

**RULES AND REGULATIONS GOVERNING
THE INSTALLATION AND
USE OF ON-SITE SEWAGE DISPOSAL SYSTEMS**

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**CASS COUNTY, NORTH DAKOTA
RULES AND REGULATIONS GOVERNING
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USE OF ON-SITE SEWAGE DISPOSAL SYSTEMS**

SECTION I – PURPOSE-OBJECTIVE-INTERPRETATION

The improper design, location, installation, use and maintenance of on-site sewage treatment systems can adversely affect the public health, safety, and general welfare by discharge of inadequately treated sewage to surface and ground waters. In accordance with the authority granted in North Dakota Century Code, Chapter 23-35 and 54-40, the County of Cass hereby provides minimum standards and criteria for design, location, installation, use and maintenance of on-site sewage treatment systems. The purpose of the rules is to protect the health, safety and welfare of residents and future residents of Cass County.

In any case, where a provision of these regulations is found to be in conflict with a provision of any zoning, building, safety or health ordinance or regulation in force in the incorporated or unincorporated areas of Cass County existing on the effective date of these regulations, the provision which establishes the higher standard for the promotion of the health and safety of the people of Cass County shall prevail.

Section II – Definitions

For the purpose of these regulations, certain terms or words used herein shall be interpreted as follows: the word “shall” is mandatory, the words “should” and “may” are permissive. All distances, unless otherwise specified, shall be measured horizontally.

“Active Mottling” – (redoximorphic features) reflect alternating reduction and oxidation conditions due to water table fluctuations. It indicates that a water table is high enough in the soil for seven days to create reducing conditions.

“Administrator” – is the Health Officer or designated officer.

“Aerobic Tank” – is any sewage tank which utilizes the principal of oxidation in the decomposition of sewage by the introduction of air into the sewage.

“Alternative System” – is an individual sewage treatment system employing such methods and devices presented in the rules.

“Basal Area” – will be determined as the total area under the mound on level ground, on sloping ground the basal area will be determined as the area under the trench area and that area under the mound down slope under the trench area.

“Baffle” – is a device installed in a septic tank for proper operation of the tank and to provide maximum retention of solids, and includes vented sanitary tees and submerged pipes in addition to those devices that are normally called baffles.

“Bedroom” – is any room within a dwelling that, in the judgment of the Health Officer, might be reasonably used as a sleeping room, including, but not limited to, rooms designated den, office, or study and unfinished areas with potential development to same.

“Building Drain” – is that part of the lowest piping of the drainage system which receives the discharge from soil, waste and other drainage pipes inside the walls of the building and conveys it to the building sewer beginning at least one (1) foot outside the building footings.

“Building Sewer” – is that part of the drainage system which extends from the end of the building drain and conveys its discharge to an individual sewage treatment system or to a public sanitary sewage collection system.

“Capacity” – is the liquid volume of a sewage tank using inside dimensions below the outlet.

“Cesspool” (or see Seepage Pits) – is an underground pit into which raw household sewage or other untreated liquid waste is discharged and from which the liquid seeps into the surrounding soil.

“Distribution Pipes” – are pipes used to distribute sewage tank effluent to to distribution boxes, drop boxes and valve boxes.

“Dosing Device” – or pump pit, siphon, or other device that discharges sewage tank effluent from the dosing chamber to the soil treatment system.

“Drain Field” – is also called the tile disposal field or soil absorption field and uses distribution pipes placed in favorable soil so that sewage from the septic tank can percolate through and into the soil.

“Dwelling” – is any building or place used or intended to be used by human occupants as a single-family or two-family unit.

“Filter Material” – is clean, rock, crushed igneous rock or similar insoluble, durable, and decay-resistant material free from sand, silt, or clay. The size shall range from three fourths (3/4) inch minimum diameter to one and one-half (1 ½) inches effective diameter.

“Floodway” – the channel of a river, a stream, and those parts of the flood plain and adjoining the channel which are reasonably required to carry and discharge the flood water, a flood flow of the river or stream.

“Gray Water” – liquid waste from a dwelling or other establishment produced by bathing, laundry, floor drains; other than toilet wastes.

“Holding Tank” – is a water-tight tank for storage of sewage until it can be transported to a point of approved disposal.

“Impermeable” – with regard to soils, is a soil horizon or layer having a vertical permeability less than one (1) inch in twenty-four (24) hours and shall be considered impermeable.

“Individual Sewage Treatment System” – is a sewage treatment system or part thereof, serving a dwelling or other small living or business unit, or group thereof, which utilizes subsurface soil treatment and disposal.

“Lawn Area” – is the area bounded by the dimensions required for the proper location of the soil treatment area.

“Malfunctioning System” – any component or components of an existing or new septic system which fails and thereby causes overland flow, noxious odors, or public nuisance.

“Mound System” – is a system where the soil treatment area is built above ground to overcome limits imposed by proximity to water table or bedrock, or by rapidly or slowly permeable soils.

“Percolation Rate” – is the time rate of drop of water surface in a test hole.

“Permeability” – the ease with which gases or liquids penetrate or pass through a bulk mass of soil or layer of soil.

“Plastic Limit” – is soil moisture content below which the soil may be manipulated for purposes of installing a soil treatment system and above which manipulation will cause compaction and puddling. If a fragment of soil can easily be rolled into a wire one-eighth (1/8) inch diameter, the moisture content is above the limit and the soil may not be manipulated. The standard method of determining the plastic limit is specified by the American Association of State Highway Officials (AASHTO) Designation: #T 90-61.

“Professional Engineer” – shall mean a person who, by reason of his special knowledge or use of the mathematical, physical and engineering sciences, and the principles and methods of engineering analysis and design, acquired by engineering education and engineering experience, is qualified to practice engineering and who has been duly registered and licensed by the state board of registration for professional engineers and land surveyors.

"Qualified Designer" - an individual or business either properly trained, licensed or certified by a state or some other qualified training facility (approved by the Counties designated health officer) to analyze the percolation rate of the soil and the identifiable mottling zone.

“Regulations” – the working regulation or these regulations unless others indicated, shall refer to all rules and regulations adopted in this text.

