

**LARIMER COUNTY
DEPARTMENT OF
HEALTH AND ENVIRONMENT**



**INDIVIDUAL SEWAGE DISPOSAL SYSTEM
REGULATIONS**

EFFECTIVE DATE: January 26, 2004

**1525 Blue Spruce
Fort Collins, Colorado 80524**

LARIMER COUNTY SEWAGE DISPOSAL REGULATIONS

LARIMER COUNTY DEPARTMENT OF HEALTH AND ENVIRONMENT

These Regulations are effective January 26, 2004, having been duly adopted by the Larimer County Board of Health on December 11, 2003, following a public hearing which was held December 11, 2003, in Fort Collins, Colorado. (Notice of such hearing was duly published in the Fort Collins Coloradoan, Loveland Reporter Herald, and Estes Park Gazette.)

Adrienne E. LeBailly, M.D., MPH
Director, Larimer County Department of
Health and Environment

NOTICE
NEW SEPTIC FEES
***Effective March 2, 2009**
****Effective June 1, 2009**
*****Effective June 1, 2010**

1. New permits:
 - ***Residential and Youth Camps..... \$1,023.00
 - Commercial/Industrial/Multi-use..... \$1,023.00

2. **Sealed vault permit..... \$375.00

3. Repair permits:
 - **Minor Residential..... \$298.00
 - **Major Residential..... \$548.00
 - *Commercial/Industrial/Multi-use \$1,023.00

4. **Supplemental Permit (upgrade/remodel)..... \$400.00

5. Self-install Fee \$150.00

6. Septic System Contractor Licenses:
 - New System Contractor License \$50.00
 - Renewal System Contractor License..... \$30.00

7. Septic System Cleaner Licenses:
 - New System Cleaner License..... \$50.00
 - Renewal System Cleaner License \$30.00

8. ***Mortgage Loan Inspection \$350.00

9. Variance Request..... \$50.00

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Larimer County Department of Health and Environment

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SECTION I: Title & Policy

- 1.1 Title: These regulations shall be known as the Individual Sewage Disposal Regulations.
- 1.2 Policy: The Larimer County Board of Health declares the purpose of these regulations is to preserve the environment and protect the public health; to eliminate and control the causes of disease, infection, and aerosol contamination; and to reduce and control the pollution of the air, land, and water; it is declared to be in the public interest to establish minimum standards, rules, and regulations for individual sewage disposal systems in the County of Larimer and to provide the authority for the administration and enforcement of such minimum standards, rules, and regulations. Further, the Board recognizes that some sites in Larimer County may be unsuitable for any type of individual sewage disposal system and ownership of the property, or the fact that the site is part of a platted subdivision, shall not guarantee to any person that a sewage system application will be approved for the site. These regulations shall apply to all individual sewage disposal systems in accordance with the provisions of the Water Quality Control Act, 25-8-101 et. seq. C.R.S. 1973. These rules and regulations shall meet or exceed the requirements of the guidelines as adopted by the Colorado Board of Health pursuant to 25-10-104 C.R.S. 1973, as amended.

SECTION II: Definitions: The following definitions shall apply in the interpretation and enforcement of these regulations. The word "shall," as used herein, indicates a mandatory requirement.

- 2.1 "Absorption System" means a leaching field and adjacent soils or other system for the treatment of sewage in an individual sewage disposal system by means of absorption into the ground.
- 2.2 "Absorption Trench" means an absorption system consisting of one or more trenches not exceeding three (3) feet in width and of varying length and depth in which sewage effluent is percolated into the soil.
- 2.3 "Acceptable Design" means a standardized design of an individual sewage disposal system, the installation of which is permitted by the Department, provided that site requirements are met.
- 2.4 "Advanced Secondary Treatment" means the extended treatment of septic tank effluent for the purpose of reducing levels of BOD, suspended solids, and total nitrogen prior to final disposal through an absorption field or trenches, evaporation field or pond, or other approved means as allowed in these regulations.
- 2.5 "Aeration Plant" means equipment or devices for the aeration treatment of sewage.
- 2.6 "Aerobic Sewage Treatment System" means an individual sewage disposal system employing bacterial action which is maintained by the addition of air or oxygen and includes the aeration plant and the method of final effluent disposal.
- 2.7 "Alternating valve" means a manual device used to periodically change the flow of sewage effluent from one part of an approved system to another.
- 2.8 "Analytical Parameters" means:
 - A. Temperature (T): The measure of the thermal state of substance with respect to its ability to communicate heat to its environment reported as degrees Centigrade (°C).
 - B. Suspended Solid (SS): Solids in the sewage that can be removed readily by standard filtering procedures in a laboratory reported as milligrams per liter (mg/l).
 - C. Volatile Suspended Solids (VSS): The quantity of solids in sewage which are lost on ignition of the dry suspended solids at 500°C reported as percent of total suspended solids.

- D. Settleable Solids: Solids in the sewage which will settle, as distinct from remaining in suspension, reported as milliliters per liter of sample after 30 minutes of settling time (ml/30 min.).
 - E. pH: The logarithm of the reciprocal of the hydrogen - ion concentration.
 - F. Dissolved Oxygen (DO): The oxygen dissolved in sewage reported as milligrams per liter (mg/l).
 - G. Chemical Oxygen Demand: Is the measure of the oxygen equivalent of that portion of organic matter that can be oxidized by a strong chemical oxidizing agent and reported as milligrams per liter (mg/l).
 - H. Five Day Biochemical Oxygen Demand (BOD5): The quantity of oxygen used in the biochemical oxidation of organic matter in five days at 20°C under specified conditions reported as milligrams per liter (mg/l).
- 2.9 "Applicant" means any person who submits an application for a permit for an individual sewage disposal system.
 - 2.10 "Approved" means official consent given in writing by the Department.
 - 2.11 "Bedrock" means undisturbed rock in place either at the surface or beneath surficial deposits of gravel, sand, or soil or a consolidated rock formation of impervious material which may exhibit jointed, fractured, or deteriorated characteristics which provide inadequate filtration, as determined by the Department.
 - 2.12 "Board of Health" means the Board of Health appointed by the Board of County Commissioners of Larimer County, Colorado.
 - 2.13 "Building Sewer" means that part of the piping of a sewage drainage system which extends from the end of the building drain and which receives the discharge of the building drain and conveys it to a public sewer, private sewer, individual sewage treatment system or other point of disposal.
 - 2.14 "Cesspool" means an underground receptacle which receives untreated sewage from a building and permits the untreated sewage to seep into surrounding soil.
 - 2.15 "Cistern" means a water-tight, covered receptacle of non-toxic material which is designed for storage of potable water.
 - 2.16 "Community Sewage Disposal System" means a sewage treatment or disposal system serving more than one property.
 - 2.17 "Competent Technician" means an employee of the Department.
 - 2.18 "Component Parts" means all physical, mechanical, and electrical components of an individual sewage disposal system or other systems approved by the Board of Health.
 - 2.19 "Composting Toilet" means a unit which consists of a toilet seat and cover over a riser which connects to a compartment or vault that contains or will receive composting materials sufficient to reduce waste by aerobic decomposition.
 - 2.20 "Constructed Wetland": A system which utilizes various wetland plants to provide secondary treatment of wastewater through biological, physical, and chemical processes.
 - 2.21 "Department" means the Larimer County Department of Health and Environment.
 - 2.22 "Dispersal System" means a system for the disposal of effluent, after final treatment in an individual sewage disposal system, by a method which does not depend upon or utilize the treatment capacity of the soil.

- 2.23 "Disposal Site" means a site approved by the Department in writing for disposal or depositing of sewage. No person or entity shall dispose of or deposit any sewage from an individual sewage disposal system or sewage treatment works at any place except a disposal site.
- 2.24 "Distribution Box" means a water tight chamber which receives waste water from a septic tank or treatment unit and from which effluent is distributed.
- 2.25 "Dosing Tank" means a tank which provides storage of wastewater until sufficient volumes have accumulated for a high rate, periodic discharge of effluent.
- 2.26 "Effective Size" means the size of a granular media such that 10% of the particles by weight are smaller and 90% greater of the whole, as specified.
- 2.27 "Effluent" means the liquid waste discharge from a individual sewage disposal system or part thereof.
- 2.28 "Evapotranspiration System" means a type of effluent disposal system which wholly or primarily utilizes liquid evaporation and transpiration by vegetation as means of effluent disposal.
- 2.29 "Experimental System" means a type of system or design incorporating improvement based on scientific technology of sewage treatment and of which further evaluation is required to provide sufficient information before consideration as an acceptable design.
- 2.30 "Flood Plain" or "Flood Fringe" means an area which is subject to flooding as determined by Larimer County, Federal Emergency Management Agency, or other appropriate source or agency.
- 2.31 "Flood Way" means that area of the flood plain in which the channel of the watercourse and adjacent portions of the flood plain which must be reserved in order to discharge the base flood as designated by Larimer County, Federal Emergency Management Agency, or other appropriate source or agency.
- 2.32 "Geologist" means a Professional Geologist as defined in 34-1-201 C.R.S. 1973.
- 2.33 "Gravelless System" means a type of effluent disposal system in which the void space and soil contact area, normally provided by a gravel matrix, is provided by man-made chambers or other materials approved by the Department.
- 2.34 "Grey Water System" means a system designed to collect, treat and dispose only liquid wastes from sinks, lavatories, tubs, showers and laundry or other approved plumbing fixtures excluding toilet fixtures.
- 2.35 "Groundwater Table" means the upper surface of groundwater in the zone of saturation of a geologic formation.
- 2.36 "Guidelines" means the Guidelines on Individual Sewage Disposal Systems as adopted by the Colorado State Board of Health.
- 2.37 "Health Officer" means the chief administrative and executive officer of the Department or representative designated by the Health Officer.
- 2.38 "Holding Tank" means a water-tight receptacle for the retention of sewage either before, during, or after treatment.
- 2.39 "Individual Sewage Disposal System", "Individual Sewage Treatment System", and the term "System" (when the context so indicates) means a system, process, procedure, or facility for treating, neutralizing, stabilizing, or disposing (including transportation) of sewage which is not a part of or connected to a sewage treatment works and includes without limitation any system, process, procedure, or facility for treating, neutralizing, stabilizing, or

disposing (including transportation) of animal excreta in suspension or solution from stock feedlots, dairies, farms, and the like which is disposed of on property which is not a part of the farm or property from which the sewage is generated.

- 2.40 "Liner" means a water tight material of at least 0.01 inch (10 mil) thickness which is used to prevent effluent from entering the soil or groundwater table. The material shall be polyvinyl chloride or material of equal integrity.
- 2.41 "Malfunction or Malfunctioning System" means an individual sewage disposal system which is not functioning in compliance with the requirements of this regulation and the design of the system and includes:
- A. Absorption systems and dispersal systems which seep or flow to the surface of the ground or into waters of the State.
 - B. Systems which have overflow from any of their components.
 - C. Systems which, due to failure to operate in accordance with their designed operation, cause backflow into any portion of a building plumbing system.
 - D. Individual sewage disposal systems discharging effluent which does not comply with applicable effluent discharge standards.
- 2.42 "Manufacturer" means the person or firm that constructs or assembles individual sewage treatment system components.
- 2.43 "Matrix" means the material in which effluent is dispersed for percolation or capillary action.
- 2.44 "Mound" or "Mounded System" means a system where any part of the dispersal media is raised or placed above the original grade.
- 2.45 "Owner" means the person who is owner of record of the land on which an individual sewage disposal system is to be designed, constructed, installed, altered, extended, or used.
- 2.46 "Percolation Test" means a soil test at the depth of a proposed absorption system, or other similar component of an individual sewage disposal system to determine the water absorption capability of the soil, the results of which are normally expressed as the rate in minutes of which one inch of water is absorbed.
- 2.47 "Permeability" means the property of a material which permits movement of water through the material.
- 2.48 "Permit" means a permit for the construction or alteration, installation, and use, or the repair of an individual sewage disposal system.
- 2.49 "Person" means individual, partnership, firm, corporation, association, or other legal entity and also the State, any political subdivision thereof, or other governmental entity.
- 2.50 "Plot Plan" means an accurate drawing or map indicating the dimensions, acreage, and location of property lines, buildings, wells, individual sewage disposal systems, water courses, geographical features, and other pertinent information as required.
- 2.51 "Privy" means a structure allowing for the disposal of excreta into a watertight receptacle which provides privacy and shelter and prevents access to the excreta by flies, rodents, or other insects and animals.
- 2.52 "Registered Professional Engineer" means an engineer licensed in accordance with Section 12-25-114 and 115, C.R.S. 1973.

