resistant to corrosion or decay, and shall have sufficient capacity to handle the maximum daily flow rate.

Reference: Administrative Rules of South Dakota, Section 74:53:01:28.

Section 2: Distribution pipes

For distribution pipes, items (1) and (2) apply:

1. Distribution pipes used in trenches or beds for gravity distribution must be at least four inches in diameter and must be constructed of sound and durable material not subject to corrosion or decay or to loss of strength under continuously wet conditions; and,
2. Distribution pipes used for gravity distribution must have one or more rows of holes of no less than 1/2 inch in diameter spaced no more than 40 inches apart. Holes must be spaced to prevent failure due to loads.

Section 3: Gravity distribution

For gravity distribution, items (1) to (3) apply:

1. Supply pipes must be designed, installed, and protected so that effluent will not freeze in the pipe;
2. Supply pipes and distribution pipes must meet the strength requirements of American Society for Testing and Materials (ASTM) Schedule 40 plastic pipe, and be supported in a manner so that there is no deflection or longitudinal bending during the backfilling and subsequent settling of the soil; and,
3. Serial distribution must be used to distribute effluent to individual trenches in an absorption system. If the necessary elevation differences between trenches for serial distribution cannot be achieved by natural topography or by varying the excavation depths, parallel distribution may be used. Serial distribution shall not create a pressure head on trenches at lower elevations.

Section 4: Additional requirements for drop boxes, distribution boxes, or valve boxes

If drop boxes, distribution boxes, or valve boxes are used, items (1) to (4) apply:

1. The invert of the outlet pipe to the next drop box shall be no greater than 2 inches higher than the crown of the outlet pipe of the trench in which the box is located;
2. The box shall be covered by a minimum of 6 inches of soil. If the top of the box is deeper than 6 inches, access must be provided above, at, or within six inches of finished grade;
3. The box shall be placed on firm and settled soil; and,
4. Distribution boxes must not be connected to one another if each box has distribution pipes.

Section 5: Dual field systems

Dual field systems using valve boxes shall comply with the following requirements:

1. Dual field systems shall be sized, designed, and constructed as set forth above for standard systems except as follows:
 - a. The absorption area shall be divided into 2 or more parts
 - b. Alternating absorption areas shall each be connected to a valve box outlet; and,
2. No part of an absorption area shall be used more than 1 year unless the effluent level indicates that a longer duration is feasible.

Section 6: Dosing or pressure systems required when absorption systems are large

A dosing chamber shall be installed with a siphon or a pump when the total length of absorption lines exceeds 750 feet, the area of the absorption system exceeds 1,200 square feet, the topography and location is such that any absorption line will exceed 100 feet in length, or it is necessary to elevate the wastewater effluent from the septic tank for discharge into a mound or absorption field. The dosing chamber shall be equipped with an automatic siphon or pump with level control switches and an alarm system. All electrical components in the dosing chamber shall be waterproof and corrosion-resistant. The alarm and electrical panel shall be located outside of the dosing chamber and shall be weatherproof. The total storage volume of the dosing chamber shall be such that the wastewater is discharged once every three to four hours. The dosing chamber shall be at least 30 inches in diameter and have a net capacity to dose 60 to 75 percent of the total volume of the absorption lines at one time. The siphon or pump for the dosing chamber shall be capable of maintaining a pressure of at least one pound per square inch at the outer ends of the absorption lines. The dosing chamber shall be vented but watertight and designed for ease of maintenance. Absorption fields exceeding 1,000 feet in total length or 1,800 square feet in area shall be divided into at least 2 equal sections with each section dosed alternately.

Reference: Administrative Rules of South Dakota, Section 74:53:01:27.

Section 7: Dosing of effluent

Where dosing is necessary, it shall comply with the requirements of this section.

Section 7.1: Dosing chamber, pump pit, wet well, or lift station

If dosing chambers, pump pits, wet wells, or lift stations are used, items (1) to (4) apply:

1. The dosing chamber shall meet or exceed the requirements of Chapter 7, Sections 1 and 3, and be vented. Dosing chambers shall be setback as specified in Table 1. A tank's final cover shall be crowned or sloped to shed surface water. Dosing chambers shall not be placed in floodplains;
2. The dosing chamber shall either include:
 - a. An alternating two-pump system; or,
 - b. Have a minimum total capacity of 500 gallons or 100 percent of the average design flow whichever is greater.
3. The inlet of pumps shall be elevated at least 4 inches from the bottom of the dosing chamber or protected in some other manner to prevent the pump from drawing excessive settled solids. The pump, pump controls, and pump discharge line shall be installed to allow access for servicing without entering the dosing chamber; and,
4. Electrical installations shall comply with applicable laws and ordinances including the latest codes, rules, and regulations of public authorities having jurisdiction.

