

PUEBLO CITY-COUNTY HEALTH DEPARTMENT

ON-SITE WASTEWATER TREATMENT SYSTEMS REGULATION NO. VIII



Pueblo City-County Board of Health

Adopted: May 28, 2014

Effective: July 12, 2014

REGULATION VIII
TABLE OF CONTENTS

| | | |
|-------------|--|----|
| I. | Title, Policy, Authority and Scope | 6 |
| | A. Title | 6 |
| | B. Policy | 6 |
| | C. Authority | 6 |
| | D. Scope..... | 6 |
| II. | Definitions | 8 |
| III. | Administration and Enforcement | 24 |
| | A. General Requirements..... | 24 |
| | B. Owner Responsibility | 25 |
| | C. Department Responsibility | 26 |
| | D. Access to Site..... | 26 |
| | E. Sewage Collection Systems | 26 |
| | F. Prohibition of On-Site Wastewater Treatment Systems in Unsuitable Areas..... | 27 |
| | G. Subdivision of Requests for Land Use Changes | 27 |
| | H. Saving Clause | 29 |
| IV. | Permit Application Requirements and Procedures: | 29 |
| | A. Requirement for Permit..... | 29 |
| | B. On-Site Wastewater Treatment System Site Requirements..... | 29 |
| | C. Permit Fees for Processing, Testing and Inspecting OWTS Sites and Systems | 31 |
| | D. OWTS Permit Application Requirements..... | 32 |
| | E. Preliminary Field Investigation..... | 33 |
| | F. Application Review | 34 |
| | 1. Standard OWTS | 34 |
| | 2. Engineered OWTS..... | 34 |

| | | |
|--------------|---|-----------|
| 3. | Effluent Discharged to Surface Waters | 35 |
| 4. | Effluent Discharge to Ground Surface..... | 35 |
| 5. | Experimental Systems | 35 |
| G. | Floodplains and Floodways..... | 35 |
| 1. | Floodplains | 35 |
| 2. | Floodways..... | 35 |
| H. | Permit for Installation of an OWTS | 36 |
| V. | Inspection of On-Site Wastewater Systems | 37 |
| A. | Inspection during Installation | 37 |
| B. | Inspection of Existing OWTS..... | 38 |
| 1. | Notice of Violation..... | 38 |
| 2. | Summons and Complaint..... | 39 |
| 3. | Cease and Desist Order..... | 39 |
| VI. | General Prohibitions; Section 25-10-112, C.R.S..... | 39 |
| VII. | Penalties; Section 25-10-113, C.R.S..... | 40 |
| VIII. | Licensing of OWTS Contractors and Cleaners: | 41 |
| A. | Regulations Governing the Licensing of On-Site Wastewater Treatment System Contractors | 41 |
| B. | Regulations Governing the Licensing of OWTS Cleaners..... | 41 |
| IX. | Variance Procedure..... | 42 |
| X. | Site and Soil Evaluation..... | 44 |
| A. | Site and Soil Evaluation..... | 44 |
| B. | Preliminary Investigation | 45 |
| C. | Reconnaissance Visit..... | 45 |
| D. | Detailed Soil Investigation | 45 |
| E. | Procedure for Performing Percolation Tests | 46 |

| | | |
|--------------|--|-----------|
| F. | Visual and Tactile Evaluation of Soil Requirements..... | 49 |
| G. | Soil Descriptions for Determination of a Limiting Layer | 50 |
| H. | Percolation Holes, Profile Holes and Profile Test Pit Excavations – Marking..... | 50 |
| I. | Report and Site Plan | 50 |
| J. | Design Document | 52 |
| K. | As-Built Drawings | 52 |
| L. | Site protection | 52 |
| M. | Qualifications for a Competent Technician..... | 52 |
| XI. | Wastewater Flow and Strength..... | 53 |
| A. | Wastewater Flows | 53 |
| B. | Wastewater Strength..... | 58 |
| XII. | Minimum Distances Between Components of an On-site Wastewater Treatment System and Physical Features | 59 |
| | Table XII-1 .. Minimum Horizontal Distances in Feet Between Components of an On-Site Wastewater Treatment System Installed After November 15, 1973 and Water, Physical and Health Impact Features | 61 |
| XIII. | Design Criteria – General..... | 63 |
| A. | Performance..... | 63 |
| B. | Reliability..... | 63 |
| C. | Accessibility for Inspection, Maintenance, and Servicing..... | 64 |
| D. | Plumbing Codes..... | 64 |
| E. | Electrical Equipment, If Used..... | 64 |
| F. | Indicators of Failure or Malfunctioning for Systems Utilizing Mechanical Apparatus..... | 64 |
| G. | Sampling Access | 65 |
| H. | Component Operating Instructions | 65 |
| I. | Surface Activity | 65 |
| J. | Floodplains | 65 |

| | |
|--|-----------|
| K. Business Commercial, Industrial, Institutional or Multi-Family Dwelling Wastewater Systems..... | 66 |
| XIV. Design Criteria – Components | 66 |
| A. Tanks and Vaults | 66 |
| B. Septic Tanks..... | 67 |
| C. Abandonment of Tank..... | 69 |
| D. Pipe Standards and Bedding Requirements | 70 |
| E. Distribution Box..... | 70 |
| F. Drop Box. | 70 |
| G. Stepdown/Relief Line | 71 |
| H. Wastewater Pumping and Dosing Siphon Systems..... | 71 |
| I. Effluent Screens..... | 72 |
| J. Grease Interceptor Tanks..... | 73 |
| XV. Design Criteria – Soil Treatment Area..... | 73 |
| A. Size and Design of the Soil Treatment Area..... | 73 |
| B. Proposed Soil Treatment Area Locations | 73 |
| C. Calculation of Infiltrative Surface of Soil Treatment Area..... | 73 |
| Table XV-1 ... Soil Treatment Area Long-term Acceptance Rates by Soil Texture, Soil Structure, Percolation Rate and Treatment Level | 74 |
| D. Allowable Soil Treatment Area Reductions and Increases | 75 |
| E. Design of Distribution Systems..... | 76 |
| F. Alternating and Sequencing Zone Systems | 79 |
| G. Dosing | 79 |
| H. Soil Replacement..... | 79 |
| I. Repairs | 80 |

| | | |
|---------------|---|----|
| XVI. | Design Criteria – Higher Level Treatment Systems | 81 |
| | A. General..... | 81 |
| | B. Treatment Levels..... | 82 |
| | C. Sand Filters..... | 82 |
| | D. Recirculating Sand Filters | 84 |
| | E. Rock Plant Filter (Constructed Wetland) Treatment Before a Soil Treatment Area... | 84 |
| XVII. | Design Criteria – Other Facilities | 85 |
| | B. Evapotranspiration and Evapotranspiration/Absorption Systems | 85 |
| | C. Wastewater Ponds | 86 |
| | D. Vaults Other Than Vault Privies | 87 |
| | E. Privies..... | 87 |
| | F. Incinerating, Composting and Chemical Toilets | 88 |
| | G. Slit Trench Latrine..... | 89 |
| | H. Treatment Systems Other Than Those Discharging Through a Soil Treatment Area or Sand Filter System..... | 89 |
| XVIII. | Technology Review and Acceptance | 90 |
| XIX. | Operation and Maintenance | 91 |

PUEBLO CITY-COUNTY HEALTH DEPARTMENT
ON-SITE WASTEWATER TREATMENT SYSTEM
REGULATION NUMBER VIII

I. Title, Policy, Authority and Scope

A. Title

This Regulation shall be known as the On-Site Wastewater Treatment System Regulation (Regulation VIII).

B. Policy

The Pueblo City-County Board of Health declares the purpose of the Regulation to be: the protection of public health and water quality to eliminate and control causes of diseases, infection, and aerosol contamination and to reduce and control the pollution of the air, land and water by the regulation of wastes from dwellings, business, industrial and public buildings. This Regulation shall be applicable throughout Pueblo County, and shall be enforced by the Pueblo City-County Health Department. It is designed to control the location, design, construction, performance, installation, alteration, maintenance, cleaning and the transportation and disposal of sewage materials.

C. Authority

Under authority contained in Title 25, Article 10, Section 104 (2), (4) and (5) Colorado Revised Statutes, [Hereafter, Colorado Revised Statutes references will be in the following manner: (Title, Article, Section(s) CRS) for example, 25-10-104 CRS], the following Regulation is established by the Pueblo City-County Board of Health governing the location, design, construction, performance, installation, alteration, maintenance, cleaning and use of septic tanks, soil treatment units and all other on-site wastewater treatment systems in Pueblo County.

D. Scope

1. This Regulation shall apply to all on-site wastewater treatment systems with a design capacity of less than 2000 gpd and shall govern all aspects of permits, performance, location, construction, alteration, installation and use of on-site wastewater treatment systems.
2. An on-site wastewater treatment system with design capacity equal to or greater than 2,000 gpd must comply with this Regulation, section 43.4(A)(1)(b) of Regulation 43, site location and design approval in section 25-8-702, C.R.S., and the discharge permit requirements in the Water Quality Control Act, 25-8-501, et seq. C.R.S.
 - a. Applicable Commission regulations include, but are not limited to, the following:
 - i. Regulation 22 – Site Location and Design Approval Regulations for Domestic Wastewater Treatment Works (5 CCR 1002-22).

- ii. Regulation 41 – The Basic Standards for Ground Water (5 CCR 1002-41).
 - iii. Regulation 42 – Site-Specific Water Quality Classifications and Standards for Ground Water (5 CCR 1002-42).
 - iv. Regulation 61 – Colorado Discharge Permit System Regulations (5 CCR 1002-61).
 - v. Regulation 62 – Regulations for Effluent Limitations (5 CCR 1002-62).
- b. For systems equal to or greater than 2,000 gpd, the Water Quality Control Division is also authorized to determine those parts of Regulation 43 identified as the prerogative of the Department.
 - c. The requirements for maintenance and standards of performance for systems equal to or greater than 2,000 gpd shall be determined by the site application approval and discharge permit.
 - d. In the interest of facilitating communication of LPHA concerns regarding a design being reviewed by the Water Quality Control Division, the local public health agency can provide comments to the Water Quality Control Division for consideration during the Water Quality Control Division's review of the proposed design and discharge permit application. Under such a coordinated process, the Water Quality Control Division retains final authority for approval or denial of each domestic wastewater treatment works that is regulated under the site location approval and Colorado Discharge Permit System Regulations. Prior to approval or denial of each OWTS domestic wastewater treatment works, the Water Quality Control Division shall acknowledge and consider local OWTS regulations when they are more stringent and restrictive than Regulation 43.

- II. **Definitions** – The following definitions shall apply in the interpretation and enforcement of this Regulation. The word “shall” as used herein indicates a mandatory requirement.

Absorption System:

A leaching field and adjacent soils or other system by means of absorption into the ground. See Soil Treatment Area.

Acceptable Design:

A standardized design of an on-site wastewater treatment system that may consist of a septic tank and soil treatment area, or other approved treatment systems that comply with this Regulation.

Applicant:

Any person who submits an application for a permit for an on-site wastewater treatment system, or a preliminary investigation application for a subdivision or other land use.

Approved:

Official consent by the Pueblo City-County Health Department.

Bed or Seepage Bed:

A below-grade soil treatment area consisting of a shallow excavation greater than three feet wide containing distribution media and more than one lateral.

Bedrock:

Continuous rock that underlies the soil or is exposed at the surface. Bedrock is generally considered impervious, but if fractured or deteriorated, it may allow effluent to pass through without adequate treatment.

Biological Oxygen Demand; Five-Day:

(BOD₅) means quantitative measure of the amount of oxygen consumed by bacteria while stabilizing, digesting or treating biodegradable organic matter under aerobic conditions over a five-day incubation period; expressed in milligrams per liter (mg/L).

Biochemical Oxygen Demand, Carbonaceous; Five-Day:

(CBOD₅) means quantitative measure of the amount of oxygen consumed by bacteria while stabilizing, digesting or treating the organic matter under aerobic conditions over a five-day incubation period while in the presence of a chemical inhibitor to block nitrification; expressed in milligrams per liter (mg/L).

Board of Health:

The officially appointed Pueblo City-County Board of Health

Building Sewer:

That part of the piping of a drainage system which conveys wastewater to a public sewer, private sewer, on-site wastewater treatment system or other point of disposal.

Building Site or Site:

The entire lot or parcel of property upon which improvements are to be located and served by an on-site wastewater treatment system.

Cesspool:

An unlined or partially lined underground pit or underground perforated receptacle into which raw household wastewater is discharged and from which the liquid seeps into the surrounding soil. Cesspool does not include a septic tank.

Cistern:

A watertight, covered receptacle of nontoxic material which is designed for storage of potable water.

Chamber:

An open, arch-shaped structure providing an open-bottom soil interface with permeable sidewalls used for distribution of effluent in a soil absorption system.

Cleaning:

The act of removing septage or other wastes from a wastewater treatment system component or grease/waste from a grease interceptor.

Colorado Plumbing Code:

Examining Board of Plumbers Rules and Regulations (3 CCR 720-1).

Commission:

The Water Quality Control Commission created by section 25-8-201, C.R.S.

Competent Technician:

A person designated by PCCHD who is able to conduct and interpret the results of soil profile test pit excavations, profile holes, percolation tests and site evaluations.

Component:

A subsection of an On-site Wastewater Treatment System; a component may include multiple devices.

Composting Toilet:

A self-contained waterless toilet designed to decompose non-water-carried human wastes through microbial action and store the resulting matter for disposal.

Consistence:

The degree and kind of cohesion and adhesion that soil exhibits and/or the resistance of soil to deformation or rupture under an applied stress.

Crest:

The highest point on the side of a dry gulch or cut bank.

Constructed Wetland:

See Rock-Plant Filter.

Daily Flow:

The measured volume of wastewater generated from a facility in a 24-hour period expressed as gallons per day.

Deep Gravel System:

A soil treatment area for repairs only where the trenches utilize a depth of gravel greater than 6 inches below the distribution line and sidewall area is allowed according to a formula specified in this regulation.

Demand Dosing:

A configuration in which a specific volume of effluent is delivered to a component based upon patterns of wastewater generation from the source.

Department:

The Pueblo City-County Health Department.

Design:

1. The process of selecting, sizing, locating, specifying and configuring treatment train components that match site characteristics and facility use, as well as, creating the associated written documentation; and 2. Written documentation of size, location, specification and configuration of a system.

Design Flow/Design Capacity:

The estimated volume of wastewater per unit of time for which a component or system is designed. Design flow may be given in the estimated volume per unit such as person per unit time that shall be multiplied by the maximum number of units that a facility can accommodate over that time.

Designer (OWTS):

A practitioner who utilizes site evaluation and investigation information to select an appropriate OWTS and prepares a design document in conformance with this regulation.

Distribution:

The process of conveying wastewater or effluent to one or more components, devices or throughout a soil treatment area.

Distribution Box:

A watertight component that receives effluent from a septic tank or other treatment unit and distributes effluent via gravity in approximately equal portions to two or more trenches, or two or more laterals in the soil treatment area.

Division:

The Environmental Health Division.

Domestic Wastewater:

A combination of liquid wastes (sewage) which may include chemicals, household wastes, human excreta, animal or vegetable matter in suspension or solution, or other solids in suspension or solution which are discharged from a dwelling, building or other structure.

Domestic Wastewater Treatment Works:

A system or facility for treating, neutralizing, stabilizing or disposing of domestic wastewater which system or facility has a designed capacity to receive 2,000 gallons of domestic wastewater per day or more. The term “domestic wastewater treatment works” also includes appurtenances to such system or facility such as outfall sewers and pumping stations and to equipment related to such appurtenances. The term “domestic wastewater treatment works” does not include industrial wastewater treatment plants or complexes whose primary function is the treatment of industrial wastes, notwithstanding the fact that human wastes generated incidentally to the industrial process are treated therein. 25-8-103 (5), CRS.

Dosing:

A high rate periodic discharge into a soil treatment area.

Dosing Siphon:

A device used for demand and dosing effluent; which stores a predetermined volume of water and discharges it at a rapid rate, from a tank at a given elevation to a component at a lower elevation, accomplished by means of atmospheric pressure and the suction created by the weight of the liquid in the conveying pipe.

Dosing Tank:

A tank which provides for storage of liquid effluent from a septic tank intended to be fed to an absorption area at a high rate, periodic discharge.

Drop Box:

A device used for serial or sequential distribution of effluent by gravity flow to a lateral of a soil treatment area.

Dry Gulch:

A deep, narrow ravine marking the course of an intermittent or ephemeral stream.

Drywell:

An unlined or partially lined underground pit (regardless of geometry) into which drainage from roofs, basement floors, water softeners or other non-wastewater sources is discharged and from which the liquid seeps into the surrounding soil.

Effective Size:

The size of granular media such that not more than ten (10) percent by weight of the media is finer than the size specified.

Effective Volume:

The amount of effluent contained in a tank under normal operating conditions; for a septic tank, effective volume is determined relative to the invert of the outlet; for a dosing tank, effective volume under normal conditions is determined to relative to the invert of the inlet and the control off level.

Effluent:

The liquid flowing out of a component or device of an on-site wastewater treatment system.

Effluent Line:

A non-perforated pipe that conveys effluent from one on-site wastewater treatment system component to the next.

Effluent Screen (filter):

A removable, cleanable (or disposable) device installed on the outlet piping of a septic tank for the purpose of retaining solids larger than a specific size and/or modulating effluent flow rate. An effluent screen may be a component of a pump installation. An effluent screen may also be installed following the septic tank but before higher level treatment components or a soil treatment area.

Environmental Health Specialist:

An employee of the Pueblo City-County Health Department who holds a bachelor's degree from an accredited college or university with not less than thirty (30) quarter hours in physical, biological and/or sanitary science and who is trained to carry out educational and inspection duties in the field of Environmental Health.

Evapotraspiration/Absorption System:

An unlined on-site wastewater treatment system component that uses evaporation, transpiration and absorption for dispersal of effluent.

Evapotranspiration System:

An on-site wastewater treatment system component with a continuous impermeable liner that uses evapotranspiration and transpiration for dispersal of effluent.

Experimental System:

A particular design or type of system based upon improvements or development in the technology of sewage that has not been fully tested.

Failure:

Damage to an on-site wastewater treatment system component, structural member or connection or when any component of an on-site wastewater treatment system no longer functions as designed or intended.

Field Performance Testing:

Data gathering on an on-site wastewater treatment system or component in actual use that is being proposed for approval by the Colorado Department of Public Health and Environment.

Final Inspection:

An inspection of an on-site wastewater treatment system when all system components are in place but prior to final earthen backfill.

Floodplain:

An area adjacent to a stream which is subject to flooding as the result of the occurrence of a one hundred (100) year flood, and is so adverse to past, current or foreseeable construction or land use as to constitute a significant hazard to public or environmental health and safety, to property or is designated by the Federal Emergency Management Agency (FEMA) or National Flood Insurance Program (NFIP). In the absence of FEMA/NFIP maps, a Colorado Registered Professional Engineer shall certify the flood plain elevations.

Floodway:

The channel of a river or other watercourse and the adjacent land areas that must be reserved in order to discharge the base flood without cumulatively increasing the water surface elevation more than one foot or as designated by the Federal Emergency Management Agency or National Flood Insurance Program. In the absence of FEMA/NFIP maps, a professional engineer shall certify the floodway elevation and location.

Flow Equalization:

A system configuration that includes sufficient effluent storage capacity to allow for regulated flow on a daily or multi-day basis to a subsequent component despite variable flow from the source.

Flow Equalizer:

An adjustment device to evenly distribute flow between outlets in a distribution box or other device that may be out of level.

