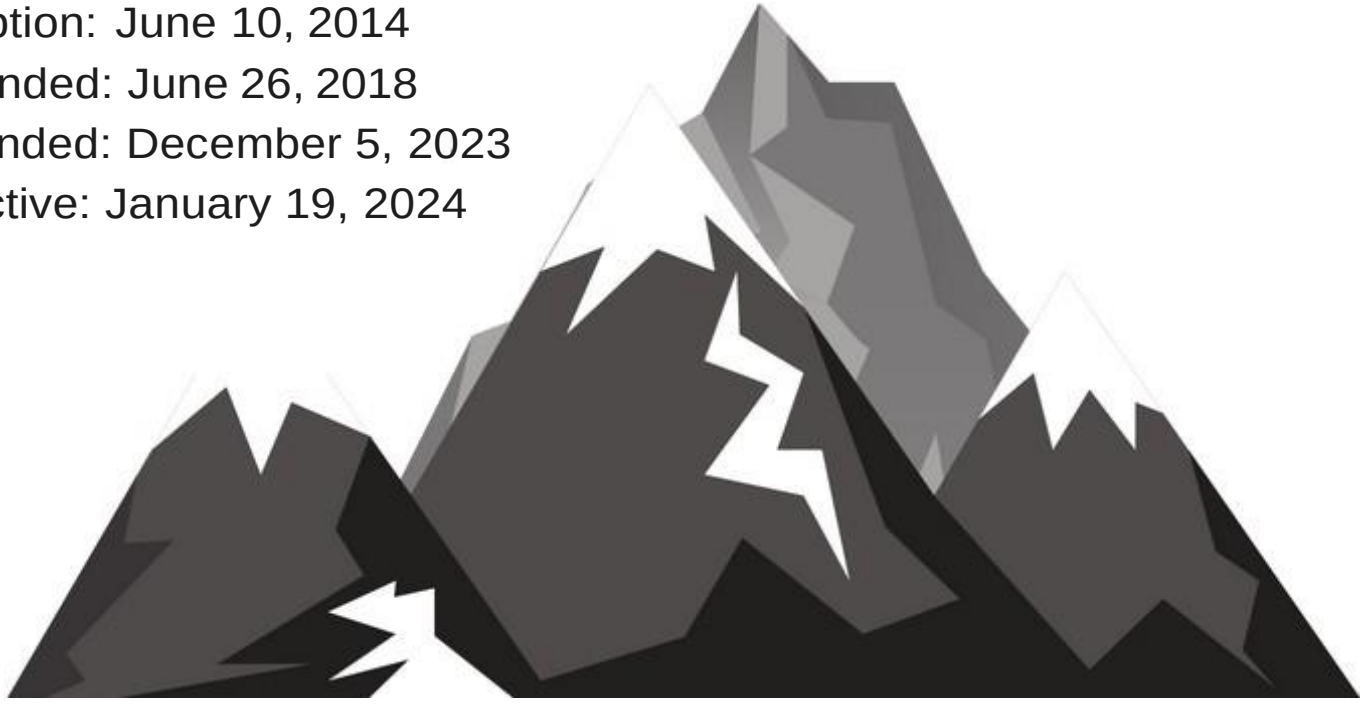
CLEAR CREEK COUNTY
ENVIRONMENTAL HEALTH

# OWTS REGULATION

Adoption: June 10, 2014
Amended: June 26, 2018
Amended: December 5, 2023
Effective: January 19, 2024



# Clear Creek County

# Onsite Wastewater Treatment System Regulations

Adopted: June 10, 2014
Effective: July 25, 2014
Amended: June 26, 2018
Further Amended: December 5, 2023
Effective: January 19, 2024 (45 days after approval of amendments)

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# Section 1 – Scope and Purpose

## 1. Authority

a. These requirements will be known as the Clear Creek County On-site Wastewater Treatment System Regulations. These requirements have been adopted by the Clear Creek County Board of County Commissioners, acting as a Board of Health pursuant to and under authority contained in the On-site Wastewater Treatment System Act, 25-10-101, et seq. C.R.S. and has designated the Clear Creek Environmental Health Department to implement these Regulations on behalf of the Board of Health.

## 2. Scope and Purpose

a. Declaration

i. In order to preserve the environment and protect the public health and water quality; to eliminate and control causes of disease, infection, and aerosol contamination; and to reduce and control the pollution of the air, land and water, it is declared to be in the public interest to establish minimum standards and regulations for On-site Wastewater Treatment Systems (OWTS) in the state of Colorado and to provide the authority for the administration and enforcement of such minimum standards and regulations.

ii. This regulation applies to On-site Wastewater Treatment Systems as defined in section 25-10-103(12), C.R.S.

b. Purpose

i. The purpose of these Clear Creek County On-site Wastewater Treatment System Regulations as authorized by the OWTS Act is to establish the minimum standards for the location, design, construction, performance, installation, alteration and use of OWTS with a design capacity less than or equal to 2,000 gallons per day within Clear Creek County, and to establish the minimum requirements for regulations adopted by local boards of health including but not limited to permit application requirements; requirements for issuing permits; the inspection, testing, and supervision of installed systems; the maintenance and cleaning of systems; the disposal of waste material and the issuance of cease and desist orders.

c. Jurisdiction

i. These Clear Creek County On-site Wastewater Treatment System Regulations apply to all OWTS in the unincorporated areas of the county and over all municipal corporations within the territorial limits of Clear Creek County, but not over any municipal corporation that maintains its own public health agency.

d. Severability

i. The provisions of this regulation are severable, and if any provisions or the application of the provisions to any circumstances are held invalid, the application of such provisions or other circumstances, and the remainder of this regulations will not be affected thereby.

**3. Incorporation of Regulation #43 Included By Reference**

a. The requirements of the Colorado Water Quality Control Commission's "On-site Wastewater Treatment System Regulation, Regulation 43, 5 CCR 1002-43, Effective date, June, 30, 2017", are made a part of these Clear Creek County On-site Wastewater Treatment System Regulations and will apply except where identified as an option of the local public health agency or where these regulations are more stringent than Regulation 43, 5 CCR 1002-43, and included in these Clear Creek County On-site Wastewater Treatment System Regulations.

b. All aspects of an On-site Wastewater Treatment System including, but not limited to, permits, design, performance, location, construction, alteration, inspection, maintenance and use must be as provided in Regulation 43 and any additional requirements contained in these Clear Creek County On-site Wastewater Treatment System Regulations.

**4. Division Authority to Administer and Enforce**

a. Wherever the term Clear Creek County Board of Health or Clear Creek Environmental Health Department is used in this regulation, said terms must also include the Division under its designated authority for the purposes of administering and enforcing the provisions of this regulation where necessary to protect the public health and environment.

**5. Effective Date**

a. These regulations will become effective 45 days after final adoption by the Clear Creek County Board of Health.

## Section 2 – Definitions and Acronyms

"**Absorption system**" means a leaching field and adjacent soils or other system for the treatment of sewage in an Onsite Wastewater Treatment System by means of absorption into the ground. See soil treatment area.

**"Accessible"** means easily reached, attained or entered by the necessary equipment or maintenance provider.

"**Applicant**" means a person who submits an application for an Onsite Wastewater Treatment System permit.

**"Basal Area"** means the effective surface area available to transmit the treated effluent from the filter media in a mound system into the in-situ receiving soils. The perimeter is measured at the interface of the imported fill material an in-situ soil. On sloping sites, only the area down-gradient from the up-slope edge of the distribution media may be included in this calculation.

"**Bed**" means a below-grade soil treatment area with a level sub-base, consisting of a shallow excavation greater than three feet wide containing distribution media and more than one lateral

"**Bedrock**" means 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.

"**Bedroom**" means a room with an egress window, a closet, and/or could be intended for sleeping purposes.

"**Biochemical Oxygen Demand, Five-Day**" ($BOD_5$) 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).

"**Building sewer**" means piping that conveys wastewater to the first system component or the sewer main.

"**Carbonaceous Biochemical Oxygen Demand**" See Biochemical Oxygen Demand, Carbonaceous.

"**Cesspool**" means 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.

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

"**Cistern**" means an underground, enclosed unpressurized reservoir or tank for storing water as part of a potable water supply system.

"**Cleaning**" means the act of removing septage or other wastes from a wastewater treatment system component or grease/waste from a grease interceptor.

"**Colorado Plumbing Code**" means Rules And Regulations of the Colorado State Plumbing Board (3 CCR 720-1).

"**Commission**" means the Water Quality Control Commission created by section 25-8-201, C.R.S.

"**Competent Technician**" means a person who has the appropriate expertise and is able to conduct and interpret the results of soil profile test pit excavations, percolation tests, and site evaluations. This individual has also met the required competencies for a "Competent Technician" as defined in Section 5.7

"**Component, Major**" means a significant component essential to the proper function of the Onsite Wastewater Treatment System; a major component may include, but is not limited to, septic tank, dosing tank, soil treatment area, higher level treatment component, etc.

"**Component, Minor**" means a component installed for the design of the system; minor component may include, but is not limited to, clean-outs, observation ports, pumps, alarm, effluent filter, tank lid and rise, etc.

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

"**Consistence**" means 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 to an extent that the soil density would restrict permeability. Aspects of consistence are used to determine if the horizon will have permeability lower than that of the defined soil type. Additional insight to consistence can be found in the UDSA-NRCS Field book for Describing and Sampling Soils; Version 3.0, Sept. 2012.

"**Covered transaction**" means the conveyance of any real property served by an On-Site Wastewater Treatment System, excluding the following:

1. Change in ownership solely to include or exclude a spouse or children;
2. Transfer subject to life estate if the property reverts back to the grantor who created the life estate;
3. Transfer to effect foreclosure or forfeiture of real property (does not include the subsequent sale of the foreclosed property after being titled to the foreclosing person);
4. Transfer by redemption from a tax sale (does not include the subsequent sale of the property after being titled to the redeeming person);
5. Transfer creating or ending joint ownership if a transferee is an original transferor of the property;
6. Transfer of property containing premises that have been demolished or are otherwise uninhabitable;
7. Transfer for the vacation or granting of a public right of way;
8. Transfer from a person (transferor) to a trust (transferee) where the transferor is trustee(s) of transferee trust estate;
9. Properties with an On-Site Wastewater Treatment System that have never been used; or
10. New homes that have not yet received a certificate of occupancy.

“**Crest**” means the highest point on the side of a dry gulch or cut bank.

“**Cut-bank”** means a nearly vertical slope caused by erosion or construction that has exposed historical soil strata.

“**Deep gravel system**” means a soil treatment area for repairs only where the trenches utilize a depth of gravel greater than 6 inches below the distribution pipe and sidewall area is allowed according to a formula specified in this regulation.