Section 7.2: Dosing devices for gravity distribution

If dosing devices are used for gravity distribution, then items (1) through (4) apply:

1. For dwellings, the dosing device shall discharge at least 10 gallons per minute but no more than 45 gallons per minute;

2. If the dosing device is a siphon, the siphon shall be maintained in proper operating condition;
3. If the dosing device is a pump, it shall be constructed and fitted with sound, durable, and corrosion-resistant materials; and,
4. Where the absorption system is at a higher elevation than the pump, sufficient dynamic head shall be provided for both the elevation difference and friction loss.

Section 7.3: Dosing devices for pressure distribution

If dosing devices are used for pressure distribution, then items (1) through (4) apply:

1. The pump discharge capacity shall be based upon the perforation discharges for a minimum average head of 1.0 foot. Perforation discharge will be determined by the following formula:

$$Q = 19.65 cd^2h^{1/2}$$

where: Q = discharge in gallons per minute,
 c = 0.60 = coefficient of discharge,
 d = perforation diameter in inches, and
 h = head in feet.

2. The pump discharge head shall be at least five feet greater than the head required to overcome pipe friction losses and the elevation difference between the pump and the distribution device;
3. The quantity of effluent delivered for each pump cycle shall be no greater than 25 percent of the average design flow; and,
4. A siphon will not be allowed as a dosing device to pressurize a system.

Section 8: Determining required absorption system area

The minimum area of absorption beds or trenches in a water-carriage dispersal system which utilizes an absorption system shall be expressed in terms of square feet, that is, the length times the width of the beds or trenches. The total absorption area (A) in square feet required for absorption beds or trenches is equal to the number derived by multiplying the gallons per day of wastewater flow (Q) for which the system is designed by the square root of the rate of percolation, as determined pursuant to ARSD 74:53:01:30, expressed in minutes per inch (t) and dividing this product by five, as shown in the following formula:

$$A = \frac{Q\sqrt{t}}{5}$$

In no case may the gallons per day of wastewater flow (Q) used in this formula be less than 750 or more than 7,500. For systems receiving wastewater flows of less than 750 gallons per day, Table 5 shall be used based on 120 gallons per day per bedroom. This formula gives the required bottom area when 6 inches or more but less than 12 inches of fill material are placed below the distribution pipe for trenches and beds. The required bottom area may be reduced by the following percentages for trenches only: 20 percent for 12 inches or more but less than 18 inches of fill material below the distribution pipe; 34 percent for 18 inches or more but less than 24 inches of fill material below the distribution pipe; and 40 percent for 24 inches or more of fill material below the distribution pipe.

Reference: Administrative Rules of South Dakota, Chapter 74:53:01:31.

Note: Table 5 may be used to determine the absorption area based on a minimum of 120 gallons per day per bedroom for a Class I dwelling. For a Class II Dwelling a minimum of 150 gallons per day per bedroom is required. This can be seen in Chapter 10, Section 3, Table 5b.

Section 9: Alternative method of determining required absorption trench system area

In lieu of calculating the absorption trench system area according to ARSD 74:53:01:30 and 74:53:01:31, the following criteria in Table 5 may be used for the design of individual or small onsite wastewater systems if the absorption trench system is of an area sufficient for at least three bedrooms. The absorption area shall be determined according to the following:

TABLE 5

Percolation Rate (Minutes for water to drop one inch)	Minimum Absorption Trench Area (Square feet of trench bottom per bedroom)
1 but less than 5 minutes per inch	Not permitted--see § 74:53:01:33
5 but less than 10 minutes per inch	125 square feet
10 but less than 15 minutes per inch	165 square feet
15 but less than 30 minutes per inch	200 square feet
30 but less than 45 minutes per inch	250 square feet
45 but less than 55 minutes per inch	300 square feet
55 but no more than 60 minutes per inch	350 square feet
Over 60 minutes per inch	Not permitted--see § 74:53:01:33

The minimum absorption trench area, as shown in the above table, may be reduced in accordance with ARSD 74:53:01:31 when the depth of fill material below the distribution pipe is 12 inches or greater.

Reference: Administrative Rules of South Dakota, Section 74:53:01:32.

Note: The above method refers to a Class I dwelling. For a Class II dwelling see Section 10, Table 5b.