- 2.53 "Repair" or "Alteration" means the physical or structural changes made to a system but not including maintenance due to a system malfunction or relocation and includes by way of example, replacement of septic tanks, extension or replacement of disposal lines or effluent disposal area, or increasing the size or other alterations of an existing system.
- 2.54 "Sand Filter" means a system which utilizes filtration or absorption or both and which contains an intermediate layer of sand as filter material.
- 2.55 "Sanitarian" means a person designated by the Department, who is trained in physical, biological, and sanitary science to carry out inspectional and educational duties in the field of environmental sanitation.
- 2.56 "Sanitary Wastes" means sewage originating from humans and human activities, such as wastewater collected from toilets, showers, wash basins, sinks used for cleaning domestic areas, sinks used for food preparation, clothes washing operations, and sinks or washing machines; sources of these wastes may include, but not be limited to, single or multiple residences, hotels and motels, restaurants, schools, campgrounds, picnic grounds, day use recreation facilities, and industrial facilities provided the waste is not mixed with industrial waste.
- 2.57 "Seepage Bed" means a subsurface soil absorption area which consists of an area wider than three (3) feet together with an effluent system of distribution through which effluent may seep or leach into the surrounding soil.
- 2.58 "Seepage Pit" means a subsurface absorption device which consists of a covered pit deeper than three (3) feet with open-jointed walls through which effluent may seep or leach into the surrounding soil.
- 2.59 "Septic Tank" means a water tight, accessible, covered receptacle designed and constructed to receive sewage from a building sewer, to settle solids from the liquid, to digest organic matter and store digested solids through a period of retention and allow the clarified liquids to discharge to other treatment units for final disposal.
- 2.60 "Serial Distribution" means an arrangement of absorption trenches or seepage beds so that effluent is retained in each successive component so as to utilize the total effective absorption areas of that component before flowing into the succeeding component.
- 2.61 "Sewage" means a combination of liquid wastes which may include chemicals, house wastes, human excreta, animal excreta, other animal or vegetable matter in suspension or solution, and other solids in suspension or solution, and which is discharged from any dwelling, building, or other establishment or enterprise and includes, without limitation, waste from stock feedlots, dairies, farms, and the like which is disposed of on property which is not a part of the farm or property from which the sewage is generated.
- 2.62 "Sewage Treatment Works" means a system or facility for treating, neutralizing, stabilizing, or disposing of sewage other than soil absorption. The term "sewage treatment works" includes appurtenances such as interceptors, collection lines, outfall and outlet sewers, pumping stations, and related equipment.
- 2.63 "Stabilization Pond" means a reservoir of diked land which receives secondary or greater treated effluent for final treatment or evaporation.
- 2.64 "Standard Design" or "Standard System" means: an individual sewage treatment system which utilizes a conventional septic tank for primary treatment followed by secondary treatment through a soil absorption and filtration area (trench or bed configuration) meeting the suitable soil criteria outlined in section 4.8 of these regulations.
- 2.65 "State Waters" means any and all surface and subsurface waters which are contained in or flow in or through this State, except waters in sewerage systems, waters in treatment works of disposal systems, waters in potable water distribution systems, and all waters withdrawn for use until all uses and treatment have been completed.

- 2.66 "Suitable Soil" means a soil which will act as an effective filter in removal of organisms and suspended solids prior to the effluent reaching groundwater or any highly permeable earth such as joints in bedrock, gravel, or very coarse soils.
- 2.67 "System Cleaner" means a person engaged in and who holds himself out as a specialist in the cleaning and pumping of sewage disposal systems and removal of the residues deposited in the operation thereof.
- 2.68 "Systems Contractor" means a person engaged in and who holds himself out as a specialist in the installation, renovation, and repair of sewage disposal systems. For the purpose of this definition and of the system contractor licensing requirements: A person who installs more than one (1) individual sewage disposal system in any twelve (12) month period shall be deemed to be engaged in, and if said person receives compensation of any kind for his services, he shall be deemed to hold himself out as a specialist in the installation, renovation, and repair of sewage disposal systems.
- 2.69 "Uniformity Coefficient" means a value which is the ratio of d60 to d10 where d60 is the soil diameter of which 60% of the soil weight is finer and d10 is the corresponding value at 10% finer. (A soil having a uniformity coefficient smaller than 4 would be considered "uniform" for purposes of this regulation.)
- 2.70 "Vault" means a water-tight, covered receptacle which is designed to receive and store the discharge of sewage from a building sewer and is accessible for the periodic removal of its contents.
- 2.71 "Wastewater Pond" means a holding reservoir or pond designed to receive effluent for further treatment and disposal.
- 2.72 "Water Quality Control Division" means the Division within the Colorado Department of Public Health and Environment.
- 2.73 "Water Saving Devices" mean permanently installed plumbing fixtures which utilize water consumption amounts rated below standard accepted rates for the same fixture (e.g., EPA rating of 1.6 gallons per flush for water closets and 2.5 GPM shower heads).

SECTION III: Administration and Enforcement

- 3.1 General Sanitation Requirements: The owner of any structure where people live, work, or congregate shall insure that the structure contains adequate, convenient, sanitary toilet and sewage disposal systems in good working order. Under no condition shall sewage or effluent be permitted to be discharged upon the surface of the ground or into Waters of the State, unless the sewage or effluent meets the minimum requirements of this regulation and the water quality standards of the Colorado Water Quality Control Commission, whichever are applicable. Any person who is aware of a malfunctioning septic system is encouraged to report the location of the malfunction to the Department.
- 3.2 Inspection and Right of Entry: Pursuant to 25-1-506 and 25-10-106 and 109 C.R.S. 1973, as amended, for the purpose of inspection and enforcing applicable rules and regulations and the terms and conditions of any permit issued, the Health Officer or designated agent is authorized to enter upon private property at reasonable times and upon reasonable notice for the purpose of determining whether or not operating individual sewage disposal facilities and systems are functioning in compliance with Article 10 of Title 25, C.R.S. 1973, and applicable rules and regulations adopted pursuant thereto and the terms and conditions of any permit issued and to inspect and conduct tests in evaluating any permit application. The owner or occupant of every property having an individual sewage disposal system shall permit the Health Officer access to the property to conduct required tests, take samples,

monitor compliance, and make inspections. The owner of any property which has been designated or for which designation has been requested to be used as a disposal site shall be deemed to have authorized the Health Officer or Department Representatives to enter upon the property to conduct tests, take samples, monitor disposal activities, and make inspections.

3.3 Permit Application Requirements:

- A. Prior to commencing construction, any person who wishes to install, alter, or repair an individual sewage disposal system in Larimer County, Colorado, shall obtain a permit from the Department. For new construction, the following information shall be provided to the Department:
1. Legal description of property and address assigned to the property.
 2. Owner of the property.
 3. Owner's mailing address and phone number.
 4. Agent or contractor's name, address, and phone number.
 5. System contractor's name, address, and phone number.
 6. Building permit application, when required.
 7. Plot plan showing all existing and proposed buildings, driveways, wells, including neighboring wells, water lines, and other amenities and showing the proposed system location.
 8. Type of building by use.
 9. Type of water supply.
 10. A report prepared by a Registered Professional Engineer to include the following information:
 - a. Type of soil or soil classification to a depth of eight feet in the area of the proposed individual treatment system.
 - b. Soil percolation test results as outlined in Section 4.4.
 - c. Proximal location of bedrock at the proposed location of the system.
 - d. Proximal location of the ground water table at the proposed location of the system.
 - e. Percent slope of ground at the proposed location of system.
 - f. Type of the individual sewage disposal system proposed.
 - g. Design of the individual sewage disposal system when required per Section 3.5.
 11. Signature of owner or agent of the owner.
 12. Such additional information as may be required by the Department.
- B. A permit fee as established by the Board of Health shall be required of applicants for new individual sewage disposal systems, payable at the Larimer County Department of Health and Environment.

- C. A building addition which will or is likely to result in expanded loading of an existing system shall require approval by the Department and may require an expansion of the individual sewage disposal system or parts thereof. A supplemental permit addressing the expansion may be required. A permit fee, as established by the Board of Health, shall be charged for the supplemental permit.
 - D. A permit fee as established by the Board of Health shall be charged for alteration or repair of an existing individual sewage disposal system. A repair, and the resultant permit fee, is classified as either major or minor according to the extent of the alteration involved. A major repair involves a physical or structural change to be made to the absorption or evaporative area of the system, resulting in the expansion or replacement of all or a portion of these areas. A minor repair involves a physical or structural change to be made to a portion of a system which does not result in the expansion or replacement of the absorption or evaporative areas of the system. Examples of a minor repair would include a tank replacement, repair or replacement of a sidewall liner, backfill replacement with wicking sand, or another non-expansive alteration.
 - E. Owners of individual sewage disposal systems which are required by the conditions of their permit to submit effluent samples to the Department shall pay a fee, as established by the Board of Health, per sample and per mile traveled from the principal office to the site and return for each sample taken by an employee of the Department. Any owner or occupant may request the collection and testing of an effluent sample at the above fee which may be done at the option of the Department, or may have an approved engineering firm or laboratory collect and test the samples and submit the results to the Department. The Board of Health may limit the number of systems which require sampling and/or reporting.
 - F. Any owner may apply to the Department for a report of opinion covering the construction and functioning of an existing system on the property of the owner. Such report shall be based upon the department files and a field inspection of the system made after receipt of the application for said report. The Report shall be directed to the owner or to such other person as may be designated in the application. All such applications shall be accompanied by an inspection fee as established by the Board of Health and such other information as the Department may require.
- 3.4 Preliminary investigation: After receiving an application for an individual sewage disposal system permit, a Health Officer or representative shall visit the applicant property to make a preliminary investigation on behalf of the Department consisting of:
- A. Inspection of the premises.
 - B. Verification of soil percolation or hydraulic conductivity tests. The owner shall insure that the soil percolation holes and the boring or excavation shall be staked and identified and left open for inspection, although the holes may be covered by boards or other temporary cover for safety reasons.
 - C. General geological conditions.
 - D. The determination of the suitability of the site and of the proposed design based upon the land use and population density in the area, the use to which the property is to be put; the size of the lot; depth verification of the groundwater table, suitable soil, and depth to bedrock; the location of water supply systems; and the location of the disposal system with reference to wells, streams, lakes, ditches, structures, and other geographical features.
 - E. When specific evidence indicates that subsurface conditions exist that may endanger state waters, additional hydrological, geological, or engineering information provided by a Registered Professional Engineer or Geologist, may be requested.
 - F. When in the opinion of the Health Officer, the Department possesses sufficient information to make one or more provisions of this section unnecessary, all or any part thereof may be waived.

- G. To insure that the site inspection is made on the right property, the owner shall have placed a conspicuous sign at the front of the property identifying the property by the owner's name and address. It is intended that this sign will meet the posting requirements of both the Department and the Larimer County Planning Department.
 - H. Property lines (corners) must be marked or be easily identifiable.
 - I. In areas where the property or parts of the property are in the Larimer County designated flood area, the floodway boundary shall be marked by the owner.
- 3.5 The Department shall determine the type or types of individual sewage disposal systems which are suitable for the property and may give a conditional approval for a permit for the proposed individual sewage disposal system, or may recommend disapproval of the application and denial of a permit if the proposed system cannot be made to comply with these regulations. The conditional approval shall set forth conditions precedent to the issuance of a permit including effluent testing, cleaning or maintenance schedules, or other special conditions. No permit shall be issued to the applicant or to a subsequent owner until the conditions have been met. Except as provided in 25-10-105 C.R.S. 1973, as amended, no permits shall be issued for the following systems unless they are designed by a Registered Professional Engineer and after review by the Department.
- A. Systems disposing of effluent into State Waters.
 - B. Systems disposing of effluent upon the ground.
 - C. Systems which service commercial, business, institutions, industry, or multi-family dwellings. Conventional septic systems are not suitable for these types of applications and their use to treat wastewater from these types of facilities shall be discouraged. In addition, all systems shall receive only such biodegradable wastes for treatment and disposal as are compatible with those biological treatment processes that occur within the septic tank, soil matrix, or advanced treatment portion of a system.
 - D. Absorption fields for which the location cannot meet suitable soil or slope requirements.
 - E. Experimental systems.
 - F. Non standard systems as described in Sections VI and VII of these Regulations.
- 3.6 In the case of any system with a design capacity over 2,000 gallons of sewage per day, or which discharges effluent into State Waters, or are designed to serve 20 or more persons per day, the Department may give its conditional approval or may disapprove the state application. Thereafter, the application, together with the Department recommendation, shall be forwarded to the Water Quality Control Division for its review. If either the Department or the Water Quality Control Division disapproves the application, no permit for the installation of the system shall be issued. Such systems shall be maintained and operated so as to meet the requirements of the permit and these regulations.
- 3.7 If both a building permit and an individual sewage disposal system permit are issued for the same property and construction is not commenced prior to the expiration date of the building permit, the individual sewage disposal system permits shall expire at the same time as the building permit. If an individual sewage disposal system permit is issued for property on which no building permit is required, the individual sewage disposal system permit shall expire 120 days after its issuance if construction has not commenced. Any change in plans or specifications after the permit has been issued invalidates the permit unless approval is secured from the Department for such changes. An expired permit may be extended or renewed if:
- A. There has been no change in the plans and specifications of the proposed system as set out in the original application; and

