

**BUCHANAN COUNTY HEALTH AND SANITATION
CODE OF ORDINANCES
2008**

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TITLE V – HEALTH AND SANITATION

Chapter 42 – Wastewater Treatment Regulations

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CHAPTER 42

WASTEWATER TREATMENT REGULATIONS

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42.01 DEFINITIONS.

1. Administrative authority: The Buchanan County Board of Health and the Buchanan County Health Department.
2. Approved: Accepted or acceptable under applicable specifications stated or cited in these rules, or accepted as suitable for the proposed use by the Buchanan County Health Department.
3. Area drain: A drain installed to collect surface or storm water from an open area of a building or property.
4. Building drain: Is that part of the lowest horizontal piping of a house drainage system which receives the discharge from waste and other drainage pipes inside the walls of any building and conveys the same to the building sewer.
5. Building sewer: Is that part of the horizontal piping from the building wall to its connection with the main sewer or the primary treatment portion of an on-site wastewater treatment and disposal system conveying the drainage of one building site.
6. Chamber system: A buried structure, typically with a domed or arched top, providing at least a six-inch height of sidewall soil exposure, creating a covered open space above a buried soil infiltrative surface.
7. Conventional: When used in reference to sewage treatment means a soil absorption system involving a series of two-foot wide trenches filled with gravel one foot deep, containing a four-inch diameter rigid pipe to convey the sewage effluent.
8. Distribution box: A structure designed to accomplish the equal distribution of wastewater to two or more soil absorption trenches.
9. Drainage ditch: Any watercourse which includes intermittent watercourses and those watercourses which typically flow only for short periods of time following precipitation in the immediate locality and whose channels are normally above the water table.
10. Drip irrigation: A form of subsurface soil absorption using shallow pressure distribution with low pressure drip emitters.

11. Drop box: A structure to divert wastewater flow into a soil absorption trench until the trench is filled to a set level, then allow any additional waste, which is not absorbed by that trench, to flow to the next drop box or soil absorption trench.
12. Dwelling: Any house or place used or intended to be used by humans as a place of residence.
13. Fill soil: Clean soil, free of debris or large organic material, which has been mechanically moved onto a site and has been in place for less than one year.
14. Foundation drain: That portion of a building drainage system provided to drain groundwater from the outside of the foundation or under the basement floor, but not including any wastewater and not connected to the building drain.
15. Free access, open filter: An intermittent sand filter constructed within the natural soil or above the ground surface with access to the distributor pipes and top of the filter media for maintenance and media replacement.
16. Gravel: Stone screened from river sand or quarried. Concrete aggregate designated as Class II by the Iowa Department of Transportation is acceptable.
17. Individual mechanical aerobic wastewater treatment system: An individual wastewater treatment and disposal system employing bacterial action which is maintained by the utilization of air or oxygen and includes the aeration plant and equipment and the method of final effluent disposal.
18. Intermittent sand filters: Beds of granular materials 24 to 36 inches deep underlain by graded gravel and collection tile where wastewater is applied intermittently to the surface of the bed through distribution pipes and the bed is underdrained to collect and discharge the final effluent.
19. Lake: A natural or man-made impoundment of water with more than one acre of water surface area at the high water level.
20. Limiting layer: Bedrock, seasonally high groundwater level, or any layer of soil with a stabilized percolation rate exceeding 60 minutes.
21. Mound system: An alternative, above-ground system used to absorb effluents from septic tanks in cases where either seasonally high water table, high bedrock conditions, slowly permeable soils or limited land areas prevent conventional subsurface absorption systems.
22. On-site wastewater treatment and disposal system: All equipment and devices necessary for proper conduction, collection, storage, treatment, and disposal of wastewater from four or fewer dwelling units or other facility serving the equivalent of 15 persons (1,500 gpd) or less. This includes domestic waste whether residential or nonresidential but does not include industrial waste of any flow rate. Included within the scope of this definition are building sewers, septic tanks, subsurface absorption systems, mound systems, sand filters, constructed wetlands and individual mechanical/aerobic wastewater treatment systems.
23. Percolation test: A falling water level procedure used to determine the ability of soils to absorb primary treated wastewater.

24. Pond: A man-made impound of water with a water surface area of one acre or less at the high water level.
25. Primary treatment: A unit or system to separate the floating and settleable solids from the wastewater before the partially treated effluent is discharged for secondary treatment.
26. Professional soil analysis: An alternative to the percolation test which depends upon a knowledgeable person evaluating the soil factors, such as color, texture, and structure, in order to determine an equivalent percolation rate. Demonstrated training and experience in soil morphology (testing absorption qualities of soil by the physical examination of the soil's color, mottling, texture, structure, topography and hill slope position) shall be required to perform a professional soil analysis.
27. Roof drain: A drain installed to receive water collecting on the surface of roof and discharging into an area or storm drain system.
28. Secondary treatment system: A system which provides biological treatment of the effluent from septic tanks or other primary treatment units to meet minimum effluent standards as required in these rules and NPDES General Permit No. 4. Examples include soil absorption systems, sand filters, mechanical/aerobic systems, or other systems providing equivalent treatment.
29. Septage: The liquid contents (including sludge and scum) of a septic tank normally pumped out periodically and transported to another site for disposal.
30. Septic tank: A watertight structure into which wastewater is discharged for solids separation and digestion, referred to as part of the closed portion of the treatment system.
31. Sewage wastewater: The water-carried waste derived from ordinary living processes.
32. Sludge: The digested or partially digested solid material accumulated in a wastewater treatment facility.
33. Stream: Any watercourse which maintains flow throughout the year, or contains sufficient pooled areas during intermittent flow periods to maintain a viable aquatic community of significance.
34. Subsurface absorption system: A system of perforated conduits connected to a distribution system, forming a series of subsurface, water-carrying channels into which the primary treated effluent is discharged for direct absorption into the soil.
35. Subsurface sand filter: A system in which the effluent from the primary treatment unit is discharged into perforated pipes, filtered through a layer of sand, and collected by lower perforated pipes for discharge to the surface or to a subsurface absorption system. A subsurface sand filter is an intermittent sand filter which is placed within the ground and provided with a natural topsoil cover over the crown of the distribution pipes.
36. Wastewater management district: An entity organized in accordance with permitting legislation to perform various specific functions such as planning, financing, construction, supervision, repair, maintenance, operation and management of on-site wastewater treatment and disposal systems within a designated area.

42.02 GENERAL REQUIREMENTS.

1. The purpose of these regulations is to prescribe minimum standards and procedures to be followed in constructing and installing individual sewage disposal systems.
2. This regulation is not applicable to public wastewater treatment facilities requiring a permit from the Iowa Department of Natural Resources, unless otherwise stated.
3. No on-site wastewater treatment and disposal system shall be installed, repaired, or rehabilitated where a public sanitary sewer is available or where a local ordinance requires connection to a public system. The public sewer may be considered as not available when such public sewer, or any building or any exterior drainage facility connected thereto, is located more than two hundred feet from any proposed building or exterior drainage facility on any lot or premises which abuts and is served by such public sewer. Final determination of availability shall be made by the administrative authority.
4. When a public sanitary sewer becomes available within two hundred feet, any building then served by an on-site wastewater treatment and disposal system shall connect to said public sanitary sewer within a time frame or under conditions set by the administrative authority.
5. When a public sanitary sewer is not available, every building wherein persons reside, congregate or are employed shall be provided with an approved on-site wastewater treatment and disposal system.
6. If a building is to be connected to an existing on-site wastewater treatment and disposal system, that existing system shall meet the standards of these rules and be appropriately sized.
7. It is prohibited to discharge any wastewater from on-site wastewater treatment and disposal systems (except under an NPDES permit) to any drain tile, land drain tile or to the surface of the ground. Under no conditions shall effluent from on-site wastewater treatment and disposal systems be discharged to any abandoned well, agricultural drainage well or sinkhole. Existing discharges to any of the above-listed locations or structures shall be eliminated by constructing a system which is in compliance with the requirements of these rules.
8. All on-site wastewater treatment and disposal systems constructed or altered after the effective date of these rules shall comply with these requirements. Alteration includes any changes that affect the treatment or disposal of the waste. Repair of existing components that does not change the treatment or disposal would be exempt. However the discharge restrictions in “7” above would always apply.
9. No on-site wastewater treatment and disposal system shall be installed or altered until an application for a permit has been submitted and a permit has been issued by the administrative authority. The installation shall be in accordance with these rules.