Section 10: Class II dwelling sizing factors

The following criteria in Table 5b may be used for the design of individual or small onsite wastewater systems classified as Class II dwellings, if the absorption trench system is of an area sufficient for at least 3 bedrooms. The absorption area shall be determined according to the following:

Table 5b

Percolation Rate (Minutes for water to drop one inch)	Minimum Absorption Trench Area (Square feet of trench bottom per bedroom)
1 but less than 5 minutes per inch	Not permitted--see § 74:53:01:33
5 but less than 10 minutes per inch	155 square feet
10 but less than 15 minutes per inch	200 square feet
15 but less than 30 minutes per inch	250 square feet
30 but less than 45 minutes per inch	300 square feet
45 but less than 55 minutes per inch	375 square feet

55 but no more than 60 minutes per inch
Over 60 minutes per inch

425 square feet
Not permitted--see § 74:53:01:33

Section 11: Requirements for absorption trenches

An absorption system shall have at least 2 absorption trenches of approximately equal length. The length of a trench with gravity flow may not exceed 100 feet, the width of a trench may not exceed 3 feet. The bottom of the trench shall be at least 18 inches below the ground surface, but the depth may not exceed 4 feet. The trench shall be constructed with a fill material consisting of washed gravel, crushed stone, slag, or clean bank run gravel ranging in size from 1/2 inch to 2 1/2 inches in diameter. An absorption line shall be placed within each trench and shall run along the length of the trench. All absorption lines shall have the ends capped. The fill material shall be at least 6 inches deep below the bottom of the absorption line and 2 inches deep above the top of the line. The bottom of the trench shall be uniformly graded to a slope from a minimum of 1/2 inch to a maximum of 4 inches per 100 feet. There shall be at least 6 feet of undisturbed soil between trenches. A closed-loop absorption trench system shall be level. To minimize sidewall compaction, trench excavation shall be made with bucket equipment having side cutters or raker teeth. When the soil does not exceed the plastic limit, the trench walls and bottoms shall be scarified before graded material is added.

Reference: Administrative Rules of South Dakota, Section 74:53:01:35.

Note: All absorption lines shall be centered within the excavated trenches. Piping shall be laid out so as that no particular run is longer than 100 feet either as a single run or consecutive runs. Any run over 100 feet in length shall be dosed as described in Chapter 8. Any excavation greater than 36 inches wide shall be considered a seepage bed.

Note: If effluent is distributed by gravity it shall not be loaded above the natural ground surface and the rock below the pipe must be in contact with original soil and gravity distribution must be designed to load effluent the entire depth of the rock below the pipe.

Section 11.1: Gravelless systems

If gravelless drainfield pipe is used, it shall:

- 1. Be constructed of commercially fabricated corrugated pipe completely encased by the manufacturer in a geotextile wrap specific to this purpose;**
- 2. Be an 8 inch or 10 inch nominal ID pipe that conforms to (a) and (b) and meets the requirements of American Society of Testing Materials (ASTM) F667:**
 - a. The pipes must be marked with an alignment stripe visible through the geotextile wrap and installed with this stripe at top center; and,**
 - b. The pipes shall contain a row or rows of cleanly cut three-eighths inch to one-half inch diameter holes located in such a manner to provide storage of solids. Each row shall contain a hole in every other corrugation valley, staggered such that every corrugation valley contains one hole.**
- 3. Be wrapped in geotextile fabric specifically designed and tested for use with gravelless pipe and for installation and use in onsite wastewater systems and designed to transmit sewage at a rate that corresponds to the sizing factor prescribed in subdivision (9), below;**
- 4. Be protected from heat and ultraviolet rays prior to installation;**
- 5. Be excavated to a width in accordance with the manufacturers recommendations;**
- 6. Have all joints secured as recommended by the manufacturer;**

7. Not be loaded above the natural ground surface. The entire pipe must be below the original grade and gravelless drainfield pipe with gravity distribution must be designed to fill the entire pipe; and,
8. Be backfilled so not to crush or damage the medium.
9. Have the following size allotments:
 - a. An eight-inch inside diameter pipe shall be equivalent to a two-foot wide rock filled trench with six inches of drainfield rock below the distribution pipe; and,
 - b. A ten-inch inside diameter pipe shall be equivalent to a three-foot wide rock filled trench with six inches of drainfield rock below the distribution pipe.