- B. The surrounding land, its use or zoning, have not changed so as to cause the original application not to be acceptable under these regulations; and
 - C. The application for extension or renewal is submitted to the Department not more than 120 days after the expiration of the original permit and meets all of the requirements of the original permit, including fees in instances where changes in design or location require additional site inspections and data evaluation.
- 3.8 The issuance of a permit does not constitute assumption by the Department or its employees of liability for the failure of any individual sewage disposal system, nor act as a certification that the equipment used in the system or any component thereof used in its operation insures continued compliance with the provisions of Article 10 of Title 25, C.R.S. 1973, as amended, the rules and regulations adopted thereunder or any terms and conditions of a permit. It is the owner's responsibility to insure that the system, when installed, meets all requirements of these regulations regarding minimum distances from wells, lot lines, buildings, and other amenities. The property owner shall also be responsible for proper maintenance of the system and for abatement of any nuisance arising from its failure.
- 3.9 When construction of an individual sewage disposal system has been completed, except for backfilling, the System Contractor shall notify the Department, and a representative of the Department shall make a final inspection within 24 hours or at a later agreed time after receipt of notice, Saturdays, Sundays, and holidays excepted. The Department may make the inspection at any time during the construction process. If the final inspection is not made within 48 hours of the final notification time, the Systems Contractor may proceed to cover or complete the installation and provide the Department with an accurate diagram of the system as installed.
- 3.10 If upon final inspection of the system, the Health Officer finds it installed in accordance with these regulations and the permit, the Health Officer shall issue final approval for the completed system. If the system has been designed by or constructed under the supervision of a Registered Professional Engineer, said engineer may at this time also certify to the Department that construction and installation of the system has been completed in accordance with the terms of the permit and these regulations. If the inspection discloses any significant departure from the description or design of the system as stated in the application and permit, or if any aspect of the system fails to comply with this regulation, approval shall be withheld. Written notice of deficiencies causing the disapproval shall be given to the Systems Contractor. Another inspection shall be made upon notification that the deficiencies have been corrected and the system brought into compliance with this regulation.
- 3.11 Denial of a Permit or Disapproval of Plans:
- A. Notice of Denial: Written notice of the denial of a permit or disapproval of plans shall be personally served upon the applicant as provided by the Colorado Rules of Civil Procedure or by registered or certified mail, return receipt requested. Service by mail shall be complete on the date of delivery specified on the return receipt.
 - B. Appeal to the Board of Health: Any person who is denied a permit or whose plans for an individual sewage disposal system are disapproved, may appeal to the Board of Health as herein provided.
 - C. Variance on Appeal: Upon finding that strict enforcement of these regulations would cause undue hardship to the applicant and a further finding that a variance would not be injurious to public health, or endanger state waters, the Board of Health may authorize the issuance of a variance to these regulations. The burden of proof is upon the applicant to show that the variance will not injure adjacent properties, will not conflict with the purposes of these regulations, will not adversely affect the health of any person, and will comply with the provisions of Section 3.12 of these Regulations.
 - D. Time of Appeal: Every appeal must be filed within thirty days from the date of service of the Notice of Denial.
 - E. Finality of Denial: Denial shall become final upon the expiration of time for filing an appeal, or when final action is taken upon an appeal, whichever is later.

3.12 Variance Procedure:

- A. The Director and Assistant Director of the Environmental Health Division are delegated the authority to grant a variance from local ISDS regulations when compelling justification is present and the variance does not endanger the public health. Any Division rulings on these variances may be appealed to the Larimer County Board of Health, using the procedure described in Section C below. The Division may also choose to refer difficult or controversial requests for variance to the Larimer County ISDS regulations directly to the Board of Health.

The criteria the Environmental Health Division shall use in making their determination on a variance are the same that the Larimer County Board of Health shall use in considering variances from the state's "Guidelines on Individual Sewage Disposal Systems," and are listed in sections 3.12 Subparts D, E, and F. The Division will not issue a variance to these regulations if the variance would also violate state Guidelines.

- B. Only the Larimer County Board of Health may approve a variance to the Colorado State Board of Health "Guidelines on Individual Sewage Disposal Systems." When absolutely necessary, an applicant may petition the Larimer County Board of Health for a variance from the state Guidelines.
- C. Upon finding that strict enforcement of these Regulations and/or the Guidelines would cause undue hardship to the applicant and a further finding that a variance would not be injurious to the public health or endanger state waters or the environment, the Board of Health may approve a variance to the applicable portions of the Regulations and/or Guidelines:
1. The Larimer County Board of Health must hear all variance cases involving state Guidelines, and all appeals or referrals from the EH Division of variance decisions on these regulations. Approval of a variance requires a majority vote of the Board.
 2. Prior to the Board of Health's rendering of a decision on a variance request, a Public Hearing must be held. The hearing shall be the subject of a Public Notice or sent via certified mail by the Department, with a minimum 20 day reply time from date of mailing, to all adjacent property owners.
 3. The Board shall consider all oral or written testimony as part of the record during the public hearing.
 4. The Board of Health may impose requirements and conditions on any variance granted.
 5. A fee, as approved by the Board of Health, may be assessed with any variance request. Hearings will not be scheduled until this fee is paid.
- D. All variance requests must include the following information:
1. Site specific request identifying the specific criteria from which a variance is being requested.
 2. Technical justification by a Colorado Registered Professional Engineer or a Professional Geologist which indicates the specific conditions which exist and/or the measures which will be taken to result in no greater risk than that associated with compliance with the requirements of the Regulations. Examples of conditions which exist, or measures which might be taken, include but are not limited to the following: evidence of a natural or physical barrier to the movement of effluent to or towards the feature from which the variance is requested; soil amendment or replacement to reduce the filtration rate of effluent from the absorption field to the physical feature is no less than the travel time through the native soil at the prescribed setback; and treatment equivalent to that required to meet National Sanitation Foundation (NSF) Standard 40 be provided.
 3. A discussion of alternatives considered in lieu of the requested variance.

4. Technical support for selected alternatives, which may include a testing program, which confirms that the variance does not increase the risk to public health and the environment.
5. A statement of the hardship which creates the necessity for the variance. No variance will be allowed solely for economic gain.
6. The applicant has the burden of proof that the variance is justified and will pose no greater risk to public health and the environment than would a system meeting the standard being varied as in D.(2) above.

E. Outcome of the Variance Procedure:

The applicant shall be notified in writing of the decision regarding the request for a variance; the notice of a denial for a variance shall include those reasons which form the basis for the denial; the notice of an approval for a variance shall include any conditions of the approval. The variance, and any conditions thereof, shall be recorded on the deed to the property.

F. Prohibitions on the Granting of Variance Requests to the Guidelines:

1. No variance will be issued to mitigate an error in construction involving any element of property improvements.
2. No variance will be issued where the property can accommodate a conforming ISDS.
3. No variance will be issued, which will result in setbacks to an offsite physical feature which do not conform to the minimum setbacks defined in Table II of the Guidelines.
4. No variance will be issued, which reduces the 4 foot separation an absorption system must have to groundwater and bedrock.
5. No variance from the horizontal setback from a well shall be given which does not also meet the variance requirements of the Board of Examiners of Water Well Construction and Pump Installation Contractors.

3.13 Community Sewers: Permits to construct, extend, or replace an individual sewage disposal system shall be denied if a community sewer is accessible and is within 400 feet of the applicant's dwelling, place of business, or institution, and if the municipality, district, or system's owner agrees to provide service.

3.14 Acceptable Design List: The Department shall prepare a list of approved septic tanks, aeration plants, evapotranspiration systems, or other systems and equipment, which will receive permits for installation provided site requirements are met.

Manufacturers or designers may request approval of standardized equipment or systems. Approval shall be granted only after submission of such information as may be requested by the Department. Designs that meet all of the requirements of this regulation will be included on the list. The list shall be revised periodically and shall be available to any person upon request.

3.15 Except for designs or types of systems which have been approved by the Colorado Department of Health, the Board of Health may approve an application for an experimental type system not otherwise provided for in these regulations only if the system has been designed by a Registered Professional Engineer, and only if the application provides for the timely installation of a back-up system. The Board of Health shall not arbitrarily deny any person the right to consideration of an application for such a system and shall apply reasonable performance standards in determining whether to approve such an application.

For those designs and types of systems, including septic tanks, which have been approved by the Colorado Department of Health, the Board of Health may disapprove such designs and systems if they do not meet the expected performance upon which they were approved.

3.16 Submission of Plans for Proposed Subdivisions: Plans for proposed subdivisions designed to utilize individual sewage disposal systems shall be submitted to the Department for review and compliance with requirements of this regulation and the requirements of Larimer County Land Use Code and Procedure Manual. The Department may require the subdivider to submit additional engineering or geological reports or data and to conduct a study of the economic feasibility of a sewage treatment works prior to making a recommendation. No plans shall receive the approval of the Board of County Commissioners unless the Department has made a favorable recommendation regarding the proposed method of sewage disposal. Plans may be forwarded to the Water Quality Control Division for their review and approval or disapproval. Appeal from an unfavorable recommendation hereunder shall be in accordance with the procedures set out in Paragraph 3.11.

3.17 Regulations of System Contractors:

A. 1. No person except as in A.2 below, shall install, engage in the installation of, or repair an individual sewage disposal system unless he holds a valid Systems Contractor License. Employees of a validly licensed System Contractor shall not be required to be licensed. The initial fee for a Systems Contractor License shall be established by the Board of Health.

Licenses shall expire on December 31 of each year and shall be renewed within 30 days thereafter, and an annual renewal fee as established by the Board of Health shall be charged. A license which lapses shall be subject to the fee established for new licenses upon reapplication.

2. Any landowner of record may install an individual sewage disposal system for his own use without the necessity of obtaining a license, provided however, such landowner shall first obtain a special permit from the Department upon a proper showing to the Department of competency to complete the said work in accordance with these regulations, and the payment of an additional permit fee as established by the Board of Health and provided further said landowner's installation shall be subject to inspection as determined by the Department and otherwise be completed in accordance with these regulations. Self installations shall only be allowed for standard, non-engineered systems as provided for in Sections 5.3 and 5.4 of these regulations.

B. Standard of Performance Required of Holders of Systems Contractor Licenses:

1. Applications for Systems Contractor Licenses or renewals shall be made upon forms supplied by the Department.

2. Prior to the issuance or renewal of a license the Department may require the applicant to demonstrate adequate knowledge of these regulations.

3. Installation, renovation, or repair of any individual sewage disposal system shall be in compliance with these regulations and with the conditions set out in the installation permit.

4. Notice of a requested inspection shall be given by the license holder not less than 24 hours before the inspection is to be made.

5. A licensed holder shall have in his possession a copy of the installation permit at the time of final inspection so that final approval may be endorsed upon it.

C. Revocation of a Systems Contractor License:

1. A license may be revoked for failure to comply with these regulations or for other good cause shown.

Revocation shall take place only after a hearing before the Board of Health. The license holder shall be given not less than 10 days' notice of the hearing and may be represented at the hearing by counsel.

2. Written notice of revocation, particularizing the violations, shall be served upon the holder of the Systems Contractor License. Service of notice as required in this section shall be as provided by the Colorado Rules of Civil Procedure, or by registered or certified mail, return receipt requested, deliverable to addressee only.
3. A systems contractor whose license has been revoked may not be considered for re-licensing for at least one year following the revocation date.

3.18 Regulations of Systems Cleaners:

- A. No person shall engage in the cleaning of individual sewage disposal systems or the transportation of sewage to a disposal site unless he holds a valid Systems Cleaner License. Employees of a validly licensed Systems Cleaner shall not be required to be licensed. The initial fee for a Systems Cleaner license shall be established by the Board of Health. Licenses shall expire on December 31 of each year, shall be renewed within 30 days thereafter, and an annual renewal fee as established by the Board of Health shall be charged. A license which lapses because of failure to renew or is revoked shall be subject to the fee established for new license upon reapplication.
- B. Standard Performance of Systems Cleaners:
 1. A license holder, when cleaning a septic tank or aeration plant, shall remove the liquid, sludge, and scum, leaving no more than three (3) inches depth of sewage in a septic tank or aeration plant.
 2. A license holder, when cleaning a septic tank or aeration plant for mortgage or sale purposes, shall complete an inspection of the septic tank or aeration plant and provide such information as requested to the Department on forms provided by the Department.
 3. A license holder shall maintain his equipment so as to insure that no spillage of sewage will occur during transportation and/or storage, and that his employees and/or the public are not subjected to undue health hazards.
 4. A license holder shall dispose of the collected sewage only at a disposal site approved in writing by the Department.
 5. Prior to the issuance of or renewal of a license, the Department may require the applicant to demonstrate adequate knowledge of paragraph 3.18 A, B, C, and D.
- C. Revocation of a Systems Cleaners License: The procedures as described in paragraph 3.17 C shall be followed for the revocation of a license.
- D. A system cleaner who handles, hauls, and disposes of hazardous waste may have the license revoked for failure to comply with all laws and rules relevant to the handling, hauling, or disposing of hazardous waste as defined in the Code of Federal Regulations, Part 40.

3.19 The Department may issue a repair permit and an emergency use permit to the owner or occupant of property on which a system is malfunctioning. Application for a repair permit shall be made by such owner or occupant to the Department within two business days after receiving notice from the Department that the system is malfunctioning or otherwise constitutes a nuisance or hazard to public health. The permit shall provide for a reasonable period of time within which repairs shall be made at the end of which period the system shall be inspected by the Health Officer to insure that it is functioning properly. Concurrently with the issuance of a repair permit, the Department

may issue an emergency use permit authorizing continued use of a malfunctioning system on an emergency basis for a period not to exceed the period stated in the repair permit. Such an emergency use permit may be extended for good cause shown in the event repairs may not be completed in the period stated in the repair permit through no fault of the owner or occupant.

The Colorado State Board of Health Guidelines on Individual Sewage Disposal Systems require that all systems installed shall meet the requirements of the Guidelines, and it is the intent of the Larimer County Board of Health that all systems installed shall meet the requirements of these regulations, except, that in instances where strict enforcement of these requirements would create an undue hardship, the Department may issue a permit for repair or replacement of an existing system provided the repaired facility shall not be closer to Table II components than the existing system.