“Registered Professional Soil Classifier” – shall mean a person who by reason of his special knowledge of the physical, chemical, and biological sciences applicable to soils as natural bodies and of the methods and principles of soil classification as required by soils education and soil classification experience in the formation, morphology, description, and mapping of soils is qualified to practice soil classifying and who has been duly registered by the State Board of Registration for Professional Soil Classifiers, as per ND Century Code, Chapter 43-36-01, 2.

“Sand” – is a soil texture composed by weight of at least twenty-five percent (25%) of very coarse, coarse, and medium sand varying in size from two (2) to 0.25 millimeters, less than fifty percent (50%) of fine or very fine sand, ranging in size between 0.25 and 0.05 millimeters and no more than ten percent (10%) of particles smaller than 0.05 millimeters.

“Septic Tank” – is a water-tight, covered receptacle, designed and constructed to receive the discharge of sewage from a building sewer, separate solids from liquid, digest organic matter, and store solids through a period of detention and allow the effluent to discharge to a soil treatment system.

“Setback” – is a separation distance measured horizontally.

“Sewage” – is any water-carried domestic, commercial or agricultural waste, exclusive of footing and roof drainage or any residence or industry, agricultural or commercial establishment or other structure, whether treated or untreated, and includes but is not limited to liquid waste produced by bathing, laundry, culinary operations and liquid wastes from toilets and floor drains.

“Septic Tank Effluent” – is that liquid which flows from a septic or aerobic tank under normal operation.

“Site” – is the proposed on-site sewage treatment system area.

“Slope” – is the ratio of vertical rise or fall to horizontal distance.

“Soil Boring” – is any type of excavating capable of revealing in detail characteristics of soils penetrated.

“Soil Characteristics, Limiting” – are those soil characteristics which preclude the installation of a standard system, including, but not limited to, evidence of seasonal high ground water table or bedrock closer than three (3) feet to the ground surface and percolation rates faster than one-half (1/2) minutes per inch or slower than sixty (60) minutes per inch.

“Soil Texture Classification” – is where soil particle sizes or textures are specified in these regulations, they refer to the Guide for USDA Textural Classification.

“Soil Type” – is the lowest unit in the natural system of soil classification; a subdivision of a soil series and consisting of or describing soils that are alike in all characteristics including the texture of the A Horizon.

“Soil Treatment Area” – is an area where sewage tank effluent is treated and disposed of below the ground surface by filtration and percolation through the soil and also by evapotranspiration, and includes those systems commonly known as seepage bed, trench drain field, disposal field, and also includes mounds and seepage pits.

“State Approved Disposal Facility” – is any disposal facility which has a National Pollutant Discharge Elimination System (NPDES) Permit or State Disposal System Permit or letter of approval from the North Dakota State Health Department and Consolidation Laboratories.

“Standard System” – an individual sewage treatment system employing a sewage tank and the soil treatment system commonly known as seepage bed or trenches, drain field, or leach field.

"Superintendent" - shall mean the Cass County Health Department or its designated official.

“Valve Box” – is any device which can stop sewage tank effluent from flowing to a portion of the soil treatment area and includes, but is not limited to, caps or plugs on distribution or drop box outlets, divider boards, butterfly valves, gate valves, or other mechanisms.

“Waste Hauler or Septic Tank Pumper” – is any person who engages in the removal of sewage and/or industrial waste including, but not limited to, those generated by washing machines, kitchens, sinks, from septic tanks, cesspools, holding tanks, or other sewage treatment or disposal facilities and who deposits such materials at some location approved by the ND State Department of Health and Consolidated Laboratories.

SECTION III – ADMINISTRATION

The designated Health Officer of Cass County shall administrate the provisions of these regulations.

SECTION IV – LICENSING OF ON-SITE SEWAGE DISPOSAL INSTALLERS-PUMPERS

Every sewage disposal pumper working in Cass County shall have a valid license from the State of North Dakota and be registered with Fargo Cass Public Health, Environmental Health Division.

No person, firm, or corporation shall engage in the business of installing or constructing on-site sewage systems within the County of Cass without first obtaining a license from Fargo Cass Public Health and procuring and posting with the County Auditor a bond in the amount specified by the County Board of Commissioners. Such license shall expire on December 31st of each calendar year.

Any installation, construction, alteration, or repair of an on-site sewage system by licensee in violation of the provisions of these regulations – or refusal on the part of the licensee, shall be cause for

revocation of or refusal to renew a license. Before any license, issued under the provision of this section may be revoked, the licensee shall be given a hearing to show cause why such license should not be revoked. Notice of the time, place and purpose of such hearing shall be in writing.

The annual license fee shall be set by the County Board of Commissioners. Applications for such license shall be made annually on a form furnished by the designated officer.

LICENSE REQUIREMENTS - In order to obtain a license under the provisions of this ordinance, an applicant must:

1. Submit a license fee;
2. Submit a contractors performance bond in a form acceptable to the County; and
3. Either present a valid and existing comparable installers license from another County or State for the current year or the year previous or pass a written test prepared by Fargo Cass Public Health.

Annual License Fees and Bond amounts shall be set through resolution by the Cass County Commission.

SECTION V – INSPECTION

The designated Health Officer of Cass County shall make inspections on all newly constructed on-site systems. No part of the drain field system shall be covered until it has been inspected, unless prior approval has been granted. It shall be the duty of the owner or occupant of the property to give the designated officer free access to the property at reasonable times for the purpose of making an inspection. Upon completion and final inspection of the system, if found satisfactory and meeting the approval of the inspection, the designated officer shall issue to the applicant a certificate of approval.

If, upon inspection, the designated officer discovers that any part of the system is not constructed in accordance with the minimum standards provided in these regulations, the applicant shall be responsible for the correction or elimination of all defects, and no

system shall be placed in service until all defects have been corrected or eliminated.

SECTION VI – PERMIT FOR INSTALLATION OF ON-SITE SYSTEMS

No person, firm, or corporation shall install, alter, repair, or extend any individual on-site sewage system in the county without first obtaining a permit from the designated officer.

The fee for the permit shall be in accordance as set or prescribed by the Cass County Commission.

Application for permits shall be made upon forms furnished by the designated officer and shall be signed by the applicant. Said permit to construct is valid for a period of 12 months from date of issuance. If construction is not started within this period, the permit is void, unless an extension is granted by the designated Health Officer.