Section 11.2: Chamber systems

If chamber media including all piping and appurtenances is used, it shall:

1. Be constructed of commercially fabricated materials, resistant to sewage, specific to this purpose;
2. Be no greater than three feet in width and have an open bottom with the vertical outside dimensions less than 30 inches;
3. To support the load of overburden and sidewall soil;
4. Have slotted or perforated sides to allow sewage to move laterally into the soil and prevent soil penetration into the chamber;
5. Have the joints secured as recommended by the manufacturer;
6. Be excavated to a width in accordance with the manufacturers recommendations;
7. Not be loaded above the natural ground surface. The entire slatted sidewall must be below the original grade, and effluent must be loaded the entire depth of the slatted sidewall;
8. Be backfilling so not to crush or damage the medium.
9. Have the following size allotments with a 20% allowable credit reduction in the size of the absorption area:
 - a. A fifteen-inch wide chamber system shall be equivalent to a two and a half-foot wide rock filled trench with six inches of drainfield rock below the distribution pipe;
 - b. A twenty-two inch wide chamber system shall be equivalent to a two and three quarters-foot wide rock filled trench with six inches of drainfield rock below the distribution pipe; and,
 - c. A thirty-six inch wide chamber system shall be equivalent to a three-foot wide rock filled trench with six inches of drainfield rock below the distribution pipe.

Section 12: Requirements for absorption beds

Seepage beds may not be constructed where the soil percolation rate is 30 or more minutes per inch. An absorption bed may be designed and constructed for gravity or pressure flows in accordance with the following criteria:

1. A gravity absorption bed system shall consist of a level bed not exceeding 100 feet in length, 15 feet in width, and 3 feet in depth. Each distribution line shall extend the length of the bed and be spaced not greater than 5 feet on center across the bed width. The distribution lines shall be preceded by a distribution box to provide uniform distribution of effluent. The outermost distribution lines

may not be closer than 30 inches to the bed walls and all ends shall be capped if it is not a closed-loop system;

2. A pressurized absorption bed system may exceed the length and width requirements in subdivision 74:53:01:36 (1), but must not be more than 3 feet in depth. The bed bottom shall be level. Each distribution line shall be installed within the perimeter limits of the bed and spaced not greater than 10 feet on center across the bed. The bed shall be center-fed by a manifold pipe. The outermost distribution lines may not be closer than 5 feet to the bed wall perimeter. The distribution system shall be closed-loop or have all ends capped; and,
3. Additional requirements for gravity and pressurized absorption bed systems are as follows:
 - a. The distribution pipe network shall meet the requirements of subdivision 74:53:01:37 (8):
 - b. The distribution lines shall be placed in at least a 12 inch layer of ½ inch to 1½ inch diameter washed gravel with at least 6 inches of gravel beneath and 2 inches of gravel above each line; and,
 - c. The gravel above the distribution line shall be covered with untreated building paper, then a 6-inch layer of loose marsh hay or straw, and then a top layer of 12 inches of soil over the entire bed. Flax straw may not be used.

Reference: Administrative Rules of South Dakota, Chapter 74:53:01:36.

Note: Parallel beds must be at least 10 feet apart.

Section 13: Additional criteria for design and construction of absorption systems

The following criteria shall be required for absorption systems:

1. Absorptions systems shall be set back as specified in Chapter 4, Section 3, Table 1. Distribution shall be made in accordance with all applicable requirements of Chapter 8, Section 3;
2. Absorption systems shall not be placed in floodplains. Absorption systems should not be placed in areas subject to excessive run-on. All absorption systems located on slopes greater than one percent must have a diversion constructed immediately upslope from the system to intercept and direct runoff;
3. The absorption area of trenches and seepage beds shall be in original soils. The bottom and sides of the absorption system to the top of the distribution medium shall be excavated in such a manner as to expose the original soil structure in an unsmearred and uncompacted condition;
4. Excavation equipment or other vehicles must not be driven on the excavated trench or absorption bed bottom. Once the trench or absorption bed is excavated, it shall not be exposed to rainfall prior to placement of the final backfill;
5. A vertical inspection pipe at least 1-1/2 inches in diameter shall be installed and secured in the distribution medium of every trench or absorption bed. The inspection pipe must be located at an end opposite from where the sewage tank effluent enters the medium. The inspection pipe must have three-eighths inch or

larger perforations spaced vertically no more than 6 inches apart. At least 2 perforations must be located in the distribution medium. No perforations shall be located above the geotextile fabric or untreated building paper. The inspection pipe must extend to the bottom of the distribution medium and must be capped flush with or above finished grade;