- 3.20 Notice of Violations: Whenever the Health Officer determines that there has been a violation of any provision of this regulation, notice shall be given of such violation to the responsible person or persons. Such notice shall be in writing, and shall particularize the violations, provide a reasonable time for correction and be addressed to the owner and occupant of the property concerned. Service of such notice shall be as provided by the Colorado Rules of Civil Procedure or by registered or certified mail, return receipt required, deliverable to addressee only. Service by mail shall be complete on the date of delivery specified on the return receipt. If one or more persons cannot be found or served after a diligent effort to do so, service may be made by posting a notice in a conspicuous place in or about the property affected by the notice, in which case the Health Officer shall include in the record a statement as to why the posting was necessary.
- 3.21 Cease and Desist Order: The Health Officer may issue an order to cease and desist from the use of any system which is found by the Health Officer to be malfunctioning or which otherwise constitutes a nuisance or hazard to public health and which has not received the timely repairs in accordance with the provisions of paragraph 3.19. Such an order may be issued only after a hearing which shall be conducted by the Health Officer not less than 48 hours after written notice, thereof, is given to the owner or occupant of the property on which the system is located and at which the owner and occupant may be present with counsel and be heard. The order shall require that the owner or occupant bring the system into compliance or eliminate the nuisance or hazard within a reasonable period of time, not to exceed thirty (30) days, or thereafter cease and desist from the use of the system.
- 3.22 Maintenance, Cleaning, and Effluent Testing Schedules: In order to insure good working order, the following minimum schedule is recommended for all septic tanks and aeration plants and is required for all sealed vaults and privies:

A.

Type of Treatment	Inspection or Maintenance	Cleaned or Pumped	Routine Effluent Testing
Septic Tank	every year	every 3 years	experimental only
Aeration Plants	every 6 months	every 4 years	not more than 2 times per year
Vault, Privies	when pumped	as necessary when full	none

- B. The owner shall be responsible for the required maintenance and cleaning of his system. Samples may be taken at any time when necessary to implement paragraph 3.22 A of these regulations.
- C. In addition to testing results conducted by the Department, the Department shall accept, in lieu thereof, results conducted by the Colorado Department of Health and results conducted by a certified laboratory of the owner's choice.

- D. Tests may be limited to those parameters which are necessary to determine the maintenance of the required standards for the disposal method.
- E. The Board of Health may limit the number of systems which require monitoring and/or reporting.
- F. The owner of a vault shall maintain all pumping receipts for at least five (5) years and shall make such receipts available to the Department for review upon written request from the Department.

3.23 Prohibition of individual sewage disposal systems in unsuitable areas: The Board of Health may conduct a public hearing after written notice to all affected property owners as shown in the records of the county assessor and publication of notice in a newspaper of general circulation at least (10) days prior to the hearing, to consider the prohibition of permits for individual sewage disposal systems in defined areas which contain or are subdivided for a density of more than two dwelling units per acre. The Board of Health may order such prohibition upon a finding that the construction and use of additional individual sewage disposal systems in the defined area will constitute a hazard to the public health or environment. In such a hearing, the Board of Health may request affected property owners to submit engineering and geological reports concerning the defined area and to provide a study of the economic feasibility of constructing a sewage treatment works.

3.24 General Prohibitions:

- A. Owners of systems treating other than sanitary wastes, as defined in Section 2.56 of these regulations, must first obtain a Class V underground injection permit, or verification that one is not required, from the United States Environmental Protection Agency before application is made for an Individual Sewage Disposal System permit.
- B. No city or county shall issue to any person a permit to construct or remodel a building or structure which is not serviced by a sewage treatment works, until a permit for an individual sewage disposal system has been issued by the Department.
- C. No city or county occupancy permit shall be issued to any person for the use of a building which is not serviced by a sewage treatment works until a final inspection of the individual sewage disposal system has been made by the Department, as provided for in paragraph 3.10, and the installation has received the approval of the Department.
- D. No individual sewage disposal system presently in use which does not comply with the provisions of this regulation regarding minimum separation between the maximum seasonal level of the groundwater table and the bottom of an absorption system, shall be permitted to remain in use without compliance with this regulation later than October 1, 1975.
- E. Cesspools, pit privies, seepage pits, slit trenches are prohibited and shall not be used.
- F. An individual sewage disposal system shall be installed and maintained on the same legal parcel as the building it serves, unless a permanent easement or other arrangement acceptable to the Department has been obtained.
- G. Not more than one dwelling, commercial business, institutional or industrial unit shall be connected to the same individual sewage disposal system unless such multiple connection was specified in the application submitted in the permit issued for the system.
- H. Installation of new or repaired individual sewage disposal systems shall be prohibited in areas where public or community sewer services are available, per the criteria of Section 3.13 of these Regulations.

- I. No person shall construct or maintain any dwelling or other occupied structure which is not equipped with adequate facilities for the sanitary disposal of sewage.
 - J. In areas designated by the Larimer County Zoning Department as flood hazard areas, individual sewage disposal systems shall not be placed within the floodway. Individual sewage disposal systems may be placed in the flood plain provided they are designed so as not to cause pollution or be damaged in the event of a flood. In the case of a waterway, stream, or intermittent stream which drains a watershed greater than one square mile and does not have a designated flood plain, a minimum setback of 100 feet from the edge of a watercourse shall apply. In cases where the 100 foot setback cannot be met, the applicant may submit a flood hazard study which indicates the boundaries of flow in a 100 year flood and the depth and velocity of flow, together with a plan for a septic system which, in the event of a 100 year flood, would be protected from damage and would not result in environmental contamination. This plan and study shall be conducted according to procedures established in the Larimer County Storm Water Management Manual, and shall be submitted to the Larimer County flood plain administrator for recommendations prior to issuance of a permit for an on-lot disposal system by the Larimer County Health Department. In the case of a drainage swale or gully which drains a watershed of one mile or less, the minimum setback will be as stated for this ground feature in Table II.
 - K. The procedures for issuance of a repair permit in a floodway or flood fringe shall be in accordance with the provisions of paragraph 3.19. Owners of systems in need of repair in these areas will make every reasonable attempt to modify, relocate, or otherwise protect their on-lot systems from flood damage and prevent pollution of floodwaters by their destruction. The Department may require the repair applicant to provide additional information to substantiate that the strict enforcement of these regulations would cause undue hardship to the individual. Denial of approval of the repair permit by the Department can be appealed to the Board of Health under Paragraph 3.11.
- 3.25 Penalties: Any person who commits any of the following acts or violates any of the provisions of this regulation commits a Class 1 petty offense, as defined in Section 18-1-107, C.R.S., 1973.
- A. Constructs, alters, installs, or permits the use of any individual sewage disposal system without first having applied for and received a permit as provided for in these regulations or as provided for in 25-10-105 (1) (f) or 25-10-106 C.R.S. 1973.
 - B. Constructs, alters, or installs an individual sewage disposal system in a manner which involves a knowing and material variation from the terms or specifications contained in the application or permit.
 - C. Violates the terms of a cease and desist order which has become final under the terms of Paragraph 3.21 or the terms of 25-10-106 (1) (k), C.R.S., 1973.
 - D. Conducts a business as Systems Contractor without having obtained the license provided for in Paragraph 3.16 or provided for in 25-10-109 (1), C.R.S., 1973.
 - E. Conducts a business as Systems Cleaner without having obtained the license provided for in Paragraph 3.17 or provided for in 25-10-109 (2) C.R.S., 1973.
 - F. Willfully fails to submit proof of proper maintenance and cleaning of a system as required by rules and regulations adopted pursuant to Paragraph 3.5, 3.18 or 3.22, or provided for in 25-10-106, C.R.S. 1973.
- 3.26 Jurisdiction: These rules and regulations are promulgated by the Larimer County Board of Health under the authority of 25-1-506 and 507 and 25-10-104 of the Colorado Revised Statutes 1973.
- 3.27 Severability: If any regulation adopted hereunder on its application to any person or circumstances is held invalid, unconstitutional, void, or inoperative such holding shall not affect other provisions or applications of the regulations

adopted hereunder. The Board of Health hereby declares that in these regards the regulations adopted hereunder are severable, and that the Board of Health would have adopted the remaining regulations hereof notwithstanding such holding.

- 3.28 Saving Clause: The repeal of any regulation adopted hereunder shall not deny any right, action, or cause of action which arose under existing regulations.
- 3.29 Effective Date: These regulations shall become effective, January 26, 2004, with the concurrent repeal of existing rules and regulations (adopted January 26, 2004).

SECTION IV: General Technical Requirements

- 4.1 Calculation of Sewage Flow: Where values can be obtained by measurement of flow and strength of waste from existing facilities, those values may be used. For new facilities, Table 1 may be used as a guide which represents average flows. Maximum flow shall be considered as 150 percent of average flow and shall be the basis for design purposes unless otherwise established.

For calculating the flow for residential dwellings, use a minimum figure of 3.5 people or 2 persons per bedroom, whichever is larger. No system shall be designed for less than the anticipated maximum daily sewage flow, except that, in instances where connection of a building to a sewer is imminent, the Department may approve a disposal system of lesser size and cost provided; however, the owner of such building has purchased the sewer tap from the sewer district or municipality for the building. A temporary six-month permit will be issued in such instances pending installation of the community sewer line, and the owner shall request the permit be renewed each six months until the community sewer is in service. The permit shall expire and shall not be renewed when the community sewer is in service, and the building shall be immediately connected to the sewer line.

- 4.2 Size Reduction for Water Conservation and Dosing: The Department may allow a reduction in design for approved, permanently installed water conservation or dosing devices.
- A. The reduction in size due to water conservation devices shall not exceed 20% of normal size and shall be based on flow rate information supplied to the Department for comparison with standard accepted rates for each fixture utilizing water saving devices. No additional reduction in size due to water saving devices shall be allowed for gravelless systems.
- B. The reduction in size due to dosing shall not exceed twenty five (25) percent of normal size. No reduction in size due to dosing shall be allowed for evapotranspiration systems or the evaporation portion of a combination absorption and evapotranspiration system or for gravelless systems. If a size reduction for the use of a gravelless system is not specified in an engineer design, a size reduction may be allowed for dosing, as allowed in this paragraph.
- C. When both water saving devices and a dosing system are utilized in any system, the total reduction allowed in area size shall not exceed 45 percent of normal size for a standard system or 30% for a combination absorption and evapotranspiration system and then shall apply only to the absorption portion of a combination absorption and evapotranspiration system.

TABLE I

TYPE OF ESTABLISHMENT	GALLONS/PERSON/DAY	LBS. 5 DAY
Residential	(*)GALLONS/UNIT/DAY	BOD/PERSON/DAY (*)BOD/UNIT/DAY
Hotel & motels without private baths	50	.15
Hotels & motels with private baths	75	.15
Multiple family dwelling or apartments	75	.20
Rooming houses	50	.15
Single family dwelling	75	.20
Commercial		
Airline catering per meal serviced	3	.03
Airports (per passenger, not incl. food)	5	.02
Airports (per employee)	10	.06
Bus service areas not incl. food	5	.02
Country clubs not incl. food	30	.02
Day workers at offices	15	.06
Drive-in theaters (not incl. food-per space per day)	10	.06
Factories/plants (exclusive of industrial wastes)(with showers)	35	.08
Kennels (Boarding only) (per animal)	10	.20
Kennels (Boarding and Grooming) (per animal)	30	.25
Laundries self service (gal. per washer)	400	2.00
Movie theaters (not incl. food) (per aud. seat)	5	0.3
Stores (per public toilet)	400	2.00
Work or construction camps (semi-permanent) (with flush toilets)	50	.17
Work or construction camps (semi-permanent)(without flush toilets)	35	.02
Travel trailer parks with individual water and sewage hook-up	*100	*.50
Travel trailer parks without individual water and sewage hook-up	*50	*.17
Restaurants (per seat)		
Restaurants (Open 1 or 2 meals)	50	.06
Restaurants-24-hour restaurant or open 3 meals	75	.07
Restaurants with paper service only	25	.01
Additional for alcohol service	30	.02
Institutional		
Churches (only) (Based on use)	5	.06
Hospitals (per bed space)	250	.20
Institutions other than hospitals (per bed space)	125	.17
Mobile home parks, independent	75	.20
Schools, boarding	100	.17
Schools, day (without cafeterias, gym and shower)	15	.04
Schools, day with cafeterias, but not gym or showers)	20	.08
Schools, day (with cafeterias, gym, and shower)	25	.10

Recreational and Seasonal		
Camps, day (no meals serviced)	15	.12
Camps, luxury resort	125	.17
Camps, resort (night & day) with limited plumbing	50	.12
Camps, tourist, trailer or campground	*100	*.50
Cottages and small dwellings (seasonal occupancy)	50	.17
Parks, picnic (toilet wastes only)	5	.06
Swimming pools and bathhouses	10	.06
Country Club		
Shower	*500	.48
Bath	*300	.29
Lavatory	*100	.25
Toilet	*150	.18
Urinal	*100	.06
Sink	*50	.51
Public Park (during hours when park is open)		
Flush Toilet (per fixture per hour)	36	.04
Urinal (per fixture per hour)	10	.01
Shower (per fixture per hour)	100	.10
Faucet (per fixture per hour)	15	.04
Separate Flow - Residential Use Per Person		
Bath/Shower	14.7	.014
Dishwasher	1.8	.002
Kitchen sink	4.4	.045
Additional for garbage grinder	1.4	.052
Laundry washer	19.5	.037
Lavatory	8.4	.021
Water closet	24.8	.029

***Gallons per day - BOD 5 per day given on a per unit basis**

4.3 Minimum distances between components of sewage disposal systems and pertinent ground features shall be as prescribed in Table II, on page 22.