**“Deficiency”** See Malfunction.

“**Department**” means the Environmental Health Department within the Clear Creek County Public and Environmental Health Department. Wherever the term “Department” is used in these Regulations, said term shall also include the Water Quality Control Division under its designated authority for the purposes of administering and enforcing the provisions of these Regulations where necessary to protect the public health and environment.

“**Design**” means the following:

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 capacity**” See Flow, Design.

“**Design flow**” See Flow, Design.

“**Designer, Onsite Wastewater Treatment System**” means a professional engineer who utilizes site evaluation and investigation information to select an appropriate On-Site Wastewater Treatment System and prepares a design document in conformance with this Regulation.

“**Distribution**” means the process of conveying wastewater or effluent to one or more components, devices, or throughout a soil treatment area.

“**Distribution box**” means 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 distribution laterals in the soil treatment area.

“**Division**” means the division of administration of the Colorado Department of Public Health and Environment of which the Water Quality Control Division is a part.

“**Domestic wastewater**” See Wastewater, domestic.

“**Domestic Wastewater Treatment Works**” means a system or facility for treating, neutralizing, stabilizing, or disposing of domestic wastewater which system or facility has a designed capacity to receive more than 2,000 gallons of domestic wastewater per day. 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), C.R.S.

“**Dosing**” means a high rate periodic discharge into a soil treatment area.

“**Dosing, demand**” means configuration in which a specific volume of effluent is delivered to a component based upon patterns of wastewater generation from the source.

“**Dosing, pressure**” means a uniform application of wastewater throughout the intended portion of the soil treatment area through small diameter pipes and orifices, under pressure. For this definition, the term pressure indicates that the system is capable of creating upward movement of effluent out of the distribution system piping.

“**Dosing, timed**” means a configuration in which a specific volume of effluent is delivered to a component based upon a prescribed interval, regardless of facility water use.

“**Dosing siphon**” means a device used for demand 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**” means a tank, compartment or basin that provides for storage of effluent from a septic tank or other treatment unit intended to be delivered to a soil treatment area at a high rate periodic discharge.

“**Drainfield**” See Soil treatment area.

“**Drop box**” means a device used for serial or sequential distribution of effluent by gravity flow to a lateral of a soil treatment area.

“**Dry gulch**” See Gulch, dry.

“**Drywell**” means 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”** means the size of granular media such that 10 percent by weight of the media is finer than the size specified.

“**Effluent**” means the liquid flowing out of a component or device of an Onsite Wastewater Treatment System.

“**Effluent filter**” See Effluent screen.

“**Effluent line**” means non-perforated pipe that conveys effluent from the final tank or chamber to the soil treatment area.

“**Effluent screen**” means 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**" means a person trained in physical, biological, or sanitary science to carry out educational and inspectional duties in the field of environmental health.

"**Evapotranspiration/absorption system**" means an unlined onsite wastewater treatment component that uses evaporation, transpiration, and absorption for dispersal of effluent.

"**Evapotranspiration system**" means an onsite wastewater treatment component with a continuous, impermeable liner that uses evapotranspiration and transpiration for dispersal of effluent.

"**Experimental system**" means a design or type of system based upon improvements or development in the technology of sewage treatment that has not been fully tested.

"**Failure**" means a condition existing within any component of an On-Site Wastewater Treatment System which prevents the system from functioning as intended, and which results in the discharge of untreated or partially treated wastewater onto the ground surface, into surface water or ground water, or which results in the back-up of sewage into the building sewer. Other conditions within an On-Site Wastewater Treatment System component that are deemed by Clear Creek County Environmental Health to be a threat to public health and/or safety may also be deemed a failure.

"**Field performance testing**" means data gathering on a system in actual use that is being proposed for Division acceptance.

"**Floodplain (100-year)"** means 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 or 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 professional engineer must certify the flood plain elevations.

"**Floodway**" means 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 must certify the floodway elevation and location.

"**Flow, daily**" means the measured volume of wastewater generated from a facility in a 24-hour period expressed as gallons per day.

"**Flow, design**" means 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.

"**Flow equalization**" means 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**” means 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**” means 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 greases.

“**Ground water**” means that part of the subsurface water that is at or below the saturated zone.

“**Ground water surface**” means the uppermost limit of an unconfined aquifer at atmospheric pressure.

“**Guidelines**” means 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.

“**Gulch, dry**” means a deep, narrow ravine marking the course of an intermittent or ephemeral stream.

“**Health officer**” means the chief administrative and executive officer of Clear Creek County Environmental Health or the Board of Health appointed health officer for On-Site Wastewater Treatment Systems and their designated representative(s).

“**Higher level treatment**” means designated treatment levels 2N, 3 and 3N.

“**Holding tank”** See Vault.

“**Individual Sewage Disposal System**” means a term used for On-Site Wastewater Treatment System in Colorado regulations from 1973 until 2013.

“**Infiltrative surface**” means designated interface where effluent moves from distribution media or a distribution product into treatment media or original soil. In standard trench or bed systems this will be the interface of the distribution media or product and in-situ soil. Two separate infiltrative surfaces will exist in a mound system and an unlined sand filter, one at the interface of the distribution media and fill sand, the other at the interface of the fill sand and in-situ soil.

“**Inspection port**” means an access point in a system component that enables inspection, operation, and/or maintenance.

“**Invert**” means elevation of the bottom of the inside pipe wall or fitting.

“**Lateral**” means pipe, tubing, or other conveyance used to carry and distribute effluent.

“**Leach field**” See Soil treatment area.

“**Limiting layer**” means a horizon or condition in the soil profile or underlying strata that limits the treatment capability of the soil or severely restricts the movement of fluids. This may include soils with low or high permeability, impervious or fractured bedrock, or a seasonal or current ground water surface.

“**Linear Loading Rate”** means the amount of effluent applied per linear food along the contour (gpd/linear ft).

“**Liner**” means an impermeable synthetic or natural material used to prevent or restrict infiltration and/or exfiltration. For the purposes of this regulation, the minimum thickness of a liner must be 30 ml.

“**Local Board of Health”** means any local, county, or district board of health.

“**Local Health Department”** See local public health agency.

“**Local Public Health Agency**” means any county, district, or municipal public health agency and may include a county, district, or municipal board of health to oversee On-site Wastewater Treatment System permitting and inspection or an on-site wastewater treatment system program. A local public health agency may designate another agency to administer the OWTS program.

“**Long-term acceptance rate**” (LTAR) means 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 (gal/ $ft^2$ /day).

“**Malfunction**” means the condition in which a component is not performing as designed or installed and is in need of repair in order to function as originally intended.

“**Manufactured media**” See media, other manufactured.

“**Media**” means solid material that can be described by shape, dimensions, surface area, void space, and application.

“**Media, enhanced manufactured”** means an accepted proprietary manufactured distribution product, wrapped in a specific fabric, and placed on a specified sandbase or media that does not mask the infiltrative surface of the in-situ soil.

“**Media, other manufactured**” means an accepted proprietary manufactured distribution product made of synthetic media for distribution of effluent that is placed directly on the in-situ soil.

“**Media, treatment**” means non-or slowly-degradable media used for physical, chemical, and/or biological treatment in an Onsite Wastewater Treatment System component.

“**Mound**” means a soil treatment area whereby the infiltrative surface is at or above original grade at any point.

“**Nitrogen reduction**” means 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**” or "**OWTS**" and, 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 or connected to a sewage treatment works.

“**Operating Permit**” means a permit that ensures specific operation and/or maintenance requirements for an existing Onsite Wastewater Treatment System that requires regular maintenance of mechanical or electrical treatment components or a system that is designed to meet specific wastewater treatment levels as set forth in these Regulations. See Section 16 for more detail.

“**Operations and Maintenance Contractor**” See Service Provider.

“**OWTS Act**” means the On-site Wastewater Treatment System Act, §25-10-101, et seq. C.R.S.

“**Owner**” means the person who is owner of record of the land on which a system is designed for, constructed, installed, altered, extended, or used.

“**Percolation test**” means 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**” means minimum performance criteria for water quality and operation and maintenance established by the regulatory authority to ensure compliance with the public health and environmental goals of the state or public health agency.

“**Permeability**” means the property of a material which permits movement of water through the material.

“**Permit**” means a permit issued by the Clear Creek County Environmental Health Department for the construction or installation, alteration, repair, continued operation of higher level treatment units or systems requiring regular inspection, or prior to a covered transaction for a property with an onsite wastewater treatment system.

“**Person**” means an individual, partnership, firm, corporation, association, or other legal entity and also the state, any political subdivision thereof, or other governmental entity.

“**Pressure distribution**” See Dosing, pressure.

**Privy**” means 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**” means an engineer licensed in accordance with section 12-25-1, C.R.S

“**Professional geologist**” means 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.

“**Proprietary product**” means 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**” means 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.

"**Record drawing**" means construction drawings that are provided to illustrate the progress or completion of the installation of an Onsite Wastewater Treatment System, or components of the Onsite Wastewater Treatment System; typically based on field inspection by the designer.

"**Redoximorphic**" means 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.

"**Regulation 43**" means the On-site Wastewater Treatment System Regulation 5 CCR 1002-43 as authorized by the On-site Wastewater Treatment System Act, §25-10-101, et seq. C.R.S.

"**Remediation system**" means a treatment system, chemical/biological additive or physical process that is proposed to restore the soil treatment area of an Onsite Wastewater Treatment System to intended performance.

"**Repair"** means the restoration of functionality and/or treatment by reconstruction, relocation, or replacement of an Onsite Wastewater Treatment System or any component thereof in order to allow the system to function as intended.

"**Replacement System"** See Repair.

"**Right-of-way"** means the legal right, established by usage or grant, to pass along a specific route through grounds or property belonging to another.

"**Riser**" means a watertight vertical cylinder and lid allowing access to an OWTS component for inspection, cleaning, maintenance, or sampling.

"**Rock-plant filter**" means 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**" means an engineer designed OWTS that utilizes a layer of specified sand as filter and treatment media and incorporates pressure distribution.

"**Sand filter, lined**" means an engineer designed OWTS that has an impervious liner and underdrain below the specified sand media. 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 re-circulating where part of the effluent is returned to an earlier component for additional treatment before distribution to a soil treatment area.

"**Sand filter, unlined**" means an engineer designed OWTS that includes a layer of specified sand used as a treatment media without a liner between the sand and the existing soil on which it is placed.

"**Seepage pit**" means 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**" means 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 Division that the material meets the definition for septage set forth in this subsection. Septage does not include chemical toilet residuals.

"**Septic tank**" means 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**" means 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**" means 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.