Grease Interceptor Tank:

A watertight device located outside a facility designed to intercept, congeal and retain or remove fats, oils and grease from sources such as commercial food service that will generate high levels of fats, oils and grease.

Ground Water:

That part of the subsurface water that is at or below the saturated zone.

Ground Water Surface:

The uppermost limit of an unconfined aquifer at atmospheric pressure.

Ground Water Table:

The upper surface of groundwater in the zone of saturation of a geologic formation.

Guidelines:

State Board of Health Guidelines on Individual Sewage Disposal Systems, 5 CCR 1003-6 – predecessor of Regulation 43, On-Site Wastewater Treatment System Regulation, 5 CCR 1002-43.

Health Officer:

The duly authorized administrative and executive head or director of the Pueblo City-County Health Department, or his/her authorized representative (ex. An Environmental Health Specialist).

High Strength Wastewater:

1. Influent having BOD₅ greater than 300 mg/L; and/or TSS greater than 200 mg/L; and/or fats, oils and greater than 50 mg/L entering a pretreatment component (as defined by NSF/ANSI Standard 40 testing protocol); 2. Effluent from a septic tank or other pretreatment component that has BOD₅ greater than 170 mg/L; and/or TSS greater than 60 mg/L; and/or fats, oils and grease greater than 25 mg/L and is applied to an infiltrative surface.

Holding Tank:

A watertight receptacle for the retention of sewage either before, during or after treatment

Higher Level Treatment:

The designated treatment levels other than treatment level 1.

Individual Sewage Disposal System:

A term used for on-site wastewater treatment systems in Colorado regulations from 1973 until 2013.

Infiltrative Surface:

The designated interface where effluent moves from distribution media or a distribution device into soil.

Inspection Port:

An access point in a system component that enables inspection, operation and/or maintenance.

Invert:

The elevation of the bottom of the inside pipe wall or fitting.

Lateral:

Piping, tubing or other conveyance used to carry and distribute effluent.

Leach Field:

See soil treatment area.

Limiting Condition:

A layer with low permeability, ground water surface or other condition that restricts the treatment capability of the soil.

Liner:

An impermeable synthetic or natural material used to prevent or restrict infiltration and/or exfiltration.

Local Board of Health:

The Pueblo City-County Board of Health

Local Public Health Agency:

The Pueblo City-County Health Department.

Long-Term Acceptance Rate (LTAR):

A design parameter expressing the rate that effluent enters the infiltrative surface of the soil treatment area at equilibrium, measured in volume per area per time, e.g. gallons per square foot per day (g/ft²/day).

Malfunction:

The condition in which a component is not performing as designed or installed.

Manufactured Media:

A synthetic media for distribution such as polystyrene blocks, beads or plastic grids.

Media:

A solid material that can be described by shape, dimensions, surface area, void space and application.

Mound:

An above-grade soil treatment area designed and installed with at least 12 inches of clean sand between the bottom of the infiltrative surface and the original ground elevation; that utilizes pressure distribution and includes a final cover of suitable soil to stabilize the surface and support vegetative growth.

Multi-Family Dwelling:

A residential structure designed to accommodate more than two family units.

Nitrogen Reduction:

A minimum 50 percent reduction of influent nitrogen strength which is the minimum objective of NSF/ANSI Standard 245 – Wastewater Treatment Systems-Nitrogen Reduction.

On-Site Wastewater Treatment System (OWTS):

Where the context so indicates, the term “system” means an absorption system of any size or flow or a system or facility for treating, neutralizing, stabilizing or dispersing sewage generated in the vicinity, which system is not a part of our connected to a sewage treatment works.

On-Site Wastewater Treatment System Cleaner:

A person who is duly licensed with the Pueblo City-County Health Department to clean on-site wastewater treatment systems and who is engaged in and holds himself/herself out as a specialist in the cleaning and pumping of sewage treatment systems and removal of the residues deposited in the operation thereof.

On-Site Wastewater Treatment System Contractor:

A person who is duly licensed with the Pueblo City-County Health Department and who is engaged in and holds himself/herself out as a specialist in the installation, renovation and repair of on-site wastewater treatment systems.

Other Land Use:

(Shall include, but not be limited to the following): Lot Line Re-Arrangement; Vacations – Alley, Easement, Road, Subdivision; Flood Hazard Area Permit; 1041 Permit; Road/Easement Dedication; Land Use Regulation Amendment; Certificate of Designation; Zoning-Map Amendments; Special Large Area Plans; Special Use Permits; Home Occupation Permits; Certificate of Non-Conformance.

Owner:

The person who is owner of record of the land on which on-site wastewater treatment system is to be designed, constructed, installed, altered extended or used.

OWTS Act:

The On-Site Wastewater Treatment System Act, 25-10-101, et seq. C.R.S.

Percolation Test:

A subsurface soil test at the depth of a proposed absorption system or similar component of an OWTS to determine the water absorption capability of the soil, the results of which are normally expressed as the rate at which one inch of water is absorbed. The rate is expressed in minutes per inch.

Performance Standard:

The minimum performance criteria for water quality and operation and maintenance established by the regulatory authority to ensure compliance with the public health and environment goals of the State of Colorado and the Pueblo City-County Health Department.

Permeability:

The property of material which permits movement of water through the material.

Permit:

A document issued by the Health Officer authorizing the construction, alteration, installation, repair and use of an on-site wastewater treatment system.

Person:

An individual, partnership, firm, corporation, association or other legal entity and also the state, any political subdivision thereof, or other governmental entity.

Plot Plan:

An accurate drawing or map of the building site on the property indicating the dimensions and location of property lines, buildings, wells, on-site wastewater treatment system, water courses, geographical features and other pertinent information as required.

Pressure Distribution:

Application of effluent over an infiltrative surface via pressurized orifices and associated devices and parts (including pump, filters, controls and piping).

Privy:

An above grade structure allowing for the disposal of excreta not transported by a sewer and which provides privacy and shelter and prevents access to the excreta by flies, rodents or other vectors.

- a. Pit Privy – privy over an unlined excavation.
- b. Vault Privy – privy over a vault.

Professional Engineer:

An engineer licensed in accordance with section 12-25-101, C.R.S.

Professional Geologist:

A person who is a graduate of an institution of higher education which is accredited by a regional or national accrediting agency, with a minimum of thirty semester (forty-five quarter) hours of undergraduate or graduate work in a field of geology and whose post-baccalaureate training has been in the field of geology with a specific record of an additional five years of geological experience to include no more than two years of graduate work. 23-41-208, C.R.S. and 34-1-201, C.R.S.

Propriety Product:

A manufactured component or other product that is produced by a private person. It may be protected by patent, trademark or copyright.

Public Domain Technology:

A system that is assembled on location from readily available components and is based on well-established design criteria and is not protected by patent, trademark or copyright.

Redoximorphic:

A soil property that results from the reduction and oxidation of iron and manganese compounds in the soil after saturation with water and subsequent desaturation.

Regulations:

Pueblo City-County Board of Health On-site Wastewater Treatment Systems Regulation VIII.

Remediation System:

A treatment system, chemical/biological additive or physical process that is proposed to restore the soil treatment area of an OWTS to good performance.

Remodel Permit:

A written document issued by the Health Officer for addition or alteration to an existing on-site wastewater treatment system.

Repair:

The correction or replacement of any component of an on-site wastewater treatment system that is failing or malfunctioning without alteration of the system. This may include but not limited to the replacement or installation of building sewers, risers, septic tank lids, effluent pumps, effluent lines and components of the soil treatment areas.

Restrictive Layer:

Horizon or condition in the soil profile or underlying strata that restricts movement of fluids. A restrictive layer may constitute a limiting soil/site condition.

Riser:

A watertight vertical cylinder and lid allowing access to an OWTS component for inspection, cleaning, maintenance or sampling.

Rock-Plant Filter:

A designed system which utilizes treatment media and various wetland plants to provide treatment of wastewater through biological, physical and chemical processes. Also called a constructed wetland.

Sand Filter:

A system that utilizes a layer of specified sand as filter and treatment media and pressure distribution.

1. Lined Sand Filter: a sand filter designed for higher level treatment that has an impervious liner and under-drain below the sand layer. Lined sand filters may be intermittent/single pass where the effluent is distributed over the sand bed a single time before distribution to a soil treatment area, or recirculating where part of the effluent is returned to an earlier component for additional treatment before distribution to a soil treatment area.
2. Unlined Sand Filter: a layer of sand used as a sand filter without a liner between the sand and the existing soil on which it is placed.

Seepage Pit:

An excavation deeper than it is wide that receives septic tank effluent and from which the effluent seeps from a structural internal void into the surrounding soil through the bottom and openings in the side of the pit.

Septage:

A liquid or semisolid that includes normal household wastes, human excreta and animal or vegetable matter in suspension or solution generated from a residential septic tank system. Septage may include such material issued from a commercial establishment if the commercial establishment can demonstrate to the Water Quality Control Division that the material meets the definition for septage set forth in this subsection. Septage does not include chemical toilet residuals.

Septic Tank:

A watertight, accessible, covered receptacle designed and constructed to receive sewage from a building sewer, settle solids from the liquid, digest organic matter, store digested solids through a period of retention and allow the clarified liquids to discharge to other treatment units for final disposal.

Sequential Distribution:

A distribution method in which effluent is loaded into one trench and fills it to a predetermined level before passing through a relief line or device to the succeeding trench. The effluent does not pass through the distribution media before it enters succeeding trenches.

Serial Distribution:

A distribution method in which effluent is loaded into one trench and fills it to a predetermined level before passing through a relief line or device to the succeeding trench. The effluent passes through the distribution media before entering succeeding trenches which may be connected to provide a single uninterrupted flow path.

Sewage:

A combination of liquid wastes which may include chemicals, house wastes, human excreta, animal or vegetable matter in suspension or solution, or other solids in suspension or solution, which is discharged from a dwelling, building, or other establishment.

Site Evaluation:

A comprehensive analysis of soil and site conditions for an on-site wastewater treatment system.

Site Evaluator:

A practitioner who conducts preconstruction site evaluations, including visiting a site and performing soil analysis, a site survey or other activities necessary to determine the suitability of a site for an on-site wastewater treatment system.

Sketch Plan:

Sketch plan means a map of a proposed subdivision, drawn and submitted in accordance with the requirements of the Regulations, to evaluate feasibility and design characteristics at an early stage in the planning.

Slit Trench Latrine:

A temporary shallow trench for use as a disposal of non-water-carried human waste.

Soil:

1. Unconsolidated mineral and/or organic material on the immediate surface of the earth that serves as a medium for the growth of plants and can potentially treat wastewater effluent; 2. Unconsolidated mineral or organic matter on the surface of the earth that has been subjected to and shows effects of: a) pedogenic and environmental factors of climate (including water and temperature effects) and b) macro and microorganisms, conditioned by relief, acting on parent material over a period of time.

Soil Evaluation:

A percolation test, soil profile or other subsurface soil analysis at the depth of a proposed soil treatment area or similar component or system to determine the water absorption capability of the soil, the results of which are normally expressed as the rate at which one inch of water is absorbed or as an application rate of gallons per square foot per day.

Soil Horizon:

The layers in the soil column differentiated by changes in texture, color, redoximorphic features, bedrock, structure, consistence and any other characteristic that affects water movement or treatment of effluent.

Soil Morphology:

1. Physical constitution of a soil profile as exhibited by the kinds, thickness, and arrangement of the horizons in the profile; and by the texture, structure, consistence and porosity of each horizon; and 2. Visible characteristics of the soil or any of its parts.

Soil Profile Hole:

A hole dug or drilled near a proposed soil treatment area to locate bedrock or ground water, if present. Observations of soil cuttings may be made.

Soil Profile Test Pit Excavation:

A trench or other excavation used for access to evaluate the soil horizons for properties influencing effluent movement, bedrock, evidence of seasonal high ground water, and other information to be used in locating and designing an on-site wastewater treatment system.

Soil Structure:

The naturally occurring combination or arrangement of primary soil particles into secondary units or peds; secondary units are characterized on the basis of shape, size class and grade (degree of distinctness).

Soil Texture:

The proportion by weight of sand, silt and clay in soil.

Soil Treatment Area:

The physical location where final treatment and dispersal of effluent occurs. Soil treatment area includes leach fields, drain fields and drip fields.

1. Alternating: The final treatment and distribution component that is composed of two soil treatment areas that are independently dosed.
2. Sequencing: A solid treatment area having more than two sections that are dosed on a frequent rotating basis.

State Board:

The State Board of Health created by 25-1-103, C.R.S.

State Waters:

Any and all surface and subsurface waters which are contained in or flow in or through this State, but does not include waters in sewage systems, waters in treatment works of disposal systems, waters in potable water distribution systems, and all water withdrawn for use until use and treatment have been completed.

Suitable Soil:

A soil which will effectively treat and filter effluent by removal of organisms and suspended solids before the effluent reaches the groundwater table or any highly permeable earth such as joints in bedrock, gravels or very coarse soils, and which meets the percolation test or soil test pit excavation requirements for determining long-term acceptance rate and has a vertical thickness of at least four feet below the bottom of the soil treatment area unless the treatment goal is met by other performance criteria.

Timed Dosing:

A configuration in which a specific volume of effluent is delivered to a component based upon a prescribed interval, regardless of facility water use.

Total Suspended Solids:

A measure of all suspended solids in a liquid, typically expressed in mg/L.

Transfer of Title:

The change of ownership of a property.

Treatment Level:

The concentrations of pollutants to be achieved by a component or series of components of an on-site wastewater treatment system.

Treatment Media:

A non-or slowly-degradable media used for physical, chemical and/or biological treatment in an On-Site Wastewater Treatment System component.

Treatment Unit:

A component or series of components where solids or pollutants are removed from wastewater or effluent from a preceding component.

Trench:

A below grade soil treatment area consisting of a shallow excavation with a width of three (3) feet or less containing distribution media and one lateral or an excavation for placement of piping or installation of electrical wire or conduit.

Uniformity Coefficient:

A value which is the ratio of D_{60} to D_{10} where D_{60} is the soil diameter of which sixty (60) percent of the soil weight is finer and D_{10} is the corresponding value at ten (10) percent finer. [A soil having a uniformity coefficient smaller than four (4) would be considered "uniform" for purposes of this Regulation.]

Vault:

A watertight, covered receptacle, which is designed to receive and store excreta or wastes either from a sewer or from a privy and is accessible for the periodic removal of its contents. If the vault is intended to serve a structure or structures that are projected to generate a domestic wastewater flow of two thousand (2000) gallons per day or more at full occupancy, the vault is a domestic wastewater treatment works. Vaults are on-site wastewater treatment systems.

Visual and Tactile Evaluation of Soil:

The act of determining the properties of soil by standardized tests of appearance and manipulation in the hand.

Wastewater Pond:

A designed pond which receives exclusively domestic wastewater from a septic tank and which provides an additional degree of treatment.

Wastewater Strength:

The concentration of constituents of wastewater or effluent; usually expressed in mg/L.

Water Quality Control Commission:

The Commission created by 25-8-201, C.R.S., as amended.

Water Quality Control Division:

The division of administration of the Department of Public Health and Environment, of which the Water Quality Control Division is a part.

Wetlands:

Those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances to support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs and similar areas.

III. Administration and Enforcement

A. General Requirements:

1. It shall be unlawful for any person to establish, construct or maintain any premise having a dwelling, or other structure, which is not equipped with adequate facilities for the disposal of sewage in a sanitary manner, as determined by the Health Officer.
2. Under no condition shall sewage or effluent be permitted to be discharged upon the surface of the ground, or into Water of the State, unless the sewage or effluent meets the minimum requirements of this Regulation and the requirements and water quality standards of the Colorado Water Quality Control Commission.
3. Unless a premises is served by connection to a publicly or privately owned treatment works operated by a city, town, county, metropolitan district, special district or other duly authorized entity, every single –family structure, multiple-family on-site wastewater treatment system which shall be constructed, operated and maintained in full compliance with this Regulation and any permit or permits issued to or for such system hereunder.
4. Any on-site wastewater treatment system serving any structure must be contained on property under the same ownership as that on which the structure is located. If the OWTS and the structure are located on separate, adjacent lots the lot line must be vacated in accordance with Pueblo County codes and ordinances.

5. This Regulation shall govern all aspects of permits, performance, location, construction, alteration, installation and use of on-site wastewater treatment systems of less than two thousand (2000) gallons per day design capacity. (Site approval and discharge permit from the Colorado Department of Public Health and Environment are required for a system (a) with a design capacity greater than or equal to two thousand (2000) gallons per day or (b) which discharges to State Waters. However, this Department's On-Site Wastewater Treatment System Regulation shall govern all other aspects of permits, performance, construction, alteration and installation.)
 6. Authority to Administer and Enforce
 - a. Wherever the term local board of health or local public health agency is used in this regulation, said terms shall also include the Water Quality Control Division under its designated authority for the purposes of administering and enforcing the provisions of Regulation 43 where necessary to protect the public health and environment.
 7. Primary Enforcement Responsibility
 - a. The primary responsibility for enforcement of the provisions of the OWTS Act, Regulation 43 and this Regulation adopted under said article shall lie with the Board of Health and the Pueblo City-County Health Department.
 - b. In the event that the local board of health fails to administer and enforce the provisions of said section and the regulations adopted under the OWTS Act, the Water Quality Control Division may assume such functions of the local public health agency or local board of health as may be necessary to protect the public health and environment.
- B. Owner Responsibility
1. Any change in plans or specifications after the OWTS permit has been issued invalidates the permit, unless approval is secured from the Health Officer for such changes.
 2. The property owner shall be responsible for proper maintenance of the OWTS and for abatement of any nuisance arising from its failure. Remodel/repair permits are required for any alteration of the system.
 3. The owner in possession of real property upon which an on-site wastewater treatment system is used, shall be responsible for operation and maintenance of the system unless jurisdiction for responsibility has been transferred to a public, quasi-public or political subdivision. Any owner or person in possession denying such responsibility shall bear the burden of proof for such denial of possession denying such responsibility shall bear the burden of proof for such denial upon establishment of ownership or possession of the property served by the system.

C. Department Responsibility

1. Nothing contained in this Regulation is intended, nor shall it be construed, to impose or create any legal duty, obligation or liability upon the Health Officer, the Board of Health, the Department or any of its employees for or to the benefit of any person; nor shall the Health Officer, Board, Department or any of its employees be held as assuming any such duty, obligation or liability by reason of any action or failure to act under or pursuant to this Regulation or corresponding state regulations, including without limitation, the approval or failure to approve any plans, designs or specifications, the inspection or failure to perform an inspection of any system, system component, site, or the issuance or failure or refusal to issue any permit for construction, repair or use. Inspections are made for public purposes and are neither intended, nor should they be construed to be, any certification or representation upon which any person may rely regarding the condition, adequacy or regulatory compliance of any system or component thereof.

D. Access to Site:

1. For the purpose of inspection and enforcing applicable rules and regulations and the terms and conditions of any permit issued, and investigating and responding to complaints, the Health Officer is authorized to enter upon private property at reasonable times and upon reasonable notice for the purpose of determining whether or not an operating on-site wastewater treatment system is functioning in compliance with the Title 25, Article 10, C.R.S., On-Site Wastewater Treatment System Regulation #43 (5 CCR-1002-43), and this Regulation 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 and occupant of every property having an OWTS shall permit the Health Officer access to the property to make inspections, conduct required tests, take sample and monitor compliance.
2. If access is denied, the Health Officer may apply to a court of competent jurisdiction within Pueblo County for an order authorizing entry.