42.03 SITE EVALUATION.

1. A site evaluation shall be conducted prior to issuance of a construction permit. Consideration shall be given, but not be limited to, the impact of the following: topography; drainage ways; terraces; floodplain; percent of land slope; location of property lines; location of easements; buried utilities; existing and proposed tile lines; existing, proposed and abandoned water wells; amount of available area for the installation of the system; evidence of unstable ground; alteration (cutting, filling, compacting) of existing soil profile; and soil factors determined from a soil analysis, percolation tests and soil survey maps if available.

2. During a site analysis and investigation, maximum use should be made of soil survey reports which are available from USDA Natural Resources Conservation Service. A general identification of the percolation potential can be made from soil map units in Iowa. Verification of the soil permeability on the specific site must be performed.

42.04 MINIMUM DISTANCES.

1. All on-site wastewater treatment and disposal systems shall be located in accordance with the minimum distances shown in Table I.

TABLE I

Minimum Distance In Feet From:	Closed Portion of Treatment System(1)	Open Portion of Treatment System (2)
Private water supply	50	100
Public water supply well	200	200
Groundwater heat pump borehole	50	100
Lake or reservoir	50	100
Stream or pond	25	25
Edge of drainage ditch	10	10
Dwelling or other structure	10	10
Property lines (unless a mutual easement is signed and recorded)	10	10
Other type subsurface treatment system	5	10
Water lines continually under pressure	10	10
Suction water lines	50	100
Foundation drains or subsurface tiles	10	10

- (1) Included septic tanks, mechanical aeration tanks and impervious vault toilets.
- (2) Includes subsurface absorption systems, mound systems, intermittent sand filters, constructed wetlands or waste stabilization ponds.

42.05 SURFICIAL DISCHARGE.

1. All discharges from on-site wastewater treatment and disposal systems which are discharged into any surface water shall be treated in a manner that will conform with the requirements of NPDES General Permit No. 4 issued by the Department of Natural Resources (DNR).
2. Prior to the installation of any system discharging to waters of the state, a notice of intent to be covered by NPDES General Permit No. 4 shall be submitted to the Department. Systems covered by this permit must meet all applicable requirements listed in NPDES permit.

42.06 BUILDING SEWERS.

1. The types of construction and distances as shown in Table II shall be maintained for the protection of water supplies. The distances shall be considered minimum and increased where possible to provide better protection.

TABLE II

Sewer Construction	Distance from Well Water Supply	
	Private	Public
Schedule 40 plastic pipe (or SDR 26 or stronger) with approved type joints or cast-iron soil pipe (extra heavy or centrifugally cast) with joints of preformed gaskets.	10	25
Sewer pipe installed to remain watertight and root-proof. Under no circumstances shall a well suction line pass under a building sewer line.	50	75

2. Building sewers used to conduct wastewater from a building to the primary treatment unit of an on-site wastewater treatment and disposal system shall be constructed of Schedule 40 plastic pipe (or SDR 26 or stronger), or cast iron with integral bell-and-gasket type joint.
3. Such building sewers shall not be less than 4 inches in diameter.
4. Such building sewers shall be laid to the following minimum grades:
4-inch sewer.....12 inches per 100 feet
6-inch sewer.....8 inches per 100 feet
5. A cleanout shall be provided where the building sewer leaves the house and at least every 100 feet to allow rodding downstream.
6. An accessible cleanout shall be provided at each change in direction or grade, if the change exceeds 45 degrees.

42.07 SEPTIC TANKS.

1. Every on-site wastewater treatment and disposal system, except mechanical aerobic systems, shall have as a primary treatment unit a septic tank as described in this rule. All wastewater from the facility serviced shall be discharged into the septic tank (except as noted in "4" below).
2. No septic tank shall be located upon property under ownership different from the ownership of that property or lot upon which the wastewater originates unless easements to that effect are legally recorded and approved by the proper administrative authority.
3. All septic tank effluent shall discharge into a secondary treatment system in compliance with this rule or other system approved by the administrative authority.
4. Septic tanks shall not be used for the disposal of chemical wastes or grease in quantities which might be detrimental to the bacterial action in the tank or for the disposal of drainage from roof drains, foundation drains, or area drains.

5. The minimum liquid holding capacity shall be as specified in the following table (capacity may be obtained by using one or more tanks):

TABLE III

1-3 bedroom homes	1,000 gal.
4 bedroom homes	1,250 gal.
5 bedroom homes	1,500 gal.
6 bedroom homes	1,750 gal.

6. Two hundred fifty gallons of capacity shall be added to each of these tank volumes if a kitchen garbage disposal unit, water softener, or a high volume water use fixture such as a whirlpool bath is to be used.
7. In the event that any installation serves more than a 6-bedroom home, or serves a facility other than a house and serves the equivalent of 15 persons or less (1,500 gal/day), the amount of septic tank liquid holding volume shall be two times the estimated daily sewage flow.
8. For wastewater flow rates for nonresidential and commercial domestic waste applications under 1,500 gal/day, refer to Appendix A.
9. Minimum liquid holding depth in any compartment shall be 40 inches. Maximum liquid holding depth for calculating capacity of the tank shall not exceed 6 1/2 feet. The interior length of a septic tank should not be less than 5 feet and shall be at least 1 1/2 times the width (larger length to width ratios are preferred). No tank or compartment shall have an inside width of less than 2 feet. The minimum inside diameter of a vertical cylindrical septic tank shall be 5 feet.
10. Any septic tank placed in fill soil shall be placed upon a level, stable base that will not settle.
11. Every septic tank shall be divided into two compartments, although compartmentalization may be obtained by using more than one tank. The capacity of the influent compartment shall not be less than one-half nor more than two-thirds of the total tank capacity. The capacity of the effluent compartment shall not be less than one-third nor more than one-half of the total tank capacity.
12. The invert of the inlet pipe shall be a minimum of 2 inches and a maximum of 4 inches higher than the invert of the outlet pipe.
13. Four-inch diameter Schedule 40 plastic pipe tees shall be used as inlet and outlet baffles. Inlet tees shall extend at least 56 inches above and 8 inches below the liquid level of the tank. The inlet tee shall extend below the liquid level no more than 20 percent of the liquid depth. The outlet tee shall extend above the liquid level a distance of at least 6 inches and below the liquid level a distance of at least 10 inches but no more than 25 percent of the liquid depth. A minimum clearance between the top of the inlet and outlet tees and the bottom of the tank lid of 2 inches shall be provided. A horizontal separation of at least 36 inches shall be provided between the inlet baffle and the outlet baffle in each compartment.
14. A horizontal slot 4 inches by 6 inches is required in the tank partition, the top of the slot to be located below the water level a distance of one-third the liquid depth. Two suitably spaced 4-inch diameter holes may also be used. A ventilation hole or slot shall be provided in the partition, at least 8 inches above the liquid level.