"**Service Provider**" means a person engaged in the business of servicing and maintaining higher level treatment units. Service providers shall hold a current National Association of Wastewater Technicians (NAWT) Operation and Maintenance credentials (Part 1 and 2) or equivalent. Service providers shall also have also have training relative to the specific system to be maintained or certification by the equipment manufacturer, if available.

"**Sewage**" means a combination of liquid wastes that may include chemicals, house wastes, human excreta, animal or vegetable matter in suspension or solution, and other solids in suspension or solution, and that is discharged from a dwelling, building, or other establishment. See also Wastewater, domestic.

"**Sewage treatment works**" has the same meaning as "domestic wastewater treatment works" under section 25-8-103, C.R.S.

"**Site evaluation**" means a comprehensive analysis of soil and site conditions for an Onsite Wastewater Treatment System.

"**Site Evaluator"** means a practitioner who conducts preconstruction site evaluations, including visitng a site and performing soil analysis, a site survey or other activities necessary to determine the suitability of a site for an Onsite Wastewater Treatment System.

"**Slit trench latrine**" means a temporary shallow trench for use as disposal of non-water-carried human waste.

"**Soil**" means:

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**” means 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**” means 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**” means:

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 test pit excavation**” means 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**” means the naturally occurring combination or arrangement of primary soil particles into secondary units or peds; secondary units are characterized on the basis of type, size class, and grade (degree of distinctness).

“**Soil texture**” means proportion by weight of sand, silt, and clay in a soil.

“**Soil treatment area**” or “STA” means the physical location where final treatment and dispersal of effluent occurs. Soil treatment area includes drainfields and drip fields.

“**Soil treatment area, alternating**” means final treatment and distribution component that is composed of two soil treatment areas that are independently dosed.

“**Soil treatment area, sequencing**” means a soil treatment area having more than two sections that are dosed on a frequent rotating basis.

“**State Waters**” has the meaning set forth under section 25-8-103. C.R.S.

“**Suitable soil**” means a soil which will effectively treat and filter effluent by removal of organisms and suspended solids, which meets long-term acceptance rate requirements as defined in Table 11-1, and has the required vertical thickness below the infiltrative surface and above a limiting layer.

“**System Cleaner**” means a person engaged in and who holds himself or herself out as a specialist in the cleaning and pumping of OWTS and removal of the residues deposited in the operation thereof.

“**System Inspector**” See Transfer of Title Inspector.

“**System Contractor**” or “**System Installer”** means a person engaged in and who holds himself or herself out as a specialist in the installation, renovation, and repair of onsite wastewater treatment systems. A Systems Contractor is required to obtain a license with Clear Creek County and must keep that license active to perform any work on Onsite Wastewater Treatment Systems.

“**Total suspended solids**” means measure of all suspended solids in a liquid; typically expressed in mg/L.

“**Transfer of Title**” means change of ownership of a property.

“**Transfer of Title Inspector**” or “**System Inspector**” means a person engaged in the business of inspecting OWTS and who is a NAWT or NSF-certified Onsite Wastewater Inspector or equivalent. Inspectors for higher level treatment systems must have training relevant to the specific system or certification by the equipment manufacturer.

“**Treatment level**” (TL) means defined concentrations of pollutants to be achieved by a component or series of components of an OWTS.

“**Treatment media**” See Media, treatment.

“**Treatment unit**” means a component or series of components where solids or pollutants are removed from wastewater or effluent from a preceding component.

“**Trench**” means:

1. Below-grade soil treatment area consisting of a shallow excavation with a width of 3 feet or less containing distribution medial and one lateral; and
2. Excavation for placement of piping or installation of electrical wire or conduit.

“**Uniformity coefficient**” means a value which is the ratio of D60 to D10 where D60 is the soil diameter of which 60 percent of the soil weight is finer and D10 is the corresponding value at 10 percent finer. (A soil having a uniformity coefficient smaller than 4 would be considered "uniform" for purposes of this regulation.)

“**Use Permit**” means a document issued by the Clear Creek Environmental Health Department prior to a covered transaction, approving the continued use of an existing OWTS. See Section 17 for more information.

“**Vault**” means a watertight, covered receptacle, which is designed to receive and store excreta or wastes either from a building 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 2,000 gallons per day or more at full occupancy, the vault is a domestic wastewater treatment works.

“**Visual and tactile evaluation of soil**” means determining the properties of soil by standardized tests of appearance and manipulation in the hand.

“**Volume, effective**” means 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, the effective volume under normal conditions is determined relative to the invert of the inlet and the control off level.

“**Wastewater, domestic**” means 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.

“**Wastewater, high strength**” means:

1. Wastewater from a structure having BOD 5 greater than 300 mg/L; and/or TSS greater than 200 mg/L; and/or fats, oils, and grease greater than 50 mg/L; or
2. Effluent from a septic tank or other pretreatment component (as defined by NSF/ANSI Standard 40 testing protocol) that has BOD 5 greater than 180 mg/L; and/or TSS greater than 80 mg/L; and/or fats, oils, and grease greater than 25 mg/L and is applied to an infiltrative surface.

“**Wastewater pond**” means a designed pond which receives exclusively domestic wastewater from a septic tank and which provides an additional degree of treatment.

“**Water Quality Control Commission**” See Commission.

“**Water Quality Control Division**” See Division.

“**Water supply**” means the type (domestic, commercial, or agricultural) and source of the water supply for a building site that may consist of a well, public water system, or a cistern.

“**Well**” means any excavation that is drilled, cored, bored, washed, fractured, driven, dug, jetted, or otherwise constructed for the acquisition of groundwater for beneficial use, including infiltration galleries permitted as wells by the Colorado Division of Water Resources.

“**Wetland, constructed**” See Rock-plant filter.

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

**Table 2-1 Abbreviations and Acronyms**

| | |
|---|---|
| **AASHTO** | American Association of State Highway and Transportation Officials |
| **ANSI** | American National Standards Institute |
| **ASTM** | American Society for Testing and Materials |
| **BOD** | Biochemical Oxygen Demand |
| **CBOD** | Carbonaceous Biochemical Oxygen Demand |
| **C.R.S.** | Colorado Revised Statutes |
| **CSA** | Canadian Standards Association |
| **CDPHE** | Colorado Department of Public Health and Environment |
| **gpd** | gallons per day |
| **ISDS** | Individual Sewage Disposal System |
| **LTAR** | Long-term Acceptance Rate |
| **mg/L** | milligrams per Liter |
| **MPI** | Minutes Per Inch |
| **NAWT** | National Association of Wastewater Technicians |
| **NSF** | National Sanitation Foundation |
| **O&M** | Operations and Maintenance |
| **OWTS** | Onsite Wastewater Treatment System(s) |
| **STA** | Soil Treatment Area |
| **TL** | Treatment Level |
| **TSS** | Total Suspended Solids |
| **UL** | Underwriters' Laboratories |

# Section 3 – General Requirements and Prohibitions

## 1. General Requirements

a. The owner of any structure or land site where people live, work, or congregate shall ensure that the structure of land site contains a properly functioning and approved OWTS or sanitary sewer connection. Any toilet, sink, tub, shower, or any other fixture that discharges wastewater shall be connected to either the OWTS or sanitary sewer

b. All OWTS designs must be reviewed and stamped by a Colorado licensed professional engineer.

c. It is the responsibility of the owner to provide the Department with proof of an existing, approved system, and a record drawing showing distances of all major components of the system to findable points on the property.

## 2. Design Capacity

a. An OWTS with design capacity less than or equal to 2,000 gpd must comply with regulations adopted by local boards of health pursuant to this regulation and the OWTS Act. Within the jurisdiction of the local public health agency, the regulations promulgated by the local board of health govern all aspects of OWTS permits, performance, location, construction, alteration, installation, and use.

b. An OWTS with design capacity greater than 2,000 gpd must comply with this regulation, 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.

    i. Applicable Commission regulations include, but are not limited to, the following:

    ii. Regulation 22 - Site Location and Design Approval Regulations for Domestic Wastewater Treatment Works (5 CCR 1002-22)

    iii. Regulation 41 - The Basic Standards for Ground Water (5 CCR 1002-41)

    iv. Regulation 42 - Site-Specific Water Quality Classifications and Standards for Ground Water (5 CCR 1002-42)

    v. Regulation 61 - Colorado Discharge Permit System Regulations (5 CCR 1002-61)

    vi. Regulation 62 - Regulations for Effluent Limitations (5 CCR 1002-62).

c. For systems greater than 2,000 gpd, the Division is also authorized to determine those parts of this regulation identified as the prerogative of the local public health agencies.

d. The requirements for maintenance and standards of performance for systems greater than 2,000 gpd shall be determined by the site application approval and discharge permit.

e. In the interest of facilitating communication of LPHA concerns regarding a design being reviewed by the Division, the local public health agency can provide comments to the Division for consideration during the Division's review of the proposed design and discharge permit application. Under such a coordinated process, the 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 Division must acknowledge and consider local OWTS regulations when they are more stringent and restrictive than this regulation.

**3. Right of Entry**

a. For the purpose of inspecting and enforcing these Regulations and the terms and conditions of any permit issued and investigating and responding to complaints, the Clear Creek Environmental Health Department is authorized to enter upon private property at reasonable times and upon reasonable notice for the purpose of determining whether or not an operating OWTS is functioning in compliance with the OWTS Act and these Regulations and the terms and conditions of any permit issued and to inspect and conduct tests in evaluating any permit application.

b. The owner or occupant of every property having an OWTS shall permit the health officer access to the property to make inspections, conduct required tests, take samples, and monitor compliance.

**4. Surface Activity**

a. Activity or use on the surface of the ground over any part of the OWTS must be restricted. The soil treatment area must not be subject to damage or soil compaction from livestock, vehicular traffic, recreational use, or other site development activity.

b. Construction equipment not necessary to install the OWTS must be kept off of the soil treatment area to prevent undesirable compaction of the soils. If compaction occurs, the disturbed or compacted soil must be re-evaluated and/or new soil evaluations performed. The system must be redesigned if the soil permeability have changed.

**5. Public Sewer Service**

a. 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.

**6. Site Development and Access**

a. For new development on unimproved lots, a Driveway Permit must be issued by the Site Development Department prior to issuance of an OWTS permit.

b. All construction access roads or pathways must be restored to pre-construction condition, through regrading, reseeding, and revegetation prior to final approval of use of the OWTS.

**7. Constructing in a County Right of Way**

a. Construction through, or under a county right of way is prohibited where a conforming system can be installed on the property without crossing the right of way.