E. Sewage Collection Systems:

No OWTS permit shall be issued to any person when the subject property is located within a municipality or special district that provides public sewer service, except where such sewer service to the property is not feasible in the determination of the municipality or special district, or the permit is otherwise authorized by the municipality or special district. Providing that the applicant for a permit complies with all other requirements of this Regulation, a permit may be issued upon receipt of written confirmation from the municipality or special district stating that connection to the municipal or district sewer line is not feasible.

F. Prohibition of On-Site Wastewater Treatment 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 a moratorium or prohibition against issuance of permits for on-site wastewater treatment systems in defined areas which contain or are subdivided for a density of more than two (2) dwelling units per acre. The Board of Health may order such moratorium or prohibition upon finding that the construction and use of additional on-site wastewater treatment systems in the defined area will constitute a hazard to the public health or the 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.

G. Subdivision of requests for land use changes to the County of Pueblo or to the City of Pueblo which impacts the performance, location, construction, alteration, installation or use of on-site wastewater treatment systems must be submitted to the Department for review and approval prior to any changes, modifications or alterations are conducted on the property or any structures.

1. Submission of proposed subdivision.

Plans for proposed subdivisions to be located within Pueblo County utilizing on-site wastewater treatment systems shall be submitted for review to the Division.

a. When a Subdivision Sketch Plan, which indicates use of OWTS, is submitted to Pueblo County, the applicant must also submit to the Division a report on the method of wastewater treatment for the proposed subdivision prepared by a professional engineer. This plan must be accompanied by the Sketch Plan Wastewater Review fee as established by the Board of Health.

b. When the applicant submits a Subdivision Preliminary Plan to Pueblo County or an initial subdivision plan to the City of Pueblo utilizing OWTS, the applicant must also concurrently submit to the Department, a complete proposal for wastewater treatment prepared by a professional engineer. This proposal must be accompanied by the Preliminary Plan Wastewater Review fee as established by the Board of Health. This submittal shall include:

i. A map, drawn at the same scale as the plan submitted to the City of Pueblo or to Pueblo County, locating all lots, drainage-ways, floodplains, slopes in excess of thirty percent (30%), surface and sub-surface soil conditions, such as shallow depth to

bedrock or shallow water table depth, all wells on and within 150 feet of the subdivision, and other pertinent geological features. If needed, sites of proposed wells may be required.

- ii. A report addressing the following:
- (1) Soil evaluation results shall be shown for no fewer than twenty (20%) of the total number of lots randomly dispersed throughout the proposed subdivision. Percolation test holes and soil profile test pit excavations shall be flagged in the field and identified on the map submittal. Soil profile test pit excavations shall be excavated to a minimum depth of 10 feet. The soil profile test pit excavation may be terminated at a depth less than 10 feet if bedrock or groundwater is encountered. In cases in which unique geologic, topographic or soil conditions, such as depth to bedrock, depth of water or slopes in excess of ten (10%) are found, additional tests may be required.
 - (2) All locations not suited for placement of OWTS due to soils, geologic topographic or other unsuitable conditions shall be noted in the report and on the map submitted. The subdivision shall be designed as to insure that each lot meets the OWTS site requirements as stated in Section IV, B, 1, 2 and 3 of this Regulation.
 - (3) Potential location of OWTS components must conform to the requirements for subdivisions approved after October 7, 2000 (listed in Table XII-1), from structures, wells, lakes, streams, irrigation systems and other pertinent physical features on adjoining parcels may be required.
 - (4) An analysis of the probable effects of OWTS effluent on the soils, geology and hydrology of the area.
 - (5) The availability of a central sewage system and feasibility of inclusion into such system must be evaluated. If there is a central sewage system within one (1) mile of the proposed subdivision, or if the subdivision is within an organized sewage district or municipal service area, the applicant shall be required to submit proof that the district or municipality is incapable of serving the site.

(6) As per Colorado Revised Statutes, Section 30-28-136 (1)(g), the applicant may be required to submit additional engineering, geological reports or data and to conduct a detailed study of the economic feasibility of a sewage treatment works.

(7) When deemed necessary by the Department, the studies, reports and findings may be submitted to the Board of health for approval/disapproval of the OWTS for the proposed subdivision before being forwarded to the City or County of Pueblo.

2. Submission of plans for Other Land Use review.

Applications for Other Land Use reviews shall be submitted by the applicant to the Department on forms approved by the Department. The application shall be accompanied with the Other Land Use review fee as established by the Board of Health.

H. Saving Clause:

Should any section, paragraph, sentence, clause or phrase of this Regulation be declared unconstitutional or invalid for any reason such portion shall be deemed separate and distinct and shall not affect the validity of the remaining portion of this Regulation.

IV. Permit Application Requirements and Procedures:

A. Requirement for Permit: prior to commencement of installation, alteration or repair of an OWTS system, a written application shall be submitted to the Department providing, as a minimum, the information called for on the application form and a permit shall have been issued by the Department.

B. On-Site Wastewater Treatment System Site Requirements:

1. The area required for the proposed or existing OWTS for sites within any subdivision finally approved before **October 7, 2000**, shall be of adequate size to allow for the construction of one original soil treatment unit and an alternate soil treatment unit using standard depth trenches as described in Section XV.

a. The area required by these trenches shall be determined for the size of the house submitted on the plot plan and taking into account the number of proposed or existing bedrooms.

b. The area required by these trenches shall be determined by using the formula described in Section XV.

c. Both the original and the alternate system shall meet all distance requirements set forth in Table XII-1.

d. This site requirement shall apply to all on-site wastewater treatment system sites in Pueblo County except those upon which an evapotranspiration system is proposed wherein Section IV.B.3. would apply.

- e. The soil treatment units must be 10 feet from the property lines and 20 feet from any occupied building or dwelling as per Table XII-1.
 2. The area of the proposed OWTS for sites within any subdivision or parcel created by any planning or zoning action finally approved after **October 7, 2000**, shall be adequate size to allow for the construction of one original soil treatment unit and an alternate soil treatment unit using standard depth absorption trenches as described in Section XV.
 - a. The area required by the soil treatment unit shall be sufficient to accommodate an average five (5) bedroom residence which is considered to be 40 feet by 70 feet regardless of whether the property is already developed with a different size residence or is undeveloped.
 - b. The area required by these soil treatment units shall be determined by using the percolation rate, LTAR and the formula described in Section XV.
 - c. Both the original and the alternate soil treatment units shall meet all distance requirements set forth in Table XII-1.
 - d. The soil treatment units must be 40 feet from the property lines and 40 feet from any occupied building or dwelling as per XII-1.
 - e. This site requirement shall apply to all on-site wastewater treatment system sites in Pueblo County except those upon which an evapotranspiration system is proposed wherein section IV.B.3. would apply.
 3. The area for the proposed evapotranspiration system shall be of adequate size to allow for the construction of the original designed evapotranspiration bed and one alternate evapotranspiration bed equal in size to the original.
 - a. The area required for an evapotranspiration system for a parcel of property or any lot created by subdivision or any other planning or zoning action finally approved after October 7, 2000, shall be sufficient to accommodate a five (5) bedroom residence which is considered to be 40 feet by 70 feet regardless of whether the properties is already developed with a different size residence or is undeveloped.
 - b. Both the original evapotranspiration bed and the alternate bed shall meet all distance requirements in XII-1.
 4. Anyone desiring to add to an existing dwelling shall be required to enlarge the on-site wastewater treatment system to comply with current standards applicable to a dwelling of that size. If the system cannot be brought into compliance in accordance with requirements of these Regulations, then approval for issuance of a building permit shall be denied.

5. No division of any OWTS site shall be made if such division impairs the usefulness of the only alternate area on that site.
 6. If any in OWTS site is located partially within the flood hazard area, adequate area outside the flood hazard area must be available for the provisions of Section IV.B. (see also Section IV.G).
- C. Permit Fees for Processing, Testing and Inspecting OWTS Sites and Systems
1. Fees shall be established by the Board of Health and shall be set at such amounts as to offset the actual indirect and direct costs of the Department's OWTS program. The permit application fees must not exceed the maximum fees established in section 25-10-107, C.R.S.
 2. Prior to installing, altering, or repairing a system, the applicant must obtain a permit from this Department. A permit fee as established by the Board of Health shall accompany the application for all new, remodel, repair and renewal permits. The permit fee shall be paid at the time the application is made. The permit fee is non-refundable.
 3. The Board of Health shall set fees for inspection, percolation tests, soil evaluation, and other services performed by this Department. The fees shall be no greater than required to offset the actual indirect and direct costs of the services, and shall not exceed the maximum amounts specified in section 25-10-107, C.R.S.
 4. Surcharge – This Department must collect a fee of twenty-three dollars for each permit issued for a new, repaired, or upgraded OWTS. Of that fee, this Department shall retain three dollars to cover the local public health agency's administrative costs and twenty dollars shall be transmitted to the state treasurer, who shall deposit that sum in the water quality control fund created in section 25-8-502(1)(c), C.R.S.
 5. An owner, prospective purchaser, lending institution or other person with an interest in property upon which an OWTS exists may file a request for inspection of such system with the Department. The request shall be accompanied by:
 - a. Written authorization from the owner of the property consenting to Department employees entering upon the property for the purpose of inspecting the system; and
 - b. A non-refundable inspection fee as established by the Board of Health. After inspection, a brief inspection report will be issued to the requestor noting any regulatory non-compliance issues, observations and corrective actions. The use of such report by the owner, requestor and third parties is expressly made subject to the restrictions set forth in Section III.C of this Regulation.

6. The Board of Health may waive any permit fee normally required for the installation, alteration or repair of an on-site wastewater treatment system. The applicant requesting such a waiver must provide the Board with a formal letter requesting the waiver, reason for such a request and any documentation required to support the reason for request.

D. OWTS Permit Application Requirements

1. Prior to installing, altering, or repairing an OWTS, the applicant must obtain a permit from this Department.
2. An applicant must submit a complete application that is consistent with Section IV.D.3 to this Department prior to installing, altering or repairing an OWTS.
3. The application for a permit shall contain the following information:
 - a. Owner name and contact information;
 - b. Property address;
 - c. Property legal description/parcel number;
 - d. Type of permit;
 - e. Size of property;
 - f. Type and use of proposed or existing structure;
 - i. Number of bedrooms;
 - ii. Number of employees;
 - iii. Presence of an unfinished basement;
 - g. Water source;
 - h. Report from Site and Soil Evaluation (Section IX);
 - i. System design with a legible, accurate site plan which shows pertinent physical features on subject property, and on adjacent properties, as noted in Table XII-1; along with
 - i. Lot dimensions;
 - ii. Proposed location of OWTS and alternate area;
 - iii. Location of proposed and existing buildings;
 - j. Other information, data, plans, specifications and tests as required by this Department.
 - i. When specific evidence suggests undesirable soil conditions exist, additional hydrological, geological, engineering or other information provided by a professional engineer or geologist may be required to be submitted by the applicant. This requirement shall not prejudice the right of this Department to develop its own information from its own sources.
 - k. Owner, agent, or Power of Attorney's signature.
 - l. Design of OWTS by a professional engineer when required by these Regulations.

4. Permit Term:
 - a. Once a completed application is submitted to this Department and all information is reviewed and approved and the permit fee has been received the application shall become a permit, which shall be valid for one (1) calendar year.
 - b. Any change in plans or specifications of the OWTS after the permit has been issued invalidates the permit unless the applicant receives written approval from this Division for such changes.
 - c. A permit will expire one year after approval if construction or installation has not occurred during that time. An expired permit may be renewed for a period of five (5) years after the initial expiration date, by submitting a renewal application fee to this Division. After five (5) years of inactivity the permit will become void. A new application and the applicable fee will then be required.

E. Preliminary Field Investigation

1. After receiving a complete application for an on-site wastewater treatment system permit, a representative of the Division shall visit the site to make a preliminary investigation on behalf of the Department consisting of:
 - a. Inspection of the premises and determination as to whether the site meets the applicable requirement of Section IV.B, of this Regulation.
 - b. Evaluation of the soil where percolation tests were performed by engineers.
 - c. A determination as to the suitability of the site and of the proposed design based upon verification of the groundwater table, suitable soil, depth to bedrock, ground slope and pertinent physical features. (e.g. the land use in the area; the use to which the property is to be put; the size of the lot; the location of water supply systems; and the location of the OWTS with reference to wells, streams, lakes, ditches, structures and other topographical features)
2. Additional Evaluation: When, in the opinion of the Health Officer, the Division does not have sufficient information for evaluation of an application or a system, he/she may require additional tests or documentation.
3. Additional hydrological, geological, engineering or other information: if required under Section IV.D.3.j.

F. Application Review

1. Standard OWTS: The Health Officer or his/her designee (Environmental Health Specialist) must determine whether the information provided in the permit application, site and soil evaluations, assumptions and calculations, and design of the proposed OWTS are in compliance with the requirements of this Regulation, OWTS Act and regulations adopted pursuant thereto. If the submittal is determined to be in compliance, authorization to begin installation may be given. A compliance determination may set forth condition precedent to the issuance of a permit including minimum size requirements, effluent testing, cleaning or maintenance schedules, or other special conditions as deemed necessary.
2. Engineered OWTS: All on-site wastewater treatment systems designed by a professional engineer shall require a review and on-site inspection by an Environmental Health Specialist. If a system meets the requirements of this Regulation, and is within the current parameter of study for a particular design, a determination of compliance will be made and a permit issued. If a proposed engineered design does not comply with this Regulation, the OWTS Act and regulations adopted pursuant thereto the application will be denied.
 - a. The following four (4) categories of on-site wastewater treatment systems must be designed by a professional engineer. These systems are also subject to the provision of Section IV.F.1., of this Regulation.
 - i. Evapotranspiration Systems.
 - ii. Systems which service exclusively domestic type wastes from commercial, business, institutional, industrial property or multi-family dwellings.
 - iii. Soil treatment units for which the location cannot meet suitable soil requirements.
 - iv. Systems accommodating two thousand (2,000) gallons per day sewage flow or greater.
 - b. The following three (3) categories of on-site wastewater treatment systems must be designed by a professional engineer. No permit for such systems shall be issued without review and approval by the Board of Health.
 - i. Systems disposing of effluent into State Waters.
 - ii. Systems which will discharge effluent directly onto the surface of the ground, directly to the atmosphere or by dispersal.
 - iii. Experimental systems.
 - iv. Other systems as required in sections XVI and XVII.

3. Effluent Discharged to Surface Waters:
 - a. Any system that will discharge into surface waters must be designed by a professional engineer. The discharge permit application must be submitted for preliminary approval to the local board of health. Once approved by the local board of health, the application must be submitted to the Water Quality Control Division for review in accordance with the Water Quality Control Act, 25-8-101, et seq. C.R.S, and all applicable regulations of the Water Quality Control Commission. Compliance with such a permit shall be deemed full compliance with this regulation.
4. Effluent Discharge to Ground Surface: Treatment systems which discharge effluent directly onto the surface of the ground, directly to the atmosphere or by dispersal. No permit shall be issued for such system if the Board of Health determines that there is a potential health hazard or private or public nuisance or undue risk of contamination. (See also Section XVII)
5. Experimental Systems:
 - a. Except for designs or types of systems which have been approved by the Water Quality Control Division pursuant to section 25-10-108 (1), C.R.S., the Board of Health may approve an application for a type of system not otherwise provided for in this regulation only if the system has been designed by a professional engineer, and only if the application provides proof of the ability to install a replacement OWTS in compliance with all local requirements in a timely manner in the event of a failure or malfunction of the experimental system.
 - b. 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. 25-10-108 (2), C.R.S.

G. Floodplains and Floodways

1. Floodplains: When an OWTS is installed in a one hundred (100) year floodplain, then the new or repaired system shall meet or exceed the requirements of the National Flood Insurance Program. The system must be designed by a professional engineer. The system as approved by the by the Health officer or his/her designee shall be designed to minimize or eliminate infiltration of flood water into the system, and discharge of the system into the flood waters.
2. Floodways: No new, expanded or replacement system shall be installed in a floodway.

H. Permit for Installation of an OWTS

1. When a permit for installation or alteration (remodel) of a new or existing OWTS is issued and the installation or alteration is not completed within one (1) year from the date of issuance, it shall automatically expire. However, if construction of an OWTS has commenced within one (1) year of permit issuance, the permit shall remain valid for such additional period until the system is completed, provided that such additional periods shall not exceed thirty (30) days. Failure to complete any OWTS during these time frames will necessitate the filing of another permit application for installation in accordance with section IV.D.4.c, of this Regulation.
2. Remodel/Repair Permits
 - a. Remodel permits for alteration of an existing OWTS which is not malfunctioning shall have the same application requirements as stated in Section IV.B, through E. Remodel permits shall also expire in accordance with Section IV.D.4.c and Section IV.H.1.
 - b. The owner or occupant of a property on which an OWTS is not in compliance must obtain a repair permit from the Division. The applicant must apply for a repair permit within two business days after receiving notice from the Division that the system is not functioning in compliance with this Regulation, the OWTS Act, , or otherwise constitutes a nuisance or a hazard to public health or water quality.
3. A permit shall be required for the expanded use of an OWTS. The OWTS must be replaced or modified to handle the increased design flow unless it is determined that the existing system is adequately designed and constructed for the higher design flow rate.
4. The issuance of a permit and specifications of terms and conditions therein shall not constitute assumption of liability, nor create a presumption that the Department or its employees may be liable for the failure or malfunctioning of any system. Permit issuance shall not constitute a certification that the system, the equipment used in the system, or any component used for system operation will ensure continuous compliance with the provision of the OWTS Act, the regulations adopted thereunder, or any terms and conditions of a permit.
5. Denial of a Permit
 - a. Notice of Denial: Written notice of the denial of a permit or disapproval of plans shall be given to the applicant by Personal Service, or by Registered or Certified Mail, Return Receipt Requested. Service by mail shall be complete upon receipt by the Department of the Return Receipt.

6. Appeal Procedure for Denial of a permit:
 - a. Any applicant whose permit application has been denied by the Health Officer may request review of the application by the Board of Health.
 - b. A request for review shall be made within sixty (60) days after denial of an application by the Health Officer.
 - c. The applicant shall bear the burden of supplying the Board of Health with sufficient evidence to document that the denied system will be constructed and used in such a manner as to comply with the declaration and intent of this Regulation and all applicable state rules and regulations and required terms and conditions in any permit issued pursuant thereto.
 - d. Such review shall be conducted pursuant to the requirements of C.R.S., 24-4-105.

V. Inspection of On-Site Wastewater Systems

A. Inspection during Installation

1. A final inspection of all on-site wastewater treatment systems is required. This inspection shall be made after all OWTS components have been installed and before placement of any earthen backfill.
2. Other inspection shall be required as follows:
 - a. If the system is engineer designed, the stages of inspection will be indicated in a condition of approval letter that shall be attached to the permit.
 - b. If a “deep trench” is used, two inspections are required;
 - i. when the trench is excavated, prior to gravel fill; and
 - ii. a final inspection.
3. The licensed OWTS contractor or the property owner, whichever is installing the OWTS, shall be responsible for notifying the Division to arrange for all inspections.
4. If any inspection discloses any significant departure from the description of design of the system as stated in the application and permit, or if any aspect of the system fails to comply with this Regulation or the OWTS Act, final approval of the system shall be withheld, and the permit shall be suspended. Written notice of deficiencies causing final approval to be withheld shall be provided to the property owner or the OWTS contractor. Final approval shall be granted upon correction of the deficiencies. Another inspection shall be made upon notification that the deficiencies have been corrected and the system brought into compliance with this Regulation.