4.4 Performance of Soil Percolation and Profile Tests

- A. Soil percolation tests shall be made in at least three test holes in the area in which the absorption field of a proposed system is to be located. A percolation test hole must be drilled or dug in undisturbed, unfrozen soil in each twelve hundred square foot area of the leachfield. A profile hole must be drilled or dug eight feet deep or to bedrock or the groundwater level, whichever is first reached, to give a fair indication of the soil condition. If an application is for a system which does not utilize a soil absorption system but which employs a dispersal system, the Department may waive the requirement of percolation tests upon request by the applicant supported by an adequate subsoil and bedrock report and by a showing that the tests are not essential to the proper design of the system and that the absence of test data involves no danger to the public health.

B. Percolation test procedure:

1. Size, depth, and location of hole: The horizontal dimension of the percolation test hole shall be from 6 to 12 inches and the vertical sides shall be terminated at the depth of the proposed absorption system or at a depth of at least 30 inches. It is recommended the bottom of the percolation holes be excavated to minimize distortion of the soils due to smearing and compaction. Percolation test holes shall be prepared in a manner so as to protect the sidewalls from excessive caving or sloughing. Methods such as sleeving or gravel-packing are acceptable. When gravel-packing is used, a correction factor shall be applied to the percolation rate for gravel-packed holes to account for the volume of water displaced by the gravel.
2. Preparation of water tests: The sidewalls of the test holes shall be scarified with a nail, knife, or other sharp object so as to remove smeared and compacted surfaces. Test holes shall then be filled with water to a depth of 14 inches or more at least 8 hours, but not more than 24 hours, prior to making the percolation test observation. Immediately prior to making the water percolation test, the hole shall be refilled with water, if necessary, to a depth of at least 14 inches.
3. From a fixed reference point, within the lower 25% (4 to 8 inches) of the percolation test hole, measure the time for the water to drop one inch or the drop in water level at consistent intervals for 3 to 4 hours or until the readings stabilize for three consecutive measurements. Maintain a 4" to 8" water depth in the holes for the duration of the test, refilling as necessary. The percolation rate is reported in minutes of time per inch drop. The percolation rate for the site shall be the average of the last measurement in each of the three test holes. A rate faster than 5 minutes per inch or a rate slower than 60 minutes per inch shall render the site unsuitable for a standard type absorption system. Sites with unsuitable percolation rates may require additional soil evaluation and the system shall be designed by a Registered Professional Engineer. Alternate percolation test procedures may be used provided the results will be at least equal to the results expected from the procedure detailed in this paragraph and have been previously approved by the Department. All field percolation test data for each hole tested shall be submitted to the Department for review of an application.

Table II
Table of Minimum Horizontal Distances in Feet Between Components
of a Sewage Disposal System and Pertinent Ground Features

	Building Sewer/Effluent Lines	Septic Tanks, Treatment Plants, or Vault	Privy Vault	Lined Evapotranspiration Or Lined Stabilization Pond	Lined Subsurface Sand Filter	Unlined or Partially Lined Evapotranspiration System, Stabilization Ponds.	Unlined Subsurface Sand Filter In Soil with a Percolation Rate Slower than 60 Min. Per Inch	Absorption Field, Seepage Bed, Sand Filter Trench
Springs, Wells or Suction Lines	50b	50	50	60	60	100	100	100*
Potable Water Supply Lines	10b	10b	10b	10b	10b	25b	25b	25b
Cistern	25b	25	25	25	25	25	25	25
Dwelling or Occupied Building	0	5a	15	15	15	15	15	20
Property Lines/Piped or Lined Irrigation Ditch	10b	10	10	10	10	10	10	10
Subsoil Drains/Intermittent Irrigation Lateral	10b	10	10	10	10	25	25	25
Lakes and Ponds	50b	50	25	25	25	50	50	100*
Intermittent Streams, Streams or Irrigation Ditches (c)(e)(f)	50b	50	25	100e	100e	100	50	100*
Swale or Gully, Dry Gulch (d)(e)	10b	10	10	10	10	15	15	25*

NOTE: The minimum distances shown above shall be maintained between the system components and the ground features described. Where geological or other conditions warrant, greater distances may be required

*Add 8 feet additional distance for each 100 gallons per day design flow over 1000 gallons per day. The high water line on lakes & ponds shall be determined by the change from aquatic vegetation and/or noticeable water line.

- a. Components which are not watertight should not extend into anticipated root system or nearby trees. Distance shown shall not apply to treatment plant
- b. Crossings or encroachments may be permitted where pipelines are encased per the requirements of Table II (subscripts 2 and 4) of the State ISDS Guidelines.
- c. Waterway or stream is defined as a feature which drains a watershed greater than one square mile.
- d. Swale or gully is a narrow ravine or shallow depression which carries water after a period of precipitation to include snow runoff and has limited water sources and a drainage basin of one square mile or less.

- e. The Department may allow a lesser distance for fully lined systems in instances where the flood zone is not a factor or consideration.
- f. The Department may allow lesser distances which meet State guidelines where irrigation ditch laterals not service as public water sources and where such lesser distances would not cause pollution or be detrimental to the septic system.

NOTE: Utility and highway agencies may be easements not listed above.

- C. Percolation tests shall be conducted by a Registered Professional Engineer unless:
1. Unusual hardship is proven by an owner in obtaining the services of a Registered Professional Engineer, and the appropriate number of holes are dug and prepared in accordance with Paragraph 4.4A, B(1) and (2) by the owner. A competent technician of the Department shall make the percolation rate tests and field rate determinations for the owner.
 2. Previous percolation tests which were made by a Registered Professional Engineer for a subdivision which show a sufficiently suitable consistency that the tests may be waived by the Department.
 3. The Department verifies previous tests were performed on the lot in the same proposed area and the intended use of the property remains unchanged.
- D. The Health Officer may require an eight foot deep excavation and additional percolation test in the proposed system area when deemed necessary for further soils and geological evaluation.

4.5 Alternative soil tests in lieu of soil percolation tests: Alternative tests may be approved by the Board of Health when adequate and sufficient scientific evidence shows that such a test will provide proper data from which reliable designs may be derived.

4.6 A proximal location of bedrock and/or groundwater levels shall be made as outlined in Section 4.4 A. of these Regulations. A profile log shall be made by a Registered Professional Engineer of the soil types, bedrock, and groundwater encountered, with the results submitted to the Department.

4.7 The location of the maximum seasonal groundwater table shall be determined by the following methods:

- A. Direct visual observation of infiltrated water at maximum seasonal elevation of the year within an eight foot boring or trench or a monitoring bore or trench observed throughout one year.
- B. Observation of soil in a trench of at least eight foot depth for determination of the ground water table; or chemically reduced iron in the soil, reflected by a dull gray or mottled coloring.
- C. Soil moisture tests indicating water saturation.
- D. Determination of the piezometric surface by the hydraulic gradient.
- E. Or, by other scientific methods approved by the Board of Health.
- F. The Department shall consider all evidence and make the final determination on groundwater depth.

4.8 A suitable soil shall meet the following criteria:

- A. Is at least 6 feet in depth to the maximum seasonal groundwater table and to bedrock as measured from the surface.
- B. Has the capacity to adequately disperse the designed effluent loading as determined by a field percolation rate of between five minutes per inch and 60 minutes per inch, or by other approved soil tests.
- C. Does not exhibit inhibiting swelling characteristics.

- D. Does not visibly exhibit a jointed or fractured pattern of an underlying bedrock.
 - E. Is not consolidated.
 - F. Acts as an effective filter within its depth for the removal of pathogenic organisms.
- 4.9 No system shall dispose of effluent directly into the ground unless soil conditions meet the characteristics of a suitable soil.
- 4.10 Disinfection of effluent (when required):
- A. Disinfection shall be introduced into the effluent by an automatic proportioning device.
 - B. A contact basin shall be provided for disinfection of effluent which meets the following requirements:
 1. A minimum of 60 minutes detention time.
 2. A free residual chlorine (or equivalent) of 1.0 ppm tested at the exit of the effluent pipe of the basin.
 3. Thorough mechanical mixing or a basin having a length to width ratio of 40:1, with a sharp crested weir spanning the entire width of the basin outlet. Other designs shall be approved when proof of their effectiveness is submitted for an acceptable design.
- 4.11 Advanced Secondary Treatment in Environmentally Sensitive Areas: Prior to the final disposal stage of an on site wastewater system, the Department shall consider and may require advanced secondary treatment of septic tank effluent in environmentally sensitive areas (as defined below) and in commercial and industrial applications. Such treatment systems shall be approved by the Colorado Department of Health and Environment and meet NSF Standard 40 criteria for BOD and suspended solids removal. To meet NSF standards, systems must be capable of reducing BOD levels to 30mg/1 and suspended solids to 20mg/1. In addition, systems shall be capable of reducing total nitrogen levels to 30 mg/1. Typical residential septic tank effluent levels are as follows: 360/mg/1 BOD, 400mg/1 suspended solids, and 60 mg/1 total nitrogen. Enhanced soil treatment, consisting of 4 feet minimum of approved fill material, of which the top 2 feet shall be filtering sand meeting the design and installation specifications of Section 5.2 D and 6.4 of these regulations, shall also be considered and may be required for added bacteria removal by the soil absorption system.

Environmentally sensitive areas would include, but not be limited to:

- Lots in which blasting has been specified by the design engineer as a means of removing bedrock in a proposed absorption area and replacing it with suitable filtering soil;
- lots in which the 100 foot set back from the soil absorption portion of a septic system and a water feature (lake, stream, or ditch) can not be met, provided the minimum 50 foot setback required by the State Guidelines can be maintained and the required variance procedure outlined in Section 3.12 of these regulations has been approved;
- lots in which the original depth to the maximum seasonal high ground water level and/or consolidated bedrock is 4 feet or less in the area of the proposed treatment system;
- lots in which the 100 foot set back from the soil absorption portion of a septic system and a well has been varianced to a lesser distance, per Section 3.12 of these Regulations;

Advanced secondary treatment systems shall be operated and maintained on a permanent basis by the System Manufacturer, a Professional Engineering Firm, or other approved maintenance personnel. Copies of the maintenance reports shall be provided to the Department on at least an annual basis.

- 4.12 Future expansion area requirements for individual sewage disposal systems: Wherever possible, all lots proposed to contain a dwelling served by an individual sewage disposal system should be of sufficient size to accommodate the initial calculated disposal area and to contain a sufficient area to allow for a 100% future expansion of this area size. All future expansion areas should conform to the same distance and physical parameter requirements (as outlined in Sections 4.7, 4.8, and Table II) as the initial disposal area.
- 4.13 All systems shall be designed and maintained so that sewage effluent will be disposed of on the same property from which generated (unless otherwise approved by the Department); will be disposed of in a manner which will not create a public health hazard or nuisance; and will not be detrimental to the environment or likely to cause environmental pollution.
- 4.14 All individual sewage disposal systems shall be completed (including backfill) prior to the dwelling being occupied and the system utilized.

SECTION V: Standard Septic System Design and Installation Criteria

5.1 Septic tanks:

A. Material:

1. Concrete tanks shall be constructed of Portland Type I-II sulfate resistance cement which shall achieve 4000 p.s.i. minimum compressive strength at 28 days of age. Welded wire mesh of not less than 10 gauge with openings of 6 inches to 10 inches shall be placed in minimum four inch thick walls and floor. At places where wire was cut, it shall lap the joint 6 inches and shall be tied. One Number 3 reinforcing steel bar shall be placed horizontally below the inlet and outlet on the tank. The concrete cover for reinforcing bars shall not be less than one (1) inch. The septic tank's lid or cover shall be at least 4 inches (nominal) thick, with one access hole no less than 20 inches in diameter at the inlet and outlet. Welded wire mesh of 4" x 4" or 6" x 6" opening and not less than 10 gauge shall be embedded in the cover, plus No. 4 rebar crossways 30 inches from each end on inside of access hole. Septic tanks may be individually approved by the Department if they have been designed by a duly licensed professional engineer and if they meet or exceed the strength standards set out in this paragraph. The manufacturer's name, the liquid capacity of tank, and the outlet shall be indelibly marked on the tank.
2. Metal, coated metal, or wooden tanks and the current use of the same are prohibited. Other materials which result in an adequate and durable construction and which resists excessive corrosion, decay, or leakage may be approved.

B. Design:

1. The outlet invert shall be a minimum of three (3) inches and a maximum of four (4) inches below the invert of the influent pipe. Inlet and outlet pipes shall be connected to the tank with a sealed flexible joint, designed for that purpose, to accommodate tank movement. The outlet shall be conspicuously marked as such on the tank exterior.
2. A baffle and/or tee shall be provided to divert the incoming sewage downward. The baffle or tee shall penetrate at least eight (8) inches below the liquid level but not to a depth greater than that allowed for the outlet device. The baffle or tee shall extend at least five (5) inches above the liquid level. The outlet shall be fitted with a baffle or a tee which shall extend a minimum of fourteen (14) inches below

the invert of the outlet and above the invert to within one (1) inch of the top of the tank. Baffles and/or tees can be made monolithically with the tank. If added, they must be made of non-corrosive fasteners to the inside of the tank.