The Health Officer shall refuse to grant a permit for the construction of an individual sewage disposal system where a public sewer system is available.

If construction is not started on the building or septic system within 12 months of the date of approval of the application, it will be necessary to resubmit an application and plot plan for the system to assure that the lot or house plan or location have not changed.

SECTION VII – SEVERABILITY

In any section, subsection, sentence, clause, phrase or portion of these regulations is for any reason held to be invalid or unconstitutional by the decision of any court of competent jurisdiction, such decision shall not affect the validity of the remaining portions of these regulations.

SECTION VIII – REGULATION ENFORCEMENT

Malfunctioning private on-site sewage disposal systems (including septic tanks, cesspools, cisterns, dry wells, absorption bed-fields, holding tanks, and the like) are a risk to the general health and welfare of this county and are hereby declared to be a nuisance.

Whenever brought to the attention of the Health Officer that any unsanitary conditions exist in any private sewage disposal system or that any construction or work regulated by these regulations is dangerous, unsafe, unsanitary, a nuisance or risk to life, health or property, or otherwise in violation of these rules and regulations, it is the responsibility of the Health Officer to investigate the problem and he/she may order any person using or maintaining any such condition to repair, alter, change, remove or demolish the problem area for the proper protection of life, health or property.

Every such order shall be in writing, addressed to the person using or maintaining any such conditions and shall specify a reasonable date or time for compliance with such order.

SECTION IX – GENERAL PROVISIONS

- No on-site disposal system shall be installed during wet conditions or other conditions by which the soil would become smeared during construction.
- All sewage shall be disposed of by a valid method of collection, treatment, and disposal. Sewage shall not be disposed of in any manner that will create a nuisance. It shall not be discharged into any abandoned or unused well, or into any crevice, sink hole, or other opening either natural or artificial in a rock formation. Sewage shall not be discharged into any river, stream, lake, pond or similar water source.
- Cesspools shall not be installed and/or utilized.
- Surface and storm waters shall not be discharged into any on-site soil absorption field or drain tile system.

- No provision of these regulations shall be deemed to require a change in any portion of an on-site sewage disposal system or any other work regulated by these regulations in or on an existing building or lot when such work was installed and is maintained in accordance with law in effect prior to the effective date of these regulations, except, when it is determined that a system is dangerous, unsafe, unsanitary, a nuisance, or a risk to life, health or property.
- No private on-site sewage disposal system or parts, thereof, shall be located on any parcel of land other than the parcel of land which is the site of the building, structure, or premises served by such families, except centralized treatment.
- In the event that a septic system with a seepage pit is abandoned, the pit shall be filled with soil, sand, or gravel. This requirement is binding on all systems whether installed prior to regulations or not.

SECTION X – SITE CONDITIONS

All proposed sites for on-site sewage systems shall include the following minimum information; under certain conditions (additional data may be required):

- A. Depth of the seasonal high water table and bedrock
- B. Soil conditions – properties and permeability
- C. Slope
- D. The existence of lowlands, depressions, outcrops
- E. Surface water drainage patterns
- F. All setbacks, as required in these regulations, shall be described or drawn out.

Private on-site sewage disposal systems shall not be permitted or constructed within the floodway of any river or stream.

Subsurface absorption areas shall not be installed where the original surface slope is greater than fifteen percent (15%) fifteen (15) foot drop in one hundred (100) feet horizontal).

SECTION XI – UNSUITABLE SOILS

If the application for an on-site sewage disposal system permit has been denied because of the soil conditions, it being identified as unsuitable for an on-site sewage disposal system, the applicant may present a plan for a specialized sewage disposal system that overcomes the limitation of the lot.

SECTION XII – PENALTIES

Any person who violates these regulations or any rule or regulation adopted by the county or who violates any determination or order of the county under these regulations, shall be fined not less than fifty dollars (\$50.00) and not more than three hundred dollars (\$300.00) for each violation. Each continuing day of a violation is considered a separate offense.

SECTION XIII – VARIANCE

In any case where a permit is required by Fargo Cass Public Health or the designated officer, and upon application by the responsible person or persons, Fargo Cass Public Health or designated officer finds that the strict enforcement of any provision of these standards would be unreasonable, impractical, or not feasible under the circumstances, the Health Officer or designated officer may permit a variance.

In granting the variance, the Health Officer or designated officer may include such conditions as is prescribed for prevention, control, or abatement of pollution in harmony with the general purpose of these rules and regulations and the interest of applicable local, state, or federal laws.

In granting the variance, the Health Officer or designated officer shall prepare a finding of facts which specifies the circumstances justifying the granting of the variance.

SECTION XIV – APPEALS

Any person aggrieved by any order or determination of the Health Officer or designated officer may within 30 days of such action petition the Cass County Planning Commission for a hearing. Such appeal shall be in writing and shall specify in detail the grounds for the appeal. The appeal shall be filed with the County Auditor.

Within 30 days of filing, the Planning Commission shall fix a date for a hearing.

Notice in writing shall be given to the petitioner at least five days prior to the hearing.

Within 15 days after the hearing, the Planning Commission shall take action and shall mail, by registered mail, a copy of its order to the petitioner.

If the petitioner is aggrieved by the determination of the Board of Commissioners, the petitioner may petition to the Cass County District Court. This appeal must be taken in accordance with the procedure provided in Section 28-34-01 of the North Dakota Century Code.

SECTION XV – CONSTRUCTION REQUIREMENTS

Every on-site sewage disposal system installed after the effective date of these regulations and every alteration, extension, and repair to any system made after that date shall conform to the standards of these regulations.

Approval of a system by Fargo Cass Public Health does not constitute a guarantee that the system will provide trouble-free service. Proper installation, maintenance, and use, however, will decrease the possibility of a premature failure.

APPENDIX A PROCEDURES FOR SOIL BORING AND PERCOLATION TESTS

A. Soil Borings – where soil borings are required, they shall be made as follows:

1. All soils borings shall be taken, analyzed and reported by a registered professional soil classifier or qualified designer.
2. Each boring or excavation shall be made to a sufficient depth to provide the required design information.
3. A soil texture description shall be recorded by depth and notations made where texture changes occur.
4. Measurements shall be made to determine the depth to the highest notable water table by recording the first occurrence of active mottling observed in the boring or excavation.
5. Particle size, including percent sand, silt, and clay shall be determined by a qualified designer or by laboratory analysis.