5. If upon final inspection the Health Officer finds the system is installed in accordance with this Regulation and the permit for installation, it shall be approved, all remaining work may be completed, and a permit for use issued.
 6. The final approval of the permit must include but is not limited to:
 - a. Receipt of letter from the engineer certifying construction of system as designed, if engineer-designed;
 - b. Receipt of as-built drawing;
 - c. Final inspection prior to backfilling the system, by this Department, confirming that the OWTS was installed according to the permit requirements and regulations or variance to the regulations; and
 - d. Identification of system contractor.
- B. Inspection of Existing OWTS
1. Notice of Violation: For the purpose of inspection, enforcing applicable rules and regulation, and investigating and responding to complaints regarding failing/malfunctioning on-site wastewater treatment systems, the owner/occupant of the property shall permit the Health Officer access to the property in accordance with Section III.D., of this Regulation.
 - a. Whenever the Health Officer determines that any installed system is not functioning in compliance with this Regulation or the OWTS Act or finds that any such system constitutes a hazard to public health or is in need of repair or maintenance, the Health Officer shall issue a notice of violation to the responsible party. Such notice shall be in writing, shall state the nature of the violation or noncompliance and the corrective action required. The notice of violation shall be served upon the owner and/or occupant of the property, or upon any other responsible person.
 - b. Service of said notice of violation shall be as provided by the Colorado Rules of Civil Procedure for service of process, or by Registered or Certified Mail, Return Receipt Requested, deliverable to addressee only. Service by mail shall be complete upon receipt by the Division of the return receipt. If one or more persons cannot be found or served after a diligent effort, 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.

2. Summons and Complaint
 - a. In appropriate circumstances, an authorized representative of the Department may initiate a request to the District Attorney for prosecution of any violations of law which may be criminal in nature, or, if qualified and authorized to do so, may issue a Summons and Complaint to a violator in accordance with the provision of C.R.Crim.P.4.1
3. Cease and Desist Order
 - a. This Division may issue an order to cease and desist from the use of any OWTS or sewage treatment works which is found by the health officer not to be functioning in compliance with the OWTS Act or with applicable regulations or is found to constitute a hazard to public health, or has not otherwise received timely repairs under the provisions of section 25-10-106 (1) (j), C.R.S. 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. The order shall require that the owner or occupant bring the system into compliance or eliminate the health hazard within a reasonable period of time, or thereafter cease and desist from the use of the system. A cease and desist order issued by the health officer shall be reviewable in the district court for the county wherein the system is located and upon a petition filed not later than ten days after the order is issued.

VI. General Prohibitions; Section 25-10-112, C.R.S.

- A. No city, county, or city and county shall issue to any person:
 1. A permit to construct or remodel a building or structure that is not serviced by a sewage treatment works until the local public health agency has issued a permit for an OWTS.
 2. An occupancy permit for the use of a building that is not serviced by a sewage treatment works until the local public health agency makes a final inspection of the OWTS, provided for in section 25-10-106 (1) (h), C.R.S. and the local public health agency approves the installation.
- B. Construction of new cesspools is prohibited.
- C. A person must not connect more than one dwelling, commercial, business, institutional or industrial unit to the same OWTS unless such multiple connection was specified in the application submitted and in the permit issued for the system.
- D. 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.

- E. All persons shall dispose of septage removed from systems in the process of maintenance or cleaning at an approved site and in an approved manner.

VII. Penalties; Section 25-10-113, C.R.S.

- A. Any person who commits any of the following acts or violates any of the provisions of this section commits a Class 1 petty offense as defined in section 18-1-107, C.R.S.:
 - 1. Constructs, alters, installs, or permits the use of any OWTS without first having applied for and received a permit as provided for in section 25-10-106, C.R.S.;
 - 2. Constructs, alters, or installs an OWTS in a manner which involves a knowing and material variation from the terms or specifications contained in the application, permit or variance;
 - 3. Violates the terms of a cease and desist order that has become final under the terms of section 25-10-106 (1) (k), C.R.S.;
 - 4. Conducts a business as a systems contractor without having obtained the license provided for in section 25-10-109 (1), C.R.S., in areas which the local board of health has adopted licensing regulations pursuant to that section;
 - 5. Conducts a business as a systems cleaner without having obtained the license provided for in section 25-10-109 (2), C.R.S., in areas which the local board of health has adopted licensing regulations pursuant to that section;
 - 6. Falsifies or maintains improper records concerning system cleaning activities not performed or performed improperly; or
 - 7. Willfully fails to submit proof of proper maintenance and cleaning of a system as required by regulations adopted by the local board of health.
- B. Upon finding by the local board of health that a person is in violation of this Regulation, the OWTS Act and/or Regulation 43, the local board of Health may assess a penalty of up to fifty dollars for each day of violation. In determining the amount of the penalty to be assessed, the local board of health shall consider the seriousness of the danger to the health of the public caused by the violation, the duration of the violation, and whether the person has previously been determined to have committed a similar violation. The penalty will be assessed in accordance with 25-10-113 (2), C.R.S.
- C. A person subject to a penalty assessed pursuant to VII.B. may appeal the penalty to the local board of Health by requesting a hearing before the Board of Health. The request must be filed within thirty (30) days after the penalty assessment is issued. The Board of Health shall conduct a hearing upon the request in accordance with section 24-4-105, C.R.S. This shall be done in accordance with 25-10-113 (3), C.R.S.

VIII. Licensing of OWTS Contractors and Cleaners:

A. Regulations Governing the Licensing of On-Site Wastewater Treatment System Contractors:

1. No person shall engage in the business of installing an on-site wastewater treatment system nor shall any person for hire install, renovate, replace or repair an OWTS unless that person holds a valid OWTS Contractor's License. This shall not preclude the owner of a property from being able to install an OWTS on that property. The initial fee as established by the Board of Health for the OWTS Contractor's License shall be payable upon application. The applicant must satisfactorily pass a written exam after which a license will be issued.
2. This license shall expire one (1) year from the date of issuance. Licenses may be renewed upon payment of an annual renewal fee as established by the Board of Health.
3. Any licensed OWTS contractor shall be responsible for the work performed by his/her employees.
4. The Board of Health may revoke the license of an OWTS contractor for violation of the applicable provisions of the OWTS Act and the implementing regulations or for other good cause shown, after a hearing conducted upon reasonable notice to the systems contractor and at which the systems contractor may be present, with counsel, and be heard.
5. Any licensed OWTS contractor whose license has been revoked cannot apply for a new OWTS contractor license for one (1) calendar year after such revocation.
6. Any license which lapses because of failure to renew, or is revoked shall be subject to the fee for a new license upon reapplication.

B. Regulations Governing the Licensing of OWTS Cleaners:

1. No person shall engage in the cleaning of OWTS or the transportation of sewage, septage, or chemical toilet wastes to a disposal site unless that person holds a valid OWTS Cleaner's License. The initial fee as established by the Board of Health for the OWTS Cleaner's License shall be payable upon application. The applicant will be required to demonstrate knowledge of Section VIII.B.7., of this regulation before issuance of a license.
2. This license shall expire one (1) year from the date of issuance. Licenses may be renewed upon payment of an annual renewal fee as established by the Board of Health.
3. Any licensed OWTS Cleaner shall be responsible for the work conducted by his/her employees.
4. The Board of Health may revoke the license of an OWTS cleaner for violation of the applicable provisions of the OWTS Act and the implementing regulations or for other good cause shown, after a hearing conducted upon reasonable notice to the OWTS cleaner

and at which the OWTS cleaner may be present, with counsel, and be heard.

5. Any licensed OWTS cleaner whose license has been revoked cannot apply for a new OWTS cleaner license for one (1) calendar year after such revocation.
6. Any license which lapses because of failure to renew, or is revoked shall be subject to the fee for a new license upon reapplication.
7. OWTS Cleaner Requirements
 - a. On both the right and left sides near the front of the body of the vehicle, the name and telephone number of the owner shall be printed in letters not less than three (3) inches high and shall be clearly legible.
 - b. A cleaner shall maintain his/her equipment so as to insure that no spillage or sewage will occur during collection, transportation, or disposition. Maintenance shall also be such that the cleaner or his/her employees are not subjected to undue health hazards.
 - c. A cleaner shall dispose of the collected sewage only at an acceptable site, as determined by this Department.
 - d. A current permit to dispose of sewage, septage or chemical toilet wastes must be maintained by the OWTS Cleaner.
 - e. The OWTS cleaner must maintain documentation that describes the following information:
 - i. Date;
 - ii. Location;
 - iii. Type of waste collected;
 - iv. Amount of waste collected;
 - v. Date of disposal;
 - vi. Name and location of disposal facility
8. The Board of Health may suspend or revoke the license of an OWTS cleaner for violation of the applicable provisions of the OWTS Act and the regulations adopted under said section or for other good cause shown after a hearing conducted upon reasonable notice to the systems cleaner and at which the systems cleaner may be present, with counsel, and be heard.
25-10-109, C.R.S.

IX. Variance Procedure

- A. An applicant who receives a notification of denial or disapproval from this Department relating to the design or siting requirements of an OWTS, or an applicant proposing to install an OWTS that does not conform to this Regulation may request a variance from the Board of Health, to allow such design, siting, or OWTS. The variance request must be submitted in writing to the Health Officer and Board of Health, along with current variance fee 20 days prior to the Board of Health Meeting in which the variance is to be heard.

1. The written request must include:
 - a. A statement from the owner requesting that the Board of Health consider the variance request.
 - b. Identification of the property owner and property in question.
 - c. The specific criteria from which a variance is being requested;
 - d. Technical justification by a Professional Engineer or Professional Geologist, indicating that the specific conditions which exist, and/or measures which will be taken, will result in no greater threat to public health or environmental degradation than that achieved by compliance with the applicable laws and regulations;
 - e. A discussion of alternatives considered in lieu of the requested variance;
 - f. Technical support for the selected alternative, which may include a testing program, which confirms that the variance does not increase the risk to public health and to the environment; and,
 - g. A statement of the hardship which creates the necessity for the variance.
 2. The applicant has the burden of proof to demonstrate that the variance is justified and will pose no greater risk to public health and the environment than would a system meeting the regulations.
 3. Based on the information submitted by the applicant the Board of Health may require a public hearing be conducted regarding the variance request. The hearing must be the subject of a public notice or notice must be sent via certified mail, with a minimum 20 day reply time from the date of mailing, to all adjacent property owners.
 4. The Board of Health has the authority to impose site-specific requirement and conditions on any variance granted.
 5. Outcome of the Variance Proceeding
 - a. The applicant must be notified, in writing, of the Board of Health's decision regarding the request for a variance. The notice of a denial of a variance must include those reasons which form the basis for the denial. The notice of an approval of a variance must include any conditions of the approval. The variance, and any conditions thereof, must be recorded on the deed to the property and any expenses associated with that recording must be the responsibility of the party obtaining the variance.
- B. Prohibitions on the Granting of Variance Requests
1. No variance shall be issued where the property can accommodate a conforming OWTS.

2. No variance shall be issued to mitigate an error in construction involving any element of property improvements.
3. No variance shall be allowed solely for economic gain.
4. No variance shall be issued, if it will result in a setback reduction to an offsite physical feature that does not conform to the minimum setbacks defined in Table XII-1 of this regulation without the written consent of the owner of property containing said feature. Property lines are considered offsite features.
5. No variance shall be issued, if it reduces the separation to ground water or bedrock based on the level of treatment in Table XII-2.
6. No variance from the horizontal setback from a well shall be issued below the requirement of Regulation 43 or 100 feet unless it also meets the variance requirements of the Board of Examiners of Water Well Construction and Pump Installation Contractors.

C. Variances for Repair of Failing Systems

1. When a proposed variance for a system repair or upgrade would result in encroachment on minimum distances to physical features on neighboring properties required by this Regulation, the hearing procedures in IX.A. Requirements for Variance Consideration above must be followed.
2. For the repair of or upgrade to an approved existing system where the existing system does not meet the required separation distances and where the size of the lot precludes adherence to the required distances, a variance to the separation distances may be requested. The repairs or upgrade shall be no closer to features requiring setbacks than the existing facilities. Variances requesting setbacks no closer than existing setbacks do not have to provide technical justification from a professional engineer or professional geologist.

D. Findings on Appeal

1. A request for review must be made within 60 days after denial of an application by this Division.
2. The applicant must bear the burden of supplying the Board of Health with sufficient evidence to document that the denied system shall be constructed and used in such a manner that will result in no greater risk than that associated with compliance with the requirements of the regulation, comply with the declaration and intent of this regulation, and comply with all applicable state and local regulations and required terms and conditions in any permit.
3. Such review must be conducted pursuant to the requirements of section 24-4-105, C.R.S.

X. Site and Soil Evaluation

- A. A site and soil evaluation must be conducted for each property on which an OWTS is proposed, to determine the suitability of a location to support an OWTS, and to provide the designer a sound basis to select the most

appropriate OWTS design for the location and application.

1. Each site evaluation shall consist of:
 - a. Preliminary investigation;
 - b. Reconnaissance;
 - c. Detailed soil investigation; and
 - d. Report and site plan.
- B. A preliminary investigation shall review documented information relative to the site and anticipated conditions. Information gathered as part of the preliminary investigation shall include, but is not limited to:
 1. Property Information:
 - a. Address
 - b. Legal Description/parcel number;
 - c. Existing structures; and
 - d. Location of existing or proposed wells on the property or adjacent properties.
 2. Local public health records.
 3. Published site information:
 - a. Topography; and
 - b. Soil data.
 4. Location of physical features, on and off the property that will require setbacks as identified in Table XII-1.
 5. Preliminary soil treatment area size estimate based on information on existing or planned facility and this Regulation.
 6. Other information required by this Division.
 7. Additional information that may be useful to the specific evaluation as available:
 - a. Survey;
 - b. Easements;
 - c. Floodplain maps;
 - d. Geology and basin maps and descriptions;
 - e. Aerial photographs;
 - f. Climate information; and
 - g. Delineated wetlands maps.
- C. A reconnaissance visit to the property shall evaluate the topography and other surface conditions that will impact the selection and location and design of the OWTS, including:
 1. Landscape position;
 2. Topography;
 3. Vegetation;
 4. Natural and cultural features; and
 5. Current and historic land use.
- D. Detailed Soil Investigation
 1. Soil investigations to determine the long-term acceptance rate of a soil treatment area shall be either:
 - a. Visual and tactile evaluation of two or more soil profile test pit excavation; or

- b. Percolation tests plus one or more soil profile holes or one or more soil profile test pit excavations.
 2. If percolation tests are performed, at least one soil profile hole shall be evaluated to determine whether current ground water levels and/or bedrock is encountered within 8 feet of the ground surface. A visual and tactile evaluation of a soil profile test pit excavation as described in section X.D.5. may be substituted for a profile hole. Following three years after the effective date of Regulation 43 (June 30, 2016), a visual and tactile evaluation of a soil profile test pit excavation shall be used instead of a soil profile hole when percolation tests are performed to determine long-term acceptance rates. See section 43.5(D)(2) of Regulation 43.
 3. If visual and tactile evaluations of soil are performed without percolation tests to determine a long-term acceptance rate:
 - a. Evaluation of two or more soil profile test pit excavations must be performed to determine soil types and structure, restrictive layers, evidence of seasonal high ground water, and best depth for the infiltrative surface.
 - b. At least one of the soil profile test pit excavations must be performed in the portion of the soil treatment area anticipated to have the most limiting conditions.
 - c. The total number of soil profile test pit excavations required is based on the judgment of the competent technician.
- E. Procedure for performing percolation tests:
 1. The percolation testing shall be performed by a trained person under the supervision of a profession engineer or by a competent technician.
 2. Location
 - a. Soil percolation tests shall be performed in at least three test holes in the area in which the soil treatment area is to be located, spaced reasonably evenly over the proposed area. There shall be no less than one test hole provided in every 1,200 square foot area of soil treatment area.
 - b. If the likely depth of a proposed infiltrative surface is uncertain, percolation tests shall be performed at more than one depth to determine the depth of the infiltrative surface.
 3. Dimensions
 - a. The percolation test hole shall have a diameter of 8 to 12 inches and be terminated a minimum of 6 inches and a maximum of 18 inches below the proposed infiltrative surface.
 4. Change in Soil
 - a. If a change of soil type, color or structure is present within those soils comprising the depth of soil below the infiltrative surface as required in Table XII-2 for vertical separation, a minimum of two soil percolation holes shall be terminated in

the changed soil, and percolation tests shall be conducted in both holes.

5. Percolation Tests

- a. The percolation test shall be conducted using the hole preparation, soil saturation and rate measurement procedures described below.
- b. Preparation of Percolation Test Holes
 - i. Excavate the hole to the depth and diameter required.
 - ii. Carefully scrape the bottom and sides of the hole with a knife blade or sharp instrument to remove any smeared soil surfaces and provide a natural soil interface into which water may percolate.
 - iii. Remove all loose soil from the hole.
 - iv. Add two inches of very coarse sand or fine gravel to protect the bottom of the hole from scouring and sediment.
- c. Presoak
 - i. The hole shall be presoaked adequately to accomplish both saturation, which is filling the void spaces between the soil particles, and swelling, which is the intrusion of water into the individual soil particles.
 - ii. To presoak the hole, carefully fill the hole with clean water to a minimum depth of 12 inches over the gravel placed in the bottom of the hole. In most soils, it is necessary to refill the hole by supplying a surplus reservoir of clean water, possibly by means of an automatic siphon, to maintain water in the hole for at least four hours and preferably overnight. Determine the percolation rate 24 hours after water is first added to the hole. This procedure is to ensure that the soil is given ample time to swell and to approach the condition it will be in during the wettest season of the year. In sandy soils containing five percent or less particles passing the #200 sieve, by weight, the swelling procedure is not essential and the test may be conducted after the water from one filling of the hole has completely seeped out of the hole.
- d. Percolation Rate Measurement
 - i. With the exception of sandy soils containing five percent or less particles passing the #200 sieve, by weight, percolation rate measurements shall be made on the day following the presoak procedure.

- ii. If water remains in the percolation test hole after the swelling period, adjust the depth to approximately six inches above the gravel in the bottom of the hole. From a fixed reference point, measure the drop in water level over a series of 30 minute intervals. The drops are used to calculate the percolation rate.
 - iii. If no water remains in the hole after the swelling period, carefully add clean water to bring the depth of water in the hole to approximately six inches above the top of the gravel in the bottom of the hole. From a fixed reference point, measure the drop in water level at 30 minute intervals for four hours, refilling to 6 inches over the top of the gravel as necessary. The drop in water level that occurs during the final 30-minute period is used to calculate the percolation rate. If the water level drops during prior periods provide sufficient information, the procedure may be modified to suit local circumstances. The requirement to conduct a four hour test under this section is waived if three successive water-level drops do not vary by more than 1/16 inch; however, in no case shall a test under this section be less than two hours in duration.
- e. Sandy Soils
- i. In sandy soils or other soils in which the first 6 inches of water seeps out of the hole in less than 30 minutes, after the 24 hours swelling period, the time interval between measurements shall be taken as 10 minutes and the test conducted for one hour. The drop that occurs during the final ten minutes shall be used to calculate the percolation rate.
 - ii. If the soil is so sandy or coarse-textured that it will not retain any water, then the infiltration rate shall be recorded as less than one minute per inch.
- f. Special Soil Types
- i. This Division may identify soil types in its area, for which it shall require different procedures such as extra presoaking to obtain a valid percolation rate.
- g. Percolation Rate Determination and Reporting
- i. The field percolation rate shall be the average rate of the percolation rates determined for all percolation test holes observed in the proposed soil treatment area in minutes per inch. The average percolation rate determined by the tests shall be used in determining the long-term acceptance rate for the proposed system from Table XV-1.