15. Access must be provided to all parts of septic tanks necessary for adequate inspection, operation, and maintenance. An access opening shall be provided at each end of the tank over the inlet and outlet. These openings shall be at least 18 inches in diameter if the tank has no other openings. Alternatively, a single opening at least 24 inches in diameter may be provided at the center of the tank allowing access to both compartments, with two small openings at least 6 inches in diameter over both the inlet and outlet.
16. If the top of the tank is to be greater than 12 inches below the finished ground surface, a riser at least 24 inches in diameter must be installed over each manhole of 18 inches in diameter or more to bring the top of the manhole lid to within 6 inches of the finished ground surface.
17. Tanks shall be constructed of poured concrete or plastic. They must be resistant to corrosion or decay and designed so that they will not collapse or rupture when subjected to anticipated earth and hydrostatic pressures when the tanks are either full or empty. Metal tanks are prohibited.
18. Tank divider walls and divider wall supports shall be constructed of heavy, durable plastic, fiberglass, concrete or other similar corrosion-resistance materials approved by the administrative authority.
19. Minimum wall thickness for tanks shall conform to the following specifications:

TABLE IV

Poured concrete	6 inches thick
Poured concrete, reinforced	4 inches thick
Special concrete mix, vibrated reinforced	2.5 inches thick
Fiberglass or plastic	.25 inches thick

20. Concrete used in pre-cast septic tank construction shall have a maximum water-to-cement ratio of 0.45. Cement content shall be at least 650 pounds per cubic yard. Minimum compressive strength ($f'c$) shall be 4,000 psi (28 Mpa) at 28 days of age. The use of ASTM C150 Type II cement or the addition of silica fume or Class F fly ash is recommended.
21. Septic tank bottoms shall conform to the specifications set forth for septic tank walls except special mix concrete shall be at least 3 inches thick.
22. Concrete septic tank tops shall be a minimum of 4 inches in thickness and reinforced with 3/8-inch reinforcing rods in a 6-inch grid or equivalent. Fiberglass or plastic tank tops shall be a minimum of 1/4 inch in thickness and shall have reinforcing and be of ribbed construction. The concrete cover for reinforcing bars, mats, or fabric shall not be less than 1 inch.
23. Fiberglass or plastic tanks shall be bedded according to manufacturer's specification. Provisions should be made to prevent flotation when the tanks are empty.
24. The pipes connecting septic tanks installed in series and at least the first 5 feet on the effluent side of the last tank shall be a minimum of 4-inch diameter Schedule 40 plastic.
25. All inlet and outlet connections at the septic tanks shall be made by self sealing gaskets cast into the concrete or formed into the plastic or fiberglass.

26. All joints in connecting Schedule 40 plastic pipe shall be approved plastic pipe connections such as solvent welded or compression-type gaskets.
27. Schedule 40 plastic pipe shall be used extending across excavations on unstable ground to at least 2 feet beyond the point where the original ground has not been disturbed in septic tank installations. If the excavation spanned is more than 2 feet, it must be filled with sand or compacted fill to provide a firm bed for the pipe. The first 12 inches of backfill over the pipe shall be applied in thin layers using material free from stones, boulders, large frozen chunks of earth or any similar material that would damage or break the pipe.

42.08 SECONDARY TREATMENT.

1. All subsurface absorption systems shall be located on the property to maximize the vertical separation distance from the bottom of the absorption trench to the seasonal high groundwater level, bedrock, hardpan or other confining layer, but under no circumstances shall this vertical separation be less than 3 feet.
2. A percolation test or professional soil analysis is required before any soil absorption system is installed. The percolation test procedure is outlined in Appendix B.
3. An area is deemed suitable for conventional soil absorption if the average percolation test rate is 60 minutes per inch or less and greater than 1 minute per inch. However, if an alternative type system is proposed (e.g., mound), then the percolation test should be extended to determine whether a percolation rate of 120 minutes per inch is achieved.
4. An additional test hole 6 feet in depth or to rock, whichever occurs first, shall be provided in the center of the proposed absorption area to determine the location of groundwater, rock formations or other confining layers. This 6-foot test hole may be augured the same size as the percolation test holes or may be made with a soil probe.
5. If seasonal high groundwater is present within 3 feet of the trench bottom final grade and cannot be successfully lowered by subsurface tile drainage, the area shall be classified as unsuitable for the installation of a standard subsurface absorption system. Consult the administrative authority for an acceptable alternative method of wastewater treatment.
6. In situations where specific location or site characteristics would appear to prohibit normal installation of a soil absorption system, design modifications may be approved by the administrative authority which could overcome such limitations. Examples of such modifications could be the installation of subsurface drainage, use of shallow or at-grade trenches, use of dual soil treatment areas, mound system or water conservation plans.
7. Roof, foundation and storm drains shall not discharge into or upon subsurface absorption systems. Nothing shall enter the subsurface absorption system which does not first pass through the septic tank.
8. There shall be no construction of any kind, including driveways, covering the septic tank, distribution box or absorption field of an on-site wastewater treatment and disposal system. Vehicle access should be infrequent, primarily limited to vegetation maintenance.
9. Connecting lines under driveways shall be constructed of Schedule 40 plastic pipe or equivalent, and shall be protected from freezing.

10. No wastewater shall be discharged upon any property under ownership different from the ownership of the property or lot upon which it originates unless easements to that effect are legally recorded and approved by the administrative authority.
11. Table V specifies lineal feet of lateral trenches percolation tests. Tables VI and VII list optional methods for determining length of lateral trenches or sizing of absorption beds. The alternative option for increased rock usage (Table VI) shall be used only when the size of lots limits the use of trench lengths prescribed in Table V. Absorption beds (Table VII) shall not be used except when the lot size limitations preclude the installation of a lateral trench system. Further details concerning limitations of these two alternatives should be obtained from the administrative authority prior to requesting authorization for installation.
12. Conventional subsurface soil absorption trenches shall not be installed in soils that have a percolation rate less than 1 minute per inch or greater than 60 minutes per inch. Plans for an alternative method of wastewater treatment shall be submitted to the administrative authority for approval prior to construction.

TABLE V

Soil Absorption System Sizing Chart
(Lineal feet of absorption trench)

Min Per Inch	Two Bed 300 g/day	Three Bed 450 g/day	Four Bed 600 g/day	Five Bed 700 g/day	Six Bed 900 g/day
1-5	160	200	260	340	400
6-15	200	300	400	500	600
16-30	300	400	500	600	700
31-45	400	500	600	800	900
45-60	500	600	700	900	1100

TABLE VI

Alternative Option for Increased Rock Usage
(Only if necessary)

Depth of gravel* below distribution line	Reduction in trench lengths as taken from Table V
12"	20%
18"	33%
24"	40%

*(Total depth of trench must not exceed 36". Soil profile must be consistent with the percolation rate throughout the depth used. Separation from groundwater and confining layers must be maintained.)

TABLE VII

Alternative Option for Use of Absorption Bed *

Percolation Rate Min/Inch	Absorption Area/Bedroom Sq. Ft.	Loading Rate/Day Gal/Sq. Ft.
1-5	300	.5
6-15	400	.375
16-30	600	.25

*(Absorption beds may only be used when site space restrictions require and shall not be used when the soil percolation rate exceeds 30 min./inch.)

13. Lateral trenches shall not exceed 36 inches in depth unless authorized by the administrative authority, but a more shallow trench bottom depth of 18 to 24 inches is recommended. Not less than 6 inches of porous soil shall be provided over the laterals. Minimum separation between trench bottom and groundwater, rock formation or other confining layers shall be 36 inches even if extra rock is used under the pipe.
14. No lateral absorption trench shall be greater than 100 feet long.
15. At least 6 feet of undisturbed soil shall be left between each trench edge on level sites. The steeper the slope of the ground, the greater the separation distance should be. Two feet of separation distance should be added for each 5 percent increase in slope from level.
16. Trench bottom should be constructed level from end to end. On sloping ground, the trench shall follow a uniform land contour to maintain a minimum soil cover of 6 inches while ensuring a level trench bottom.
17. There shall be minimum use of traffic or heavy equipment on the area proposed for soil absorption. In addition, it is prohibited to use heavy equipment on the bottom of the trenches in the absorption area.
18. Soil absorption systems shall not be installed in fill soil. Disturbed soils which have stabilized for at least one year would require a recent percolation test.
19. Soil absorption systems shall be designed to carry loadings to meet AASHTO H10 standards.
20. Soils with significant clay content should not be worked when wet. If soil moisture causes sidewall smearing, the trench bottom and sidewalls shall be scarified.