**8. Floodplains**

a. New, expanded or repair/replacement OWTS installed in a 100-year floodplain must meet or exceed the requirements of the Federal Emergency Management Agency (FEMA) and Clear Creek County Site Development. Repairs of an existing system shall meet the requirements as feasible. The system as approved by the local public health agency shall be designed to minimize or eliminate infiltration of floodwaters into the system and discharge from the system into the floodwaters. The OWTS must be located to avoid impairment to floodwaters or contamination from them during floods

b. A new or expanded OWTS must not be installed in a floodway designated in a 100-year floodplain where a conforming OWTS outside the floodway can be installed. For any new OWTS or system repair that may affect the floodway delineation, appropriate procedures shall be followed including revision of the floodway designation, if necessary.

**9. Leasing Water from Clear Creek Basin**

a. If a property will be leasing water in accordance with the Clear Creek County Water Augmentation Plan, then all requirements for OWTS design and monitoring set forth in the Clear Creek Water Augmentation Plan must be followed, in addition to these Regulations.

**10. Fees**

a. Non-refundable permit and license application fees as established by the Board of Health must be remitted to the Department at the time of application.

b. Fees that are assessed to the permit after issues shall be remitted prior to the final approval of the system.

**11. Material Incorporated by Reference**

a. Throughout these regulations, standards and requirements by outside organizations have been adopted and incorporated by reference. The materials incorporated by reference cited herein include only those versions that were in effect as of June 30, 2017, and not later amendments to the incorporated material. Materials incorporated by reference are available for public inspection during normal business hours from the Water Quality Control Division, 4300 Cherry Creek Drive South, Denver, Colorado 80246. Copies may be purchased from the source organizations.

**12. General Prohibitions**

a. 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.

b. 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.

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. Construction or repair, and use of cesspools, pit privies, slit trenches, or aerosol disposal systems is prohibited.

e. No city, county, or city and county department shall issue to any person:

   i. A permit to construct, add on to or remodel a building or structure that is not serviced by a sewage treatment works until the Clear Creek County Environmental Health Department has issued a permit for an OWTS or sanitary sewer, and

   ii. An occupancy permit for the use of a building that is not serviced by a sewage treatment works until the health officer makes a final inspection of the OWTS, provided for in section 25-10-106 (1) (h), C.R.S., and the health officer approves the installation.

**13. Prohibitions of Systems in Unsuitable Areas**

a. The Board of Health may prohibit issuance of OWTS permits in accordance with applicable land use laws and procedures for defined areas in which the Board of Health determines that construction and use of additional OWTS may constitute a hazard to public health or water quality.

b. If the Board of Health is going to prohibit the issuance of OWTS permits pursuant to Section 3.13.A, then it will conduct a public hearing, after providing written notice to all affected property owners as shown in the records of the Clear Creek County Assessor and publishing public notice in a newspaper of general circulation, at least 20 days prior to the hearing, to consider the prohibition of permits for systems in defined areas that contain or are subdivided for a density of more than two dwelling units per acre. 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 an OWTS.

# Section 4 – Construction Permit Application Requirements

## 1. Applicability

a. No person or persons shall construct, install, alter, upgrade or repair a system within Clear Creek County unless such person holds a valid permit, issued by the Clear Creek Environmental Health Department. The permit must be in the name of the property owner for the specific construction, installation, alteration, repair, or use proposed at the location described on the permit.

b. A permit is 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.

c. The owner of a property on which an OWTS is not in compliance with these Regulations shall apply for a permit to repair the system within two business days after receiving notice from the Department that the system is not functioning in compliance with the OWTS Act or these Regulations, or otherwise constitutes a nuisance or a hazard to public health or water quality.

d. Replacement or repair of a minor component that will not compromise that system's integrity, design, use or operation may be authorized by the health officer without the issuance of a permit, provided that the work will comply with all other aspects of these Regulations, and prior approval has been given. Minor repairs include but are not limited to, repair or installation of vent pipes, observation ports, clean outs, sampling ports, distribution boxes, or less than five feet of pipe.

    i. The Clear Creek Environmental Health Department may require an inspection of minor repair work and may charge a fee for said inspection.

## 2. Construction Permit Types

a. Major Construction Permit – 2 or more major components of an OWTS are installed replaced, repaired, upgraded.

b. Minor Construction Permit – 1 major component only of an OWTS is installed, replaced, repair or upgraded.

## 3. Minimum Permit Application Requirements

a. An applicant must submit a complete, application on a form provided by the Department prior to installing, construction, altering, or repairing a system. Such application must include (but is not limited to) the following forms and documentation:

b. An application form containing:

    i. Owner name and contact information;

    ii. Applicant name and contact information;

iii. Design Engineer name and contact information;

iv. Licensed System Contractor name and contact information;

v. Legal Description and parcel number of property;

vi. Physical Address of property;

vii. Type of permit requested;

viii. Reason for permit;

ix. Type of water supply;

1. See Section 3.9 if water supply is being leased from Clear Creek Basin

c. Construction Site Sanitation Agreement;

d. Erosion Control Agreement;

e. Landowner Authorization Form, if landowner and applicant are not the same person;

f. Report and Site Plan, as detailed in Section 6;

g. Design Document, as detailed in Section 6;

h. Full fees pursuant to section 3.10 must accompany all OWTS permit applications at the time of submittal;

i. Other information, data, plans, specification and tests as required by the Clear Creek Environmental Health 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 will not prejudice the right of the local public health agency to develop its own information from its own source at its own expense.

**4. Site and System Identification**

a. At the time of application of an OWTS Construction Permit, the applicant must ensure the following:

i. The site must be marked at the primary road access by a sign showing the property address in compliance with the Clear Creek County Addressing Policy;

ii. The corners of the property must be marked with stakes. The stakes shall have an exposed height of not less than two feet and must be flagged and labeled;

iii. All major components must be staked. The stakes must have an exposed height of not less than two feet and must be flagged or labeled;

iv. If the onsite well has not been drilled, the well location or water supply location must be staked. The stakes must have an exposed height of not less than two feet and must be flagged and labeled.

**5. Application Review and Permit Issuance**

a. The Clear Creek Environmental Health Department will 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 the OWTS Act and these Regulations. If the submittal is determined to be in compliance with these Regulations, a permit will be issued.

b. The permit will set forth the conditions relating to the installation, operation and maintenance of the system, including but not limited to, effluent testing, cleaning, or maintenance schedules or other special conditions.

c. Prior to the issuance of any permit, best management practices (BMPs) for erosion and sediment control shall be installed and maintained in accordance with the Clear Creek County Best Management Practices Manual.

d. A permit issued for non-repair related reasons, such as new construction, upgrade, or alteration, shall expire one year from the date of issuance, unless the renewal of a permit has been approved.

e. A permit issued for repair of an OWTS must provide a reasonable period of time to complete the repairs, not to exceed 30 days. Failure to complete the repairs within this period of time may result in an Cease and Desist Order.

f. A permit issued for reasons other than repair, may be renewed one time for a period of one year from the date of renewal, upon written request if:

i. The written request is received prior to expiration of the initial permit;

ii. There have been no changes in the plans and specifications of the proposed system as set out in the original permit;

iii. Full fees pursuant to section 3.10 will apply.

**6. Design Revisions**

a. If the Department determines that the proposed system does not comply with these Regulations, the Department will notify the design engineer and applicant that revisions are needed and will provide a reasonable amount of time to submit the revisions. Time to submit revisions will be established by the Clear Creek Environmental Health Department

in writing and is not to exceed 60 days. Revisions are subject to all fees pursuant to Section 3.10.

b. If revisions are not received within a reasonable period of time, the permit will be denied.

**7. Changes in Design Documents or Specifications**

a. Any change in plans or specifications of the OWTS after the permit has been issued invalidates the permit unless the Department has reviewed and approved the changes in writing.

**8. Denial of a Construction Permit**

a. Written notice of the denial of a permit application will be given to the applicant by personal service or registered or certified mail, return receipt requested. Service will be complete as to the date of the certificate of mailing or hand delivery. The notice of denial will include reasons why the permit application was denied.

b. The applicant can appeal the denial of the permit or request a variance pursuant to Section 20 of these Regulations.

c. The denial shall become final upon the expiration of time for filing an appeal or a variance under Section 20 or when final action is taken on the appeal or variance, whichever is later.

**9. Inspection Stages**

a. During the installation of the OWTS, the following inspections must be conducted by the Clear Creek Environmental Health Department are required, unless otherwise specified by the permit terms:

i. Site Evaluation – prior to issuance of permit;

ii. Open Hole Excavation – prior to installation of any components;

iii. Component – after installation of components and prior to backfill. **A copy of gradation and invoice for any imported sand must be provided at this time**.

iv. Final Grading – after approval of component placement and after grading and reseeding, and after any electrical hook-ups are completed.

b. A maximum of five (5) inspections by the Clear Creek Environmental Health Department will be permitted for each permit as part of the permit fee. Additional inspection fees will be assessed for each inspection after the fifth inspection.

c. When each required inspection stage has been completed, the applicant or licensed Systems Contractor shall provide notice to the Clear Creek Environmental Health Department and request an inspection. The notice and request for inspection shall be given at least one business day prior to the requested inspection date. Inspections will be conducted by the health officer as soon as possible after the request is made. Inspections will not be conducted on days the county offices are closed. Inspections must be called into the Clear Creek County Environmental Health Inspection Line.

d. The applicant or licensed Systems Contractor shall assure reasonable and safe access for the inspection of any excavation required in the installation of the permitted system. For the purpose of these Regulations, a ladder is not considered reasonable and safe access.

e. The inspection card shall be conspicuously posted at the job site at all times during construction. A fee for lost or missing inspection cards will be assessed if the card is not available during inspections.

f. If any inspection reveals any deviation from the design of the permitted system or change in the proposed water supply, or if any aspect of the system fails to comply with the permit, no further progress shall be made under the permit until written approval by the design engineer is submitted to and approved by the Department.

g. Under certain circumstances and upon prior approval by the Clear Creek Environmental Health Department, if an inspection cannot be completed by the Department, the design engineer for the system may perform one inspection on behalf of the Department with written approval from the Department. The inspection shall be documented by the design engineer in a report containing the engineer's stamp, photographs, and the report shall be submitted to the Department prior to next required inspection.

h. If upon final inspection, the Department finds the system is installed in accordance with these Regulations and the permit conditions, has received the design engineer certification and record drawing and all pertinent fees have been remitted, the health officer will approve the completed system for use.

i. No OWTS shall be placed in use without the Clear Creek Environmental Health Department confirming through a component inspection, that it was installed according to the permit requirements and regulations or variances to the regulations.