B. Percolation Tests – where percolation tests are required they shall be made as follows:

1. Test hole dimensions and locations:

- a. Each test hole shall be six (6) to eight (8) inches in diameter, have vertical sides, and be bored or dug to the depth of the bottom of the proposed individual sewage treatment system.

2. Preparation of the test hole:

- b. 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.

3. Soil Saturation and swelling:

- a. The hole shall be carefully filled with clear water to a minimum depth of twelve (12) inches over the soil at the bottom of the test hole and maintained for no less than four (4) hours.
- b. The soil shall then be allowed to swell for at least sixteen (16) hours, but no more than thirty (30) hours. In sandy soils, the saturation and swelling procedure shall not be required and the test may proceed if one filling of the hole has seeped away in less than ten (10) minutes.

4. Percolation rate measurement:

- a. In sandy soils, adjust the water depth to eight (8) inches over the soil at the bottom of the test hole. From a fixed reference point, the drop in water level shall be measured in inches to the nearest one-eighth (1/8) inch at approximately ten (10) minute intervals. A measurement can also be made by determining the time it takes for the water level to drop one (1) inch from an eight (8) inch reference point. If eight (8) inches of water seeps away in less than ten (10) minutes, a shorter interval between measurements shall be used, but in no case shall the water depth exceed eight (8) inches. The test shall continue until three consecutive percolation rate measurements vary by a range of no more than ten percent (10%).
- b. In other soils, adjust the water depth to eight inches over the soil at the bottom of the test hole. From a fixed reference point, the drop in water level shall be measured in inches to the nearest one-eighth (1/8) inch at approximately thirty (30) minute intervals, refilling between measurements to maintain an eight (8) inch starting head. The test shall continue until three consecutive percolation rate measurements

vary by a range of no more than ten percent (10%). The percolation rate can also be made by observing the time it takes the water level to drop one (1) inch from an eight (8) inch reference point if a constant water depth of at least eight (8) inches has been maintained for at least four (4) hours prior to the measurement.

5. Calculating the percolation rate:

- a. Divide the time interval by drop in water level to obtain the percolation rate in minutes per inch.
- b. Percolation rates determined for each test hole shall be averaged to determine the final soil treatment system design.

6. For reporting the percolation rate, worksheets showing all calculations and measurements shall be submitted.

7. A percolation test shall not be run where frost exits below the depth of the proposed soil treatment system.

APPENDIX B

MINIMUM CONSTRUCTION REQUIREMENTS

A. SEWAGE TANKS

1. General

- a. All tanks shall be concrete, pre-cast, or cast in place regardless of material or method of construction and shall be:
 1. Watertight.
 2. So designed and constructed as to withstand all lateral earth pressures under saturated soil conditions with the tank empty.
 3. So designed and constructed as to withstand a minimum of seven feet of saturated earth cover above the tank top.
 4. Not subject to corrosion or decay.
- b. Any tank not having an integrally cast bottom shall not be installed when the water table is closer than three (3) inches to the bottom of the excavation at the time of construction.

2. Septic Tanks

- a. Design – all tanks shall conform to the following criteria:
 1. The liquid depth of any septic tank or compartment thereof shall not be less than thirty (30) inches. A liquid depth greater than six and one-half (6 ½) feet shall not be considered in determining tank capacity.

2. No tank or compartment thereof shall have an inside horizontal dimension less than twenty-four (24) inches.
3. Inlet and outlet connections of the tank shall be submerged by means of baffles or sanitary tees.
4. The space in the tank between the liquid surface and the top of the inlet and outlet baffles shall be less than twenty percent (20%) of the total required liquid capacity, except that in horizontal cylindrical tanks, this space shall not be less than fifteen percent (15%) of the total required liquid capacity.
5. Inlet and outlet baffles shall be constructed of acid resistant concrete, acid resistant fiberglass or plastic.
6. Sanitary tees shall be affixed to the inlet or outlet pipes with a permanent water-proof adhesive. Baffles shall be integrally cast with the tank, affixed with a permanent water-proof adhesive or affixed with stainless steel connectors, top and bottom.
7. The inlet baffle, or sanitary tee, shall extend at least six inches, but not more than twenty percent (20%) of the total liquid surface and at least one (1) inch above the crown of the inlet sewer.
8. The outlet baffle, or tee, and the baffles between compartments shall extend below the liquid surface, a distance equal to forty percent (40%) of the liquid depth, except that the penetration of indicated baffles or sanitary tees for horizontal cylindrical tanks shall be thirty-five percent (35%) of the total liquid depth. They also shall extend above the liquid surface. In no case shall they

extend less than six (6) inches above the liquid surface.

9. There shall be at least one (1) inch between the underside of the top of the tank and the highest point of the inlet and outlet devices.
10. The inlet invert shall not be less than three (3) inches above the outlet invert.
11. The inlet and outlet shall be located opposite each other along with the axis of maximum dimension. The horizontal distance between the nearest points of the inlet and outlet devices shall be at least four (4) feet.
12. Sanitary tees shall be at least four (4) inches in diameter. Inlet baffles shall be no less than six (6) inches or no more than twelve (12) inches measured from the end of the inlet pipe to the nearest point on the baffle. Outlet baffles shall be six (6) inches measured from beginning of the outlet pipe to nearest point on the baffle.
13. Access to the septic tank shall be as follows:
 - a. There shall be one (1) or more manholes, at least eighteen (18) inches least dimension and located within six (6) feet of all walls of the tank. All man hole covers shall not be covered and shall be level or above the finished grade.
 - b. There shall be a six (6) inch minimum inspection pipe for each baffled wall. The eighteen (18) inch diameter manhole cover can serve as the inspection cover. All inspection pipes shall be capped flush or above the finished grade.
14. Compartmentation of single tanks

- a. Septic tanks larger than three-thousand (3,000) gallons and fabricated as a single unit shall be divided into two or more compartments.
- b. When a septic tank is divided into two (2) compartments, not less than one-half (1/2) nor more than two-thirds (2/3) of the total volume shall be in the first compartment.
- c. When a septic tank is divided into three or more compartments, one-half of the total volume shall be in the first compartment and the other half equally divided in the other compartments.
- d. Connections between compartments shall be baffled so as to obtain effective retention of scum and sludge.
- e. Adequate venting shall be provided between compartments by baffles or by an opening of at least fifty (50) square inches near the top of the compartment walls.
- f. Adequate access to each compartment shall be provided by one or more manholes, at least eighteen (18) inches diameter, and located within six (6) feet of all walls of the tank. All manhole covers shall not be covered and shall be flush or above the finished grade.