3. A minimum four (4) inch diameter (12.5 square inches) to a maximum eight (8) inch diameter (50.3 square inches) sweep elbow pipe or aperture shall be located at least fourteen (14) inches below the outlet invert in the partition of a two-compartment tank but not in the sludge zone. If a sweep elbow is used, it shall be located in the first compartment.
 4. Tanks shall be of the following proportions:
 - A. The tank shall have a liquid depth between 30 and 60 inches.
 - B. The distance from the outlet invert to the cover shall be at least 10 inches.
 - C. The tank may have various shapes provided the capacity, inlet, outlet, and depth requirements are met, and it has a uniform horizontal flow throughout its length.
 - D. There shall be no less than 25 square feet of liquid surface area provided and at least six (6) feet between the inlet and the outlet.
 5. Tanks shall be watertight, and slab lids shall be sealed. (Riser and manhole lids need not be sealed.)
 6. The first compartment of a two-compartment tank shall hold one-half to two-thirds of the effective capacity of the tank.
 7. Plans and specifications must be submitted and approved for all tanks fabricated on the site.
 8. A minimum two-compartment tank or two tanks in series is required.
 9. If septic tank effluent filters are utilized, they shall comply in all respects with the standards of National Sanitation Foundation Standard 46-"Evaluation of Components and Devices Used in Wastewater Treatment Systems". Such devices shall be sized, installed, and maintained as per the individual manufacturer recommendations."
- C. Installation of septic tanks:
1. Tanks are to be installed on a solid base and shall be level. Tanks shall be buried. The tank shall be installed with removable covers or manholes extended to within 8 inches of finished grade in order to provide access to the inlet and outlet devices of each compartment for cleaning and inspection. Where covers are flush with or above ground, they shall be provided with a mechanical system to prevent unauthorized entry. Roof drains, foundation drains, area drains, or cistern overflows are not to enter the tank or any part of the treatment system.
 2. The building sewer to septic tank shall be laid with a minimum fall of 1/8 inch per foot (1/4 inch fall per foot is recommended) and shall be no less than four (4) inches in diameter. Bends in the building sewer shall be limited to 45 degree ells. The building sewer and effluent line shall be buried a minimum of 1 foot and shall meet all installation requirements of the current Uniform Plumbing Code. All piping shall be constructed of compatible pipe, bonding agent, and fittings. The inlet and outlet pipes shall be grouted or sealed with waterproof materials. A cleanout shall be provided within 5 feet

of building and each subsequent 100 feet of building sewer. Building sewer lines and effluent lines shall be laid on a firm bed throughout their entire length and shall be bedded with on site or select bedding material.

3. Backfilling around a septic tank shall be accomplished in a manner to prevent settlement and avoid undue strain on the tank and the pipes entering and leaving the tank. To help prevent failures as a result of settling: pipe meeting ASTM Standard D3034 (PVC SDR 35) or equivalent is required from the building to the septic tank and from the septic tank to the disposal area.
4. Abandoned septic tanks, vaults, cesspools, and seepage pits shall be pumped and filled with soil, or they shall be removed.
5. All septic tanks and vaults shall be located and maintained in an area which is accessible for the pumping of their contents.
6. Septic tanks shall be located no closer than six (6) feet to the disposal area. In locations where groundwater may cause instability to the tank, pumping chamber, vault, or other tanks due to flotation, the tanks shall set sufficiently to provide stability when the tank is emptied.

D. Minimum capacities for septic tanks:

1. For residential applications, the minimum tank capacity shall be determined by the number of bedrooms (at two people per bedroom) being served according to Table III:

TABLE III	
Number of Bedrooms	Minimum Tank Capacity (gal)
3 or less	1000
4	1250
each additional	add 250

2. The minimum capacity of a septic tank shall permit retention of incoming sewage for thirty (30) hours at 150% of the estimated daily average flow but in no case shall be less than 1,000 gallons capacity.

5.2 General requirements for disposal of effluent into an absorption system:

- A. The methods for calculating minimum absorption area shall be based upon the capacity of the soil to absorb liquids as established by the percolation test or other approved soil tests.
- B. Unless designed by a Registered Professional Engineer and approved by the Department, no absorption system shall be permitted where:
 1. Sufficient suitable soil is not available.
 2. Where the ground slope is in excess of 30 percent.

- C. Absorption Area: The minimum absorption area in square feet for an individual sewage disposal system shall be determined by the formula:

$$A = \frac{Q \sqrt{t} \times 1.25}{5}$$

Where: A = absorption area

Q = 150% of the total average daily flow of sewage in gallons per day per residence determined at two persons per bedroom or as specified in Table 1.

t = percolation rate

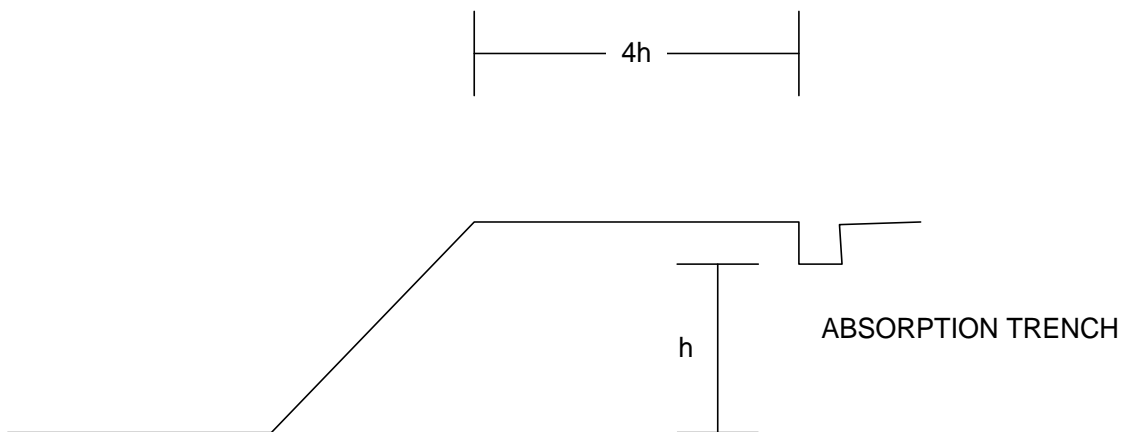
For standard absorption trenches the 1.25 factor in the formula may be eliminated.

The minimum size of an absorption area allowed is 400 square feet for a bed & 300 square feet for a trench system. absorption fields and trenches are summarized on Table IV per bedroom number and percolation rate.

TABLE IV
REQUIRED MINIMUM ABSORPTION AREA SQUARE FOOTAGE

PERC RATE Min/Inch	Absorption Field Size In Square Feet Per Bedroom Number				PERC RATE Min/Inch	Trench Size In Square Feet Per Bedroom Number			
	1	2	3	4		1	2	3	4
	5	400	400	400		503	5	300	300
6	400	400	413	551	6	300	300	331	441
8	400	400	477	636	8	300	300	382	509
10	400	400	534	712	10	300	300	427	569
12	400	400	585	779	12	300	312	468	624
14	400	421	631	842	14	300	337	505	673
16	400	450	645	900	16	315	360	540	720
18	418	477	716	955	18	334	382	573	764
20	440	503	755	1006	20	352	402	604	805
22	462	528	792	1055	22	369	422	633	844
24	482	551	827	1102	24	386	441	661	882
26	502	574	860	1147	26	402	459	688	918
28	521	595	893	1191	28	417	476	714	952
30	539	616	924	1232	30	431	493	739	986
32	557	636	955	1273	32	445	509	764	1018
34	574	656	984	1312	34	459	525	787	1050
36	591	675	1013	1350	36	473	540	810	1080
38	607	693	1040	1387	38	485	555	832	1110
40	623	712	1067	1423	40	498	569	854	1138
42	638	729	1094	1458	42	510	583	875	1167
44	653	746	1119	1492	44	522	597	895	1194
46	668	763	1145	1526	46	534	610	916	1221
48	682	779	1169	1559	48	546	624	935	1247
50	696	795	1193	1591	50	557	636	955	1273
52	710	811	1217	1622	52	568	649	973	1298
54	723	827	1240	1653	54	579	661	992	1323
56	737	842	1263	1684	56	589	673	1010	1347
58	750	857	1285	1714	58	600	685	1028	1371
60	762	871	1307	1743	60	610	697	1046	1394

- D. Where absorption systems are to be installed in a new fill material, the fill must be designed and approved by a Registered Professional Engineer. In addition, the fill material shall consist of well-graded soil or filtering sand with a percolation rate between 10 and 30 minutes per inch, free of heavy sod or other organic material, trash, frozen material, or debris. The design criteria used for the sizing in fill material shall include consideration for the absorption capability of the receiving stratum around the fill material. Fill material shall be deposited in layers not exceeding 6 inches in thickness, and each layer shall be compacted by means of mechanical tampers, pneumatic rollers, or other similar means. The degree of compaction and density for filled areas shall be specified by the engineer.
- E. If blasting is required to remove consolidated bedrock material prior to the fill placement, the blasting shall be specified in the design by a Registered Professional Engineer. The blasted material shall be removed and a minimum of 4 feet of approved fill material, of which the top 2 feet shall be filtering sand meeting the design and installation specifications of Section 5.2D. of these Regulations, shall be incorporated into the design. A system designed to incorporate blasting may also be subject to the requirement of Section 4.11 of these Regulations.
- F. Over excavation shall be utilized to build soil in sites having decomposed granite. The decomposed or weathered granite shall be mixed to a depth of four (4) feet below and 3 feet surrounding the absorption field and carefully re-laid. The disturbed weathered granite can be mixed or replaced with suitable filter material if the existing material is too coarse. Suitable filter material consists of sand or finer material. Over excavation is used to create suitable soil which will effectively treat effluent by removing organisms and filter suspended solids before the effluent reaches any highly permeable earth such as joints in bedrock.
- G. The minimum horizontal distance required from cut banks and fill areas to individual sewage disposal system components discharging effluent into or onto the surrounding soil shall be four (4) times the height of the bank, to a maximum of 100 feet, measured from the bottom of the absorption area, (see diagram below) unless it can be demonstrated that the use of a barrier will prevent lateral effluent seepage. When using a barrier, the distance in height is measured at the bottom of the barrier.



- H. The surface of an absorption area shall be protected from activities which may cause compaction or otherwise interfere with its proper functioning. Driveways, parking areas, storage buildings, animal confinement areas, sprinkler systems, and other similar uses shall not be placed on or above any portion of an absorption or evaporative area.

5.3 Standard Absorption Trenches:

- A. At least two trenches separated by at least six feet of undisturbed soil and of near equal length shall be constructed with a length not exceeding 100 feet; a width not exceeding 3 feet; and a depth not exceeding 3 feet (unless approved by the Health Officer). A disposal line shall be provided for each trench and shall be surrounded by clean, washed, graded gravel or rock, or similar clean aggregate. The material shall range in size from 3/4 inch to 2½ inches. Before placement of the aggregate in the trench, all compacted and smeared soil surfaces shall be scarified. The material shall extend for at least two (2) inches above the top of the pipe to at least six (6) inches below the bottom of the pipe. The top of the gravel shall be covered with untreated building paper, a 2 inch layer of hay or straw, a 4 inch layer of pea gravel, a geotextile filter fabric, or similar pervious material to prevent the gravel from becoming clogged by the earth backfill. When pea gravel is used as a covering, the depth of this pea gravel may be included in the overall depth of gravel. An impervious covering shall not be used, as this interferes with evapotranspiration at the surface. There shall be at least twelve (12) inches of backfill placed over the trench which shall be graded to promote run-off water from the disposal area. No trees or shrubs shall be placed closer than six feet to the trench. A distribution device providing uniform distribution of effluent shall be included. The bottom of the trench shall be level. Four foot depth of suitable soil below the bottom of the trench is required. Machine tamping, rolling, or hydraulic compaction of final cover shall not be permitted; however, hand tamping may be allowed where necessary to stabilize the soil to prevent erosion or the intrusion of extraneous water.
- B. Disposal lines of perforated of pvc pipe with a minimum 3-inch diameter shall be fitted with tight joints and the perforations shall be so laid that a relatively even distribution of effluent over the system will occur. Perforated distribution pipe shall have a minimum wall thickness conforming to ASTM Standard 2729. Corrugated polyethylene pipe with smooth interior that meets ASTM Standard F405 and AASHTO M252 specification or equivalent may also be used. Tile, open-joint pipe, and cast iron pipe shall not be used. When at the discretion of the Health Officer, it is necessary to maintain grade or alignment of pipe lengths, pipe lengths shall be placed on narrow grade boards which are securely staked. The grade of pipe lines shall be level. All ends of disposal lines shall be fitted with water tight end cap devices or connected with adjacent disposal lines to form a closed system.

5.4 Standard Seepage Beds:

- A. Seepage beds shall be constructed with a length not exceeding 100 feet, a width not less than 3 feet, and a depth not exceeding 3 feet (unless approved by the Health Officer). A twelve (12) inch layer of 3/4 to 2 1/2 inch washed gravel shall be distributed evenly over the entire bed, with pipe lines set at a depth to insure at least two (2) inches of gravel above the pipe and at least six (6) inches of gravel below the bottom of the pipe. The bottom of the bed shall be level. Before placement of the aggregate in the bed, all compacted and smeared soil surfaces shall be scarified. A covering of untreated building paper, a 2 inch layer of hay or straw, a 4-inch layer of pea gravel, a geotextile filter fabric, or similar material, shall be placed on top of the gravel, and, after final inspection, backfill shall be placed over the bed to a minimum depth of twelve (12) inches. Depth of the pea gravel may be included in the overall depth of the gravel. The final cover shall be graded to promote drainage runoff away from the disposal area. No trees or shrubs shall be placed closer than six feet from the system. Four foot depth of suitable soil below the bottom of the bed is required. Machine tamping, rolling, or hydraulic compaction of final cover shall not be permitted. However, hand tamping may be allowed where necessary to stabilize the soil to prevent erosion or the intrusion of extraneous water.