**10. Final Approval of Permit**

a. Prior to issuing final approval for use of the system, the following must be received by the Clear Creek Environmental Health Department:

b. Receipt of letter from the design engineer certifying the construction of the OWTS was per the approved design plan. The certification must include, but is not limited to:

    i. Suitability of in situ, imported, or reconditioned site materials to provide adequate treatment of the effluent.

ii. Verification of sizing and specs of all components;

iii. Verification of reseeding after backfill;

iv. Verification of the water table, if applicable;

v. Verification of installation of all pumps, siphons or any other mechanical or electrical appurtenances, if applicable;

vi. Verification of installation of sample, and or monitoring equipment, if applicable;

vii. Verification of blasting conformance with submitted blasting plans, if applicable;

viii. Name of licensed contractor who installed the system;

ix. Name of service provider who will be maintaining the system, if applicable;

c. Receipt of a record drawing which includes a scaled drawing showing all components of the OWTS including their 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.

d. Receiving an approved inspection prior to backfilling the OWTS by the Clear Creek Environmental Health Department confirming that it was installed according to the permit requirements and regulations or variance to the regulations.

**11. Record Drawings**

a. Record drawings, where required in this regulations, must be to scale and must include the following:

i. All major and minor components of the system including their location from known and findable points;

ii. Dimensions of components;

iii. Depths of components;

iv. Sizes of components;

v. Manufacturers' names and models, as available;

vi. Location of any wells, or cisterns;

vii. Location of dry wells, infiltrator wells, or other features of drainage on the property;

viii. Location of driveway; and

ix. Slope of property.

**12. Disclaimer**

a. The issuance of a permit and specifications of terms and conditions therein will not constitute assumption of liability, nor create a presumption that the Clear Creek County Board of Health, Clear Creek Environmental Health Department or its employees may be liable for the failure or malfunctioning of any system. Permit issuance will 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.

# Section 5 – Site Assessment and Soil Evaluation

## 1. 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 design engineer a sound basis to select the most appropriate OWTS design for the location and application.

b. The soil evaluation must be conducted by a Competent Technician, see Section 5.7 for qualifications.

c. Each site evaluation must consist of:

   i. Preliminary investigation;

   ii. Reconnaissance;

   iii. Detailed soil investigation; and

   iv. Report and Site Plan

## 2. Preliminary Investigation

a. Research of information relative to the site and anticipated conditions must be conducted. Information gathered as part of the preliminary investigation must include, but is not limited to:

   i. Property Information:

      i. Physical Address

      ii. Legal Description

      iii. Existing Structures; and

      iv. Location of existing or proposed wells on the property.

b. Clear Creek Environmental Health Department Records.

c. Published Site Information

   i. Topography; and

   ii. Soil Data

d. Location of physical features, on and off the property that will require setbacks as identified in Table 8-1.

e. Preliminary soil treatment area size estimate based on information on existing or planned facility and local regulations.
f. Easements, if applicable;

g. Floodplain maps, if applicable;

h. Delineated wetland maps, if applicable;

i. Any other information as required by the Department.

**3. Reconnaissance**

a. A visit to the property to evaluate the topography and other surface conditions that will impact the location and design of the OWTS must be conducted. Information gathered as part of the site reconnaissance may include, but is not limited to:

a. Landscape position;

b. Topography;

c. Vegetation;

d. Natural and cultural features; and

e. Current and historical land use.

**4. Detailed Soil Investigation**

a. Soil investigations to determine the long-term acceptance rate of a soil treatment area must be conducted per the following criteria:

i. Visual and tactile evaluation of two or more soil profile test pit excavations must be conducted to determine soil type as well as to determine whether a limiting layer is encountered.

ii. In addition to the two soil profile test pit excavations, percolation testing may be conducted to obtain additional information regarding the long-term acceptance rate of the soil.

iii. If the site evaluation includes both a visual tactile evaluation of soil profile test pit excavations and percolation tests, and the results from these two evaluations do not coincide with the same LTAR as noted in Table 11-1 the designer must use the more restrictive LTAR in determining the size of the soil treatment area.

iv. Procedure for performing visual and tactile evaluations of soil in order to determine a long-term acceptance rate.

v. Evaluation of two or more soil profile test pit excavations must be performed to determine soil types limiting layers, and best depth for the infiltrative surface. The total number of soil profile test pit excavations beyond the required two shall be based on the judgment of the competent technician.

vi. 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.

vii. The minimum depth of the soil profile test pit excavation must be to any limiting layer, or four feet below the infiltrative surface of the in-situ soil, whichever is encountered first.

viii. Layers and interfaces that interfere with the treatment and dispersal of effluent must be noted. Thus, any limiting soil characteristic such as consistence also needs to be evaluated. The evaluation of consistence may also include an evaluation of excavation difficulty, rupture resistance, and/or penetration resistance.

ix. 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.

x. 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.

xi. The soil observation method must allow observation of the different soil horizons that constitute the soil profile.

xii. 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 must be conducted.

xiii. The soil type at the proposed infiltrative surface of the soil treatment area or a more restrictive soil type within the treatment depth must be used to determine the long-term acceptance rate from Table 11-1 or Table 11-1A. 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 8-2.

xiv. Soils data, previously collected by others at the site can be used for the purposes of an OWTS design if approved by the Department. The data must be verified, at a minimum, by performing an evaluation of a soil profile test pit excavation.

b. Soil descriptions for determination of a limiting layer must include:

i. The depth of each soil horizon measured from the ground surface and a description of the soil texture, and structure of each soil horizon;

ii. Depth to the bedrock;

iii. Depth to the periodically saturated soil as determined by:

1. Redoximorphic features and other indicators of water levels, or
2. Depth of standing water in the soil observation excavation, measured from the ground surface, if observed, unless redoximorphic features indicate a higher level.

c. Procedure for performing percolation tests:

i. The percolation testing shall be performed by a professional engineer or by a trained person under the supervision of a professional engineer or by a competent technician.

ii. Number of test holes; Location

1. 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 evenly over the proposed area.

2. If the likely depth of a proposed infiltrative surface is uncertain, percolation tests must be performed at more than one depth to determine the depth of the infiltrative surface.

iii. Dimensions

1. The percolation test hole must have a diameter of eight to 12 inches and be terminated a minimum of six inches and a maximum of 18 inches below the proposed infiltrative surface**.**

iv. Change in Soil

1. 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 8-2 for vertical separation, a minimum of two soil percolation holes must be terminated in the changed soil, and percolation tests must be conducted in both holes.

v. Percolation Tests

1. The percolation tests must be conducted using the hole preparation, soil saturation and rate measurement procedures described below.

vi. Preparation of Percolation Test Holes

1. Excavate the hole to the depth and diameter required.

2. 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.

3. Remove all loose soil from the hole.

4. Add two inches of very coarse sand or fine gravel to protect the bottom of the hole from scouring and sediment.

vii. Presoak

1. The hole must 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.

2. 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.

viii. Percolation Rate Measurement

1. With the exception of sandy soils containing five percent or less particles passing the #200 sieve, by weight, percolation rate measurements must be made on the day following the presoak procedure.

2. 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 30 minute interval. The drops are used to calculate the percolation rate.

3. 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 six 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.

ix. Sandy Soils

1. In sandy soils or other soils in which the first six inches of water seeps out of the hole in less than 30 minutes, after the 24 hour swelling period, the time interval between measurements must be ten minutes and the test conducted for one hour. The drop that occurs during the final ten minutes must be used to calculate the percolation rate.

2. If the soil is so sandy or coarse-textured that it will not retain any water, then the infiltration rate must be recorded as less than one minute per inch

x. Special Soil Types

1. The Clear Creek Environmental Health Department may identify soil types in its area for which different procedures such as extra presoaking or an extended testing time to obtain a valid percolation rate will be required.

xi. Percolation Rate Determination and Reporting

1. The field percolation rate will 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 must be used in determining the long-term acceptance rate for the proposed system from Table 11-1.

2. The technician performing the percolation tests shall furnish an accurate scale drawing, showing the location of the soil profile test pit excavations and/or percolation holes tied to lot corners or other permanent objects. The drawing must meet the criteria in Section 6.1.e.vii. The information in the subsections following Section 6.1.e.vii.1-5 may be included but is not required for this drawing. All holes must be clearly labeled to relate to the information provided for the profile test pits and percolation tests.

xii. Alternate Percolation Testing

1. 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.

2. Prior approval from the Department of alternate percolation test procedures is required.

**5. Marking of Soil Profile Test Pit Excavation or Percolation Holes**

a. The engineer or technician conducting the soil profile test pit excavations or percolation tests must, upon completion of the tests, flag or otherwise mark each excavation or hole to allow easy location by others. Soil profile test pit excavations and percolation holes must remain open until after evaluation by the local public health agency, if required by the agency. Excavations must be suitably barricaded to prevent unauthorized access and to address safety concerns.

**6. Site Protection**

a. Prior to and during construction, the proposed soil treatment area and replacement area, if any, must be protected from disturbance, compaction, or other damage by means of staking, fencing, posting, or other effective methods.

**7. Qualifications for a Competent Technician**

a. Visual and Tactile Evaluations of Soil

i. Qualification required:

1. Proof of a completed degree in soil science, agronomy, geology, or other majors if a course(s) in soil morphology was included; or

2. Attendance at a training or workshop for soil evaluations for OWTS including both class and field work.

a. If the training or workshop includes an exam to verify acceptable completion of the course, a passing grade on the exam must be attained.

b. The Division must approve training for visual and tactile evaluations of soil.

ii. Competencies needed to conduct visual and tactile evaluation:

1. Identify soil types by hand texturing and observation;

2. Identify presence or absence of soil structure;

3. Identify type and grade of soil structure;

4. Recognize evidence of highest seasonal water surface;

5. Identify layers and interfaces that will interfere with effluent movement;

6. Determine the most promising depth for infiltrative surface of OWTS and for percolation tests, if used; and

7. Understand basic principles of OWTS siting and design.

b. Percolation Tests

i. Qualification Required

1. The Clear Creek Environmental Health Department may require training for percolation testing based on technician background and familiarity with conducting percolation tests.

ii. Competencies needed to conduct percolation testing:

1. Set up equipment;

2. Perform and run percolation tests according procedure in this regulation; and

3. Record results and calculate percolation rates.

# Section 6 – Report, Site Plan and Design Document

## 1. Report and Site Plan Minimum Requirements

a. A written report describing the results of the preliminary investigation, reconnaissance, and detailed evaluations must be submitted at the time of permit application.

b. The report must be reviewed and stamped by a Colorado licensed professional engineer.

c. The report may be in text and/or tabular form and must include a drawing locating features relative to the proposed OWTS location and test locations.

d. The report must accompany the Design Document, see Section 6.2 for requirements.

e. The report must include, but is not limited to:

i. Company name, address, telephone number, e-mail address, and name of individual, credentials and qualifications of the individual conducting the site evaluation;

ii. Preliminary and detailed evaluations, providing information from the surface site characteristics assessment and soils investigation;

iii. Dates of preliminary and detailed evaluations;

iv. A graphic soil log, to scale, indicating depth of the soil test pit excavation, soil description and classification, depth to any limiting layer encountered, type of equipment used to excavate the soil profile test pit and date of soils investigation.

v. Setback distances to features listed in Table 8-2

vi. Setback distances to features listed in Table 8-1 existing on the site or within applicable setback limits, whichever is greater;

vii. A drawing created to a scale that provides the complete property boundary lines. The minimum drawing size is 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 must indicate dimensions, have a north arrow and graphic scale and include:

1. Fixed, non-degradable temporary or permanent benchmark, 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;

2. Contours or slope direction and percent slope;

3. The location of any visible or known unsuitable, disturbed or compacted soils;

4. The estimated depth of periodically saturated soils and bedrock, or flood elevation, if applicable; and

5. The proposed elevation of the infiltrative surface of the soil treatment area, from an established datum (either ground surface or a benchmark);

viii. Anticipated construction-related issues, if applicable;

1. 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, if applicable; and

2. 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, if applicable.