42.09 DISTRIBUTION.

1. Dosing is recommended and preferred to improve distribution, improve treatment and extend the life of the system.
2. On a hillside, septic tank effluent may be serially loaded to the soil absorption trenches by drop boxes or overflow piping (rigid sewer pipe). Otherwise, effluent shall be distributed evenly to all trenches by use of a distribution box or commercial distribution regulator approved by the administrative authority.
3. When a distribution box is used, it shall be of proper design and installed with separate watertight headers leading from the distribution box to each lateral. Header pipes shall be rigid PVC plastic pipe meeting ASTM Standard 2729 or equivalent.
4. The distribution box shall have outlets at the same level at least 4 inches above the bottom of the box to provide a minimum of 4 inches of water retention in the box. All unused outlet holes in the box shall be securely closed.
5. All distribution boxes shall be constructed of corrosion-resistant rigid plastic materials, or other corrosion-resistant material approved by the administrative authority.
6. All outlets of the distribution box shall be made level. A 4-inch cap with an offset hole approximately 2 1/2 inches in diameter may be installed on each outlet pipe. These caps can be rotated until all outlets discharge at the same elevation. Equivalent leveling

devices may be approved by the local authority. The soil absorption area serviced by each outlet of the distribution box should be equal.

7. In the event the effluent from the septic tank outlet cannot be discharged by gravity and still maintain proper lateral depths, the effluent shall discharge into a watertight vented pump pit with an inside diameter of not less than 24 inches, equipped with a tight-fitting manhole cover at grade level. The sump vent shall extend a minimum size of 1 1/4 inches fitted with a return bend. The pump shall be of a submersible type of corrosion-resistant material.
8. The pump shall be installed in the pump pit in a manner that ensures ease of service and protection from frost and settled sludge. The pump shall be set to provide a dosing frequency of approximately twice a day based on the maximum design flow. No on-site electrical connections shall be made in the pump pit. These connections shall be made in an exterior weatherproof box.
9. The pressure line from the pump to the point of discharge shall not be smaller than the outlet of the pump it serves.
10. Pressure lines shall be installed to provide total drainage between dosing to prevent freezing or be buried below frost level up to the distribution box.
11. Pump pits shall be equipped with a sensor set to detect if the water level rises above the design high water level if the pump fails. This sensor shall activate an auditory or visual alarm to alert the homeowner that repairs are required.
12. The effluent shall discharge under pressure into a distribution box or may be distributed by small diameter pipes throughout the entire absorption field.
13. Dosing siphons require periodic cleaning to ensure their continued proper operation.

42.10 GRAVEL SYSTEMS.

1. A minimum of 6 inches of clean, washed river gravel, free of clay and clay coatings, shall be laid below the distribution pipe, and enough gravel shall be used to cover the pipe. This gravel shall be of such a size that 100 percent will pass a 4 1/2 inch screen and 100 percent will be retained on a 3/4-inch screen. If limestone or crushed rock is used it shall meet the following criteria:
 - a. Abrasion loss. The percent wear, as determined in accordance with the AASHTO T 96, Grading C, shall not exceed 40 percent.
 - b. Freeze and thaw loss. When subjected to the freezing and thawing test, Iowa DOT Materials Laboratory Test Method 211, Method A, the percentage loss shall not exceed 10 percent.
 - c. Absorption. The percent absorption, determined in accordance with Iowa DOT Materials Laboratory Test Method 202, shall not exceed 3 percent.
 - d. Gradation. The aggregate shall have not more than 1.5 percent by weight pass a No. 16 sieve.
 - e) Lateral trenches for gravel systems shall be a minimum of 24 inches and a maximum of 36 inches in width at the bottom of the trench.

- f) The distribution pipes shall be laid with a minimum grade of 2 inches per 100 feet of run, with a preference given to the lesser slope.
- g) Distribution pipe shall be PVC rigid plastic meeting ASTM Standard 2729, or other suitable material approved by the administrative authority. The inside diameter shall not be less than 4 inches apart. Two rows of perforations shall be provided, located 120 degrees apart along the bottom half of the tubing (each 60 degrees up from the bottom centerline). The end of the pipe in each trench shall be sealed with a watertight cap unless, on a level site, a footer is installed connecting the trenches together. Coiled perforated plastic pipe shall not be used when installing the absorption system.
- h) Unbacked, rolled, 3 1/2-inch thick fiberglass insulation, untreated building paper, synthetic drainage fabric, or other approved material shall be laid so as to separate the gravel from the soil backfill.

42.11 CHAMBER SYSTEMS.

- 1. Chamber systems may be used as an alternative to conventional 4-inch pipe placed in gravel-filled trenches. However, they cannot be used in areas where conventional systems would not be allowed due to poor permeability, high groundwater, or insufficient depth to bedrock.
- 2. Manufacturer's specifications and installation procedures shall be closely adhered to.
- 3. The total length of absorption trench for chambers 24 inches or less in bottom width shall be the same as given in Table V for a conventional absorption trench. For chambers greater than 33 inches in width, a reduction of 25 percent from the lengths given in Table V may be used.

42.12 MOUND SYSTEMS.

- 1. Mound systems shall be permitted only after a thorough site evaluation has been made and landscaping, dwelling placement, effect on surface drainage and general topography have been considered.
- 2. Mound systems shall not be utilized on sites which are subject to flooding with ten-year or greater frequency.
- 3. Mound systems shall not be utilized on soils where the high groundwater level, impermeable bedrock or soil strata having a percolation rate exceeding 120 minutes per inch occur within 12 inches of natural grade, or where creviced bedrock occurs within 20 inches of natural grade.
- 4. Mound systems shall be constructed only upon undisturbed naturally occurring soils.
- 5. Mound systems shall be located in accordance with the distances specified in Table I as measured from the outer edge of the mound.
- 6. No buildings, driveways or other surface or subsurface obstructions shall be permitted within 50 feet on the down gradient side of the mound when the mound is constructed on a slope greater than 5 percent. No future construction shall be permitted in this effluent disposal area as long as the mound is in use.

7. Specifications given in these rules for mounds are minimal and may not be sufficient for all applications. Technical specifications are changing with experience and research. Other design information beyond the scope of the rules may be necessary to properly design a mound system.
8. The mound shall be constructed using clean, medium-textured sand, sometimes referred to as concrete sand. The sand size shall be such that at least 25 percent by weight shall have a diameter between 2.0 and 0.25 mm, less than 35 percent with a diameter between 0.25 and 0.05 mm, and less than 5 percent with a diameter between 0.002 and 0.05 mm.
9. Rock fragments larger than 1/16 inch (2.0mm) shall not exceed 15 percent by weight of the material used for sandy fill.
10. There shall be a minimum of 3 feet of fill material and undisturbed, naturally occurring soils between the bottom of the washed gravel and the highest elevation of the limiting conditions defined in Section XII, Para. 3.
11. Gravel shall be washed and shall range in size from 3/4 inch to 4 1/2 inches.
12. From 1 to 2 feet of medium-textured sand must be placed between the bottom of the gravel and the top of the plowed surface of the naturally occurring soil.
13. Mound systems shall utilize absorption bed distribution piping design. The bed shall be installed with the long dimension parallel to the land contour. Systems on steep slopes with slowly permeable soils should be narrow to reduce the possibility of toe seepage.
14. Minimum spacing between distribution pipes shall be 4 feet, and a minimum of 3 feet shall be maintained between any trench and the sidewall of the mound.
15. No soil under or up to 50 feet down gradient of the mound may be removed or disturbed except as specified herein.
16. Construction equipment which would cause undesirable compaction of the soil shall be kept off the base area. Construction or plowing shall not be initiated when the soil moisture content is high. If a sample of soil from approximately 9 inches below the surface can be easily rolled into a 1/8 to 1/4-inch diameter wire, the soil moisture content is too high for construction purposes.
17. The area shall be plowed to a depth of 7 to 8 inches, parallel to the land contour with the plow throwing the soil up slope to provide a proper interface between the fill and the natural soil. Tree stumps should be cut flush with the surface of the ground, and roots should not be pulled.
18. The base area of the mound is to be calculated on the results of percolation rate as indicated in Table VIII. The base area of the mound below and down slope from the trenches, excluding the area under the end slopes, must be large enough for the natural soil to absorb the estimated daily wastewater flow.