- B. The outer-most disposal lines in the bed shall be placed no less than eighteen (18) inches and no more than thirty-six (36) inches from the outside bed walls. For each six (6) feet, or part thereof, in bed widths, there shall be one disposal line extending the length of the bed. A minimum of two disposal lines, connected to a common manifold line, is required. Such pipe lines shall be so spaced and connected as to distribute the effluent evenly over the entire bed area, and shall meet the requirements of Paragraph 5.3B. The excavation shall be conducted in a manner that does not compact the soil. Wheeled equipment in the excavation is discouraged. All open ends of disposal lines in a seepage bed shall be fitted with water tight end cap devices, or connected with adjacent lines to form a closed system. A distribution box or tee shall be located near the middle of the manifold line to provide uniform distribution of effluent and shall comply with Section 5.6. If the loading point can not be centered in the manifold line, the far ends of the distribution lines shall be looped.
- C. Alternating Absorption Systems: Two or more standard design absorption systems, each designed and constructed to receive at least 50% of the anticipated maximum daily sewage flow, may be allowed. Such multiple systems shall be interconnected with a manually operated valve assembly readily accessible to finished grade which allows for convenient, periodic (at least yearly) diversion of flow between the absorption systems.

5.5 Serial Distribution:

Serial distribution systems may be used in all situations where a soil absorption system is permitted and may be used where the ground slope does not allow for suitable installation of a single level absorption field unless a distribution box or dosing system is used. The horizontal distance from the side of the trench to the surface of the ground shall be adequate to prevent lateral flow and exposure of effluent, and in no case less than two feet. A liner may be required on the lower side of the trench. When a serial distribution system is used, the following design and construction procedures shall be required. The bottom of each absorption trench and its distribution line shall be level. There shall be a minimum of 12 inches of ground cover over the gravel fill in the absorption trenches. The absorption trenches shall follow approximately the ground surface contours so that variation in trench depth will be minimized. There shall be a minimum of 6 feet of undisturbed earth between adjacent trenches and between the septic tank and the nearest trench. Adjacent trenches may be connected with the relief line or a drop box arrangement, in such a manner that each trench is completely filled with septic tank effluent to the full depth of the gravel before the effluent flows to succeeding trenches.

5.6 Distribution Box:

A distribution box, if used, shall be of sufficient size to accommodate the necessary field lateral lines and shall be constructed with the inlet invert at least one (1) inch above the outlet invert, with all outlet inverts on the same level. Distribution boxes, when used, shall be water leveled (filled with water) in field installations so as to assure even distribution of effluent into disposal lines. Disposal lines shall be level for at least one foot beyond the box.

5.7 Dosing Tanks:

- A. If a dosing chamber is used, it shall be water tight and sized to dose the area 3 to 4 times per day. A reduction of up to twenty-five (25) percent in absorption area size may be allowed for standard systems. No size reductions will be allowed for dosing in total evapotranspiration systems. For combination evapotranspiration and absorption systems, the reduction shall apply only to the absorption portion.
- B. The size of the dose, or the net capacity of the dosing tank, shall be 60 to 75 percent of the volume of the distributors dosed at one time, unless a pressurized system is used.

5.8 Sewage Pumping System, Where Applicable:

- A. Non-clog pump opening shall have at least 2 inch diameter solids handling capacity where raw sewage is pumped or not more than 1/2-inch diameter solids handling capacity if previously settled effluent is pumped. Only pumps which have been tested and certified by the manufacturer as effluent, sewage, or dewatering pumps shall be utilized in an individual sewage pumping system.
- B. Automatic liquid level controls shall be provided to start and shut-off pumps at a level required by the design.
- C. Pressure pipe shall be of sufficient strength to accommodate pump discharge pressure and the pipe shall be sized to maintain a velocity of 2 or more feet per second.
- D. Automatic air release valves shall be installed at high points in the pressure line where necessary to prevent air locking. Check valves shall not be installed.
- E. A storage basin preceding the pump shall be provided to allow pump cycling commensurate with pump design capacity. The second compartment of the septic tank shall not be used as a pumping chamber unless it can be shown that the minimum thirty (30) hour detention time will not be decreased, and the pump is screened or provided with an approved filtering device to assure that only liquid effluent will be discharged. Pumping chambers shall be readily accessible.
- F. The discharge line from the pump chamber shall be protected from freezing by burying the pipe below frost level or sloping the pipe to allow it to be self draining.
- G. The pump shall be installed a minimum of 6 inches above the floor of the storage basin to insure proper functioning and prevent clogging by sludge or other solid material.
- H. A high water alarm shall be provided to signal a pump failure.

5.9 Gravelless Soil Absorption Systems:

All gravelless soil absorption systems shall have received the approval of the Colorado Department of Health. Such systems shall be installed according to Colorado Department of Health approved sizing criteria and manufacturer's installation criteria.

5.10 Electrical Equipment, Where Applicable:

All electrical work, equipment, and material utilized in on-site wastewater systems shall comply with the requirements of the current National Electrical Code in force on the effective date of these Regulations, or those revisions of said code as are adopted by the State Electrical Board.

5.11 Grease Traps:

A component designed to intercept, trap, and remove grease and oil from wastewater prior to it entering a septic tank shall be required for all commercial or licensed establishments that prepare or serve food to the public and that discharge into an individual sewage disposal system. Such components shall be properly sized, installed, and maintained per the criteria of the current edition of the Uniform Plumbing Code (or other locally adopted code) and shall treat only those portions of the total wastewater flow from which grease and oils are generated.

SECTION VI: Engineered Systems: Alternate Soil Treatment and Disposal Systems

The following systems are considered non-standard systems and are required to be designed by a Registered Professional Engineer.

6.1 Aerobic Sewage Treatment Systems:

- A. General Design: The shape and design of an aeration compartment, its inlet and outlet arrangements, baffling, and air application shall:
 - 1. Allow for thorough mixing of applied sewage, return solids, and applied air.
 - 2. Prevent excessive short circuiting of flow.
 - 3. Prevent the deposition and buildup of solids in the aeration compartment.
- B. Method of Aeration: The method of aeration shall be accomplished by mechanical aeration, diffused air, or a combination of these. The method of aeration shall, at all times, maintain aerobic conditions at the maximum organic loading in both the aeration and settling compartment.
- C. All aeration plants shall have been tested and certified by the National Sanitation Foundation or equivalent.
- D. Effluent shall be disposed of in a standard absorption system or other approved method as specified in these regulations.

6.2 Wastewater Pond:

- A. A wastewater pond may be permitted by the Department for final disposal of effluent following secondary treatment when the property being considered is large enough to prevent odors or other nuisances from affecting neighboring properties (ten acres or more). The pond shall be designed for a loading not to exceed 0.46 Pounds of BOD5 per 1,000 square feet of water surface area. The design shall comply with Section 3.24 A in each case in which non-domestic wastes will be treated.
- B. Maximum water depth in the pond shall not exceed five (5) feet. The inside slope of the pond, dike, or embankment shall not be steeper than 2:1, (two feet horizontally for each foot measured vertically). A center inlet shall be provided.
- C. Unless four feet of suitable soil exists beneath the bottom of the pond, said pond shall be constructed in impervious soil or be sealed or lined to prevent excess seepage of wastewater. Only ponds in areas where the exfiltration rate is 1×10^{-6} cm/sec or less shall be deemed adequate to prevent excess seepage.
- D. Adequate safety protection shall be provided, such as fencing and signs, to protect against personal injury.
- E. Surface runoff shall be diverted away from the pond.

6.3 Mound System:

A mound soil absorption system shall be designed by a registered professional engineer, and the design shall be site specific and include specifications for fill material and compaction requirements, basal area size calculations, absorption area calculation, distribution networks, cap, topsoil, final grading, and other pertinent information to the construction of the system as may be requested by the Health Department. When chambers are used in an above

grade mounded system and/or installed in fill material, the design shall include provisions addressing chamber settling.

- A. The distribution system shall be designed for uniform effluent application throughout the mound. When chambers are used in lieu of gravel in a mounded or dosed system, the chambers shall also be designed to provide uniform effluent application throughout the mound, per manufacturer specifications.
- B. The effluent distribution system shall be graded to drain back to the dosing chamber or buried below frost line, where necessary.
- C. The final slope of the mound backfill shall be no greater than 3 to 1 (three feet horizontally to one foot vertically), whenever possible.
- D. Where the slope of the mound is 3 to 1 or less, 6 mil liners of polyethylene or better, and doubled, shall be used on sidewalls to prevent lateral flow. Sidewall slopes of 4 to 1 or less do not require a liner. Where the slope of the sidewall is greater than 3 to 1, a 10 mil polyvinyl chloride liner of one piece is required. In addition, the Department may require added retaining structure to prevent lateral flow. The liner barrier must extend at least 12 inches into the original grade or below the bottom of the bed or trench, whichever is deeper.
- E. The mound shall be planted with suitable grass cover to control erosion.

6.4 Sand Filter Beds: Sand filter beds may be used to provide filtration for an absorption system when on-site conditions require added filtration media.

- A. Filter sand shall meet the following criteria:
 - 1. The filtering material shall be clean, coarse sand, all passing a screen having four meshes to the inch. The sand shall have an effective size between 0.25 And 0.6 MM. The uniformity coefficient shall be 4.0 or less.
 - 2. The sand shall be at least two feet deep with an additional two feet of suitable soil, or four feet deep if suitable soil is unavailable, below the bed. The sand filter shall extend four feet beyond the sidewalls of the bed, or the sidewalls shall be lined. The top of the sand bed shall be no less than four feet above the high ground water level or bedrock.
 - 3. The minimum surface area for a lined sand filter shall be computed as a function of the maximum daily application rate of 0.95 gallons per square feet per day. The minimum surface area for an unlined sand filter shall be computed as a function of 0.95 gallons per square per day and the basal area sized per the standard absorption area criteria as outlined in Section 5.2, C. of these Regulations.
- B. A dosing tank shall be provided where the total filter area exceeds 1,800 square feet. The size of the dose, or the net capacity of the dosing tank, shall be at least 75 percent of the volume of the distributors.
- C. The sand must be thoroughly settled by flooding or other means before the bed is placed at the final grade. The sand filter or trench shall meet the construction criteria of Sections 5.3 or 5.4 and shall be designed to include a means of evenly distributing the effluent over the entire surface of the sand. When chambers are used in lieu of gravel in sand filter beds or trenches, the chambers shall also be designed to provide uniform effluent application throughout the sand filter surface, per manufacturer specifications.

6.5 Constructed Wetland Treatment:

A constructed wetland treatment system shall be designed by a Registered Professional Engineer, and the design shall be site specific and include specifications for: loading, capacity, liner material, filter media, density, and species of plant material, effluent level, final discharge type, and other pertinent information as requested by the Department. The design shall include estimates of effluent quality at the inlet and outlet. The filter shall be designed to provide for a minimum five-day detention time in the wetland filter based on maximum daily flow.

Effluent shall be disposed in an absorption system of suitable soil or other disposal system as specified in these regulations.

SECTION VII: Requirements for Evapotranspiration Systems

Evapotranspiration systems and combination systems must be designed by a professional engineer. The Department may limit the use of the following systems:

7.1 Evapotranspiration systems may be used where soil absorption of effluent is not possible and where high groundwater, bedrock, fractured rock, or highly pervious material precludes the use of a standard soil absorption system. Owners of property who intend to install an evapotranspiration system should be aware that installation of such a system may jeopardize their ability to obtain a well permit from the Water Resources Division of the Colorado Department of Natural Resources.

7.2 Material and construction requirements:

- A. Septic tanks and aeration plants shall meet all of the requirements as provided for in these regulations.
- B. Liners, when necessary, shall be impervious to the chemical reaction and passage of sewage. Polyvinyl chloride plastic lining, manufactured from domestic polyvinyl chloride resin, of 10 mil thickness; butyl rubber, or other nontoxic equivalent materials, shall be used. (Polyethylene is not equivalent.)
- C. Matrix material shall be resistant to chemical decomposition and the formation of colloidal particles. The matrix shall be well graded and with the proper sizing to do the specified work of the design. The content of fine particles shall be limited to the extent that they do not inhibit capillary action or permeability.

7.3 Design Requirements:

- A. All systems shall be designed by a Registered Professional Engineer who shall furnish design calculations to support the design and size of the system. Specifications to be furnished shall include, but not be limited to: liner material and protection of liner, soil analysis of select material, grain size, soil description, and provision for vegetation cover.
- B. Designs shall provide for adequate depth to prevent freezing. The entire matrix shall be a minimum of 20 inches and maximum of 30 inches in depth with an upper 8-18 inches consisting of a non-plastic select silty sand material approved by the design engineer and meeting the specification of Section VII, D. 4, i of the State Guidelines for wicking purposes.
- C. The number and placement of distribution lines shall be the same as required for standard absorption areas (as outlined in Section 5.4). The distribution lines shall be surrounded by a minimum of twelve (12) inches of washed gravel ranging in size from 3/4 inch to 2½ inches. Placement of 2 inches of straw, a layer of untreated building paper, pea gravel, a geotextile filter fabric, or a similar pervious material is required over the gravel before placement of the wicking material to prevent void reduction capacity in the gravel.