6. A finder wire of Number 14 solid strand insulated copper wire shall be installed for all new and upgraded onsite wastewater system installations. The finder wire shall be accessible at the clean out and run to and around the septic tank access hole, and through the trenches or around the bed;
7. A geotextile fabric, or untreated building paper, or a 4 to 8 inch thickness of hay or straw, shall be used to cover distribution rock medium. The fabric must be of sufficient strength to undergo installation without rupture. In addition, the fabric must permit passage of water without passage of overlying soil material into the rock medium. When fabric or untreated building paper is used, the:
 - a. Edges of adjacent sheets shall be overlapped by a minimum of 6 inches;
 - b. Geotextile fabric shall have adequate tensile strength to prevent ripping during installation and backfilling, adequate air permeability to allow free passage of gases, and adequate particle retention to prevent downward migration of soil particles into the filter material; and,
 - c. Use of waterproof paper is prohibited. An impervious covering shall not be used. Tile or open joint pipe shall not be used.
8. The minimum depth of cover over the distribution medium shall be at least six inches. The trenches or absorption beds shall be backfilled and crowned above finished grade to allow for settling. The top six inches of soil shall have the same texture as the adjacent soil; and,
9. A vegetative cover shall be established over the absorption system. The absorption system shall be protected until a vegetative cover is established. The vegetative cover established shall not interfere with the hydraulic performance of the system and shall provide adequate frost and erosion protection.

Section 14: Mound systems

Section 14.1: Requirements for a mound or evapotranspiration system

A mound or evapotranspiration system may be designed for gravity or pressure flows in accordance with the following criteria:

1. Plans and specifications shall be submitted to the Secretary by a registered professional engineer or licensed plumber for review and approval of any individual or small onsite mound or evapotranspiration system prior to construction;
2. Mound and evapotranspiration systems shall not be constructed on sites located in a floodplain. Mound systems shall not be constructed on sites located on bedrock or on soils with percolation rates of 120 or more minutes per inch or 3 or fewer minutes per inch at a depth of 12 inches below the sand layer of the mound. Mound or evapotranspiration systems may not be located on natural slopes exceeding 12 percent under any soil percolation rate conditions. When a mound or evapotranspiration system is located on a slope, no buildings, driveways, other surface or subsurface obstructions, or future construction is permitted within 30 feet of the system on the down gradient side while the system is being used. The systems shall be located in open areas with maximum available sunshine. The

area surrounding the systems shall be graded to provide for diversion of surface runoff water;

3. The mound or evapotranspiration system may be constructed only upon undisturbed naturally occurring soils. The bottom of the system bed shall be excavated to a depth from 8 to 12 inches below the ground surface and shall be completely level. The system may be round or rectangular;
4. The mound system shall be constructed so that the minimum distance between the seasonal high ground water table and the invert elevation of the distribution system is 4 feet;
5. The required bottom area of the bed shall be calculated on the basis of a recommended or design application rate with respect to the soil percolation rate. For mound systems receiving less than 1,500 gallons of wastewater per day, an application rate of 0.6 gallons per square foot per day shall be used when the percolation rate is from 60 to 120 minutes per inch and an application rate of 0.83 gallons per square foot per day shall be used when the percolation rate is 3 or more but less than 60 minutes per inch. For mound systems receiving 1,500 or more gallons of wastewater per day, the application design rate shall equal the soil percolation rate plus the seasonal evapotranspiration rate as shown in Table 6. For evapotranspiration systems, the application design rate is the seasonal evapotranspiration rate shown in Table 6 as follows;

TABLE 6

Evapotranspiration Rate	
<i>Season of Use</i>	<i>Gallons per square foot per day</i>
Year Around	0.12
Summer	0.20
Winter	0.06
Soil Infiltration Rate	
<i>Percolation Time, Minutes per inch</i>	<i>Gallons per square foot per day</i>
5 or more but less than 10	0.65
10 or more but less than 15	0.60
15 or more but less than 20	0.54
20 or more but less than 30	0.49
30 or more but less than 45	0.42
45 or more but less than 60	0.34
60 or more but less than 90	0.27
90 or more but less than 120	0.18
120 or more	0.12

6. The fill material for the interior portion of a mound or evapotranspiration system shall consist of sandy loam soil, medium-size pit run sand, and pea rock or washed gravel ranging in size from ½ inch to 2-½ inch diameter. The first layer of fill material placed on the excavated bed bottom shall be a minimum of 12 inches of sand. The next layer of fill material shall consist of at least 9 inches of the pea rock or washed gravel placed in the immediate area on which the distribution pipe system will be placed. After placement of the distribution pipe system, additional pea rock or washed gravel shall be added until there are at least 2 inches of cover over and around the entire pipe system. The rock or gravel layer shall be covered

with untreated building paper. The finish fill shall consist of sandy loam soil placed on the untreated building paper to a depth of 1 foot in the center of the mound and to a depth of 6 inches at the sides tapered out onto the side of the sand filled layer;