15. Multiple tanks

- a. Where more than one tank is used to obtain the required liquid volume, the tanks shall be connected in series.
- b. Each tank shall comply with all other provisions of these regulations.

- c. No more than 4 tanks in series can be used to obtain the required liquid volume.
- d. The first tank shall be no smaller than any subsequent tanks in series.

16. Outlet pipe from septic tank

- a. The outlet pipe from the septic tank must not be cast in iron.
- b. The outlet pipe extending from the septic tank must be of sound and durable construction, not subject to corrosion or decay.
- c. The outlet pipe extending from the septic tank to the undisturbed soil beyond the tank must meet the strength requirements of the American Society for Testing and Materials (ASTM), schedule 40 plastic pipe and must be supported in a manner that there is no deflection during the backfilling and subsequent settling of the soil between the edge of the septic tank and the edge of the excavation.
- d. The soil around the pipe extending from the septic tank must be compacted to original density for a distance of three (3) feet beyond the edge of the tank excavation.

17. Capacity

- a. Dwelling – the liquid capacity of a septic tank serving a dwelling shall be based on the number of bedrooms contemplated in the dwelling served and shall be at least as large as the capacities given below:

TABLE I

Number of Bedrooms	Tank Liquid Capacities (in gallons)
1 to 4	1,000
5 to 6	1,500
7, 8 or 9	2,000

For ten or more bedrooms, the septic tank shall be sized as another establishment.

- b. Other establishments. The liquid capacity of the septic tank serving an establishment other than a dwelling shall be sufficient to provide a sewage detention period of not less than thirty-six (36) hours in the tank for sewage flows less than 1,500 gallons per day, but in no instance shall the liquid be less than 1,000 gallons. For sewage flows greater than 1,500 gallons per day the minimum liquid capacity shall equal 1,125 gallons plus 75% of the daily sewage flow.
- c. Garbage disposal. If a garbage disposal unit is installed in a residence or other establishment at any time, septic tank capacity must be at least fifty percent (50%) greater than that required in items A and B and either multiple compartments or multiple tanks must be provided.
- d. Location
 1. The sewage tank shall be placed so that it is accessible for the removal of liquids and accumulated solids.
 2. The sewage tank shall be placed on firm and settled soil capable of bearing the weight of the tank and its contents.

3. Setbacks (see Table II chart below)

TABLE II
Minimum Setback Distances (feet)

Feature	Sewage Tank	Soil Treatment Area
Water supply well less than fifty (50) feet deep and not encountering at least ten feet of impervious material	50	100
Any other water supply well or buried water suction pipe	50	50
Buried pipe distributing water under pressure	10	10
Buildings	10	20
Lakes and Rivers	100	100

e. Maintenance: The owner of any septic tank or his agent shall regularly inspect and arrange for the removal and sanitary disposal of septage from the tank whenever the top of the sludge layer is less than twelve (12) inches below the bottom of the outlet baffle or whenever the bottom of the scum layer is less than three (3) inches above the bottom of the outlet baffle.

18. Distribution and dosing of effluent:

1. Gravity distribution

a. Level ground - Where the elevation difference of the ground surface does not exceed twenty-eight (28) inches in any direction within the soil treatment system, the sewage tank effluent may be directed to the soil treatment system through a system of interconnected distribution pipes or trenches in a continuous system.

b. Slightly sloping ground

1. Sewage tank effluent may be distributed by a distribution box provided the final ground surface elevation of the lowest trench is at least one (1) foot higher than the outlet inverts of the distribution box.
2. Distribution box: the box shall be water tight with a removable cover and shall be constructed of durable materials not subject to excessive corrosion or decay.
 - a. The inverts of all outlets shall be at the same elevation as measured from a liquid surface in the bottom of the box.
 - b. The inlet invert shall be at least one (1) inch above the distribution box floor.
 - c. The outlet inverts shall be at least four (4) inches above the distribution box floor.
 - d. Each drain field trench line shall be connected separately to the distribution box and shall not be subdivided.
 - e. When sewage tank effluent is delivered to the box by pump, either a baffle wall shall be installed in the distribution box or the pump discharge shall be directed against a wall, bottom, or side of the box on which there is no outlet. The baffle shall be secured to the box and shall extend at least one inch above the crown of the inlet flow line.

c. Sloping Ground

1. Where the elevation difference of the ground surface treatment system and a distribution

box cannot be used as specified in these regulations a drop box shall be installed at the head end of each lateral line. Connections between drop boxes shall be by water tight pipes.

2. Drop Boxes - The drop box shall be water tight and constructed of durable materials not subject to excessive corrosion or decay.
 - a. The invert of the inlet pipe shall be least one (1) inch higher than the invert of the outlet pipe to the next trench.
 - b. The invert of the outlet pipe to the next trench shall be at least two (2) inches higher than the invert of the outlet pipe of the trench in which the box is located.
 - c. When sewage tank effluent is delivered to the drop box by a pump, the pump discharge shall be directed against a wall or side of the box on which there is no outlet.
 - d. The drop box shall have a removable cover, either flush or above finished grade, or covered by no more than six (6) inches of soil.

2. Pressure Distribution

a. Dosing

1. The dosing chamber shall be water tight and constructed of concrete.
2. There shall be one or more manholes, at least eighteen (18) inches diameter preferably located directly above the dosing

device. The manhole shall extend through the dosing system chamber cover to final grade and or above and shall be so constructed as to prevent unauthorized entry.