**2. Design Document Minimum Requirements**

a. The design document must be reviewed and stamped by a Colorado licensed professional engineer.

b. 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.

c. The design document must include a brief description of the facility and its proposed use, basis and calculations of design flow, and influent strength.

d. The design document must contain all plan details necessary for permitting, installation and maintenance, including, but not limited to:

i. Assumptions and calculations for each component, including total dynamic head (TDH) and gallons per minute (GPM) for all dosing systems;

ii. A fixed, non-degradable temporary or permanent benchmark, (North America Vertical Datum or assumed elevation is acceptable);

iii. A scale drawing showing location of each OWTS component and distances to water supplies, surface water, physical and health impact features on both the subject and adjacent properties requiring setbacks;

iv. Layout of soil treatment area, dimensions of trenches or beds, distribution method and equipment, distribution boxes, drop boxes, valves, or other components used;

v. Elevation or depth of infiltrative surface of the soil treatment area, the septic tank invert, and all other components of the OWTS;

vi. Special structural design considerations, as applicable to ensure the long-term integrity of each component;

vii. References to design manuals or other technical materials used;

viii. Installation procedures, as applicable;

ix. Operation and maintenance manuals or instructions; and

x. Other information that may be useful such as photos and cross-section drawings.

# Section 7 – Wastewater Flow and Strength

## 1. Single Family Residential Flows

a. Design flow per person must be 75 gallons per day (gpd).

b. The minimum design flow for a new home must be for a two-bedroom house unless otherwise noted in this regulation.

c. The minimum design flow for the repair or replacement of an OWTS of an existing one-bedroom home must be for one-bedroom unless bedrooms are added.

d. For homes up to and including three bedrooms, the assumed number of persons per bedroom is two for design purposes.

e. For homes with more than three bedrooms, the assumed number of persons is six persons (first three bedrooms x two persons per bedroom) plus one additional person for each bedroom more than three bedrooms.

f. The Department may increase the number of persons per bedroom to two for all bedrooms for design purposes.

g. Table 7-1 summarizes the design flows for single-family residential homes up to six bedrooms.

h. Flows estimates will be determined by the number of bedrooms originally present.

**Table 7-1 Single Family Residential Design Flows**

| # Bedrooms | Occupancy (# of Persons) | Design Flow (gallons/day) |
|---|---|---|
| 2 | 4 | 300 |
| 3 | 6 | 450 |
| 4 | 7 | 525 |
| 5 | 8 | 600 |
| 6 | 9 | 675 |

**2. 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 will 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 must be sized on the basis of Table 7-2 and a septic tank detention time of 48 hours.

e. Any auxiliary building that will be used as an accessory dwelling unit must comply with all requirements as found in the Clear Creek County Zoning Regulations.

**3. Multi Family and Commercial Systems**

a. Design flow values and strengths for multi-family and commercial systems must be determined from:

   i. Table 7-2; 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 local public health agency for approval. The analysis must 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 must 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 will be the design flow.

      2. Total Suspended Solids and $BOD_5$ or $CBOD_5$ tests at times of full use. At least three samples taken at least one week apart are required. Sampling that provides equivalent and representative data through "composite sampling" may be allowed.

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

b. An OWTS that will serve a business, commercial, industrial or institutional property, or a multifamily dwelling must:

i. 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

ii. 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. Subsequent to acceptance by the EPA, the local public health agency may choose to also issue a permit for this type of use.

c. Flow equalization may be used if a facility has flows that vary from day to day by more than four times the average flow.

i. The highest peak assumed must be at least equal to the full capacity of the facility.

ii. The stored flow must be distributed to the soil treatment area before the next greater-than-average peak.

iii. Flow equalization may be used only if:

1. The facility is non-residential;

2. The facility is only used for one purpose;

3. Flows will follow a predictable pattern; and

4. There is a long-term expectation that size and pattern of the flows will remain the same.

iv. Timed dosed pressure distribution or timed dosed NDDS must be used. The soil treatment area reduction for pressure distribution (Table 11-2) must not be used in addition to the flow equalization reduction.

v. Contingency plans must be made for expanding the capacity of the OWTS in the event of changed use at the facility.

d. Multi-family or commercial properties serviced by an OWTS are required to provide daily metered water use data on a monthly basis, or as otherwise specified in permit conditions, to the Clear Creek Environmental Health Department.

**Table 7-2 Estimated Daily Wastewater Flow and BOD5 Load per Person**

| RESIDENTIAL WASTEWATER | GPD | $BOD_5$ IN POUNDS PER DAY |
|---|---|---|
| Single-family dwellings | 75 | .20 |
| **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 |
| Hotels and motels per room | 75 | .15 |
| Multiple-family dwellings or apartments | 75 | .20 |
| Boarding and rooming houses (users absent during working hours) | 50 | .15 |
| Tiny Homes[3], per unit | 150 | .40 |
| Mobile home | 75 | .20 |
| Mobile home park per space | 300 | .80 |
| **COMMERCIAL WASTEWATER** | **GPD** | **$BOD_5$ IN POUNDS PER DAY** |
| Facilities with short-term or transient visitors<br>(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[1] |
| Bowling alleys per lane - toilet wastes only | 5 | .03[1] |

| | | |
|---|---|---|
| Country club per member | 30 | .02 |
| County club per employee | 20 | .06 |
| Dentist offices per non-wet chair | 50 | .14[1] |
| Doctor offices per doctor | 250 | .80[1] |
| 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[1] |
| Stores and shopping centers per square foot of retail space | .1 | .01[1] |
| 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** | **GPD** | **$BOD_5$ 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** | **GPD** | **$BOD_5$ IN POUNDS PER DAY** |
| Churches per seat; without any food service, or other uses | 3.5 | .01 |

| | | |
|---|---|---|
| Churches, per seat; warming kitchen only, no major food service | 5 | .01 |
| Churches, per seat; with food service, per meal served[4] | 4 | .02 |
| Hospitals per bed space | 250 | .20 |
| Nursing homes; Group homes for developmentally disabled, per bed space | 125 | .20 |
| 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** | **GPD** | **$BOD_5$ IN POUNDS PER DAY** |
| Camps, day, no meals served | 15 | .12 |
| Luxury resort | 125 | .17 |
| Resort night and day | 50 | .12 |
| Campground per campsite[2] | 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 [2] | 100 | .24 |
| Travel trailer park without individual water and sewage hookup per unit [2] | 50 | .12 |

1 BOD levels need further verification depending on the specific use of the facility.
2 Laundry facilities are to be calculated on a per commercial washer basis in accordance with other elements of this table.
3 For the purposes of this Table, a “Tiny home” is a structure (a non-recreational vehicle) that has only one bedroom and has <400 sq.ft. of livable space, including lofts. In this instance, the OWTS may be sized for only one bedroom.
4 For churches with food service, the 4 gal/meal must be added to the 3.5 gal/seat to determine projected design flows.

### 4. Wastewater Strength

a. Table 7-3 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 by the Division.

b. High strength waste must be reduced to at least Treatment Level TL1 quality or lower before applying to a soil treatment area. Waste strength levels defined in Table 7-3 and 7-4 must be used to determine compliance.

**Table 7-3 Treatment Levels**

| Treatment Level | $BOD_5$ (mg/L) | $CBOD_5$[1] (mg/L) | TSS (mg/L) | Total Nitrogen (mg/L) |
|---|---|---|---|---|
| **TL1**[2] | 180 | - | 80 | 60-80 |
| **TL2** | - | 25 | 30 | N/A[3] |
| **TL2N** | - | 25 | 30 | >50% reduction[4] |
| **TL3** | - | 10 | 10 | N/A[3] |
| **TL3N** | - | 10 | 10 | 20 mg/L |

Shading indicates higher treatment levels.
1 Requirements for $CBOD_5$ are only related to effluent samples from a higher level treatment system.
2 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.
3 Total Nitrogen does not apply to Treatment Levels TL2 and TL3. Processes intended to reduce total nitrogen are addressed in Treatment Levels TL2N and TL3N. Any total nitrogen reductions that may be observed for TL2 and TL3 are as a result of the treatment process for $BOD_5$ and TSS reductions.
4 NSF/ANSI Standard 245 – Wastewater Treatment Systems – Nitrogen Reduction requires reduction of 50 percent rather than an absolute value.

**Table 7-4 High Strength Wastewater***

| | $BOD_5$ (mg/L) | TSS (mg/L) | Fats, Oils, Grease (FOG) (mg/L) |
|---|---|---|---|
| **Septic Tank Influent** | >300 | >200 | >50 |
| **Septic Tank Effluent** | >180 | >80 | >25 |

* High strength effluent prior to a septic tank has a wide range of concentrations. These values are typical, but values used for design purposes must account for site-specific information.

# Section 8 – Minimum Horizontal and Vertical Setback Distances

1. **Horizontal Distances**

    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 8-1.

    b. The setback requirements are applicable for minimum system performance and treatment levels with specific modifications allowed for higher treatment levels as provided in Table 8-2.

    c. All distance setback modifications must be analyzed and approved by the Clear Creek County Board of Health and be in complete compliance with the variance procedures of this regulation and those of the local board of health.

    d. Acceptable methods of analyzing horizontal separation distances with higher treatment levels include but are not limited to:

        i. Analyzing the intended uses of impacted surface and/or ground waters;

        ii. Contacting adjacent property owners for potential conflicts with property line encroachments; and

        iii. Analyzing potential impacts that system locations may have on building foundations and other potentially affected features.

    e. Reductions in separation distances with higher level treatment must include provisions for operation and maintenance for the life of the system, as described in Section 16.

2. **Dry Gulches, Cut Banks and Fill Areas**

    a. Separation distances to dry gulches, cut banks and fill areas in Table 8-1 must apply unless the design engineer determines by observation of the exposed slope of the dry gulch or cut bank or by soil profile test pit excavations that a limiting layer is present that will direct or allow the effluent from the soil treatment area to move laterally and surface. In this instance, a greater distance may be required.

    b. 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.

    c. 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 the slope are too close together. If there is potential for erosion or instability, the separation distance must be increased until the risk is minimized.