TABLE VIII

APPLICATION RATE

Percolation Rate Min/Inch	Gal/Square Foot/Day
Less than 1	Not Suitable
1-5	1.25

6-15	1.00
16-30	.75
31-45	.50
46-60	.40
61-90	.20
91-120	.10
Over 120	Not Suitable

19. The area of the fill material shall be sufficient to extend 3 feet beyond the edge of the gravel area before the sides are shaped to at least 4:1 slope (preferably 5:1).
20. The distribution pipe shall be rigid plastic pipe, Schedule 40 or 80 with 1-inch nominal diameter, and with a single row of 1/4-inch perforations in a straight line 30 inches on center along the length of the pipe or an equivalent design that ensures uniform distribution. All joints and connections shall be solvent-cemented. The distribution pipe shall be placed in the clean, washed gravel (or crushed limestone as described in Section X, Para. 1), with holes downward. The gravel shall be a minimum of 9 inches in depth below and 3 inches in depth above the pipe. No perforations shall be permitted within 3 inches of the outer ends of any distribution pipes, and the outer ends of all pressure distribution lines shall be securely capped. The central pressure manifold should consist of 1 1/2-inch or 2-inch solid plastic pipe, using a tee or cross for connecting the distribution lines.
21. Construction should be initiated immediately after preparation of the soil interface by placing all of the sandy fill material needed for the mound (to the top of the trench) to a minimum depth of 21 inches above the plowed surface. This depth will permit excavation of the trenches to accommodate the 9 inches of washed gravel or crushed stone necessary for the distribution piping.
22. The absorption trench or trenches shall be hand excavated to depth of 9 inches, the bottoms of the trenches made certain to be level.
23. Twelve inches of gravel shall be placed in the trench and hand leveled, and then remove 3 inches of the gravel with a shovel in the location where the distribution pipe will be placed. After the distribution pipe is placed, the pipe shall be covered with 2 inches of gravel.
24. The top of the gravel shall be covered with synthetic drainage fabric. Unbacked, rolled 3 1/2-inch-thick fiberglass insulation, untreated building paper, or other suitable material may be used with approval of the administrative authority. Plastic or treated building paper shall not be used.
25. After installation of the distribution system, gravel and material over the gravel, the entire mound is to be covered with topsoil native to the site or of similar characteristics to support vegetation found in the area. The entire mound shall be crowned by providing 12 inches of topsoil on the side slopes with a minimum of 18 inches over the center of the mound. The entire mound shall be seeded, sodded or otherwise provided with a grass cover to ensure stability of the installation.
26. The area surrounding the mound shall be graded to provide for diversion of surface runoff water.
27. Dosing and venting shall be required for mound systems, and the dosing volume shall be five to ten times the distribution piping network volume. The size of the dosing pump or

siphon shall be capable of maintaining an approximate pressure of one psi at the outer ends of the distribution lines.

42.13 INTERMITTENT SAND FILTERS.

1. Intermittent sand filters may be used when the administrative authority determines the site is unacceptable for a full-sized soil absorption system.
2. Intermittent sand filters shall be located in accordance with the distances specified in Table I.
3. A sampling port shall be available at the discharge point of the filter or shall be installed in the discharge line. Monitoring and effluent sampling of intermittent sand filters must meet the requirements of the NPDES permit as specified in Section V, Para. 1. Such sampling shall be performed annually, or as directed by the administrative authority. The maximum carbonaceous BOD₅, total suspended solids and fecal coliform count requirements are as follows:

TABLE IX

Effluents Discharging To Class "A" Waters:	Fecal Coliform /100 ml	BODS	TSS
Primary contact water use (a & b)	200	25	25
All other water use classifications no limit		25	25

a) A separation distance of 750 feet shall be maintained between any point of discharge and a primary recreational area as specified in the "Recommended Standards for Bathing Beaches" of the Great Lakes-Upper Mississippi River Board of State Public Health and Environmental Managers.

b) Fecal coliform tests shall be required only where waste discharge is into a watershed within one mile upstream of a "Class A" water.

4. There shall be no construction, or concrete driveways covering any part of an intermittent sand filter.
5. An intermittent sand filter shall consist of one filtering bed, or two or more filtering beds connected in a series and separated by a minimum of 6 feet of undisturbed earth.
6. Each bed shall contain a horizontal set of collector lines. The collector lines shall be equivalent to SDR 35 PVC pipe, 8-inch diameter gravel-less drainpipe or other suitable materials.
7. One collector line shall be provided for each 6 feet of width or fraction thereof. A minimum of two collector lines shall be provided.
8. The collector lines shall be laid to a grade of 1 inch in 10 feet and shall be vented or connected to a common vent. Vents shall extend at least 12 inches above the ground surface with the outlet screened, or provided with a perforated cap.
9. If 4-inch plastic pipe with perforations is used for the collector lines, they shall be covered with gravel, 3/4 inch to 2 1/2 inches in size, around and over the lower collector lines until there is a minimum of 4 inches of gravel over the pipes. The gravel shall be

overlain with a minimum of 3 inches of washed pea gravel 1/8-inch to 3/8-inch size interfacing with the filter media. A layer of fabric filter may be used in place of the pea gravel. Fabric filters must be 30 by 50 mesh with a percolation rate of at least 5 gal/sq.ft.

10. A minimum of 24 inches of coarse washed sand shall be placed over the pea gravel or above the gravel-less drainfield pipe. The sand shall meet the Iowa DOT standards for concrete sand.
11. Six inches of gravel, 3/4 inch to 2 1/2 inches in size, shall be placed upon the sand in the bed.
12. Distribution lines shall be level and shall be horizontally spaced a maximum of 3 feet apart, center to center. Distribution lines shall be rigid perforated PVC pipe.
13. Venting shall be placed on the downstream end of the distribution lines with each distribution line being vented or connected to a common vent. Vents shall extend at least 12 inches above the ground surface with the outlet screened, or provided with a perforated cap.
14. Enough gravel shall be carefully placed to cover the distributors.
15. Separation layer. A layer of material such as unbacked, rolled 3 1/2-inch thick fiberglass insulation, untreated building paper of 40-to 60-pound weight, synthetic drainage fabric or 4 to 6 inches of marsh hay or straw shall be placed upon the top of the upper layer of gravel.
16. A minimum of 12 inches of soil backfill shall be placed over the beds.
17. A distribution box shall be provided for each filter bed where gravity distribution is used. The distribution boxes shall be placed upon undisturbed earth outside the filter bed. Separate watertight lines shall be provided leading from the distribution boxes to each of the distributor lines in the beds.
18. For residential systems, single or multiple bed subsurface sand filters shall be sized at a rate of 240 square feet of surface area per bedroom. In dual subsurface sand filters, constructed in series, the first filter bed shall be twice the size of the second filter.
19. For residential systems, single bed subsurface sand filters dosed by a pump or dosing siphon may be sized at a rate of 180 square feet of surface area per bedroom. In dual subsurface sand filters, constructed in series, the first filter bed shall be twice the size of the second filter.
20. Effluent application rates for commercial systems treating domestic waste shall not exceed 1.5 gallon/sq. ft./day for double bed sand filters; 1 gallon/sq. ft./day for single bed sand filters; and the total surface area for any subsurface sand filter system shall not be less than 200 square feet.
21. Media characteristics and underdrain systems for free access filters are similar to those for subsurface filters. Dosing frequency is usually greater than two times per day and for media coarser than 0.5 mm, a dosing frequency greater than four times per day is desirable. Higher acceptable loadings on these filters as compared to subsurface filters relate primarily to the accessibility of the filter surface for maintenance. Gravel is not used on top of the sand media, and the distribution pipes are exposed above the surface.