3. The size of the effluent dose shall be determined by design of the soil treatment unit but in no case shall the dosing chamber be sized to provide a dose of less than seventy-five (75) gallons.
4. It shall be the responsibility of the installer to contact a qualified electrician for proper installation of any electrical component used for dosing.

b. Dosing devices for gravity distribution

1. A pump or siphon shall deliver the dose to the soil treatment unit for gravity distribution over the soil treatment area.
2. If the dosing device is a pump, it shall be cast iron or bronze fitted and with stainless steel screws or constructed of other sound, durable and corrosion-resistant materials.
3. Where the soil treatment area is at a higher elevation than the pump, sufficient dynamic head shall be provided for both the elevation difference and friction loss.

c. Dosing devices for pressure distribution

1. The dosing device shall be a pump which is cast iron or bronze fitted and with stainless steel screws or constructed of sound, durable and corrosion resistant materials.

2. The pump discharge capacity shall be at least thirty (30) gallons-per-minute for a three (3) bedroom or smaller dwelling and an additional ten (10) gallons-per-minute for each bedroom above three. For other establishments, the pump discharge shall be 10 gallons per minute of each two hundred (200) gallons-per-day of sewage flow or thirty (30) gallons-per-minute; whichever is greater.
3. The pump discharge height shall be at least five (5) feet greater than the head required to overcome pipe friction losses and the elevation difference between the pump and the distribution device.
4. The quantity of effluent delivered for each pump cycle shall be equal to twenty-five percent (25%) of one day's sewage flow or one hundred (100) gallons; whichever is greater.
5. An alarm device shall be installed to warn of pump failure.

B. FINAL TREATMENT AND DISPOSAL

1. General - Final treatment and disposal of all sewage tank effluent shall be approved by the Health Officer or designated Health Officer.

Standard System

a. Sizing

1. After considering the soil conditions, the required soil treatment area shall be determined by number of bedrooms for dwellings, the sum of the areas required for

each individual unit for multiple residential units, and by the daily sewage flow for other establishments.

2. The minimum soil treatment area required for any dwelling shall provide treatment for at least two (2) bedrooms.
3. Estimates of sewage flow for dwellings are given in Table III.

TABLE III

Number of Bedrooms	Sewage Flow (gallons per day)
2	300
3	450
4	600
5	750
6	900

4. The soil treatment area shall be at least as large as set forth in Table IV.

TABLE IV
Required Soil Treatment

Percolation Rate (minutes per inch)	Area in Sq Feet (per gallon of waste per day)	Area per Bedroom (sq feet)
Faster than 0.1**	-	-
0.1 to 5***	0.83	125
6 to 15	1.27	190
16 to 30	1.67	250
31 to 45	2.00	300
46 to 60	2.20	330
Slower than 60****	-	-
** Soil is unsuitable for standard system if percolation rate is less than 0.1 minutes per inch.	*** Consider alternative sewage treatment systems for soils with this percolation rate range.	**** Soil is unsuitable for standard system if percolation rate is slower than 60 minutes per inch.

b. Location

1. On slopes in excess of twelve percent (12%), the soil profile shall be carefully evaluated in the location of the proposed soil treatment system and down slope to identify the presence of layers with different permeabilities that may cause side hill seepage. In no case shall a trench be located within fifteen (15) feet of such a layer surfacing on the down slope.
2. Bed construction shall be limited to areas having natural slopes of less than six percent (6%).

c. Design and Construction

1. The bottom trenches and beds shall be at least thirty (30) inches above the active mottling zone or bedrock.
2. The trenches shall not be less than twenty-four (24) inches nor more than thirty-six (36) inches wide. Any trench wider than thirty-six (36) inches shall be considered a bed.
3. Trenches and beds shall not be more than one hundred (100) ft in length.
4. The bottom of the trench or bed excavation shall be level.
5. The bottom and sides of the soil treatment system to the top of the filter material shall be excavated in such a manner as to leave the soil in a natural, un-smearred, and uncompacted condition. Excavation shall be made only when the soil moisture content is at least or less than the plastic limit.
6. When the percolation rate is slower than 15 minutes-per-inch, excavation shall be by back hoe or other means that allow the equipment wheels or tracks to remain on the surface soil. Excavation equipment or other vehicles shall not be driven on the soil treatment area.
7. There shall be a layer of at least twelve (12) inches but no more than twenty-four (24) inches of filter materials on the bottom of the trenches and beds.
8. Distribution pipes – gravity distribution
 - a. Distribution pipe used in trenches or beds for gravity flow distribution shall be at

least four (4) inches in diameter and constructed of sound and durable material not subject to corrosion or decay or to loss of strength under continuously wet conditions.

- b. Perforated pipe used for sewage distribution pipes shall have one or more rows of holes of no less than one half (1/2) inch in diameter spaced no more than thirty-six (36) inches apart. Holes shall be spaced to prevent failure due to loads. Distribution pipes shall have a load bearing capacity of not less than 1,000 lbs per lineal foot.
- c. Other devices may be used to distribute sewage tank effluent over the soil treatment area upon approval by the Health Officer or designated Health Officer.

9. Pressure Distribution

- a. Distribution pipes used or beds for pressure distribution shall be at least one (1) inch in diameter and constructed of sound and durable material not subject to corrosion or decay or to loss of strength under continuously wet conditions.
- b. Perforations shall be sized and spaced as shown in Table V.

TABLE V

Maximum Allowable Number of One-Fourth (1/4) Inch Diameter or Smaller Perforations Per Pipe Diameter, Nominal and Inside

Perforation Spacing in Ft	1"	1-1/4"	1-1/2"	2"
	1.049	1.380	1.610	2.067
2.5	8	14	18	28
3	8	13	17	26
3.3	7	12	16	25
4	7	11	15	23
5	6	10	14	22

10. The distribution pipes shall be laid level or on a uniform slope away from the distribution device, no more than four (4) inches per one hundred (100) feet.
11. The distribution pipes in beds shall be uniformly spaced no more than five (5) feet apart and not more than thirty (30) inches from the side walls of the bed.
12. The filter material shall completely encase the disposal pipes to a depth of at least two (2) inches.
13. The filter material shall be covered with an unwoven geo-textile fabric or a similar, permeable material approved by the designated Health Officer.
14. The trenches or beds shall be backfilled and crowned above finished grade to allow for settling. The top six (6) inches of soil shall have the same texture and density as the adjacent soil.
15. The minimum depth of cover over the distribution pipes shall be at least eight (8)

inches. The maximum depth of cover over the distribution pipes shall be no more than thirty-six (36) inches and preferably no more than twenty-four (24) inches.