3. **Design Considerations**

a. Components of an OWTS listed in Table 8-1 shall be installed or located in accordance with the minimum distance requirements provided in the table.

b. Table 8-2 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.

i. Items 1, 2 and 3 in Table 8-2 address the allowable horizontal setback distance between the soil treatment area and the following physical features:

ii. Setback distance from soil treatment area to on-site well;

iii. Setback distance from soil treatment area to water features; and

iv. Setback distance from soil treatment area to a dry gulch or cut bank.

c. Item 4 in Table 8-2 addresses the required vertical separation distance between the infiltrative surface of the soil treatment area and the limiting layer or the required depth of soil comprising the soil treatment area.

d. The designer may select the level of treatment from Table 8-2 to be applied to the soil treatment area that is necessary in order to accommodate the site conditions.

**Table 8-1 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 Cistern[4] | Potable Water Supply Line [2] | Structure w/basement, crawl space or footing drains | Structure without basement, crawl space or footing drains | Property Lines, Piped or Lined Irrigation Ditch, upslope curtain drain | Subsurface Drain, Intermittent Irrigation Lateral, Drywell, Stormwater Structure | Lake, Water Course, Irrigation Ditch, Stream, Wetland | Dry Gulch, Cut Bank, Fill Area (from Crest) | Septic Tank, Higher level treatment Unit, Dosing Tank, Vault or Privy |
|---|---|---|---|---|---|---|---|---|---|
| Septic Tank, Higher Level Treatment Unit, Dosing Tank, Vault or Vault Privy | 50 [2] | 10 [2] | 5 | 5 | 10 | 10 | 50 | 10 | -- |
| Building Sewer or Effluent Lines | 50 [2] | 5 [6] | 0 | 0 | 10 [2] | 10 [2] | 50 [2] | 10 [2] | -- |
| STA Trench, STA Bed, Unlined Sand Filter, Sub-surface Dispersal System, Seepage Pit | 200 (100 [3, 7, 8]) | 25 [2] | 20 | 10 | 10 | 25 | 50 [3] | 25 | 5 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Lined Sand Filter | 60 | 10 [2] | 15 | 10 | 10 | 10 | 25 | 10 | 5 |
| Lined Evapo-transpiration Field or Outside of Berm of Lined Wastewater Pond | 60 | 10 [2] | 15 | 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 Evapotrans-piration System, Outside of Berm of Unlined Wastewater Pond, or System Not Relying on STA for Treatment Other than Aerosol | 100 | 25 [2] | 15 | 15 | 10 | 25 | 25 | 15 | 10 |
| System Not Relying on STA for Dispersal | 100 [3] | 10 [2] | 125 | 125 [5] | 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 must 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 potable wells, irrigation wells and monitoring wells set within a potable aquifer and 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 with a minimum Schedule 40 rating of sufficient diameter to easily slide over and completely encase the conveyance must be used. 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 must 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 must be sealed with an approved underground sealant compatible with the piping used. Other methods of encasement that provide equal protection are allowed. These methods must be reviewed and approved by the local public health agency.

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. If effluent meets Treatment Level 3N and the local public health agency has a maintenance oversight program in accordance with section 14.D. of this regulation, the distance addition is not required. Flows 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 Division site application and permitting process.

4 All horizontal setbacks to a potable water supply cistern must be met unless a variance by the Board of Examiners of Water Well Construction and Pump Installation Contractors is granted per section 18.2 of the Water Well Construction Rules, 2 CCR 402-2. Setback requirements which may necessitate a variance are found within section.10.2 or 11.4 of the Water Well Construction Rules, as applicable. The minimum horizontal setback that may be granted through a variance is to 25 feet.

5 If the structure is not used as a habitable unit, the isolation may be reduced by the local board of health to no less than 50 feet.

6 Building sewer installations shall meet the design requirements of the Colorado Plumbing Code.

7 Minimum setback of 100 feet permitted for systems receiving TL2N, 3 or TL3N treatment level effluent.

8 See Appendix A for well deep grouting setback reduction requirements.

**Table 8-2 On-site Wastewater Treatment System Design Consideration and Treatment Requirements – Separation Distances from Soil Treatment Area**

| | | | **PRESSURE DOSING REQUIRED** | **PRESSURE DOSING REQUIRED** | **PRESSURE DOSING REQUIRED** |
|---|---|---|---|---|---|
| **ITEM** | OWTS DESIGN CONSIDERATION | Treatment Levels 1 & 2 | Treatment Level 2N | Treatment Level 3 | Treatment Level 3N |
| | **Horizontal Separation Distances** | | | | |
| 1 | Distance from soil treatment area to on-site well | Greater than or equal to 200 feet | Greater than or equal to 100 feet[1] | Greater than or equal to 100 feet[1] | Greater than or equal to 100 feet [1] |
| 2 | Distance from soil treatment area to pond, creek, lake, or other surface water feature | Greater than or equal to 50 feet | Greater than or equal to 25 feet | Greater than or equal to 25 feet | Greater than or equal to 25 feet |
| 3 | Distance from soil treatment area to dry gulch or cut bank | Greater than or equal to 25 feet | Greater than or equal to 10 feet | Greater than or equal to 10 feet | Greater than or equal to 10 feet |
| | **Vertical Separation Distances** | | | | |
| 4 | Treatment depth in feet from infiltrative surface to a limiting layer | 4 feet[2] (3 feet with pressure dosing) | Greater than or equal to 2.5 feet | Greater than or equal to 2.5 feet | Greater than or equal to 2 feet |

NOTE: Treatment levels are defined in Table 7-3.

1 All setback distance reductions to the 100 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. For TL 3N effluent, a reduction to 75 feet is allowed if a variance from the Water Well Construction Regulations is obtained.

2 Reductions in the vertical separation requirements for the use of higher level treatment systems with seepage pits are not allowed. The bottom of the excavation of a seepage pit must be a minimum of four feet above a limiting layer.

# Section 9 – Design Criteria: General

## 1. General

a. The OWTS for single-family homes shall be designed to accommodate the proposed flows from the structure as defined in section 7.1. Flow estimates for multi-family or commercial OWTS must comply with section 7.3. Expected waste strength as noted in Table 7-3 and Table 7-4 must also be addressed, where applicable.

b. Installation of low flow fixtures or the separation of toilet waste or other sources of wastewater does not allow for the reduction in the size of an OWTS.

c. OWTS shall be designed and constructed to achieve the treatment level, as specified by the design.

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

## 2. Accessibility for Inspection, Maintenance and Servicing

a. Septic tanks must have watertight risers over each access manhole and all risers must extend to or above final grade.

b. For new construction, the top of any septic tank, dosing tank or vault must be no deeper than four feet below finished grade.

c. Each treatment component of an OWTS other than the septic tank and soil treatment area must 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.

d. Riser Lids

   i. Each riser lid must be watertight, brought to or above the surface, and must have a secure closing mechanism, such as a lock, special headed bolts or screws, or sufficient weight (defined as 59 pounds) to prevent unauthorized access.

   ii. The Department may require a secondary plug, cap, cover or screen be provided below the riser cover to prevent tank entry if the cover is unknowingly damaged or removed.

e. Components that require access for maintenance must 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.

f. Components must be designed and constructed so that, when installed, they must be easily maintained, sampled, and serviced according to the manufacturer's recommendations. Easy physical access to treatment components by maintenance personnel and equipment must be provided.

**3. Plumbing Codes**

a. Plumbing fixtures, building sewers, vents, sewer lines and other appurtenances must 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 must adhere to the Colorado Plumbing Code (3 CCR 720-1). A local plumbing permit may be required.

**4. Electrical Equipment**

a. All electrical work, equipment, and material must 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). An electrical permit may be required.

b. Electrical components must be protected from moisture and corrosive gases.

**5. Indicators of Failure or Malfunction for System Utilizing Mechanical Apparatus**

a. A signal device must be installed which will provide a recognizable indication or warning to the user that the system or component is not operating as intended. This indication or warning must be a visual signal and an audible signal, and be located in a centralized area within visual and audible range of the system user. A signal message may also be sent remotely to a service provider.

**6. Sampling Access**

a. 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 must be provided.

b. 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 must be constructed. Monitoring wells must 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 the local public health agency or other issuer of a permit.

**7. Component Operating Instructions**

a. The manufacturer of proprietary treatment units utilizing mechanical components must provide clear, concise written instructions covering the components which, when followed, must assure proper installation and safe and satisfactory operation and maintenance.

b. If the OWTS uses public domain technology, the design engineer must provide clear, concise written instructions covering the components which, when followed, must assure proper installation and safe and satisfactory operation and maintenance.

# Section 10 – Design Criteria: Components

## 1. Tanks and Vaults

a. Watertightness

i. Septic tanks, vaults, dosing tanks, other treatment components, risers and lids must not allow infiltration of ground water or surface water and must not allow the release of wastewater or liquids through other than designed openings.

ii. When the final compartment of a tank is being proposed for use as a pump or siphon chamber, the wall between this chamber and the previous chamber must be watertight except for the intended hydraulic opening.

iii. Acceptable watertightness testing methods performed at a manufacturer's site or in the field include water filling the tank or vacuum testing.

b. Tank Anchoring

i. 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 must be anchored in a manner sufficient to provide stability when the tank is empty.

ii. Buoyancy calculations must be provided. Risers must be included in buoyance calculations.

iii. If a manufacturer provides recommendations for anchoring designs, they may be used if they meet the conditions present at the site.

iv. 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 must be prepared by the professional engineer.

c. Identification and Data Marking

i. All tanks and treatment units must be permanently and legibly marked in a location for the purpose of inspection that is readily visible when inspected before backfilling. The marking inscription must include the following:

1. Name of manufacturer;

2. Model or serial number, if available;

3. Effective volume and unit of measure;

4. Maximum depth of earth cover and external loads the tanks is designed to resist; and

5. Inlet and outlet identifications, if relevant.

## 2. Septic Tanks

a. The manufacturer must provide sufficient information to demonstrate that the tank will meet the design specification.

   i. Sizing for residential capacity for new installations must be based upon the number of bedrooms according to Table10-1:

**Table 10-1 Tank Sizing Chart**

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

   ii. For multi-family and non-residential applications, a septic tank must be sized to permit detention of incoming wastewater design flows for a minimum of 48 hours.

   iii. For systems that remove toilet waste for separate treatment, tank capacity may be less than 1,000 gallons, if it provides a minimum of 48 hours detention time.

   iv. Minimum tank size for new installations other than for a single-family residence is 400 gallons.