- ii. The technician performing the percolation tests shall furnish an accurate scale drawing, showing the location of the soil profile holes or soil profile test pit excavations and percolation holes tied to lot corners or other permanent objects. The drawing shall meet the criteria in section X.I.1.g. The information in the
 - iii. Subsections following section X.I.1.g.i through section X.I.1.g.v. may be included but is not required for this drawing. All holes shall be clearly labeled to relate to the information provided for the profile test pits and percolation tests.
 - h. Percolation Test Waiver
 - i. If the applicant demonstrates to the satisfaction of this Division that the system is not dependent upon soil absorption, the requirement of percolation tests may be waived.
 - i. Alternate Percolation Testing
 - i. Alternate percolation test procedures may be approved, provided the test results of alternate procedures are substantially equivalent to those determined using the test procedures described in this section.
 - ii. Prior approval from this Division of alternate percolation test procedures is required.
- F. Visual and Tactile Evaluation of Soil Requirements:
1. Each soil profile test pit excavation observed at the proposed soil treatment area must be evaluated under adequate light conditions with the soil in an unfrozen state.
 2. The soil observations must be conducted at or immediately adjacent to the location of the proposed soil treatment area, but if possible, not under the final location of a trench or bed.
 3. The soil observation method must allow observation of the different soil horizons that constitute the soil profile.
 4. Soil profile test pit observations must be conducted prior to percolation tests to determine whether the soils are suitable to warrant percolation tests and, if suitable, at what depth percolation tests shall be conducted.
 5. The minimum depth of the soil profile test pit excavation must be to the periodically saturated layer, to the bedrock, or four feet below the proposed depth of the infiltrative surface, whichever is encountered first.
 6. The soil type at the proposed infiltrative surface of the soil treatment area or a more restrictive soil type within the treatment depth shall be used to determine the long-term acceptance rate

from Table XV-1. The treatment depth is two to four feet depending on the required thickness for the treatment level below the infiltrative surface from Item 4, Table XII-2.

7. Soils data, previously collected by others at the site can be used for the purposes of an OWTS design at the discretion of Division. It is recommended that the data be verified, at a minimum, by performing an evaluation of a soil profile test pit excavation.

G. Soil descriptions for determination of a limiting layer shall include:

1. The depth of each soil horizon measured from the ground surface and a description of the soil texture, structure, and consistency of each soil horizon;
2. Depth to bedrock;
3. Depth to the periodically saturated soil as determined by:
 - a. Redoximorphic features and other indicators of water levels, or
 - b. Depth of standing water in the soil observation excavation, measured from the ground surface, if observed, unless redoximorphic features indicate a higher level; and
4. Any other soil characteristic that needs to be described to design a system, such as layers that will restrict permeability.

H. Percolation Holes, Profile Holes and Profile Test Pit Excavations – Marking

1. The engineer or technician conducting the percolation tests must, upon completion of the tests, flag or otherwise mark each hole to allow easy location by others. Percolation holes and profile test pits must remain open until after evaluation by this Division.

I. Report and Site Plan

1. A written report shall describe the results of the preliminary investigation, reconnaissance, and detailed evaluations. The report may be in text and/or tabular form and shall include a drawing locating features relative to the proposed OWTS location and test locations. The report may be included as part of the OWTS design document. The report must include, but is not limited to:
 - a. The name, address, telephone number, e-mail address, and credentials and qualifications of the individual conducting the site evaluation;
 - b. Preliminary and detailed evaluations, providing information from the surface site characteristics assessment and soils investigation;
 - c. Dates of preliminary and detailed evaluations;
 - d. A graphic soil log, to scale, indicating depth of drill hole or excavation, soil description and classification, depth to ground water encountered during drilling or excavation,

- type of equipment used to drill the profile hole or excavate the soil profile test pit, date of soils investigation, name of investigator and company name;
- e. Setback distances to features listed in Table XII-1;
 - f. Setback distances to features listed in Table XII-2, existing on the site or within applicable setback limits, whichever is greater;
 - g. A drawing created to a scale that provides the complete property boundary lines. Minimum drawing size shall be 8.5-inches by 11-inches. If the property is too large to adequately indicate and label the profile test pits and percolation test holes, a detail of the portion of the site containing the soil profile test pits and percolation test holes must be submitted. If the property is too large to adequately show site evaluation information, a detail drawing that includes the information required from the site and soil evaluation that will impact the location of the OWTS must be submitted. Drawings shall indicate dimensions, have a north arrow and graphic scale and include:
 - i. Horizontal and vertical reference points of the proposed soil treatment area; soil observations; percolation testing results and pertinent distances from the proposed OWTS to all required setbacks, lot improvements, easements; ordinary high water mark of a pond, creek, stream, lake, wetland or other surface waters, and detention or retention ponds; and property lines;
 - ii. Contours or slope direction and percent slope;
 - iii. The location of any visible or known unsuitable, disturbed or compacted soils;
 - iv. The estimated depth of periodically saturated soils and bedrock, or flood elevation, if applicable; and
 - v. The proposed elevation of the infiltrative surface of the soil treatment area, from an established datum (either ground surface or a benchmark);
 - h. Anticipated construction-related issues;
 - i. An assessment of how known or reasonably foreseeable land use changes are expected to affect the system performance, including, but not limited to, changes in drainage patterns, increased impervious surfaces and proximity of new water supply wells; and
 - j. A narrative explaining difficulties encountered during the site evaluation, including but not limited to identifying and interpreting soil and landform features and how the difficulties were resolved.

J. Design Document

1. The report and site plan may be attached to the design document or the report and site plan may be combined with the design information as a single document.
2. The design document shall include a brief description of the facility and its proposed use, basis and calculations of design flow, and influent strength.
3. The design document must contain all plan detail necessary for permitting, installation and maintenance, including:
 - a. Assumptions and calculations for each component;
 - b. A scale drawing showing location of each OWTS component and distances to water, physical and health impact features requiring setbacks;
 - c. Layout of soil treatment area, dimensions of trenches or beds, distribution method and equipment, distribution boxes, drop boxes, valves, or other components used;
 - d. Depth of infiltrative surface of soil treatment area, depth of the septic tank, depth of other components;
 - e. Specifications of each component. Specifications for septic tanks or other buried components must include loads due to burial depth, additional weight or pressure loads, and highest elevation of ground water. Resistance to local water composition such as high sulfates shall be included in the specification if such conditions exist at the site;
 - f. References to design manuals or other technical materials used;
 - g. Installation procedures;
 - h. Operation and maintenance manuals or instructions; and
 - i. Other information that may be useful such as photos and cross section drawings.

K. As-Built Drawings: Scale drawing showing the OWTS as installed, including its location from known and findable points, dimensions, depths, sizes, manufacturers' names and models as available and other information relative to locating and maintaining the OWTS components.

L. Site protection: During construction, the proposed soil treatment area and replacement area, if any, must be protected from disturbance, compaction, or other damage by staking, fencing, posting, or other effective method.

M. Qualifications for a Competent Technician

1. Percolation Tests
 - a. Competencies needed:
 - i. Set up equipment;
 - ii. Perform and run percolation tests according to the procedure in this regulation; and
 - iii. Record results and calculate percolation rates.
 - b. The Division may approve training for percolation testing.

2. Visual and Tactile Evaluation of Soil
 - a. Competencies needed:
 - i. Identify soil by hand texturing and observation;
 - ii. Identify presence or absence of soil structure;
 - iii. Identify grade of soil structure;
 - iv. Recognize evidence of highest seasonal water surface;
 - v. Identify layers and interfaces that will interfere with effluent movement;
 - vi. Determine the most promising depth for infiltrative surface of OWTS and for percolation tests, if used; and
 - vii. Understand basic principles of OWTS siting and design.
 - b. Possible demonstrations of competence in visual and tactile evaluation of soil:
 - i. Degree in soil science, agronomy, geology, other majors if a course(s) in soil morphology was included; or
 - ii. Attendance at training or workshop for soil evaluation for OWTS including both class and field work.
 - c. The Water Quality Control Division of the Colorado Department of Public Health and Environment shall approve training for visual and tactile evaluation if soil.

XI. Wastewater Flow and Strength

A. Wastewater Flows

1. The Division may require the installation of a meter to measure flow into the facility or the OWTS.
2. Single Family Residential Homes:
 - a. Design flow per person shall be 75 gallons per day (gpd).
 - b. The minimum design flow for a new home shall be for a two-bedroom house. The minimum design flow for the repair or replacement of an OWTS of an existing one-bedroom home shall be one-bedroom unless bedrooms are added.
 - c. For design purposes, the assumed number of persons per bedroom shall be two.
 - d. Table XI-1 summarizes the design flows for single-family residential homes up to six bedrooms. If a new home has unfinished areas, the Division may increase the number of bedrooms used for the design of the OWTS by one or more bedrooms based on an assumption that 150 square feet of unfinished space can be converted into a bedroom, if the space can meet building code requirements for a bedroom.

Table XI-1 Single-Family Residential Design Flows

| # Bedrooms | Occupancy (# of Persons) | Wastewater Flow Per Person (gallons/day) | Design Flow (gallons/day) |
|------------|-----------------------------|--|------------------------------|
| 2 | 4 | 75 | 300 |
| 3 | 6 | 75 | 450 |
| 4 | 8 | 75 | 600 |
| 5 | 10 | 75 | 750 |
| 6 | 12 | 75 | 900 |

3. Auxiliary Buildings

- a. If a single-family home has an auxiliary building, such as a non-commercial shop with plumbing fixtures, the flow may be conveyed to the OWTS of the home, or to a separate OWTS constructed to handle the flow from the auxiliary facility.
- b. If the flow from the auxiliary building is only generated by residents of the home, it shall be assumed that the OWTS for the home will be adequately sized to include the auxiliary building if the flows are combined.
- c. If the auxiliary building will have users in addition to residents and the flow from the auxiliary building will flow to the OWTS of the home, the design flow of the home must include the increased use.
- d. If the auxiliary building has a separate OWTS, the facility shall be sized on the basis of Table XI-2 and a septic tank detention time of 48 hours.

4. Multi-Family and Commercial On-site Wastewater Treatment Systems

- a. Design flow values and strengths for multi-family and commercial systems shall be determined from:
 - i. Table XI-2; or
 - ii. An analysis of flows and strengths from at least three comparable facilities or from the facility, if it is an existing facility, must be submitted to the Division for approval. The analysis shall include:
 - (1) Metered water flows for inside use only for at least a year, or if use is seasonal, for a full season. If metered flows are less than full capacity, they shall be paired with actual use in units of persons present or meals served or other units as appropriate so that an actual daily rate per unit can be determined. The daily rate per unit times the number of units at full occupancy shall be the design flow.
 - (2) Total Suspended Solids and BOD5 or CBOD5 tests at times of full use. At least three

samples taken at least one week apart are required.

(3) Explanation and justification for the comparability of the tested facilities with the proposed facility.

5. Flow Equalization

- a. Flow equalization may be used if a facility has flows that vary from day to day by more than four times the average flow.
- b. The highest peak assumed shall be at least equal to the full capacity of the facility.
- c. The stored flow shall be distributed to the soil treatment area before the next greater-than-average peak.
- d. Flow equalization may be used only if:
 - i. The facility is non-residential;
 - ii. The facility is only used for one purpose;
 - iii. Flows will follow a predictable pattern; and
 - iv. There is a long-term expectation that size and pattern of the flows will remain the same.
- e. Timed pressure distribution shall be used. The soil treatment area reduction for timed pressure distribution shall not be used in addition to the flow equalization reduction.
- f. Contingency plans must be made for expanding the capacity of the OWTS in the event of changed use at the facility.

**TABLE XI-2 Estimate of Average Daily Wastewater Flow and BOD5 Load
Per Person Unless Otherwise Noted**

| RESIDENTIAL WASTEWATER | AVERAGE GPD | BOD₅ IN POUNDS PER DAY |
|---|------------------------|--|
| Single-family dwellings | 75 | .20 |
| OR Single-family dwellings or auxiliary buildings by fixture type | | |
| Bath/Shower | 14.7 | .014 |
| Dishwasher | 1.8 | .002 |
| Kitchen sink with garbage grinder | 5.8 | .052 |
| Laundry washer | 19.5 | .037 |
| Lavatory | 8.4 | .021 |
| Water closet (toilet) | 24.8 | .029 |
| Total with kitchen sink garbage grinder | 75 | .20 |
| Hotels and motels per room without private baths | 50 | .15 |
| Hotels and motels per room with private baths | 75 | .15 |
| Multiple-family dwellings or apartments | 75 | .20 |
| Boarding and rooming houses | 50 | .15 |
| Mobile home | 75 | .20 |
| Mobile home park per space | 300 | .80 |
| COMMERCIAL WASTEWATER | AVERAGE GPD | BOD₅ IN POUNDS PER DAY |
| Facilities with short-term or transient visitors Examples: Airports or bus stations per passenger; fairgrounds per person attending; ball parks, race tracks, stadiums, theaters or auditoriums per seat | 5 | .02 |
| Airport per employee | 10 | .06 |
| Barber and beauty shops per chair | 100 | .70* |
| Bowling alleys per lane - toilet wastes only | 5 | .03* |
| Country club per member | 30 | .02 |

| | | |
|--|--------------------|--|
| County club per employee | 20 | .06 |
| Dentist offices per non-wet chair | 50 | .14* |
| Doctor offices per doctor | 250 | .80* |
| Factories and plants exclusive of industrial wastewater per employee per eight-hour shift – no showers | 20 | .05 |
| Factories and plants exclusive of industrial wastewater per employee per eight-hour shift - showers provided | 35 | .08 |
| Kennels per dog | 30 | .20 |
| Laundries, self-service per commercial washer | 400 | .75 |
| Office buildings per employee per eight-hour shift | 15 | .06 |
| Service stations per toilet fixture | 250 | .50* |
| Stores and shopping centers per square foot of retail space | .1 | .01* |
| Work or construction camps semi-permanent with flush toilets | 50 | .17 |
| Work or construction camps semi-permanent without flush toilets | 35 | .02 |
| FOOD SERVICE ESTABLISHMENT | AVERAGE GPD | BOD₅ IN POUNDS PER DAY |
| Restaurant open 1 or 2 meals per seat | 50 | .06/meal |
| 24-hour restaurant per seat | 75 | .07/meal served |
| Restaurant with paper service only per seat | 25 | .01/meal served |
| Additional for bars and cocktail lounges per seat | 30 | .02 |
| Drive-in restaurant per car space | 50 | .02 |
| INSTITUTIONAL WASTEWATER WITHOUT KITCHENS UNLESS OTHERWISE NOTED | AVERAGE GPD | BOD₅ IN POUNDS PER DAY |
| Churches | 5 | .01 |
| Hospitals per bed space | 250 | .20 |
| Nursing homes per bed space | 100 | .17 |
| Schools, Boarding per person | 100 | .17 |
| Schools, Day without cafeteria, gym or showers | 15 | .04 |
| Schools, Day with cafeterias, no gym or showers | 20 | .08 |

| | | |
|--|--------------------|--|
| Schools, Day with cafeterias, gym and showers | 25 | .10 |
| Schools, Day additional for school workers | 15 | .06 |
| RECREATIONAL AND SEASONAL WASTEWATER USE | AVERAGE GPD | BOD₅ IN POUNDS PER DAY |
| Camps, day, no meals served | 15 | .12 |
| Luxury resort | 125 | .17 |
| Resort night and day | 50 | .12 |
| Campground per campsite** | 50 | .12 |
| Public park flush toilet per fixture per hour when park is open | 36 | .04 lbs./ fixture |
| Public park urinal per fixture per hour when park is open | 10 | .01 lbs./fixture |
| Public park shower per fixture per hour when park is open | 100 | .10 lbs./ fixture |
| Public park faucet per fixture per hour when park is open | 15 | .04 lbs./ fixture |
| Swimming pools and bathhouses | 10 | .06 |
| Travel trailer parks with individual water and sewage hookup per unit ** | 50 | .12 |
| Travel trailer park without individual water and sewage hookup per unit ** | 50 | .12 |

*BOD levels need further verification

**Laundry facilities are to be calculated on a per commercial washer basis in accordance with other elements of this table

B. Wastewater Strength

1. Table XI-3 includes levels of treatment that can be achieved by various OWTS components, excluding the soil treatment area. Systems qualifying for these treatment levels except TL1 produced by a septic tank alone must be approved under section XVIII. of this regulation.
2. CBOD5 strength must be reduced to Treatment Level TL1 or lower before applying to a soil treatment area.

Table XI-3 Treatment Levels

| Treatment Level | CBOD ₅ * (mg/L) | TSS (mg/L) | Total Nitrogen (mg/L) |
|-----------------|-------------------------------|---------------|--------------------------|
| TL 1** | 145 | 80 | 60-80 |
| TL 2 | 25 | 30 | 60-80 |
| TL 2N | 25 | 30 | >50% reduction*** |
| TL 3 | 10 | 10 | 40-60 |
| TL 3N | 10 | 10 | 20 mg/L |

Shading indicates higher treatment levels

*If concentrations of organic material are submitted in BOD₅ without data in CBOD₅, the data in BOD₅ shall be multiplied by 0.85 to estimate CBOD₅ levels.

**Domestic septic tank effluent prior to soil treatment or higher level treatment has a wide range of concentrations. These values are typical, but values used for design must account for site-specific information.

***NSF/ANSI Standard 245 – Wastewater Treatment Systems – Nitrogen Reduction requires reduction of 50 percent rather than an absolute value.

XII. Minimum Distances Between Components of an On-site Wastewater Treatment System and Physical Features

A. Horizontal distances from the various components of a system to pertinent terrain features, including streams, lakes, water courses, springs, wetlands, wells, subsurface drains, cisterns, water lines, suction lines, dry gulches, cut banks, dwellings, other occupied buildings and property lines, must be in accordance with Table XII-1.. All distance setback modifications must be analyzed and approved by this Division and be in complete compliance with the variance procedures of this Regulation and those of the Board of Health. Acceptable methods of analyzing horizontal separation distances with higher treatment levels include but are not limited to:

1. Analyzing the intended uses of impacted surface and/or ground waters;
2. Contacting adjacent property owners for potential conflicts with property line encroachments; and
3. Analyzing potential impacts that system locations may have on building foundations and other potentially affected features.

B. Dry Gulches, Cut Banks and Fill Areas

1. Separation distances to dry gulches, cut banks and fill areas in Table XII-1 shall apply unless the designer or design engineer determines by observation of the exposed slope of the dry gulch or cut bank or by profile holes or soil profile test pit excavations that a restrictive layer is present that will direct or allow the effluent from the soil treatment area to move laterally and surface.

2. A lesser distance may be used if it can be demonstrated by a professional engineer or professional geologist that the use of a barrier, such as a minimum 30 mil PVC liner placed between the soil treatment area and the slope of the dry gulch, cut bank or fill area will prevent effluent surfacing laterally.
 3. The separation distance between a component and the crest of a dry gulch or cut bank will be evaluated for potential erosion or slope instability if the component and slope are too close together. If there is a potential for erosion or instability, the separation distance shall be increased until the risk is minimized.
- C. Components of an OWTS listed in Table XII-1 shall be installed or located in accordance with the minimum distance requirements provided in the table or such increased distances provided by this Regulation.
- D. Table XII-2 provides the required site evaluation, design, and treatment level considerations necessary to evaluate the site and to design and locate the soil treatment area component of an OWTS.
1. Items 1, 2 and 3 in Table XII-2 address the allowable horizontal setback distance between the soil treatment area and the following physical features:
 - a. Setback distance from soil treatment area to on-site well;
 - b. Setback distance from soil treatment area to water features;
and
 - c. Setback distance from soil treatment area to a dry gulch or cut bank.
 2. Item 4 in Table XII-2 addresses the required vertical separation distance between the infiltrative surface of the soil treatment area and the restrictive layer or the required depth of soil comprising the soil treatment area.