16. A grass cover shall be established by the owner or his agent over the soil treatment system.

C. ALTERNATIVE SYSTEMS

1. **General** – the intent of this portion of the regulation is to provide guidelines for the design, location, installation, use and maintenance of alternative sewage treatment systems in areas of limiting soil characteristics, or where a standard system cannot be installed or may not provide the most suitable treatment.

2. Modified Standard Systems

- a. Extreme caution and careful planning shall be employed wherever limiting characteristics including, but not limited to water table or bedrock, existing within two (2) feet of the original ground surface.
- b. Fluctuating ground water:
 1. Where natural drainage will not provide thirty (30) inches of separation between the bottom of the soil treatment area and the highest known or calculated level of the water table, agricultural drain tile may be used to intercept or lower the seasonal high water table, except within shore-lands of public waters. There shall be at least 10 feet of undisturbed soil between the sidewall of the soil treatment unit and the agricultural drain tile.
 2. Within shore lands of public waters, drain tile may be used to intercept the seasonal high water table provided the ground water table has a slope of at least

two (2) feet per one hundred (100) feet toward the public water and provided the drain tile is installed up-slope of the soil treatment system. There shall be at least twenty (20) feet of undisturbed soil between the side-wall of the soil treatment unit and the agricultural drain tile.

3. In all cases the greatest practical vertical separation distance from the water table shall be provided.
- c. Bedrock proximity – In no case shall filter material of the soil treatment system be placed closer than thirty (30) inches to creviced bedrock or to consolidated permeable bedrock. When all horizons of the original soil profile have percolation rates slower than sixty (60) minutes-per-inch, filter material of the soil treatment system shall be placed no closer than seven (7) feet to consolidated impermeable bedrock. A maximum depth of twenty-four (24) inches of sand may be used under the filter material. Where additional fill is required to achieve the required separation distance, a soil having a percolation rate between five (5) and forty-five (45) minutes-per-inch (loamy sand to silt loam) 12 months after placement shall be used. If it is not possible to allow the soil to settle for 12 months after placement, mechanical methods may be used to settle the fill to within ten percent (10%) of its in-situ density.
- d. Slowly permeable soils
1. In no case shall excavation for the purpose of constructing a soil treatment system be made in any soil layer having a percolation rate slower than one hundred and twenty (120)minutes-per-inch.
 2. In no case shall excavation for the purpose of constructing a soil treatment system be made in a soil layer having a percolation rate slower than sixty (60) minutes-per-inch unless the moisture content is lower than the plastic limit of the soil.

3. In no case shall construction equipment, wheels or tracks, be placed in contact with the bottom of the excavation during the construction of a soil treatment system in soils having a percolation rate slower than fifteen (15) minutes-per-inch.
 4. The size of the soil treatment system shall be based on 2.2 square feet-gallon-per-day for a soil at sixty (60) m.p.i.; 4.2 square feet-gallon-per-day for a soil at one hundred and twenty (120) m.p.i.
- e. Rapidly permeable soils:
1. Filter material for a soil treatment unit using gravity distribution effluent shall not be placed in contact with original soil having a percolation rate faster than one-tenth (1/10) minute-per-inch.
 2. For course soils having a percolation rate faster than one-tenth (1/10) minute-per-inch, at least six (6) inches of sandy loam textured soiling having a percolation rate between 5 and 15 minutes-per-inch after placement (loamy sand to sandy loam) shall be placed between the filter material and the coarse soil along the excavation bottom and sidewalls.
 3. For soils with percolation rates between one-tenth (1/10) and 5 minutes-per-inch at least one of the following treatment techniques shall be used:
 - a. Provide at least six (6) inches of sandy loam textured soil with a percolation rate between 5 and 15 minutes-per-inch after placement between the filter material and the coarse soil.
 - b. Distribution of sewage tank effluent by pressure flow over the treatment area as outlined in these regulations.

c. Divide the total soil treatment area into at least four equal parts connected serially.

f. Flood prone areas

1. No part of a system shall be installed in the floodway.
2. The soil absorption system shall be located on the highest feasible area of the lot and shall have location preferences over all other improvements except the water supply well. The soil absorption system shall not be installed in the floodway.
3. If a pumping station is used to move effluent from the sewage tank to the drain field, provisions shall be made to prevent the pump from operating when inundated with flood waters.
4. The building sewer shall be designed to prevent back flow of liquid into the building when the system is inundated. If a holding tank is utilized, the building sewer shall be designed to permit rapid diversion of sewage into the holding tank when the system is inundated.
5. Whenever the water level has reached a stage above the top of the sewage tank, the tank shall be pumped to remove all solids and liquids after the flood has receded before the use of the system is resumed.

3. Mounds

- a. Mounds must be constructed on original soils so that there is at least twenty-four (24) inches of separation between the bottom of the distribution medium and limiting soil characteristics.
- b. There must be at least twelve (12) inches of original soil with a percolation rate faster than one hundred and twenty (120) minutes-per inch.

- c. Where the original soil has a depth of at least twelve (12) inches to the water table as the limiting soil characteristic, but has a percolation rate of 5 minutes-per-inch or faster, a layer of at least twelve (12) inches of loamy sand textured soil with a percolation rate between 6 and 15 minutes-per-inch at the original site must be placed before placing the sand layer of mound. The required absorption width must be determined for a soil having a percolation rate between 16 and 30 minutes-per-inch.
- d. The allowable absorption area loading rate must be determined according to Table VI by the percolation rate of the twelve (12) inches of original or fill soil immediately under the sand layer.

TABLE VI

Percolation Rate of	Allowable Absorption Area Loading Rate	
	Gallons per day per square foot	Square feet per gallon per day
Original soil under sand layer (minutes-per-inch)		
6 to 15	0.79	1.50
16 to 30	0.60	2.00
31 to 45	0.50	2.40
46 to 60	0.45	2.67
61 to 120	0.24	5.00

- e. The required absorption width of mounds constructed on ground sloping from zero (0) to two point nine percent (2.9%) must include the width of the rock layer plus a distance measured between the outer edges of the upslope and the down- slope banks. The require absorption width for mounds constructed on ground sloping between three percent (3%) and twelve percent (12%) must include the width under the drain field rock layer plus a portion of the width of the downslope bank.