7. The exterior portion of mound shall consist of at least a 6-inch layer of loose marsh hay or straw over the sandy loam soil, covered with at least 6 inches of topsoil. Flax straw may not be used. The outside slopes may not be steeper than 3 feet horizontally to 1 foot vertically (3:1). Where the terrain slopes more than 7 percent, the downward slopes may not be steeper than 5 feet horizontally to 1 foot vertically (5:1). The entire system shall be seeded, sodded, or otherwise provided with a grass cover. No shrubs, trees, or other woody vegetation may be planted on the top of the system;
8. The distribution pipe network for an elevated mound or evapotranspiration system shall consist of a dosing chamber, pump or siphon, 1 1/4-inch to 3-inch diameter flexible plastic pipe from the dosing chamber to the mound, and a manifold connected to the perforated distribution pipe. The distribution lines shall be installed in accordance with subdivision 74:53:01:36 (2). The pipe from the dosing chamber to the center of the mound shall be installed below the frost line or be sloped uniformly back to the dosing chambers. The dosing or pressure system shall be constructed in accordance with ARSD 74:53:01:27. The distribution lines shall have perforations spaced from 2 to 7 feet along the pipe with varying hole diameters from 3/16-inch to 1/2-inch to provide uniform pressure and distribution over the bed. All drilled holes shall have burrs removed. All distribution pipe ends shall be capped. For gravity flow systems, all distribution pipes shall be at least 4 inches in diameter and spaced not greater than 5 feet on center across the bed width or closer than 30 inches to the bed wall perimeter; and,
9. Livestock and heavy equipment shall not be allowed on the bed.

Reference: Administrative Rules of South Dakota, Section 74:53:01:37.

Section 14: Requirements for graywater system

A graywater system shall be designed in accordance with the following criteria:

1. All graywater treatment and recycle systems shall be located in accordance with the distances specified in ARSD 74:53:01:19, Table 1;
2. Design of graywater systems for homes or cabins shall be based on a minimum graywater flow of 40 gallons per day per person. Three days retention time shall be provided for each graywater tank. For other facilities, the design flow shall be specified on a case-by-case basis by the Secretary;
3. Graywater tanks are septic tanks and shall conform to the requirements for septic tanks as specified in ARSD 74:53:01:23;
4. Effluent from graywater systems may be recycled for toilet use, conveyed to absorption fields, mounds, or seepage pits, or used for irrigation of lawns and areas not intended for food production. Percolation tests shall be conducted and the minimum size of absorption area shall be determined in accordance with ARSD 74:53:01:29 to ARSD 74:53:01:32, inclusive.

Reference: Administrative Rules of South Dakota, Section 74:53:01:38.

CHAPTER 9: ALTERNATIVE OR UNCONVENTIONAL SYSTEMS

Section 1: Holding Tanks

Section 1.1: Approval for use

Due to the unique circumstances of a holding tank, it shall be used as a waste disposal system of a last resort. The Director shall approve in writing, on a form to be attached to the building permit, the circumstances under which a holding tank will be accepted, including an agreement to pay an inspection fee. Included in said form will be the requirement for periodic inspections by the Director and the off site location of waste disposal. An Onsite Wastewater System Construction Permit will be issued only when these additional requirements are met.

Holding tanks shall not be used without an Onsite Wastewater System Operating Permit, the terms, conditions, and effective period of which shall be limited solely to the temporary use of the holding tank.

Section 1.2: Requirements for holding tanks

The requirements for holding tanks are as follows:

1. The minimum liquid holding capacity shall be 1,000 gallons or the wastewater flow generated over a period of 7 days, whichever is greater. There shall be no discharge of effluent from the tank;
2. The tank shall be equipped with a high-water alarm positioned to allow at least 3 days of storage after the alarm is activated; The alarm shall be placed in a location of easy recognition and shall be labeled Alarm-Sewage Holding Tank.
3. Holding tanks shall conform to the requirements for septic tanks under ARSD 74:53:01:23 (1) to (3) inclusive, with the exception of outlet devices; Tanks shall be fitted with easily accessible inspection holes for maintenance and pumpage. The inlet fixture and openings shall be properly sealed to assure watertightness of the tank. Baffle walls are not required in holding tanks.
4. Holding tanks shall be installed to meet the requirements for septic tanks under ARSD 74:53:01:24.

Reference: Administrative Rules of South Dakota, Section 74:53:01:26.

Note: In addition to number 1 above, the tank shall be sized to incorporate a 25 percent addition of projected sewage flows as a buffer in case of weather conditions, temporary unavailability of a liquid waste hauler, and other adverse conditions. Tanks at 75 percent of overflow capacity shall be considered to be full.