Gravelless chambers (high capacity model or equivalent) may be used in lieu of gravel and distribution lines provided they are sized and installed per applicable manufacturer specifications. A minimum six inch layer of sand meeting the size specification of well graded concrete sand (ASTM C-33) shall also be placed in between the chamber rows prior to backfilling with silt sand as specified in 7.3B.

- D. The following formula may be used as a minimum guide for determining the area necessary for total evapotranspiration of septic tank effluent:

$$\text{Area (in square feet)} = \frac{\text{Total Flow (150\% ADF)}}{.0685}$$

If alternate sizing formulas are used, the resultant square foot of area must be equal to or greater than the results obtained by using the above formula.

7.4 Installation:

- A. The evapotranspiration bed bottom and any capillary interface shall be level within one inch as measured from any perimeter and shall be cleaned or smoothed of any sharp projections. A berm or drainage ditch shall be provided for a control for surface water drainage. The bed shall be located in an open area where there will be exposure to sunshine.
- B. A liner is required wherever existing conditions are such that the high groundwater level, bedrock, fractured rock, or other conditions which may permit pollution are within four (4) feet of the bottom of the evapotranspiration system. A liner is not required when the average percolation rate at the site exceeds 240 minutes per inch and when the groundwater and/or bedrock is four (4) feet or greater below the bottom of the evapotranspiration system.
- C. The liner shall be one full piece or, when necessary, welded according to manufacturer's specifications at all openings to the bed and shall completely underlie the matrix of the evapotranspiration bed. Seams shall be welded tightly and imperviously. Any damage to the liner shall be repaired using the proper solvent or mastic and patch of the same material as the liner. Liners shall not be laid directly on any sharp rocks or objects. A sufficient amount of sand or dirt fill shall be added over sharp bedrock that will prevent the puncturing of the liner. The contractor shall notify the Department for inspection of liner placement. Workmanship shall be of sufficient quality as to maintain the integrity of the liner to its specifications.
- D. The matrix shall be installed with care so that the liner is not perforated. Heavy machinery shall not be permitted to drive over the matrix or the liner. The surface of the matrix shall be convex so as to permit run-off of rain water and to increase the air turbulence over it. The covering surface of the matrix (if required because of a lack of organic material in the wicking sand) shall consist of a maximum of four inches of top soil, grass cover, and any other plants specified by the designer and shall be maintained as designed. The bed area shall be protected so as to prevent damage from vehicular or pedestrian travel.

7.5 Combination Absorption and Evapotranspiration System:

- A. Combination systems are permitted where water table elevations or soil conditions permit leaching, but

percolation rates are greater than 60 mpi. Partial or no liners may be permitted. Calculations submitted for rates of effluent disposal may include the percolation rate and the evaporation rate. The system design shall meet all the distribution line and matrix requirements as outlined for evapotranspiration systems in Section 7.2 and 7.3. Partial liners on mounded sidewalls may be of 6 mil doubled polyethylene or better.

- B. The following formula may be used to determine the minimum size in square feet of a combination absorption and evapotranspiration system:

$$\text{Area} = \frac{QT}{RE + RP} \quad \text{Where}$$

QT = Total Flow (150% average Daily flow x 1.25)

RE = .0685 gpd/sq ft (the application rate for evapotranspiration)

RP = the absorption application rate per the following percolation rates: =

<u>Percolation Rate</u>	<u>Absorption Rate(RP)</u>
61-90 mpi	.35 g/sq.ft./d
91-120mpi	.25 g/sq.ft./d
121-160 mpi	.15 g/sq.ft./d
161-200 mpi	.13 g/sq.ft./d
200+mpi	.11 g/sq.ft./d

If alternate sizing formulas are used, the resultant square foot of area must be equal to or greater than the results obtained using the above formula.

- C. As an alternative, a system may be designed on the basis of a monthly water balance for the system. Such a design would provide for total storage of average daily flows for all periods in which evapotranspiration is not shown to occur. The design shall also provide wicks or sand structures which penetrate through the rock media to the bottom of the bed equal to 10 to 15 percent of the bed surface area. The wicks shall be uniformly spaced throughout the bed. Adequate surface area shall be provided to evaporate/transpire total annual average daily flows at a rate equivalent to local net lake evaporation over the remaining period of the year. If the system is designed as a percolation/evapotranspiration system, the amount of storage and ET capacities may be reduced by the volume of effluent percolating into the soil.

SECTION VIII: Requirements of Other Disposal Systems

Use of the following systems are intended to provide a limited option for sewage disposal in situations where a standard system or an approved alternate soil absorption and disposal system is prohibited and where the quantity of sewage produced will be minimal. Because of the increasing environmental impacts and the extreme cost of maintaining the following systems, they are not intended to provide for full-time occupancy usage.

- 8.1 Vaults shall have a minimum 1,250 gallon effective capacity and may be permitted for indoor, water carriage sewage systems only on property which cannot accommodate a sewage treatment system and are intended to, and are likely to remain, as limited use and limited occupancy. Vaults shall be constructed of concrete unless pre-approved by the Department and shall meet the same installation and construction standards as apply to septic tanks except that no effluent outlet shall be provided. Vaults shall be provided with an indicator which signals when the vault capacity has reached 75 percent. Vaults may be required on existing dwellings which experience failure and are prevented from installing a new system.

- 8.2 Privies shall be constructed to include: a concrete water-tight receptacle which is fly proof; a super-structure affording complete privacy; an earth mound around the top of the receptacle and below the floor level which slopes downward away from the receptacle; a floor and riser of concrete or other impervious material; and a seat and lid of easily cleanable, impervious material, hinged, and fly proof. All venting shall be fly proofed with No. 16 or smaller mesh screening. The effective capacity of the privy receptacle shall be no less than 400 gallons or less than 4 x 4 x 4 feet (64 cubic feet) in dimensions. Privies are not intended for permanent residential or commercial use.
- 8.3 Incineration toilets may be approved if they comply with all applicable statutes, laws, rules, and regulations governing sewage disposal, air pollution, and safety.
- 8.4 Portable chemical toilets shall have a super-structure which meets the requirements of a privy and shall have a sewage receptacle of easily cleanable and impervious material, which is accessible or removable for thorough cleaning and disinfection. Use of portable chemical toilets in permanently occupied buildings shall be prohibited except during construction or under emergency circumstances.
- 8.5 Non-portable chemical toilets may be provided for permanent installation and shall drain into a vault. Design and installation shall meet all applicable Colorado safety codes and may be used in conjunction with a mini-system.
- 8.6 A grey water system may be considered to dispose of waste from sinks, lavatories, and showers where approved means are currently in use to dispose of human excreta. The standard design requirements for conventional septic systems prescribed by these regulations shall apply except that:
- A. Design shall be based on a minimum volume of wastes, which do not contain human excreta, of 50 gallons per day, per person.
 - B. Percolation tests shall be conducted and a system design submitted by a Registered Professional Engineer. The minimum size components of the system shall be calculated in accordance with this regulation, and a minimum of four feet of suitable soil shall underlie the absorption area of the system.
 - C. The building drain and sewer leading to the septic tank shall be a maximum of two (2) inches in diameter to preclude a later tap for a water closet.
 - D. Grey water systems not utilizing a conventional septic tank and soil absorption techniques shall be designed by a Registered Professional Engineer and/or have received the approval of the National Sanitation Foundation and meet the Guidelines.
 - E. The reuse of grey water for irrigation or any other use may be subject to water rights limitations as regulated through the Office of the State Engineer, Division of Water Resources, and must be in place and confirmed prior to considering grey water reuse of any kind.
- 8.7 Grease traps, building sewers, sewer lines, and other appurtenances shall be designed, operated, and maintained as required by the most current edition of the Uniform Plumbing Code, or such local code as may be in force.
- 8.8 Holding and pretreatment tanks shall be watertight; shall be covered or otherwise protected so as to prevent odor or other nuisance conditions; and shall be easily accessible for inspection and cleaning.
- 8.9 Cesspools, slit trenches, seepage pits, non-vaulted privies, and flush hopper toilets are not approved and are prohibited.

- 8.10 Composting Toilets: Manufactured composting toilets shall bear the seal of approval of the National Sanitation Foundation, or an equivalent testing program, and is otherwise approved by the Department.
- A. Deposits of feces, urine, and readily decomposable household garbage that are not diluted with water or other fluids may be retained in a compartment in which aerobic composting will occur. The compartment may be located, subject to local board of health or other applicable regulations or codes, within a dwelling or building provided the unit complies with the applicable requirements of these guidelines, and provided the installation will not result in conditions considered to be a health hazard as determined by the local Health Department. The effective volume of the receptacle must be sufficient to accommodate the number of persons served.
 - B. Adequate additional volume shall be provided for the use of composting materials which shall not be toxic to the process or hazardous to persons and which shall be used in sufficient quantity to assure proper decomposition.
 - C. Compartment and appurtenances related to the unit shall include fly-tight construction and exterior ventilation as required by the plumbing code.
 - D. When the available effective volume is filled to seventy-five percent (75%) of capacity, residue from the unit shall be properly disposed of by acceptable solid waste practices.
 - E. No composting toilet may be installed to serve more than eight (8) persons per system for residential use.
 - F. If a system will be installed where low temperature may be a factor, design shall compensate for the effects of the low temperature.
- 8.11 Systems which recycle treated wastewater for non-potable purposes such as flushing water closets or urinals:
- A. That portion of the wastewater recycled for non-potable purposes such as flushing water closets or urinals must meet applicable treatment requirements of these regulations for effluent in which the possibility exists for occasional direct human contact.
 - B. No cross-connection to a pipe, fixture, or supply containing potable water shall be permitted.
 - C. Systems which recycle treated wastewater for potable purposes:
 - 1. No system shall be permitted which will recycle wastewater for potable purposes except a system which shall consistently meet all of the sanitation and maximum contaminant level requirements of rules, regulations, and standards of the Colorado Department of Public Health and Environment and the local Board of Health.

SECTION IX: Treatment Systems other than those Discharging through a Soil Absorption or Sand Filter
System and Non-Discharging Systems

A. General:

Those systems which will discharge effluent directly to the atmosphere, the ground surface, or which employ aerobic principles of sewage treatment or a dispersal system, may be permitted only if designed by a

registered professional engineer. This Article IX shall not apply to systems discharging below ground through a soil absorption system or sand filter system or to a non-discharging system.

B. Review of Application:

The local Board of Health shall review all applications for such systems which may result in discharge or drainage of effluent from the property of origin. No permit shall be issued for such a system if the local Board of Health determines a potential health hazard or private or public nuisance or undue risk of contamination exists. The Department may review applications and issue permits for systems which do not permit the drainage of effluent off the property of origin, or may refer them to the Board of Health.

- C. All systems which will discharge effluent to the atmosphere, the ground surface, or which employ aerobic principles, or a dispersal system shall meet the requirements of Section IX, Guidelines on Individual Sewage Disposal Systems, as currently adopted by the Colorado State Board of Health. The local Board of Health may limit the number of systems requiring routine monitoring and/or reporting.

SECTION X: New or Experimental Designs

10.1 The Board of Health acknowledges the need for progress in sewage treatment and encourages the development of technology and design which will further the development of sewage treatment and its efficient disposal. Manufacturers whose designs lack sufficient technical data or background for inclusion on the acceptable design list may petition the Board of Health for an experimental installation permit in accordance with Section 3.15.

10.2 Requirements for an experimental installation permit:

- A. The design specifications along with any previous laboratory or field data shall be submitted to the Department for review.
- B. The necessary field tests shall be agreed upon between the manufacturer, the applicant, and the Board of Health.
- C. The installation shall be made as stipulated and approved.
- D. Applicable field tests will be conducted by an independent certified laboratory, and the results of these tests be submitted to the Department. All test costs shall be borne by the manufacturer or applicant.
- E. The duration of the testing period shall be determined by the Board of Health.
- F. The manufacturer or designer and applicant shall warrant the design and the installation; and shall agree, in writing, to remove an unsatisfactory installation, as determined by the Board of Health, within the time limit stipulated by the Board. A back-up system of an approved type shall be provided.

10.3 Procedure for Obtaining an Experimental Design Permit:

- A. The applicant and/or the registered professional engineer shall submit an engineered design report addressing the above requirements to the Department. The Department shall review the engineered design report and prepare a recommendation for approval, conditional approval, or denial to the Board of Health. The Board of Health, at its next regularly scheduled meeting, shall consider the submittal for approval, conditional approval, or denial. The decision of the Board shall be final.

- 10.4 Upon satisfactory performance of the design and installation and after receiving certification in accordance with the Guidelines, the Board of Health may approve the design for the acceptable design list. A manufacturer or engineer may petition the Board for approval of the design on the acceptable design list.
- 10.5 An unsatisfactory installation may be repaired or changed in design with the consent and observation by the Health Officer. However, the Board of Health may limit the duration of the testing period and may declare the design and installation to be unsatisfactory and to be replaced by acceptable installation or to be removed from the designated lot. Failure to satisfactorily repair or remove an unsatisfactory installation shall be deemed a violation of these regulations.
- 10.6 The application for an experimental system shall include provisions for the timely installation of a back-up system in the event of failure of the experimental system and shall be approved by the Department prior to installation of the experimental system.
- 10.7 An experimental system shall meet all applicable statutory provisions of these regulations, including but not limited to, suitable soil conditions, geographical setback requirements, and Section IX (where applicable). (See section XI of the Guidelines).