22. Distribution to the free access filter may be by means of troughs laid on the surface, pipelines discharging to splash plates located at the center or corners of the filter, or spray distributors. Care must be taken to ensure that lines discharging directly to the filter surface do not erode the sand surface. The use of curbs around the splash plates or large stones placed around the periphery of the plates will reduce the scour. A layer of washed pea gravel placed over the filter media may also be employed to avoid surface erosion. This practice will create maintenance difficulties, however, when it is time to rake or remove a portion of the media surface.
23. Free access filters may be covered to protect against severe weather conditions and to avoid encroachment of weeds or animals. The cover also serves to reduce odor conditions. Covers may be constructed of treated wooden planks, galvanized metal, or other suitable material. Screens or hardware cloth mounted on wooden frames may also serve to protect filter surfaces. Where weather conditions dictate, covers should be insulated. A space of 12 to 24 inches should be allowed between the insulated cover and sand surface. Free access filters may not be buried by soil or sod.
24. The hydraulic loading for free access sand filters should be from 2 to 5 gpd/sq.ft.
25. Dual filters, each sized for the design flow are recommended for loading rates in excess of 3 1/2 gpd/sq. ft. treating septic tank effluent.
26. Dosing for sand filters is strongly advised. Without dosing, the entire area of the sand filter is never effectively used. Dosing not only improves treatment effectiveness but also decreases the chance of premature failure.
27. A pump shall be installed when adequate elevation is not available for the system to operate by gravity, and shall be of corrosion-resistant material, in a watertight pit, and the dosing system shall be designed to flood the entire filter during the dosing cycle. A dosing frequency of greater than two times per day is recommended and a high water alarm shall be installed.
28. When a dosing siphon is used where elevation permits, such siphon shall be installed between the septic tank and the first filter bed and to the manufacturing specifications.
29. The dosing tank shall be of such size that the siphon will flood the entire filter during the dosing cycle. A dosing frequency of greater than two times per day is recommended.

42.14 MECHANICAL AEROBIC SYSTEMS.

1. Mechanical/aerobic systems may be used only when the administrative authority determines that the site is unacceptable for a full-sized soil absorption system. Because of the higher maintenance requirements of mechanical/aerobic systems, preference should be given to sand filters, where conditions allow.
2. All individual mechanical aerobic wastewater treatment plants shall be certified by an ANSI-accredited third-party certifier to meet National Sanitation Foundation Standard 40, Class I, including appendices (May 1996).
3. All individual mechanical aerobic wastewater treatment plants shall be installed, operated and maintained in accordance with the manufacturer's instructions and the requirements of the administrative authority. The aerobic plants shall have a minimum treatment capacity of 150 gallons per bedroom per day or 500 gallons, whichever is greater.

4. The effluent from individual mechanical aerobic wastewater treatment plants shall receive additional treatment through the use of intermittent sand filters, mound systems or subsurface absorption systems of a magnitude of half that prescribed in this regulation.
5. A maintenance contract with a manufacturer-certified technician shall be maintained at all times. Maintenance agreements and responsibility waivers shall be recorded with the County Recorder and in the abstract of title for the premises on which mechanical aerobic treatment systems are installed. Mechanical aerobic units shall be inspected for proper operation at least twice a year on six-month intervals.
6. Any open discharge from systems involving mechanical aeration shall have the effluent sampled at each inspection. Tests shall be run for BOD₅, TSS and coliform bacteria.

42.15 CONSTRUCTED WETLANDS.

1. Constructed wetlands shall only be used where soil percolation rates at the site exceed 120 minutes per inch. Because of the higher maintenance requirements of constructed wetland systems, preference should be given to sand filters, where conditions allow.
2. The effluent from a constructed wetland shall receive additional treatment through the use of intermittent sand filters of a magnitude of half that prescribed in these regulations.
3. Effluent sampling of constructed wetlands shall be performed twice a year or as directed by the administrative authority. Tests shall be run on all parameters as required in these regulations. Specifications given in these rules for constructed wetlands are minimal and may not be sufficient for all applications. Other design information beyond the scope of these rules may be necessary to properly design a constructed wetland system.
4. The wetland shall be of a subsurface flow construction with a rock depth of 18 inches and a liquid depth of 12 inches.
5. Substrate shall be washed river gravel with a diameter of 3/4 inch to 2 1/2 inches. If crushed quarried stone is used, it must meet the criteria listed in these regulations.
6. Detention time shall be a minimum of seven days, and may be accomplished with trenches 16 to 18 inches deep (12 inches of liquid), 3 feet wide with 100 feet of length per bedroom. This may also be done with beds 16 to 18 inches deep with at least 300 square feet of surface area per bedroom. The bottom of each trench or bed must level within $\pm 1/2$ inch.
7. Multiple trenches or beds in a series should be used. Beds or trenches in a series may be "stepped down" in elevation to fit a hillside application. If the system is on one elevation, it should still be divided into units by earthen berms at about 50 to 75 percent of the total length.
8. Each subunit shall be connected to the next with an overflow pipe (rigid sewer pipe) that maintains the water level in the first section. Protection from freezing may be necessary.
9. Effluent shall enter the wetland by a 4-inch pipe sealed into the liner. With beds, a header pipe shall be installed along the inlet side to distribute the waste.
10. Wetland system sites shall be bermed to prevent surface water from entering the trenches or beds.

11. Vegetation shall be established on the wetlands at the time of construction. Twelve inches of rock is placed in each unit, the plants are set, then the final 4 to 6 inches of rock is placed.
12. Only indigenous plant species shall be used, preferably collected within a 100 mile radius of the site. Multiple species in each system are recommended. Preferred species include, but are not limited to, the common cattail, narrow leaf cattail, bulrush, and reed.
13. Transplantation is the recommended method of vegetation establishment. For transplanting, the plant should be transplanted, at a minimum, on a 2-foot grid. The transplants should be fertilized, preferably with a controlled release fertilizer. Trenches or beds should be filled with fresh water immediately.
14. In the late fall the vegetation shall be mowed and the detritus left on the wetland surface as a temperature mulch. In the early spring the mulch shall be removed and disposed of to allow for adequate bed aeration.