- f. Mounds may be located on natural slopes exceeding twelve percent (12%) if the absorption area is designed to be at least twenty-five percent (25%) larger than the required in Table VI.
- g. The bottom area of the drain field rock layer must be sized on the basis of 0.823 square feet-gallon of waste per day.
- h. The width of the drain field rock layer in a single bed must not exceed ten (10) feet.
- i. A rubber-tired tractor may be used for plowing or disking, but must not be driven on the absorption area after the surface preparation is completed. A crawler or track-type tractor must be used for mound construction.
- j. The discharge pipe from the pump to the mound area must be installed before soil surface preparation. The trench must be carefully backfilled and compacted to prevent seepage of effluent.
- k. All vegetation in excess of four (4) inches in length and dead organic debris must be removed from the surface of the total area selected for the mound, including the area under the banks. The total area must be roughened by plowing to a depth of at least eight (8) inches or the sod layer broken and roughened by backhoe teeth. Furrows must be thrown uphill and there must be no dead furrow under the mound.

The soil must be plowed or roughened when the moisture content of a fragment eight (8) inches below the surface is below the plastic limit. The soil under a mound including the area under the banks must not be roughened by rototilling or pulverizing. In soils having percolation rates faster than fifteen (15) minutes-per-inch (sandy loam) in the top eight (8) inch depth, disking may be used for surface preparation as a

substitute for plowing. Mound construction must proceed immediately after surface preparation is completed. The original soil must not be excavated or moved more than one (1) foot from its original location during soil surface preparation.

- I. A minimum of twelve (12) inches of soil defined as sand must be placed where the drain field rock is to be located. This sand must be placed by using a construction technique that minimizes compaction. If the sand is pushed into place, a crawler tractor with a blade or unloaded bucket must be used to push the sand into place. At least six (6) inches of sand must be kept beneath the equipment to minimize compaction of the plowed layer. When placing sand with a backhoe that has rubber tires, the tractor must not drive over the drain field rock or banks of the mound. The sand layer upon which the drain field rock is placed must be level.

On slopes of three percent (3%) or greater, the long axis of the level drain field rock layer must not diverge up or down the slope by more than twelve (12) inches of elevation from the natural contour line. The depth of the sand layer along the upper edge of the level drain field rock layer must not vary by more than twelve (12) inches.

On slopes of three percent (3%) or greater, and where the percolation rate in the top foot of original soil is in the 61 to 120 minutes-per-inch range, mounds must not be located where the ground surface contour lines directly below the long axis of the drain field rock layer represent a swale or draw, unless contour lines have a radius of curvature greater than one hundred (100) feet. Mounds must never be located in swales or draws where the radius of curvature of the contour lines is less than fifty (50) feet.

- m. A depth of at least nine (9) inches of drain field rock must be placed over the bed area below the distribution pipe.
- n. Distribution of effluent over the drain field rock layer must be by perforated pipe under pressure.
- o. The drain field rock shall completely encase the top and sides of the distribution pipes to a depth of two (2) inches. The top of the drain field rock must be level in all directions.
- p. The drain field rock must be covered with a permeable synthetic fabric.
- q. Construction vehicles must not be allowed on the drain field rock until back fill is placed.
- r. Sandy loam soil must be placed on the drain field to a depth of one (1) foot in the center of the mound and to a depth of six (6) inches at the sides.

A maximum of two 10-foot wide beds may be installed side by side in a single mound if the original soil percolation rate is between 5 and 60 minutes-per-inch to a depth of at least twenty-four (24) inches below the sand layer. The beds must be separated by four (4) feet of clean sand.

When two beds are installed side by side, the sandy loam fill must be eighteen (18) inches deep at the center of the mound and six (6) inches deep at the sides.

- s. Six (6) inches of top soil must be placed on the fill material over the entire area of the mound.
- t. A grass cover must be established over the entire area of the mound.

- u. Shrubs must not be planted on the top of the mound. Shrubs may be placed at the foot and side of the mound.
- v. The side slopes on the mound must not be steeper than 3 to 1.
- w. Whenever mounds are located on slopes, a diversion must be constructed immediately upslope from the mound to intercept and direct runoff.
- x. A pump must be used as specified in these rules and regulations.

4. Holding Tanks

- a. **General** – Holding tanks may be allowed only as replacements for existing non-conforming systems or on existing parcels or lots as the date of the enactment of these standards and only where it can conclusively be shown that a standard or mound system cannot be feasibly installed.
- b. **Construction** – A holding tank shall be constructed of the same materials and by the same procedures as those specified for water tight septic tanks.
- c. **Access** – A cleanout pipe of at least eighteen (18) inches in diameter shall extend to the ground surface and be provided with seats to prevent odor and to exclude insects and vermin. A manhole of at least eighteen (18) inches in diameter shall extend through the cover to finished grade.
- d. **Depth of bury** – The tank shall be protected against flotation under high water table conditions. This shall be achieved by weight of tank, earth anchors, or shallow bury depths.

e. **Capacity**

1. For a dwelling the minimum size shall be 1,000 gallons or 400 gallons times the number of bedrooms, whichever is greater.
2. For permanent structures other than dwellings, the capacity shall be based on measured flow rates or estimated flow rates. The tank capacity shall be at least 5 times the daily flow rate.
3. Location: Holding tanks shall be located:
 - a. In an area readily accessible to the pump track under all weather conditions.
 - b. Where accidental spillage during pumping will not create a nuisance.

f. **Contract** – A contract for disposal and treatment of the sewage wastes shall be maintained by the owner with a pumper, municipality, agency, or firm established for that purpose.

g. **Accidental overflow** – Holding tanks shall be monitored to minimize the chance of accidental sewage overflows. Techniques such as visual observation, warning lights, or bells or regularly scheduled pumping shall be used. For other establishments, a positive warning system shall be installed which allows twenty-five percent (25%) reserve capacity after actuation.

5. Other Systems – where unusual conditions exist, special systems of treatment and disposal other than those specifically mentioned in these regulations may be provided if:

- a. Reasonable assurance of performance of such system is presented to the permitting authority;

- b. The engineering design of such system is first approved by the permitting authority;
- c. There is no discharge to the ground surface or to surface waters;
- d. Treatment and disposal of wastes is in such a manner so as to protect the public health and general welfare;
- e. Such systems comply with all applicable requirements of these standards and with all local codes and ordinances.