Section 1.3: Maintenance of holding tanks

The conditions of use which may be prescribed by the Director on a Onsite Wastewater System Operating Permit shall include, but not be limited to, the requirement that the owner/user:

1. **Contract with a liquid waste hauler. The contract shall provide that the hauler maintain and make available to the Director a record of pumping activities at the site;**
2. **Deliver to the Director on a quarterly basis copies of the liquid waste hauler's weekly bills, statements, or invoices; and,**
3. **Provide written authorization to allow the Director to initiate required maintenance at the owner/user's expense if noncompliance with these rules or legal notices results in an imminent threat to public health or safety.**

Section 2: Requirements for vault privies

Vault privies shall be constructed to include a fly-tight vault; a superstructure affording complete privacy; an earth mound around the top of the vault and below the floor level, which slopes downward away from the vault; a floor and riser of reinforced concrete at least four inches in thickness or other impervious material; and a hinged, self-closing, fly-proof seat and lid of easily cleanable impervious material. All venting shall be fly-proofed with no. 16 or smaller mesh screening. The vault shall be located in an area, which is accessible for the removal of its contents. The vaults shall be durable and have corrosion-resistant material on the interior and exterior.

Reference: Administrative Rules of South Dakota, Section 74:53:01:39.

Section 3: Requirements for unconventional systems

Unconventional systems, such as portable and non-portable chemical, composting, incinerating, recirculating, watersaving, or other innovative commercially manufactured toilets, shall be sized, installed, operated, and maintained in accordance with the manufacturer's specifications. When vents are required, they shall be of durable, corrosion-resistant material installed in accordance with the South Dakota State Plumbing Code, Chapter 20:54:12. The units shall have receptacles of smooth, durable, impervious material that are resistant to chemicals and can be easily cleaned. All portable units shall be designed to receive and contain the wastes deposited in them and shall be located and maintained in a manner that will not create a nuisance condition. Waste material from unconventional system units shall be disposed of in vault privies, holding tanks, or in accordance with ARSD 74:53:01:41. Systems employing new technology are considered experimental systems, and their design shall have provisions for a back-up system to be installed if the proposed system, once installed, is not functioning properly or is otherwise creating a hazard to the public health. Applications for temporary approval of experimental systems for demonstration purposes shall be accompanied with documentation of reliability and applicability in full-scale operations and provided with written guarantee for service, component parts, or replacement provided by the manufacturer.

Reference: Administrative Rules of South Dakota, Section 74:53:01:40.

Section 3.1: Unconventional systems to be used when water or electrical systems unavailable

Vault privies, chemical toilets, incinerator toilets, or composting units shall be used when a water or electrical system is not available. With the exception of vault privies, all unconventional systems are considered experimental systems, and plans and specifications shall be submitted to the Secretary for approval as an experimental system prior to installation.

Reference: Administrative Rules of South Dakota, Section 74:53:01:10.

Section 4: Absorption or alternative water-carriage system permitted under certain circumstances

An absorption system or alternative water-carriage system may be used when the percolation rate as determined by ARSD 74:53:01:31 and 74:53:01:32 is between 5 and 60 minutes per inch if all other requirements for the absorption system or alternative water-carriage system are met. An alternative water-carriage system must be used when the percolation rate of the soil is slower than 60 minutes per inch or faster than 5 minutes per inch. An absorption system may be used where fill material is used to decrease the percolation rate from more than one but less than 5 minutes per inch to more than 5 but less than 60 minutes per inch.

Reference: Administrative Rules of South Dakota, Section 74:53:01:33.

Section 5: Seepage pits allowable

A seepage pit is permissible at the end of an absorption system if the bottom of the pit is no more than 4 feet below the ground surface and the requirements of ARSD 74:53:01:15 and either ARSD 74:53:01:31 and 74:53:01:32 are met.

Reference: Administrative Rules of South Dakota, Section 74:53:01:34.

Section 6: Cesspool, pit privy or other failing systems

Section 6.1: Cesspools and pit privies prohibited

The construction of a cesspool or a pit privy is prohibited. The operation of a cesspool or a pit privy constructed after February 28, 1975, is prohibited. Cesspools will be considered failing systems under the guidelines of this Manual. Where a property is determined to have a cesspool, pit privy or a failing onsite wastewater system, the said system shall be replaced with an onsite wastewater system complying with all local ordinances. If a failing system is determined then the failing system shall be replaced with a conforming onsite wastewater system and the failing system shall be abandoned according to Chapter 10, Section 4 of this Manual.

Reference: Administrative Rules of South Dakota, Section 74:53:01:18.

Note: The use of metal tanks, drums, barrels or pipes as sewage tanks are prohibited for use with any onsite wastewater system. These failing systems are considered non-repairable and shall be replaced with acceptable onsite wastewater systems.

Note: A free permit shall be required to abandon onsite wastewater systems.