42.16 WASTE STABILIZATION PONDS.

1. Waste stabilization ponds may be used if designed and constructed in accordance with the following criteria and provided the effluent is discharged in accordance with the requirements of the general NPDES permit. An appropriately sized septic tank shall precede a waste stabilization pond.
2. Waste stabilization ponds must meet the following separation distances:
 - a. 1,000 feet from the nearest inhabitable residence, commercial building, or other inhabitable structure. If the inhabitable or commercial building is the property of the owner of the proposed treatment facility, or there is written agreement with the owner of the building, this separation criterion shall not apply. Any such written agreement shall be filed with the County Recorder and recorded for abstract of title purposes, and a copy submitted to the department.
 - b. 1,000 feet from public shallow wells.
 - c. 400 feet from public deep wells.
 - d. 400 feet from private wells.
 - e. 400 feet from lakes and public impoundments.
 - f. 25 feet from property lines and rights-of-way.
3. Ponds shall have a length not exceeding three times the width.
4. When domestic sewage from a septic tank is to be discharged to a waste stabilization pond, the capacity of the pond shall be equivalent to 180 times the average daily design flow.
5. The wastewater depth for a waste stabilization pond shall be uniform and 3 feet to 5 feet.
6. A minimum freeboard of 2 feet shall be maintained at all times.
7. Embankments shall be constructed of impermeable materials and shall be compacted. The bottom of the waste stabilization pond shall be cleared and leveled to the required elevation

and shall be lined with an impermeable natural or man-made material. Seepage loss through the sides and bottom shall be less than 1/16 inch per day.

8. Inside embankment slopes shall be 3 horizontal to 1 vertical. Outside embankments shall be at least 3:1. Berm tops shall be at least 4 feet wide.
9. Embankments shall be seeded from the outside tow to the inside high water line. From the high water line down the embankment diagonally about 5 feet shall be ripped for erosion and vegetation control.
10. The inlet shall be placed no higher than 12 inches above the bottom of the pond. It shall discharge near the middle of the pond at a point opposite the overflow structure and onto a concrete splash plate at least 2 feet square.
11. The outlet pipe shall withdraw water from a submerged depth of at least 1 foot. The intake for the outlet pipe shall be 3 to 5 feet from the embankment. The inlet and outlet should be separated to the maximum extent possible, ideally by a berm or baffle constructed in the lagoon to prevent short-circuiting. All surface water shall be diverted away from the waste stabilization pond.
12. If the pond is designed for open discharge, it must be discharged under controlled conditions. The effluent must be tested before discharge, and effluent quality must be less than 25 mg/l of BOD5 and less than 25 mg/l of TSS. Another test must be taken during discharge with the same results. Pond discharge is permitted only in spring and fall when stream flows are highest.
13. If the pond is to have an unlimited continuous discharge, the effluent shall receive additional treatment through the use of intermittent sand filters, mound systems or subsurface absorption systems of a magnitude of half that prescribed in these rules. Under continuous discharge, effluent sampling shall be as required for constructed wetlands as outlined in Section XV, Para. 3.
14. All waste stabilization ponds are to be fenced adequately to prevent entrance of livestock and to discourage entrance by people into the area. Signs shall be posted warning of possible health and safety hazards.
15. Vegetation on the top and sides of the berm shall be kept mowed. No trees shall be allowed to become established.

42.17 VAULT AND PORTABLE TOILETS.

All impervious vault toilets hereafter constructed or required by the administrative authority to be reconstructed shall comply with the following requirements:

1. Impervious vault toilets shall be located in accordance with the distances given in Table I, for the closed portion of the treatment system.
2. The vault shall be constructed of reinforced, impervious concrete at least 4 inches thick. The superstructure, including floor slab, seat, seat cover, riser and building shall comply with good design and construction practices to provide permanent safe, sanitary facilities. The vault shall be provided with a cleanout opening fitted with a fly-tight cover. Wastewater from impervious vault toilets shall be disposed of at a public sewage treatment facility.

3. All portable toilets shall be designed to receive and retain the wastes deposited in them and shall be located and maintained in a manner that will prevent the creation of any nuisance condition. Disposal of waste from portable toilets shall be at a public sewage treatment facility.
4. All chemical toilets shall comply with the following requirements:
 - a. Chemical toilets for use in isolated residences shall have a receptacle of smooth, impervious material that is resistant to chemicals and easily cleanable.
 - b. When vents are required for chemical toilets, they shall be of durable corrosion-resistant material installed in a professional manner.
 - c. The fixture shall be equipped with a mixing device and shall be charged with the proper concentration of bactericidal chemical or chemicals. Chemical recharges shall be added and mixed with the contents when necessary to maintain sufficient solution strength and to suppress odors.
 - d. Chemical toilets shall be located in toilet rooms which are well lighted, ventilated and maintained in a nuisance-free condition.
 - e. The recommended method of disposal of receptacle contents is discharging to a municipal sewage treatment facility.
5. Other methods or types of private wastewater treatment and disposal systems shall be installed only after plans and specifications for each project have been approved by administrative authority.

42.18 DISPOSAL OF SEPTAGE.

1. The collection, storage, transportation and disposal of all septage shall be carried out in accordance with the requirements in 567 – Chapter 68, IAC, and the following:
 - a. Discharge (with owner approval) to a municipal or other permitted wastewater treatment system.
 - b. Discharge (with owner approval) to permitted sludge lagoons or sludge drying beds.
 - c. Land application.
2. With land application the maximum application rate is 30,000 gallons of septage per year per acre of cropland and the following:
 - a. Septage shall not be applied to a lawn or home garden.
 - b. The septage shall be applied only to soils classified as acceptable throughout the top five feet of soil profile. The septage shall not be applied to soils classified as sand, loamy sand and silt. The acceptability of soil shall be determined using the USDA soil classifications.
 - c. Land application sites shall have soil pH maintained above 6.0, unless crops prefer soils with lower pH conditions. If the soil pH is below 6.0, it is acceptable to use agricultural lime to increase the pH to an acceptable level.

- d. If the septage is applied to land on which the soil loss exceeds the soil loss limits established by the County Soil Conservation District, the septage shall be injected on the contour or shall be applied to the surface and mechanically incorporated into soil within 48 hours of application. The septage shall not be applied to ground having greater than 9 percent slope.
 - e. Septage application on frozen or snow-covered ground should be avoided, unless special precautions are taken to avoid runoff. If application on frozen or snow-covered ground is necessary, it shall be limited to land areas of less than 5 percent slope.
 - f. Septage shall not be applied to land that is 35 feet or less from an open waterway. If septage is applied within 200 feet of a stream, lake, sinkhole or tile line surface intake located down gradient of the land application site, it shall be injected or applied to the surface and mechanically incorporated into the soil within 48 hours of application.
 - g. If the septage is applied to land subject to flooding more frequently than once in ten years, the septage shall be injected or shall be applied to the surface and mechanically incorporated into the soil within 48 hours. Information on which land is subject to flooding more frequently than once in ten years is available from the DNR.
 - h. Septage shall not be applied within 200 feet of an occupied residence or within 500 feet of a well.
 - i. Food crops shall not be harvested for 38 months after application of septage.
 - j. Animals shall not be allowed to graze on the land for 30 days after application of septage.
3. One of the following vector attraction reduction and pathogen reduction requirements shall be met when septage is applied to land.
- a. Septage shall be injected below the surface of the land. No significant amount of the septage shall be present on the land surface within one hour after the septage is injected.
 - b. Septage applied to the land surface shall be incorporated into the soil within six hours after application to or placement on the land.
 - c. The septage shall be stabilized by adding and thoroughly mixing sufficient lime to produce a mixture with a pH of 12. Provide a minimum of two hours of contact time after mixing the lime with the septage prior to applying to land. Each container of septage shall be monitored for compliance.
 - d. The septage shall be stabilized by adding and thoroughly mixing 50 pounds of lime with each 1,000 gallons of septage.
4. When septage is applied to land, the person who applies the septage shall develop the following information and shall retain the information for five years:
- a. The location, by either street address or latitude and longitude, of each site on which septage is applied.
 - b. The number of acres in each site on which septage is applied.
 - c. The date and time septage is applied to each site.