Table XII-1 Minimum Horizontal Distances in Feet Between Components of an On-Site Wastewater Treatment System Installed After November 15, 1973 and Water, Physical and Health Impact Features

| | Spring, Well, ¹ Suction Line | Potable Water Supply Line | Potable Water Supply Cistern | Dwelling Occupied Building | Property Lines, Piped or Lined Irrigation Ditch | Subsurface Drain, Intermittent Irrigation Lateral, Drywell, Stormwater Infiltration Structure | Lake, Water Course, Irrigation Ditch, Stream, Wetland | Dry Gulch, Cut Bank, Fill Area (from Crest) | Septic Tank |
|--|---|---------------------------|------------------------------|----------------------------|---|---|---|---|-------------|
| Septic Tank, Higher Level Treatment Unit, Dosing Tank, Vault | 50 ² | 10 ² | 25 | 5 | 10 | 10 | 50 | 10 | -- |
| Building Sewer or Effluent Lines | 50 ² | 10 ² | 25 ² | 0 | 10 ² | 10 ² | 50 ² | 10 ² | -- |
| STA Trench, STA Bed, Unlined Sand Filter, Sub-surface Dispersal System, Seepage Pit | 150 ³ | 25 ² | 25 | 20 | 10 | 25 | 50 ³ | 25 | 5 |
| Lined Sand Filter | 60 | 10 ² | 25 | 15 | 10 | 10 | 25 | 10 | 5 |
| Lined Evapo-transpiration Field or Outside of Berm of Lined Wastewater Pond | 60 | 10 ² | 25 | 15 | 10 | 10 | 25 | 10 | 5 |
| Unlined Sand Filter in Soil With a Percolation Rate Slower than 60 Minutes per Inch, Unlined or Partially Lined Evapotranspiration System, Outside of Berm of Unlined Wastewater Pond, or System Not Relying on STA for Treatment Other than Aerosol | 150 | 25 ² | 25 | 15 | 10 | 25 | 25 | 15 | 10 |
| Vault Privy | 50 | 10 ² | 25 | 15 | 10 | 10 | 25 | 10 | -- |
| Slit Trench Latrine, Pit Privy | 150 | 50 ² | 25 | N/A | 25 | 25 | 100 | 25 | N/A |
| System Not Relying on STA for Treatment and Utilizing Aerosol Methods | 150 ³ | 10 ² | 50 | 125 | 10 | 0 | 25 ³ | 10 | 10 |

NOTE: The minimum distances shown above must be maintained between the OWTS components and the features described. Where soil, geological or other conditions warrant, greater distances may be required by the local board of health or by the Water Quality Control Commission pursuant to section 25-8-206, C.R.S. and applicable regulations. For repair or upgrading of existing OWTS where the size of lot precludes adherence to these distances, a repaired OWTS shall not be closer to setback features than the existing OWTS, as reviewed and approved by the local public health agency. Components that are not watertight should not extend into areas of the root system of nearby trees.

1. Includes infiltration galleries permitted as wells by the Division of Water Resources.

2. Crossings or encroachments may be permitted at the points as noted above provided that the water or wastewater conveyance pipe is encased for the minimum setback distance on each side of the crossing. A length of pipe shall be used with a minimum Schedule 40 rating of sufficient diameter to easily slide over and completely encase the conveyance. Rigid end caps of at least Schedule 40 rating must be glued or secured in a watertight fashion to the ends of the encasement pipe. A hole of sufficient size to accommodate the pipe shall be drilled in the lowest section of the rigid cap so that the conveyance pipe rests on the bottom of the encasement pipe. The area in which the pipe passes through the end caps shall be sealed with an approved underground sealant compatible with the piping used.

3. Add eight feet additional distance for each 100 gallons per day of design flows between 1,000 and 2,000 gallons per day, unless it can be demonstrated by a professional engineer or geologist by a hydrologic analysis or the use of a barrier, consisting of a minimum 30 mil PVC liner or equivalent, that contamination will be minimized. Flows equal to or greater than 2,000 gallons per day must be hydrologically analyzed for flow, velocity, hydraulic head, and other pertinent characteristics as means of estimating distances required to minimize contamination as part of the Water Quality Control Division site application process.

Table XII-2 On-site Wastewater Treatment System Design Consideration and Treatment Requirements – Separation Distances from Soil Treatment Area

| ITEM | OWTS DESIGN CONSIDERATION | All Treatment Levels |
|------|--|-----------------------------------|
| | <u>Horizontal Separation Distances</u> | |
| 1 | Distance from soil treatment area to on-site well | Greater than or equal to 150 feet |
| 2 | Distance from soil treatment area to pond, creek, lake, or other surface water feature | Greater than or equal to 50 feet |
| 3 | Distance from soil treatment area to dry gulch or cut bank | Greater than or equal to 25 feet |
| | <u>Vertical Separation Distances</u> | |
| 4 | Depth in feet from soil treatment area infiltrative surface to restrictive layer or ground water | Greater than or equal to 4 feet |

NOTE: Treatment levels are defined in Table XI-3..

1. Prior to approval, all setback distance reductions to the 150 foot requirement for wells and soil treatment areas must be in full compliance with the minimum standards and variance requirements of the State of Colorado Division of Water Resources: [Rules and Regulations for Water Well Construction, Pump Installation, Cistern Installation, and Monitoring and Observation Hole/Well Construction.](#)

XIII. Design Criteria – General

- A. Performance: OWTS shall be designed and constructed to achieve the treatment level specified by the design.
- B. Reliability: OWTS shall be designed and constructed such that each component shall function, when installed and operated, in a manner not adversely affected by normal operating conditions including erosion, corrosion, vibration, shock, climatic conditions, and usual household

chemicals. Each component shall be free of non-functional protrusions or sharp edges, or other hazards, which could cause injury to persons, animals, or properties. Design shall be such as to exclude flies and rodents and other vectors and to prevent the creation of nuisances and public health hazards and shall provide for efficient operation and maintenance.

C. Accessibility for Inspection, Maintenance, and Servicing

1. Septic tanks shall have risers over each access manhole and all risers shall extend to or above final grade.
2. Each treatment component of an OWTS other than the septic tank and soil treatment area shall be equipped with access manholes with risers that extend to or above final grade, located to permit periodic physical inspection, collection and testing of samples and maintenance of all components and compartments.
3. Riser Lids
 - a. Each riser lid brought to the surface shall have a secure closing mechanism, such as a lock, special headed bolts or screws, or sufficient weight to prevent unauthorized access.
 - b. The Health Officer may require a secondary plug, cap, cover or screen below the riser cover to prevent tank entry if the cover is unknowingly damaged or removed.
4. Components that require access for maintenance shall include but not be limited to submerged bearings, moving parts, pumps, siphons, valves, tubes, intakes, slots, distribution boxes, drop boxes, cleanouts, effluent screens, filters, inlet and outlet baffles, aerators, treatment equipment and other devices.
5. Components shall be designed and constructed so that, when installed, they shall be easily maintained, sampled, and serviced according to the manufacturer's recommendations. Easy physical access to treatment components by maintenance personnel and equipment shall be provided.

D. Plumbing Codes: Plumbing fixtures, building sewers, vents, sewer lines and other appurtenances shall be designed, operated and maintained so as to comply with the minimum requirements of the most recently revised locally enforceable plumbing code. In absence of a local plumbing code, designs shall adhere to the Colorado Plumbing Code (3 CCR 720-1). A local plumbing permit may be required.

E. Electrical Equipment, If Used

1. All electrical work, equipment, and material shall comply with the requirements of the currently applicable National Electrical Code as designated by the State Electrical Board Rules and Regulations (3 CCR 710-1). A local electrical permit may be required.
2. Electrical components shall be protected from moisture and corrosive gases.

F. Indicators of Failure or Malfunctioning for Systems Utilizing Mechanical Apparatus: A signal device shall be installed which will provide a

recognizable indication or warning to the user that the system or component is not operating or is operating but malfunctioning. This indication or warning shall be a visual signal or an audible signal or both and shall be located in a centralized area within visual and audible range of the system user. A signal or message may also be sent remotely to a maintenance provider.

G. Sampling Access

1. If sampling for testing or as a requirement for a permit will be required of effluent from a component other than the soil treatment area, an accessible sampling point shall be provided.
2. If sampling of the treated wastewater from the soil treatment area will be required for testing or as a requirement for a permit, a monitoring well or wells shall be constructed. Monitoring wells shall be located down gradient from the soil treatment area, accessible, and provided with a properly securable cover at or above the ground surface. Monitoring wells up gradient of the system may also be required. Lysimeters or other collection devices under the soil treatment area may be used instead of a monitoring well if approved by this Division.

H. Component Operating Instructions

1. The manufacturer of proprietary treatment units utilizing mechanical components shall provide clear, concise written instructions covering the components which, when followed, shall assure proper installation and safe and satisfactory operation and maintenance.
2. If the OWTS uses public domain technology, the design engineer shall provide clear, concise written instructions covering the components which, when followed, shall assure proper installation and safe and satisfactory operation and maintenance.

I. Surface Activity: Activity or use on the surface of the ground over any part of the OWTS must be restricted to that which shall allow the system to function as designed and which shall not contribute to compaction of the soil or to structural loading detrimental to the structural integrity or capability of the component to function as designed. During construction, equipment shall be kept off of the ground surface above the soil treatment area and out of the excavation to prevent compaction. If compaction occurs, the disturbed or compacted soil shall be re-evaluated and new percolation tests may be performed to the disturbed or compacted soil and the system redesigned if the parameters have changed.

J. Floodplains

1. New OWTS and replacement OWTS installed in a 100-year floodplain shall meet or exceed the requirements of the Federal Emergency Management Agency and the local emergency agency. Repairs of an existing system shall meet the requirements as feasible. The system as approved by this

Division shall be designed to minimize or eliminate infiltration of floodwaters into the system and discharge from the system into the floodwaters.

2. No new or expanded OWTS shall be installed in a floodway designated in a 100-year floodplain. For any system repair that may affect the floodway delineation, appropriate procedures shall be followed including revision of the floodway designation, if necessary.

K. Business Commercial, Industrial, Institutional or Multi-Family Dwelling Wastewater Systems

1. An OWTS that will serve a business, commercial, industrial or institutional property, or a multifamily dwelling shall:
 - a. Be designed by a professional engineer;
 - b. Receive only such biodegradable wastes for treatment and distribution as are compatible with those biological treatment processes as occur within the septic tank, any additional treatment unit and the soil treatment area; and
 - c. Receive authorization by rule or a class V underground injection permit from the United States Environmental Protection Agency (EPA) before an application for an OWTS permit is approved if the system may receive non-residential wastewater or is otherwise covered by the EPA underground injection control program.

XIV. Design Criteria – Components

A. Tanks and Vaults

1. Watertightness
 - a. Septic tanks, vaults, pump tanks, other treatment components, risers and lids shall not allow infiltration of ground water or surface water and shall not allow the release of wastewater or liquids through other than designed openings.
 - b. Acceptable watertightness testing methods performed at a manufacturer's site or in the field include water filling the tank or vacuum testing.
2. Tank Anchoring: In locations where ground water or floodwaters may cause instability problems to the septic tank, vault, or other treatment unit in the OWTS due to flotation, the tank, vault or unit shall be anchored in a manner sufficient to provide stability when the tank is empty. Risers shall be included in the buoyancy calculations.
 - a. If a manufacturer provides recommendations for anchoring designs, they may be used if they meet the conditions present at the site.
 - b. If a manufacturer does not provide recommendations for provisions to compensate for buoyancy, or if the

professional engineer chooses to provide his/her own designs, the anchoring system design shall be prepared by the professional engineer.

3. Identification and Data Marking: All tanks and treatment units shall be permanently and legibly marked in a location for the purpose of inspection that is readily visible when inspected before backfilling. The marking inscription shall include the following:
 - a. Name of manufacturer;
 - b. Model or serial number, if available;
 - c. Effective volume and unit of measure;
 - d. Maximum depth of earth cover and external loads the tank is designed to resist; and
 - e. Inlet and outlet identifications, if relevant.

B. Septic Tanks

1. The manufacturer shall provide sufficient information to demonstrate that the tank will meet the design specification.
2. Sizing Requirements:
 - a. Sizing for residential capacity for new installations shall be based upon the number of bedrooms according to Table XIV-1:

Table XIV-1 Minimum Septic Tank Size Based on Number of Bedrooms

| Number of Bedrooms | Tank Capacity (gallons) |
|---------------------------|--------------------------------|
| 2 or 3 | 1,000 |
| 4 | 1,250 |
| Each Additional | 250 |

- b. For multi-family and non-residential applications, a septic tank shall be sized to permit detention of incoming wastewater design flows for a minimum of 48 hours.
 - c. Minimum tank size for new installations other than for a single-family residence is 1000 gallons.
 3. Testing of Septic Tank Watertightness
 - a. Testing of septic tanks must be performed and evaluated as specified in section 9 of ASTM C1227-12 (Standard Specification for Precast Septic Tanks) for concrete tanks or in Standard IAPMO/ANSI Z1000-2007 (American Standards for Prefabricated Septic Tanks) for other prefabricated septic tanks.
 - b. Each unit shall be inspected in the field for conditions that may compromise its watertightness.
 - c. The inspection in the field shall be conducted by and Environmental Health Specialist and be performed after the tank installation but before backfilling.

- d. If the inspection in the field indicates that the tank may be damaged or is not watertight, the inspector may require that the tank be tested for watertightness by the tank manufacturer or the system contractor.
4. Septic Tank Design and Dimension Criteria
- a. A septic tank shall have two or more compartments or more than one tank may be used in series. The first compartment of a two-compartment tank or the first tank in a series shall hold no less than one-half of the required effective volume.
 - b. Inlet invert shall be at least two inches higher than the outlet invert.
 - c. Inlet tee or baffle shall extend above the surface of the liquid at least five inches and shall extend a minimum of eight inches below the liquid surface.
 - d. Outlet tee or baffle shall extend at least 14 inches below the outlet invert and, if needed, be modified to accommodate an effluent screen. The outlet tee or baffle that accommodates an effluent screen must be located so that the effluent screen has sufficient clearance to be removed through the access opening with a riser in place.
 - e. The distance from the outlet invert to the underside of the tank top shall be at least ten inches.
 - f. Liquid depth shall be a minimum of 30 inches and the maximum depth shall not exceed the tank length.
 - g. The transfer of liquid from the first compartment to the second or successive compartment shall be made at a liquid depth of between 35 and 40 percent of the liquid depth measured from the liquid surface.
 - h. At least one access manhole no less than 20 inches across shall be provided in each compartment of a septic tank.
 - i. A septic tank shall have a minimum of 25 square feet of liquid surface area and have at least a six-foot separation between inlets and outlets. Septic tanks in series, combined, shall have a minimum of 25 square feet of liquid surface area and the sum of the distances between inlets and outlets of all tanks must be at least six feet. The requirements for liquid surface area and separation between inlet and outlet may be waived for tanks with less than 750 gallon effective volume.
5. Concrete Septic Tank Structural Design
- a. Concrete septic tanks shall comply with the structural design criteria of ASTM C1227-12 (Standard Specification for Precast Septic Tanks).

- b. The design for each tank model and size by each manufacturer must be certified by a professional engineer as complying with these design and structural requirements and the watertightness standard of this regulation.
 - c. Certification by a professional engineer must be submitted to the Water Quality Control Division for acceptance.
 - d. Tank slab lids or mid-seam tanks shall be sealed to be watertight.
 - e. Connections between tank and risers shall be sealed to be watertight.
 - 6. Fiberglass, Fiberglass-Reinforced Polyester, and Plastic Tanks
 - a. All fiberglass, fiberglass-reinforced polyester, and plastic tanks shall meet the minimum design and structural criteria of IAPMO/ANSI Z1000-2007 (American Standards for Prefabricated Septic Tanks) and be certified by a professional engineer as meeting these standards. The professional engineer certifying the criteria must be registered or licensed in the United States, but need not be registered in Colorado.
 - b. All tanks shall be sold and delivered by the manufacturer or manufacturer's designated representative, preferably completely assembled. On-site tank assembly will be allowed on an as-needed basis.
 - c. Tanks shall be structurally sound and support external forces as specified in the standard referenced above when empty and internal forces when full. Tanks shall not deform or creep resulting in deflection of more than five percent in shape as a result of loads imposed.
 - d. All tanks shall be constructed of sound, durable materials and not be subject to excessive corrosion, decay, frost damage, or cracking.
 - e. All seams or connections including to risers shall be sealed to be watertight.
 - 7. Metal tanks are prohibited
- C. Abandonment of Tank
 - 1. A tank may be completely removed and the parts disposed of safely.
 - 2. If the tank will remain in place:
 - a. The tank shall be pumped to remove as much waste as possible;
 - b. The bottom of the tank shall be broken so the tank neither floats nor fills with water;
 - c. The top must be collapsed and the sides may be broken into the void;
 - d. The remaining void shall be filled with gravel, sand or compacted soil; and

- e. The filled excavation will be graded to surroundings, allowing for settling.
 - 3. The Division may require abandonment of a tank that is deemed to be a hazard.
 - D. Pipe Standards and Bedding Requirements:
 - 1. Pipe Standards
 - a. All wastewater lines used in an OWTS shall be constructed of compatible pipe, primer, bonding agent, and fittings.
 - b. Where unperforated plastic pipe and fittings are used for gravity flow, the minimum wall thickness of the pipe shall conform to ASTM Standard D 3034 or equivalent or greater strength. Schedule 40 pipe is preferred.
 - c. Perforated distribution pipe surrounded by rock within a soil treatment area shall have a minimum wall thickness and perforations conforming to ASTM Standard D 2729 or equivalent or greater strength. Corrugated polyethylene pipe with smooth interior that meets ASTM F405 or AASHTO M252 specifications or equivalent may be used.
 - d. Schedule 40 or pipe of equivalent or greater strength shall be used for the placement of piping under driveways or roadways and in instances where sewer line setback distances are granted a variance for any reason.
 - e. Tile pipe, open-joint pipe, and cast iron pipe must not be used in an OWTS.
 - f. Pressure pipe must be rated for the intended use to accommodate pump discharge pressure.
 - 2. Bedding: All system piping, except for distribution laterals within the soil treatment area, shall be bedded with select material before final inspection by the Division. Select bedding material shall consist of loose, granular material, free from stones, clods, frozen soil, or other deleterious material. Select material may consist of on-site job-excavated or imported material. Bedding material must be mechanically compacted to support piping.
 - E. Distribution Box: A distribution box, if used, shall be of sufficient size to distribute effluent equally to the lateral lines of a trench or absorption bed system. The box shall be constructed with the inlet invert at least one inch above the level of the outlet inverts. Flow equalizers or similar devices shall be used to adjust the flow between lines. Access to the box shall be provided with a manhole riser with access lid at or above grade if the top of the box does not reach final grade.
 - F. Drop Box: In sequential or serial distribution, a watertight box may be used to transfer the effluent to the following trench when the effluent in a trench has received the designed level for overflow to the next trench. A drop box shall have a riser at or above final grade, if the top of the drop box does not reach final grade. Outlet lines in sequential distribution shall

be designed and installed so that they may be capped off for resting periods.

G. Stepdown/Relief Line: In sequential or serial distribution, an un-perforated pipe may be used to transfer the effluent to the following trench when the effluent in a trench has received the designed level for overflow from that trench.