CHAPTER 10: STATE AND LOCAL POLICIES

Section 1: Conflict

In any case where a provision of these regulations is in conflict with the provisions of any zoning, building, fire, safety, or health regulations, law, or ordinance effective within the jurisdictional boundaries of these regulations, the provisions which establishes a higher standard or specification or which is more stringent in its requirements shall control.

Section 2: Variances by secretary

Variances to these rules may be granted by the Secretary or the Secretary's authorized designee provided adequate documentation is provided to justify the need for the deviation and conditions are such that it will not cause a violation of any existing water quality standard, cause a health hazard, or create a nuisance.

Reference: Administrative Rules of South Dakota, Section 74:53:01:44.

Note: These variances apply to variances requested from the Secretary. Variances requested from the Director will follow procedures outlined in the Rapid City Onsite Wastewater System Ordinance.

Section 3: Disposal of septage

The disposal of septage shall be handled in the following manner:

1. Requirements for the use or disposal of septage are those in 40 C.F.R. Part 503 (October 25, 1995); and,
2. Final disposal of contents may be made into a public system if specific permission has been obtained for the disposal from local governmental officials and the public system has the equipment and facilities to provide at least secondary treatment to the contents.

Reference: Administrative Rules of South Dakota, Section 74:53:01:41.

Section 4: Abandoned systems to be disconnected, plugged, dismantled, pumped, removed, and filled

Abandoned wastewater systems shall be disconnected from buildings or facilities, pipes plugged, and receptacles dismantled or removed; and any void space in which such receptacles were contained shall be filled with soil. Before filling, receptacle contents shall be pumped out and disposed of in accordance with ARSD 74:53:01:41.

Reference: Administrative Rules of South Dakota, Section 74:53:01:11.

CHAPTER 11: CERTIFICATION OF INSTALLERS

Section 11.1: Certification required

No installer may engage in the business of the installation of individual or small onsite wastewater systems without first obtaining a certificate to conduct such activities pursuant to this chapter. All individual or small onsite wastewater system installations shall be performed in accordance with the provisions of Chapter 74:53:01.

Reference: Administrative Rules of South Dakota, Section 74:53:02:02.

Section 11.2: Application for certification

An installer desiring to be certified shall complete an application form provided by the Secretary. The application shall contain the name and address of the installer and any

additional information required by the Secretary. The application shall be submitted to the Secretary for consideration.

Reference: Administrative Rules of South Dakota, Section 74:53:02:03.

Section 11.3: Examination required

The installer must successfully complete an examination of the principles set forth in Chapter 74:53:01. The passing grade for all examinations is an overall grade of 70 out of a possible 100. The examination will be prepared, administered, and graded by the Secretary.

Reference: Administrative Rules of South Dakota, Section 74:53:02:04.

Section 11.4: Certification issued upon fulfillment of requirements

Upon satisfactory fulfillment of the requirements in this chapter, the Secretary shall issue a certificate to the installer.

Reference: Administrative Rules of South Dakota, Section 74:53:02:05.

Section 11.5: Certification renewal

Certificates are valid for five years from the date of issuance, unless suspended or revoked for cause under ARSD 74:53:02:07. Certification renewal requires successful completion of the examination required in ARSD 74:53:02:04. An installer must apply for renewal at least 30 days before expiration of the installer's certification.

Reference: Administrative Rules of South Dakota, Section 74:53:02:06.

Section 11.6: Suspension or revocation of certification

An installer failing to comply with the requirements of this chapter may be subject to suspension or revocation of certification. After opportunity for hearing, the Secretary may suspend or revoke a certificate for reasons including, but not limited to, incompetence, negligence, misrepresentation, providing fraudulent information in applying for a certificate, failure to comply with the requirements of this chapter, and failure to comply with Chapter 74:53:01. The decision of the Secretary is final. Appeal from the action of the Secretary may be made as provided by SDCL 1-26.

Reference: Administrative Rules of South Dakota, Section 74:53:02:07.

Section 11.7: Re-certification following suspension or revocation

An Onsite Wastewater System Installer whose certification is suspended is eligible to apply for re-certification no sooner than six months from the date of suspension. An Onsite Wastewater System Installer whose certification is revoked is eligible to apply for re-certification no sooner than three years from the date of revocation. Re-certification requires successful completion of the examination required in ARSD 74:53:02:04.

Reference: Administrative Rules of South Dakota, Section 74:53:02:08

Section 11.8: Penalty provisions for noncompliance

An installer in noncompliance with the requirements of this chapter may be subject to the penalty provisions of SDCL 34A-2. These provisions may be pursued either independently or concurrently with the suspension or revocation procedures in ARSD 74:53:02:07.

Reference: Administrative Rules of South Dakota, Section 74:53:02:09.