- d. The rate, in gallons per acre per year, at which septage is applied to each site.
- e. A description of how the vector attraction reduction requirements are met.
- f. The following certification statement shall be provided with the records when the records are requested by the department:

"I certify, under penalty of law, that the pathogen requirements and the vector attraction reduction requirements have been met. I am aware that there are significant penalties for false certification including the possibility of fine and imprisonment."

- 5. Other methods of stabilization may be acceptable if shown to be equivalent to the aforementioned requirements. Discharge (with owner approval) to a permitted sanitary landfill in accordance with IAC 567, Chapters 102 and 103, and the septage is stabilized by adding and thoroughly mixing sufficient lime to produce a mixture with a pH of 12, a minimum of two hours of contact time is provided after mixing the lime with the septage prior to applying to the landfill, the septage is dewatered, and a special waste authorization permit is obtained from the DNR. Commercial septic tank cleaners shall be licensed in accordance with the requirements of IAC 567, Chapter 68.

42.19 ALTERNATIVE SYSTEMS.

- 1. Alternative or innovative systems are to be designed and operated in accordance with approved standards and operating procedures established by individual administrative authorities.
- 2. Plans and specifications, meeting all applicable rule requirements, should be prepared and submitted to the administrative authorities by a licensed professional engineer. Included with the engineering submittal should be adequate supporting data relating to the effectiveness of the proposed system.
- 3. For systems designed to discharge treated effluent into waters of the state, it will be necessary to obtain a Notice of Intent to fall under the requirements of NPDES General Permit No. 4.
- 4. Wastewater management districts may be formed for the purpose of providing specialized control of on-site wastewater treatment and disposal systems located in certain problem areas or in intensive development areas. Formation of such wastewater management districts shall be coordinated under the guidance of the Buchanan County Health Department.

42.20 VARIANCES.

Variations to these rules may be granted by the DNR or the Buchanan County Health Department provided sufficient information is submitted to substantiate the need and propriety for such action. Applications for variances and justification shall be in writing and copies filed with the department and Buchanan County.

Appendix A

Estimates of Non-Household Sewage Flow Rates

Source of use

Gallons per day per unit	
Average	Maximum

		(Sec. treatment Septic tank unit sizing)	
Dwelling Units			
Hotels/Motels	(Each Guest)	50	60
	(Add per employee)	11	13
	(Per square foot)	0.26	0.3
Rooming house	(Each resident)	40	50
	(Add per nonres. Meal)	2.5	4.0
Commercial/Industrial			
Retail stores	(Sales area sq./ft.)	0.1	0.15
Or	(Each customer)	2.5	5
	(Each employee)	11	15
Or	(Each toilet room)	530	630
Offices	(Each employee)	15	18
Or	(Per square foot)	0.1	0.25
Medical offices	(Per square foot)	0.6	1.6
Industrial buildings	(Each employee)	15	20
(Does not include product or cafeteria)			
Construction camp	(Each employee)	15	20
Visitor center	(Each visitor)	5	20
Laundromat	(Each machine)	580	690
Or	(Each load)	50	50
Or	(Per square foot)	2.2	2.9
Barber shops	(Per chair)	55	80
Beauty shops	(Per station)	270	300
Eating and Drinking Establishment			
Restaurant	(Per meal, no bar/lounge)	2.5	4.0
Or	(Each seat)	24	40
	(Plus add per employee)	11	13
Dining hall	(Per meal)	2.5	4.0
Coffee shop	(Each customer)	2.0	2.5
	(Add per employee)	11	13
Cafeteria	(Each customer)	2	2.5
	(Add per employee)	11	13
Drive-in	(Per car stall)	110	145
Bar or lounge	(Each customer)	2	5.5
	(Add per employee)	13	16
Or	(Per seat)	32	40
Country clubs	(Per member, no meals)	22	22
Or	(Per member, meals, showers)	105	130
Or	(Per member in residence)	75	100
Resorts			
Housekeeping cabin	(Per person)	42	50
Lodge	(Per person)	53	74
Parks/swim pools	(Per person)	10	13
Parks (Toilets only)	(Per guest)	5	10
Movie theaters	(Per guest)	2.5	4
Drive-in theaters	(Per space)	3	5
Skating rink/dance hall	(Per customer)	7	10
Bowling lanes	(Per lane)	133	200
Transportation			
Airport, bus/rail depot	(Per passenger)	2.5	4
Or	(Per square foot)	3.33	6.5
Or	(Per public restroom)	500	630

Auto service station	(Each vehicle served)	11	13
Or	(Add per employee)	13	16
Or	(Per inside square foot)	0.25	0.6
Or	(Per public restroom)	500	630
Institutional			
Hospitals	(Each medical bed)	175	250
	(Add per employee)	10	16
Mental institution	(Each bed)	105	250
	(Add per employee)	10	16
Prison or jail	(Each inmate)	120	160
	(Add per employee)	10	16
Nursing home	(Each resident)	93	145
	(Add per employee)	10	16
Schools and churches			
School	(Per student)	10	17
	(Per student, cafeteria only)	16	17
	(Student, cafeteria, gym & showers)	20	30
Boarding school	(Per student)	75	115
Churches	(Per member)	0.14	0.86
	(Add for each kitchen meal)	1	1
	(Add per Sunday School student)	0.14	0.86
Recreational			
Campground with hookups	(Per person)	32	40
Or	(Per site with central showers)	100	100
	(Per site)	50	75
	(Add for dump station w/hookup)	13	16
Day camp (no meals)	(Per person)	13	16
Weekly overnight camp	(Per member)	33	33

Appendix B

Percolation Test Procedure

- (1) A minimum of three test holes distributed evenly over the proposed lateral field is required.
- (2) Percolation test holes shall be 4 to 12 inches in diameter and to the same depth as the proposed absorption trenches (not to exceed 36 inches in depth).
- (3) Sides and bottoms of the test holes shall be scratched or roughened to provide a natural surface. All loose material shall be removed from each hole.
- (4) The bottoms of the test holes shall be covered with approximately 2 inches of rock to protect the bottom from scouring action when the water is added.
- (5) The hole shall be filled with at least 12 inches of clean water and this depth shall be maintained for at least 4 hours and preferably overnight if clay soils are present. It is important that the soil be allowed to soak for a sufficiently long period of time to allow the soil to swell if accurate results are to be obtained.
- (6) In sandy soils with little or no clay, soaking is not necessary. If, after filling the hole twice with 12 inches of water, the water seeps completely away in less than 10 minutes, the test can proceed immediately.
- (7) Except for sandy soils, percolation rate measurements should be made at least 4 hours but no more than 24 hours after the soaking period began. Any soil that sloughed into the hole during the soaking period is removed and the water level is adjusted to 6 inches above the gravel (or 8 inches above the bottom of the hole). At no time during the test is the water level allowed to rise more than 6 inches above the gravel.

- (8) Immediately after adjustment, the water level is measured from a fixed reference point to the nearest 1/8 inch at 30-minute intervals. The test is continued until two successive water level drops do not vary by more than 1/8 inch. At least three measurements are made.
- (9) After each measurement, the water level is readjusted to the 6-inch level. The last water level drop is used to calculate the percolation rate.
- (10) In Sandy soils or soils in which the first 6 inches of water added after the soaking period seeps away in less than 30 minutes, water level measurements are made at 10-minute intervals for a 1-hour period. The last water level drop is used to calculate percolation rate.
- (11) The percolation rate is calculated for each test hole by dividing the time interval used between measurements by the magnitude of the last water level drop. This calculation results in a percolation rate in terms of minutes per inch. To determine the percolation rate for that area, the rates obtained from each hold are averaged. (If tests in the area vary by more than 20 minutes per inch, variations in soil type are indicated. Under these circumstances, percolation rates should not be averaged.) EXAMPLE: If the last measured drop in water level after 30 minutes is 5/8 inch, the percolation rate = (30 minutes)/(5/8) = 48 minutes/inch.