H. Wastewater Pumping and Dosing Siphon Systems

1. Pumps

- a. Non-clog pump opening shall have at least two-inch diameter solids handling capacity where raw wastewater is pumped. A pump opening shall not have more than 3/4-inch diameter solids handling capacity if previously settled effluent is pumped.
- b. Pumps must be certified to the applicable UL or CSA electrical safety standard, bear the seal of approval of CSA, UL or an equivalent testing program and be constructed of corrosion resistant materials.
- c. Grinder pumps must also be certified to NSF/ANSI Standard 46 and bear the seal of approval of the NSF or equivalent testing and certification program.

2. Floats and Switches

- a. Automatic liquid level controls must be provided to start and shut off pumps at a frequency or level specified in the design.
- b. Floats must be mounted on a stem separate from the pump discharge piping to allow for removal, adjustment, and replacement of the float without removing the pump.
- c. Float switches must be certified to the applicable UL or CSA electrical safety standard, bear the seal of approval of CSA, UL or an equivalent certification program and be constructed of corrosion resistant materials.

3. Location of Pump or Siphon

- a. A pump may be, or a siphon shall be, installed in a separate tank following the septic tank and be of sufficient volume to allow pump or siphon cycling commensurate with the design capacity. The use of a three-compartment septic tank, sized to provide effective volume in the first two compartments with the pump in the third compartment, is acceptable.
- b. The second compartment of the septic tank shall not be used as the pump tank unless it can be demonstrated to the satisfaction of this Division that the minimum 48-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.

4. Pump or Siphon Discharge Piping
 - a. The discharge line from the pumping or siphon chamber shall be protected from freezing by burying the pipe below frost level or sloping the pipe to allow it to be self-draining. Drainage shall be provided through the bottom of the pump or through a weep hole located in the discharge line prior to exiting the tank.
 - b. The pump discharge piping shall have a quick disconnect that is accessible within the riser to allow for easy pump access and removal.
 - c. The pipe shall be sized to maintain a velocity of two or more feet per second.
 - d. Automatic air/vacuum release valves shall be installed at high points in the pressure line where necessary to prevent air or vacuum locking and allow self draining of the lines.
5. Access
 - a. The pump or dosing system tank, chamber, or compartment shall have a minimum 24-inch diameter access riser, made of corrosion-resistant material, extending to or above the ground level.
 - b. The access riser must have a watertight connection to the pump or dosing chamber/compartment to prevent infiltration or exfiltration.
6. Splice Box
 - a. Splice boxes shall be located outside the pump system access riser and be accessible from the ground surface.
 - b. No wire splices shall be made inside the tank, dosing chamber or riser. Wire splicing shall be completed with corrosion-resistant, watertight connectors.
7. Controls
 - a. The pump system shall have an audible and visual alarm notification in the event an excessively high water condition occurs.
 - b. The pump shall be connected to a control breaker separate from the high water alarm breaker and from any other control system circuits.
 - c. The pump system shall have a switch so the pump can be manually operated.
 - d. The pump system for pressure dosing and higher level treatment systems shall have a mechanism for tracking either the amount of time the pump runs or the number of cycles the pump operates.
 - e. Control panels shall be UL listed.
- I. Effluent Screens
 1. Effluent screens may be used in all septic tanks in new installations and repairs where the septic tank is replaced.

2. If a pump or dosing siphon is used to remove septic tank effluent from the final compartment of the septic tank, an effluent screen must be provided prior to the pump or siphon inlet. A pump vault equipped with a filter cartridge may be considered equivalent to an effluent screen preceding the pump.
 3. The effluent screen shall be cleaned at manufacturer-recommended intervals, or more often, if use patterns indicate.
 4. An alarm may be installed on an effluent screen indicating need for maintenance. This Division may require effluent screens to be equipped with alarms.
- J. Grease Interceptor Tanks
1. All commercial food service facilities and other facilities generating fats, oils and greases in their waste must install a grease interceptor tank.
 2. Grease interceptor tanks shall treat only those portions of the total wastewater flow in which grease and oils are generated.

XV. Design Criteria – Soil Treatment Area

- A. The size and design of the soil treatment area shall be based on the results of the site and soil evaluation, design criteria, and construction standards for the proposed site and OWTS selected.
- B. At proposed soil treatment area locations where any of the following conditions are present, the system shall be designed by a professional engineer and approved by this Division:
 1. The soil classifications are Types 0, 3A, 4, 4A, and 5 in Table XV-1 of this regulation;
 2. The maximum seasonal level of the ground water surface is less than four feet below the bottom of the proposed absorption system;
 3. A restrictive layer exists less than four feet below the bottom of the proposed absorption system;
 4. The ground slope is in excess of thirty percent; or
 5. Pressure distribution is used.
- C. Calculation of Infiltrative Surface of Soil Treatment Area
 1. The infiltrative surface of a trench or bed receiving any treatment level of effluent is only the bottom area. No sidewall credit is allowed except in deep gravel trenches and seepage pits that are permissible in repairs.
 2. Long-term acceptance rates (LTARs) are shown in Table XV-1.
 3. Factors for adjusting the size of the soil treatment area are in Tables XV-2 and XV-3.

4. The required area for a soil treatment area is determined by the following formula:

$$\text{Soil Treatment Area in square feet required} = \frac{\text{Design Flow (in gallons per day)}}{\text{LTAR (in gallons per day per square foot)}}$$

- a. Adjusted Soil Treatment Area = Required Soil Treatment Area x Size Adjustment Factor(s).
- b. Size adjustment factors for methods of application are in Table XV-2.
- c. Size adjustment factors for types of storage/distribution media are in Table XV-3.
- d. A required soil treatment area receiving TL1 effluent may be multiplied by one size adjustment factor from Table XV-2, Table XV-3, or both.

Table XV-1 Soil Treatment Area Long-term Acceptance Rates by Soil Texture, Soil Structure, Percolation Rate and Treatment Level

| Soil Type, Texture, Structure and Percolation Rate Range | | | | | Long-term Acceptance Rate (LTAR) Gallons per day per square foot |
|--|---|--|----------------------------|------------------------|--|
| Soil Type | USDA Soil Texture | USDA Soil Structure-Shape | USDA Soil Structure-Grade | Percolation Rate (MPI) | All Treatment Levels |
| 0 | Soil Type 1 with more than 35% Rock (>2mm); Soil Types 2-5 with more than 50% Rock (>2mm) | -- | 0 (Single Grain) | <5 | Minimum 3-foot deep unlined sand filter required ² |
| 1 | Sand, Loamy Sand | -- | 0 | 5-15 | 0.80 |
| 2 | Sandy Loam, Loam, Silt Loam | PR (Prismatic) BK (Blocky) GR (Granular) | 2 (Moderate) 3 (Strong) | 16-25 | 0.60 |
| 2A | Sandy Loam, Loam, Silt Loam | PR, BK, GR 0 (none) | 1 (Weak) Massive | 26-40 | 0.50 |
| 3 | Sandy Clay Loam, Clay Loam, Silty Clay Loam | PR, BK, GR | 2, 3 | 41-60 | 0.35 |
| 3A | Sandy Clay Loam, Clay Loam, Silty Clay Loam | PR, BK, GR 0 | 1 Massive | 61-75 | 0.30 |
| 4 | Sandy Clay, Clay, Silty Clay | PR, BK, GR | 2, 3 | 76-90 | 0.20 |
| 4A | Sandy Clay, Clay, Silty Clay | PR, BK, GR 0 | 1 Massive | 91-120 | 0.15 |
| 5 | Soil Types 2-4A | Platy | 1, 2, 3 | 121+ | 0.10 |

NOTE: Shaded areas require system design by a professional engineer.

D. Allowable Soil Treatment Area Reductions and Increases:

1. The soil treatment area size determined by dividing the design flow rate by the long-term acceptance rate may be adjusted by factors for method of treatment, soil treatment area design, and type of distribution media.
2. For the purpose of the table, a “baseline system,” i.e. adjustment factor of 1.00, is considered to be Treatment Level 1 (TL1) applied by gravity to a gravel-filled trench.
3. The maximum reduction from all combined reductions including higher level treatment shall be no greater than 50 percent of the baseline system required for a soil treatment area.
4. Reductions for use of the higher level treatment categories listed in Table XV-1 shall not be permitted in Pueblo County.

Table XV-2 Size Adjustment Factors for Methods of Application in Soil Treatment Areas

| Type of Soil Treatment Area | Method of Effluent Application from Treatment Unit Preceding Soil Treatment Area | | |
|-----------------------------|--|------------------------|----------------|
| | Gravity | Dosed (Siphon or Pump) | Pressure Dosed |
| Trench | 1.0 | 0.9 | 0.8 |
| Bed | 1.2 | 1.1 | 1.0 |

Table XV-3 Size Adjustment Factors for Types of Distribution Media in Soil Treatment Areas Accepting Treatment Level 1 Effluent

| Type of Soil Treatment Area | Type of Storage/Distribution Media Used in Soil Treatment Area | | |
|-----------------------------|--|--|----------|
| | Rock or Tire Chips | Manufactured Media Other Than Chambers | Chambers |
| Trench or Bed | 1.0 | 0.9 | 0.7 |

E. Design of Distribution Systems

1. General

- a. The infiltrative surface and distribution lines must be level.
- b. The infiltrative surface must be no deeper than four feet unless adequate treatment at a deeper level can be demonstrated and is approved by the Division. The depth will be measured on the downslope side of the trench or bed.
- c. Trenches must follow the ground surface contours so variations in infiltrative surface depth are minimized. Beds must be oriented along contours to the degree possible.
- d. Pipe for gravity distribution must be no less than three inches in diameter.
- e. Final cover of soil suitable for vegetation at least ten inches deep must be placed from the top of the geotextile or similar pervious material in a rock and pipe system, chamber, or manufactured media up to the final surface grade of the soil treatment area.
- f. Following construction, the ground surface must be graded to divert stormwater runoff or other outside water from the soil treatment area. The area must be protected against erosion. Subsurface drains upslope of the soil treatment area may be installed to divert subsurface flow around the area.
- g. Backfilling and compaction of soil treatment areas shall be accomplished in a manner that does not impair the intended function and performance of the storage/distribution media and soil and distribution laterals, allows for the establishment of vegetative cover, minimizes settlement and maintains proper drainage.

2. Distribution Lines

- a. Distribution between lines in a soil treatment area must be as even as possible. Uneven settling of portions of the distribution system following construction must be addressed by provisions in the design to adjust flows between lines.
- b. Distribution lines shall be a maximum of 100 feet long.
- c. The end of a distribution pipe must be capped, unless it is in a bed or trenches in a level soil treatment area, where the ends of the lines may be looped.
- d. Inspection Ports
 - i. An inspection port accessible from ground surface must be installed at the terminal end of each line. The bottom of the inspection port tube must extend to the infiltrative surface and not be connected to the end of the distribution pipe. Inspection ports in chambers may be installed according to

- manufacturer's instructions if the infiltrative surface is visible or can be measured from the inspection port.
 - ii. Additional inspection ports connected to distribution pipes may be installed.
 - iii. The top of inspection ports may be below the final grade of the surface if each has a cover at the surface such as a valve box for a lawn irrigation system.
 - e. Trenches
 - i. Trenches must be three feet wide or less.
 - ii. The separating distance between trenches must be a minimum of six feet sidewall-to-sidewall.
 - iii. Perforated distribution pipe used in a trench must be as close to the center of the trench as possible.
 - iv. Perforations must be oriented downward unless pressure distribution is used and provision for pipe drainage is included.
 - f. Beds
 - i. Maximum width for a bed must be 12 feet.
 - ii. The separating distance between beds must be a minimum of six feet sidewall-to-sidewall.
 - iii. The separating distance between parallel distribution lines in a bed must not exceed six feet and a distribution line must be located within three feet of each sidewall and endwall of the bed.
 - g. Serial and Sequential Distribution
 - i. A serial or sequential distribution system may be used where the ground slope does not allow for suitable installation of a single level soil treatment area unless a distribution box or dosing chamber is used.
 - ii. The horizontal distance from the side of the absorption system to the surface of the ground on a slope must be adequate to prevent lateral flow and surfacing.
 - iii. Adjacent trenches or beds must be connected with a stepdown/relief line or a drop box arrangement such that each trench fills with effluent to the top of the gravel or chamber outlet before flowing to succeeding treatment areas.
- 3. Storage/Distribution Media
 - a. Rock and Pipe
 - i. The pipe must be surrounded by clean, graded gravel, rock, or other material of equal efficiency which may range in size from 1/2 inch to 2 1/2 inches. At least six inches of gravel, rock or other material must be placed below the pipe. The gravel, rock or other material must fill the trench around the pipe and

- at least two inches above the top of the distribution pipe.
 - ii. The top of the placed gravel or such material used must be covered with non-woven permeable geotextile meeting a maximum thickness rating of 2.0 ounces per square yard or equivalent pervious material. An impervious covering must not be used.
- b. Tire Chips
 - i. The pipe may be surrounded with clean, uniformly-sized tire chips.
 - ii. Tire chips must be nominally two inches in size and may range from 1/2 inch to a maximum of four inches in any one direction.
 - iii. Wire strands must not protrude from the tire chips more than 0.75 inches.
 - iv. Tire chips must be free from balls of wire and fine particles less than two mm across.
 - v. The top of the tire chips used must be covered with non-woven permeable geotextile meeting a maximum thickness rating of 2.0 ounces per square yard or equivalent pervious material. An impervious covering must not be used.
- c. Chambers
 - i. Chambers must be installed with the base on the infiltrative surface.
 - ii. Installation must be according to manufacturer's instructions.
 - iii. Effluent may be distributed by gravity or pressure dosing.
- d. Manufactured Media
 - i. Manufactured media must be installed with the base on the infiltrative surface.
 - ii. Installation must be according to manufacturer's instructions.
 - iii. Effluent may be applied by pressure distribution only if the manufacturer specifies suitability of the product for that use.
- e. Pressure Distribution
 - i. Design of pressure distribution systems must include:
 - (1) Dose size and frequency for flows and soil or media long-term acceptance rate;
 - (2) Pipe diameter and strength requirements;
 - (3) Orifice size and spacing; and
 - (4) Distal pressure head.
 - ii. Cleanouts must be installed at the end of each line.

f. Driplines

- i. The infiltrative surface area must be calculated using the long-term acceptance rate for the site or a more conservative value if recommended by the manufacturer.
- ii. Driplines must be installed on manufacturer's spacing recommendations.
- iii. Drainback must be provided for all drip lines, pipes and pumps.
- iv. Provisions must be made to minimize freezing in the distribution lines, driplines, relief valves, and control systems.
- v. Provisions must be made for backflushing or other cleaning.

F. Alternating and Sequencing Zone Systems

1. Alternating Systems

- a. An alternating system must have two zones that must be alternated on an annual or more frequent basis.
- b. Each section must be a minimum of 50 percent of the total soil treatment area. Size adjustment factors for methods of effluent application or type of distribution media shall not be allowed.
- c. A diversion valve or other approved diversion mechanism may be installed on the septic tank effluent line allowing soil treatment area sections to be alternated.
- d. The diversion mechanism must be readily accessible from the finished grade.

2. Sequencing Zone Systems

- a. Sequencing zone systems have more than two soil treatment area sections that are dosed on a frequent rotating basis.
- b. Where soil conditions are similar between the sections, each section area shall be the same size. If soil conditions are such that long-term acceptance rates are different, each section may be sized for the same dose, but different long-term acceptance rates.
- c. An automatic distribution valve must be used.
- d. Dosing of each system must be evaluated by the design engineer based on projected daily flow rates, number of zones, and soil types.

G. Dosing: Dosing may be used for soil treatment area distribution. The dose must be sized to account for the daily flow and the dosing frequency.

H. Soil replacement must be permitted to bring the soil within the requirements of suitable soil. Added soil must meet the specifications of sand filter media, as specified in section XVI.C.2.a.i. All added soil must be completely settled prior to installation of components as specified and

approved by the design engineer. The loading rate for sand filters must be used. Pressure distribution must be used.

I. Repairs

1. When space is not available or if there are other site limitations that preclude other soil treatment area options for OWTS repairs, wide beds, deep gravel trenches, and seepage pits may be considered for repairs only. Other options are vaults or higher level treatment systems, if the local board of health permits them.
2. Wide Beds: For repairs, beds may be wider than 12 feet.
3. Deep Gravel Trenches
 - a. The length of an absorption trench or bed may be calculated by allowance for the sidewall area of additional depth of gravel in excess of six inches below the bottom of the distribution pipe according to the following formula:

$$\text{Adjusted Length} = L \times \frac{(W+2)}{(W+1+2D)}$$

Where:

L = length of trench prior to adjustment for deep gravel

W = width of trench or bed in feet

D = additional depth in feet of gravel in excess of the minimum required six inches of gravel below the distribution pipe

- b. Maximum allowable additional depth is five feet.
 - c. Percolation tests and soil profile hole or soil profile excavation test pit evaluations must be performed at the proposed infiltrative surface depth.
 - d. The reduction in field size area with the use of chambers must not be applied to deep gravel systems.
4. Seepage Pits
 - a. For repairs, potential for risk to public health and water quality may be evaluated by this Division. If risk is low in the determination of the Division, a seepage pit may be used.
 - b. Seepage pit shall consist of a buried vertical cylinder with holes in the wall.
 - i. Pits must be provided with both vertical sidewall and top supporting structural concrete or other material of equal structural integrity.
 - ii. The excavation must be larger than the cylinder by at least 12 inches on each side.
 - iii. The over-excavated volume must be filled with rock ranging in size from 1/2 inch to 2 1/2 inches.
 - iv. The capacity of the pit must be computed on the basis of long-term acceptance rates determined for each

- stratum penetrated. The weighted average of the results must be used to obtain a design figure.
- v. Soil strata in which the percolation is slower than 30 minutes per inch must not be used for absorption or seepage. These strata must not be included in the weighted average to determine the long-term acceptance rate.
 - vi. The infiltrative surface of the pit is the vertical wall area (based on dug perimeter) of the pervious strata below the inlet plus the bottom area inside the vertical cylinder.
- c. Pits must be separated by a distance equal to three times the greatest lateral dimension of the largest pit. For pits over 20 feet in depth, the minimum space between pits must be 20 feet.
 - d. The construction of new seepage pits for the treatment and dispersal of on-site wastewater on new sites is prohibited.
5. Vaults
- a. Vaults may only be used for repairs by variance request and approval by the Board of Health.
 - b. Criteria for vaults are in section XVII.D. of this regulation.
6. Higher Level Treatment Options
- a. Reductions in required soil treatment area for repairs will not be permitted with higher level treatment.
 - b. Design criteria for higher level treatment systems are in section XVI.

XVI. Design Criteria – Higher Level Treatment Systems

A. General

- 1. Higher level treatment systems must be designed by a professional engineer.
- 2. Higher level treatment systems may be public domain technology systems or proprietary systems.
 - a. Public domain technology systems must be designed, installed and maintained according to established criteria and additional criteria established by the Water Quality Control Division. When design criteria are not specifically provided in Regulation 43 or this Regulation, the criteria used in the design must be from a reference commonly used as an industry standard and the criteria must be cited in the design.
 - b. Proprietary systems must be designed, installed, and maintained according to manufacturer's instructions and additional criteria identified in the Technology Review and Acceptance process, section XVIII.

3. Reductions to soil treatment area or separation distances based on higher level treatment shall not be permitted.
 4. Soil treatment areas for higher level treatment systems must be pressure dosed.
 5. Systems must be capable of accommodating all anticipated flows and organic loads.
 6. Ventilation and air systems: Mechanical components must be installed in a properly vented location and all vents, air intakes, and air hoses must be protected from snow, ice, or water vapor accumulations.
 7. Covers, barriers, or other protection: All systems must be installed to include protection of openings against entry of insects, rodents, other vectors and unauthorized people.
- B. The treatment levels identified in Table XI-3 are specified in this section for public domain technology, and proprietary treatment systems shall be assigned a treatment level by the technology review and acceptance process in section XVIII. Adequate maintenance for each must be required and documented as in section XIX.
- C. Sand Filters
1. Sand filters, such as a lined intermittent sand filter or recirculating sand filter, may be used as a pre-treatment system where the treated effluent is collected and dispersed to a soil treatment area or where site conditions require importing treatment media, such as an unlined sand filter, a soil replacement system, or a mounded system.
 2. Intermittent (Single Pass) Sand Filters
 - a. General
 - i. The filtering material used in a sand filter must be clean, coarse sand, all passing a screen having four meshes to the inch. The sand must have an effective size between 0.25 and 0.60 mm. The uniformity coefficient must be 4.0 or less. Material meeting ASTM 33, for concrete sand, with one percent or less fines passing a 200 mesh sieve may be used.
 - ii. The sand below the distribution lines must be at least two feet deep.
 - iii. Distribution system
 - (1) Dispersal of effluent to the surface of the sand filter must be by a pressurized distribution system for equal distribution.
 - (2) Pipes used to disperse the effluent must be surrounded by washed coarse screened gravel or crushed stone. All of the gravel or stone must pass a 2 1/2-inch screen and must be retained on a 3/4-inch screen.

- (3) Manufactured media may be used as an alternative to gravel or stone.
 - (4) The separation distance between parallel distribution lines must not exceed six feet, and a distribution line must be located within three feet of each filter sidewall.
 - iv. Application Rates
 - (1) When receiving wastewater that meets TL1 treatment level, a maximum sand filter application rate of 1.0 gpd/ft² must be used.
 - (2) When receiving wastewater that meets TL2, TL2N, TL3, or TL3N treatment levels, the sand filter must be sized based on the long-term acceptance rate for Soil Type 1.
 - (3) An intermittent sand filter must not be used to treat wastewater that does not conform to TL1 treatment level or better.
- b. Lined Sand Filters
 - i. Lined sand filters must have an impervious liner on the sides and bottom of the filter. The liner must consist of a 30 mil thickness PVC material or equivalent.
 - ii. A minimum four-inch diameter under-drain pipe must be used. The under-drain pipe must be surrounded by washed coarse screened gravel or crushed stone. All of the gravel or stone must pass a 2 1/2 inch screen and must be retained on a 3/4-inch screen. Manufactured media may be used as an alternative to gravel or stone.
 - iii. Under-drain effluent collected below the sand filter shall be dispersed to a soil treatment area. The soil treatment area receiving the sand filter effluent may be sized with a long-term acceptance rate for the receiving soil.
- c. Unlined (Open Bottom) Sand Filters
 - i. The bottom of the sand filter receiving TL1 must be no less than four feet above the high ground water surface or bedrock for installations in which effluent percolates downward through the soil.
 - ii. The bottom of the sand bed receiving TL2, TL2N, TL3 or TL3N must be at or above the high ground water surface or bedrock.
 - iii. An unlined sand filter is to be sized based on section XVI.C.2.a.iv or the long-term acceptance rate of the receiving soil, whichever results in the larger area.
- d. Mounded Sand Filters (Mound Systems)

- i. When the infiltrative surface area of the media receiving wastewater effluent is above the natural ground surface, the system shall be considered a mounded sand filter.
- ii. Mounded sand filters must conform to section XVI.C.2.iii. for unlined (open bottom) sand filters.
- iii. The basal area and linear loading rate must be determined from the loading rate for the soil type under the mound and the slope of the site.
- iv. The final slope of the mound must be no greater than three feet horizontal to one foot vertical.
- v. The surface of the mounded area must be planted with a suitable vegetative cover.
- vi. If the thickness of the sand is at least two feet, the treatment level for mounded sand filters is TL2 and it does not need an additional two-foot unlined sand filter.

D. Recirculating Sand Filters

- a. A recirculating sand filter must have an impervious liner on the sides and bottom of the filter. The liner must consist of a 30 mil thickness PVC material or equivalent.
- b. A minimum four-inch diameter under-drain pipe must be used. The under-drain pipe must be surrounded by washed coarse screened gravel or crushed stone. All of the gravel or stone must pass a 2 1/2-inch screen and must be retained on a 3/4-inch screen. Manufactured media may be used as an alternative to gravel or stone.
 - i. Filter media effective size (D10) must range from 1.0 to 1.50 mm and the uniformity coefficient (D60/D10) must be less than 4.0. Fines passing a 200 mesh sieve must be less than one percent.
- c. Sand depth must be a minimum of two feet.
- d. Typical loading rates are 3.0 to 5.0 gpd/ ft2. Rate must not exceed 5.0 gpd/ ft2.
- e. Design re-circulation ratios may be 3:1 to 5:1.
- f. Effluent collected from the sand filter must be discharged to a soil treatment area. The soil treatment area receiving the sand filter effluent may be sized with a long-term acceptance rate for TL3N effluent.

E. Rock Plant Filter (Constructed Wetland) Treatment Before a Soil Treatment Area

- 1. Rock Plant Filter (Constructed Wetland) Treatment Before a Soil Treatment Area
- 2. The design must be site specific and include specifications for: loading, capacity, dimensions, liner material, filter media, effluent

- depth and depth control mechanism, density and species of plant material, and other site specific information.
3. The treated effluent from a rock plant filter must be distributed to a soil treatment area.
 4. Although producing higher level treatment, rock plant filters must not be assigned a treatment level higher than TL1 because of system and seasonal variability.

XVII. Design Criteria – Other Facilities

- A. An OWTS treating the wastewater remaining after the separation of the toilet wastes must meet all minimum design and construction standards for a TL1 OWTS based on the volume and character of wastes for the fixtures and the number of persons to be served.
- B. Evapotranspiration and Evapotranspiration/Absorption Systems:
 1. An evapotranspiration system may be designed to consider evaporation and transpiration only, or in soil types 3A, 4, 4A and 5, absorption may also be considered.
 - a. An evapotranspiration system or evapotranspiration/absorption system must be designed by a professional engineer.
 - b. Data to be furnished must include, but shall not be limited to: dimensions; distribution system design; specifications of gravel and wicking sand if used, liner material if used, and bedding; properties of the soil under the evapotranspiration system and provision for vegetation cover.
 - c. The following formula may be used as a guide for determining the area necessary for total evapotranspiration of septic tank effluent:

$$\text{Area (in square feet)} = \frac{\text{Design Flow (in gallons per day)} \times 586}{\text{Lake Evaporation Rate at the Site (inches/yr)}}$$

- d. As an alternative, a system may be designed and sized 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.
- e. If the design provides wicks (sand structures which penetrate through the rock media to the bottom of the bed), they must be equal to 10 to 15 percent of the bed surface area. The wicks must be uniformly spaced throughout the bed.
- f. Sand utilized in evapotranspiration or evapotranspiration/absorption beds for wicks must meet the gradation requirements in Table XVII-1 and be approved by the design engineer.

Table XVII-1 Gradation of Wicking Sand for Evapotranspiration Beds

| Sieve Size | Percent Passing |
|------------|-----------------|
| 4 | 100 |
| 40 | 50-70 |
| 200 | <15 |

- g. Adequate surface area must be provided to evaporate/transpire total annual average daily flows at a rate equivalent to local net lake evaporation including over the part of the year when the evaporation rate is not measured.
- h. If the system is designed as an evapotranspiration/absorption system, the amount of storage and evapotranspiration capacities may be reduced by the volume of effluent absorbed by the soil based on the long-term acceptance rate for that soil type.
- i. Except for dwellings, if the system is designed for summer use only, as determined by the local public health agency, the surface area may be multiplied by 0.6 to obtain the required area.
- j. Evapotranspiration beds and evapotranspiration-absorption beds may be wider than 12 feet.

C. Wastewater Ponds

- 1. Construction of new wastewater ponds for single-family homes is prohibited.
- 2. A septic tank must precede the wastewater pond.
- 3. The depth of the design volume of the wastewater pond must be five feet.
- 4. A wastewater pond must have two feet of free board above the design volume of the pond.
- 5. A wastewater pond must be fenced to keep out livestock, pets, vermin, and unauthorized people.
- 6. Wastewater ponds must be designed on the basis of monthly water balance including design flow, precipitation, evaporation, and seepage.
- 7. Wastewater ponds must be constructed so the seepage out of the bottom or sides does not exceed 1/32 of an inch per day. If this limit cannot be achieved using compacted natural soil materials including soil additives, an impermeable synthetic membrane liner must be used.
- 8. Maintenance must include preventing aquatic and wetland plants from growing in or on the edge of the pond, protecting sides from erosion, and mowing grasses on the berm and around the pond.

9. Wastewater ponds must be designed by a professional engineer.
- D. Vaults Other Than Vault Privies
1. Vaults may be permitted for use by variance request to the Board of Health. Requests for installation and use of a vault must comply with section IX of this Regulation.
 2. A vault must have a minimum 1000 gallon effective volume or be capable of holding a minimum of the two-day design wastewater flow, whichever is larger.
 3. Vaults may be permitted for limited use occupancy on a property which cannot accommodate an OWTS with soil treatment area.
 4. Variances may be granted for specialized commercial uses.
 5. A visual or an audible signal device or both, indicating filling to a maximum of 75 percent capacity, must be installed to indicate when pumping is necessary.
 6. Concrete vaults must meet the strength and watertightness requirements for septic tanks. Prefabricated fiberglass, fiberglass-reinforced polyester, and plastic tanks may be used as vaults, if the tank manufacturer provides testing criteria certifying them for this use.
 7. Vaults for full time use in new construction are prohibited where a property can accommodate an OWTS with a soil treatment area.
 8. Vaults for full time use may be permitted temporarily while a failing OWTS is being repaired or replaced.
 9. A vault may be permitted by variance request to the Board of Health if the facility is on land where the installation of an OWTS with soil treatment area is not permitted.

E. Privies

1. Vault Privy
 - a. Vault privies may be permitted for use by Board of Health. Requests for installation and use of a vault privy must comply with section IX of this Regulation.
 - b. Effective volume of the vault must be no less than 1000 gallons and it must be constructed of concrete or plastic. The vaults for privies must meet the structural and watertightness standards of vaults.
 - c. A vault privy must be built to include: fly- and rodent-tight construction, a superstructure affording complete privacy, an earth mound around the top of the vault and below floor level that slopes downward away from the superstructure base, a floor, and a riser of concrete or other impervious material with hinged seats and covers of easily cleanable, impervious material. All venting must be fly-proofed with No. 16 or tighter mesh screening.
2. Pit Privy
 - a. Pit privies are not approved and installation or use is prohibited by this Regulation.

F. Incinerating, Composting and Chemical Toilets

1. The Board of Health may approve the installation and use of incinerating, composting and chemical toilets by variance request only. See section IX of this Regulation.
2. Permitting of an incinerating or composting toilet may also be subject to the jurisdiction of a local agency regulating plumbing or the Colorado Plumbing Board, whichever has jurisdiction over plumbing in the location.
3. An incinerating or composting toilet may be used for toilet waste where an OWTS is installed for treating wastewater remaining after removal of toilet waste. Subject to Board of Health or other applicable regulations or codes (e.g., Colorado Plumbing Code if a local code does not exist), the compartment may be located within a dwelling or building provided the unit complies with the applicable requirements of this Regulation, and provided the installation will not result in conditions considered to be a health hazard as determined by the Division. Compartment and appurtenances related to the unit must include fly-tight and vector-proof construction and exterior ventilation.
4. Incinerating Toilets: An approved incinerating toilet must be designed and installed in accordance with all applicable federal, state, and local air-pollution requirements and manufacturer's instructions.
 - a. An incineration toilet may only be used in connection with a grey water system.
5. Composting Toilets
 - a. An approved composting toilet must treat deposits of feces, urine, and readily decomposable household garbage that are not diluted with water or other fluids and are retained in a compartment in which aerobic composting will occur.
 - b. The effective volume of the receptacle must be sufficient to accommodate the number of persons served in the design of the unit installed. The effective volume of the unit must include sufficient area for the use of composting materials which must not be toxic to the process or hazardous to persons and which must be used in sufficient quantity to assure proper decomposition.
 - c. Residue from the composting toilet must be removed when it is filled to 75 percent of capacity. Residue from the unit must be properly disposed of by methods recommended by the manufacturer and acceptable to the Division. Disposal methods must prevent contamination of water and not cause a public health nuisance. Disposal using solid waste practices is recommended.

- d. If a system will be installed where low temperature may be a factor, design and installation must address the effects of the low temperature.
 - e. Composting toilets must be operated according to manufacturer's specifications.
6. Portable Chemical Toilets
- a. Use of a portable chemical toilet in permanently occupied buildings is prohibited except during construction or under emergency circumstances as determined by the Division. Proper ventilation of a chemical toilet used inside must be required.
- G. Slit Trench Latrine
- 1. Slit trenches are not approved and installation or use is prohibited by this Regulation.
- H. Treatment Systems Other Than Those Discharging Through a Soil Treatment Area or Sand Filter System
- 1. For systems discharging to State Waters, see section IV.F.3.
 - 2. Systems that discharge other than through a soil treatment area or a sand filter system must:
 - a. Be designed by a professional engineer;
 - b. Be reviewed by the Board of Health; and
 - c. Not pose a potential health hazard or private or public nuisance or undue risk of contamination.
 - 3. Effluent shall be retained upon the property of origin unless expressly permitted by the Board of Health to be piped or conveyed by an approved means to an approved treatment site.
 - 4. The following minimum performance criteria must be required for all permitted systems pursuant to this section:
 - a. If effluent discharge is made into areas in which the possibility exists for occasional direct human contact with the effluent discharge, the effluent at the point of discharge must meet the minimum treatment criteria of TL3 effluent and specifically adhere to each of the following standards:
 - i. The geometric mean of the fecal coliform density must not exceed 25 per 100 milliliters when averaged over any five consecutive samples, and no single sample result for fecal coliform can exceed 200 per 100 milliliters.
 - ii. The arithmetic mean of the standard five-day carbonaceous biochemical oxygen demand (CBOD₅) must not exceed ten milligrams per liter when averaged over any three consecutive samples.
 - iii. The arithmetic mean of the total suspended solids must not exceed ten milligrams per liter when averaged over any three consecutive samples.

- b. If the effluent discharge is made into an area so restricted as to protect against the likelihood of direct human contact with the discharged effluent, the effluent at the point of discharge must meet the treatment criteria of TL2 effluent and specifically adhere to each of the following standards:
 - i. The geometric mean of the fecal coliform density must not exceed 500 per 100 milliliters when averaged over any five consecutive samples, and no single sample can exceed 5000 fecal coliform per 100 milliliters.
 - ii. The arithmetic mean of the standard five-day carbonaceous biochemical oxygen demand (CBOD₅) must not exceed 25 milligrams per liter when averaged over any three consecutive samples.
 - iii. The arithmetic mean of the total suspended solids must not exceed 30 milligrams per liter when averaged over any three consecutive samples.
5. To determine compliance with the standards contained in this section, the required sampling frequency for fecal coliform, CBOD₅, and total suspended solid levels must be performed at least once per month when the system is in operation and the results submitted to the Department for compliance with the permit requirements.
6. Methods of Analysis - Sampling Points:
 - a. All effluent samples must be analyzed according to the methods prescribed in the American Public Health Association, American Water Works Association, and Water Environment Federation: Standards Methods for the Examination of Water and Wastewater, 21st edition.
 - b. The sampling point must be a location that is representative of final discharge from the system.

XVIII. Technology Review and Acceptance

- A. OWTS technologies must either be public domain, including but not limited to rock and pipe distribution systems, sand filters with pressure distribution and mound systems, with criteria for design, installation, maintenance and use as described in this Regulation, or proprietary products that have received Colorado Water Quality Control Division review and acceptance before this Department may permit them for use.
- B. Information regarding the review and acceptance of OWTS technologies can be found in On-site Wastewater Treatment System Regulation #43, Section 43.13 Technology Review and Acceptance.

XIX. Operation and Maintenance

- A. Responsibility: The owner must be responsible for maintenance of an OWTS unless the responsibility has been contractually assigned to a tenant or a third party or a public, quasi-public, or political subdivision.
- B. Service Label: For higher level treatment systems or other components under a service contract, a clearly visible, permanently attached label or plate giving instructions for obtaining service must be placed at a conspicuous location.
- C. For the purpose of enforcing this Regulation, the Health Officer is authorized to enter upon private property at reasonable times and upon reasonable notice to the occupant of the property to determine whether an OWTS installed thereon is in compliance with this Regulation, the OWTS Act and other applicable rules and regulations.
- D. In order to insure good working order, the following minimum schedule of inspection, maintenance, cleaning and effluent testing shall be required as a condition of every permit for installation or alteration of a new or existing OWTS and remodel or repair permit issued after the effective date of this Regulation, July 1, 2014.

| Type of Treatment Facility | Inspection and Maintenance | Cleaned or Pumped | Effluent Testing |
|----------------------------|---|---|-----------------------------------|
| Septic Tank | Yearly | Every 2 - 4 Years: or as recommended by a licensed systems cleaner | |
| Vaults, Vault Privies | Yearly | at 80% capacity: pumping receipts required | at intervals: specified by permit |
| Aeration Plants | Every 6 months | Every 4 Years | Every 6 Months |
| Surface Discharge | Daily | Every 4 Years | at intervals: specified by permit |
| Experimental Systems | Shall meet such conditions as specified in the permit | | At intervals: specified by permit |

- E. The Health Officer may require the owner of an OWTS to maintain and submit to the Division records of inspection, maintenance, cleaning and testing performed on the system. (See owner responsibility Section III.B, of this Regulation).
- F. Disposal of Waste Materials: Disposal of waste materials removed from a system in the process of maintenance or cleaning shall be accomplished at a site in a manner which does not create a hazard to the public health, a nuisance or an undue risk of pollution and which complies with this Regulation, Regulation 43 and the OWTS Act. Said site to be approved by the Pueblo City-County Health Department and shall comply with all federal, state and local rules and regulations.
- G. No discharge is permitted which does not comply with this Regulation.
- H. Termination of Use of System: The contents of a septic tank, vault, or seepage pit, the use of which has been terminated, shall be disposed of properly. The emptied tank, vault, or pit shall be filled with soil or rock. The Health Officer may require the tank or vault to be removed and disposed of properly.
- I. Evapotranspiration Vegetation: Maintenance of the vegetation on the surface of an evapotranspiration system is the responsibility of the owner as mention in Section III.B.3, of this Regulation.
- J. Monitoring and Sampling:
 - 1. Reasonable periodic collection and testing by this Division of effluent samples from OWTS for which monitoring of effluent is necessary in order to insure compliance with this Regulation, Regulation 43 and the OWTS Act may be performed not more than two (2) times a year, except when required by the Health Officer in Conjunction with an enforcement action. (See also Section XVII.H)
 - 2. Any owner or occupant of property on which an OWTS is located may request the Division to collect and test an effluent sample from the system. Said sample may be done at the option of the Department for the fee stated in Section XIX.J.3.
 - 3. Owners of sewage treatment systems, which by condition of their permit require effluent samples to be tested by the Department, shall pay a fee not to exceed that which allowed by the OWTS Act. This fee shall not exceed actual costs, plus locally established mileage reimbursement rates for each mile traveled from the Department to the site of the system and return, for each such sample so collected and tested. No more than two (2) samples per year shall be collected at the owner's expense. Tests will be limited to those parameters which are necessary to determine compliance with this Regulation.