b. Inspection and Testing of Septic Tank Watertightness

   i. Testing of septic tanks must be performed and evaluated as specified in section 9 of ASTM C1227-13 (Standard Specification for Precast Septic Tanks) for concrete tanks or in Standard IAPMO/ANSI Z1000-2013 (American Standards for Prefabricated Septic Tanks) for other prefabricated septic tanks.

   ii. Each unit must be inspected in the field for conditions that may compromise its watertightness.

   iii. The inspection in the field must be conducted by The Clear Creek Environmental Health Department and be performed after the tank installation but before backfilling.

   iv. 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.

c. Septic Tank Design and Dimension Criteria

   i. A septic tank must 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 must hold no less than one-half of the required effective volume.

ii. Inlet invert must be at least two inches higher than the outlet invert.

iii. Inlet tee or baffle must extend above the surface of the liquid at least five inches and must extend a minimum of eight inches below the liquid surface. However the inlet tee or baffle must not extend to a depth of more than 40 percent of the liquid depth measured from the liquid surface.

iv. Outlet tee or baffle must extend at least 5 inches above and 14 inches below the outlet invert, however it must not extend to more than 40 percent of the liquid depth measured from the liquid surface. 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.

v. The distance from the outlet invert to the underside of the tank top must be at least ten inches.

vi. Liquid depth must be a minimum of 30 inches and the maximum depth must not exceed the tank length.

vii. The transfer of liquid from the first compartment to the second or successive compartment must be made at a liquid depth of between 35 and 40 percent of the liquid depth measured from the liquid surface.

viii. At least one access opening no less than 20 inches across must be provided in each compartment of a septic tank.

ix. A septic tank must 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, must 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.

d. Concrete Septic Tank Structural Design

i. Concrete septic tanks must comply with the structural design criteria of ASTM C1227-13 (Standard Specification for Precast Septic Tanks).

ii. 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.

iii. Certification by a professional engineer must be submitted to the Division for acceptance.

iv. Tank slab lids, mid-seam tanks, and the connections between the tank and risers must be designed to provide for a watertight seal.

e. Fiberglass, Fiberglass-Reinforced Polyester, and Plastic Tanks

i. All fiberglass, fiberglass-reinforced polyester, and plastic tanks must meet the minimum design and structural criteria of IAPMO/ANSI Z1000-2013 (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.

ii. All tanks must 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.

iii. Tanks must be structurally sound and support external forces as specified in the standard referenced above when empty and internal forces when full. Tanks must not deform or creep resulting in deflection of more than five percent in shape as a result of loads imposed.

iv. All tanks must be constructed of sound, durable materials and not be subject to excessive corrosion, decay, frost damage, or cracking.

v. All seams or connections including to risers must be sealed to be watertight.

f. Metal tanks are prohibited.

**3. Abandonment of Tank**

a. A tank may be completely removed and the parts disposed of safely

i. If the tank will remain in place:

ii. The tank must be pumped to remove as much waste as possible;

iii. The bottom of the tank must be broken so the tank neither floats nor fills with water;

iv. The top must be collapsed and the sides may be broken into the void;

v. The remaining void must be filled with gravel, sand or compacted soil; and

vi. The filled excavation will be graded to surroundings, allowing for settling.

b. The Department may require abandonment of a tank that is deemed to be a hazard.

**4. Pipe Standards and Bedding Requirements**

a. Pipe Standards

i. All wastewater pipes used in portions of an OWTS that are pressurized must be constructed of compatible pipe, primer, bonding agent, and fittings. Flexible couplings to connect pipes may only be used in portions of an OWTS that are intended for gravity flow of the wastewater.

ii. Where unperforated plastic pipe and fittings are used for gravity flow, the minimum wall thickness of the pipe must conform to ASTM Standard D 3034-16 (2016 version) or equivalent or greater strength. Schedule 40 pipe is preferred.

iii. Perforated distribution pipe surrounded by rock within a soil treatment area must have a minimum wall thickness and perforations conforming to ASTM Standard D 2729-17 (2017 version) or equivalent or greater strength. Corrugated polyethylene pipe with smooth interior that meets ASTM F405-13 (2013 version) or AASHTO M252-09 (2009 version) specifications or equivalent may be used.

iv. Schedule 40 [ASTM Standard D 3034-16 (2016 version)] or pipe of equivalent or greater strength must 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.

v. Tile pipe, open-joint pipe, and cast iron pipe must not be used in an OWTS.

vi. Pressure pipe must be rated for the intended use to accommodate pump discharge pressure.

b. Bedding

i. All system piping, except for distribution laterals within the soil treatment area, must be bedded with select material before final inspection by theh Department.

ii. Select bedding material must 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.

iii. Bedding material must be mechanically compacted to support piping.

c. Cleanouts required between the building and the septic tank:

i. Cleanouts must have a secure cap and a riser extending to or easily accessible from grade. The installation of a straight tee or sanitary tee is acceptable.

ii. Cleanouts must be provided within five (5) feet of the outside of the building.

iii. Where a sewer has a change of horizontal direction greater than 45 degrees, a cleanout must be installed at the change of direction unless a cleanout already exists within 40 feet upstream of this fitting. Where more than one change of direction greater than 45 degrees occurs within 40 feet of a developed length of piping, the cleanout for the first change of direction may serve as the cleanout for all changes within that 40 feet of developed length of pipe.

iv. Cleanouts must be provided at intervals within the building sewer from the structure to the tank of not more than 100 feet. The effluent pipe between the septic tank and soil treatment area is exempt from this requirement

**5. Distribution Box**

a. A distribution box, if used, must be of sufficient size to distribute effluent equally to the laterals of a trench or absorption bed system. The box must be constructed with the inlet invert at least one inch above the level of the outlet inverts. Flow equalizers or similar devices must be used to adjust the flow between laterals. Access to the box must be provided with a manhole riser with access lid at or above grade if the top of the box does not reach final grade.

**6. Drop Box**

a. 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 pipes in sequential distribution must be designed and installed so that they may be capped off for resting periods.

**7. Stepdown/Relief Pipe**

a. In sequential or serial distribution, an unperforated 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.

**8. Wastewater Pumping and Dosing Siphon Systems**

a. Pumps

i. Non-clog pump opening must have at least two-inch diameter solids handling capacity where raw wastewater is pumped. A pump opening must not have more than 3/4-inch diameter solids handling capacity if previously settled effluent is pumped.

ii. Pumps must be certified to the UL778 (Edition 6 or earlier version) electrical safety standard, bear the seal of approval of CSA, UL or an equivalent testing program and be constructed of corrosion resistant materials.

iii. Grinder pumps must also be certified to NSF/ANSI Standard 46 (2017 or earlier version) and bear the seal of approval of the NSF or equivalent testing and certification program.

b. Floats and Switches

i. Automatic liquid level controls must be provided to start and shut off pumps at a frequency or level specified in the design.

ii. Floats must be mounted on a stem separate from the pump discharge piping to allow for removal, adjustment, and replacement of the float from grade without removing the pump.

iii. Float switches must be certified to the UL60947-4-1 (Edition 3 or earlier version), or CSA C22.23 No 205-17 (2017 or earlier version) electrical safety standard,

bear the seal of approval of CSA, UL or an equivalent certification program and be constructed of corrosion resistant materials.

iv. Dosing siphons for pressure dosing and higher level treatment systems must provide for a means of determining the number of dosing events.

c. Location of Pump or Siphon

i. A pump or a siphon may be installed in a separate tank following the septic tank. The tank must be of sufficient volume to allow pump or siphon cycling commensurate with the design capacity.

ii. The second compartment of a two-compartment septic tank may only be used as the pump tank when the tank is specifically designed for this purpose and it can be demonstrated to the satisfaction of the local public health agency that the minimum 48-hour detention time will not be decreased. The pump must be screened or provided with an approved filtering device to assure that only liquid effluent will be discharged. The transfer of liquid from the first to the second compartment must be at an elevation that is between the inlet and outlet invert elevations, and through a standard tee designed and located as per the requirements of Section 10.4.c.iv.

iii. Siphons must not be installed in the second compartment of a two compartment tank.

iv. The use of a three-compartment septic tank, sized to provide the required effective volume in the first two compartments with the pump or siphon in the third compartment is acceptable for tanks specifically designed for this purpose. The transfer of liquid from the second to the third compartment must be at an elevation that is between the inlet and outlet invert elevation, and through a standard tee designed and located as per the requirements of Section 10.2.c.iv.

d. Pump or Siphon Discharge Piping

i. The discharge pipe from the pumping or siphon chamber must be protected from freezing by burying the pipe below frost level or sloping the pipe to allow it to be self-draining. Drainage must be provided through the bottom of the pump or through a weep hole located in the discharge pipe prior to exiting the tank.

ii. The pump discharge piping must have a quick disconnect that is accessible from grade to allow for easy pump access and removal.

iii. The pipe must be sized to maintain a velocity of two or more feet per second.

iv. Pressure pipes must be designed to prevent air or vacuum locking and allow self-draining of the pipes.

e. Access

i. The pump or dosing system tank, chamber, or compartment must have a minimum 24-inch diameter access riser, made of corrosion-resistant material, extending to or above ground level. A smaller diameter riser may only be

installed if it is accepted by the Division as an integral component of a specific product during the product review process.

ii. The access riser must have a watertight connection to the pump or dosing chamber/compartment to prevent infiltration or exfiltration.

iii. All other intrusions to the riser for electrical or other component access must also be watertight.

f. Splice Box

i. Splice boxes must be located outside the pump system access riser and be accessible from the ground surface.

ii. Wire splices are prohibited inside the tank, dosing chamber or riser. Wire splicing must be completed with corrosion-resistant, watertight connectors.

g. Controls and Circuits

i. Control panels or other electrical boxes used to control the functions of an OWTS must comply with the following, as appropriate:

1. The pump system must have an audible and visual alarm notification in the event an excessively high water condition occurs.

2. The pump must be connected to a control breaker separate from the alarm breaker and from any other control system circuits.

3. An electrical disconnect must be provided within the line of sight of the pump chamber.

4. The pump system must be provided with a means that will allow the pump to be manually operated; such as an H.O.A. switch (Hand/Off/Auto).

5. The pump system for pressure dosing and higher level treatment systems must have a mechanism for tracking both the amount of time the pump runs and the number of cycles the pump operates.

6. Must bear the seal of a Nationally Recognized Testing Laboratory (NRTL), such as UL or ETL.

**9. Effluent Screens**

a. An effluent screen is required on all new systems and repairs where the septic tank is replaced.

b. If a pump or dosing siphon is used to remove septic tank effluent from the final compartment of the septic tank, the effluent must be filtered prior to dispersal into the soil treatment area. An effluent screen, pump vault equipped with a filter cartridge, or a filter on the discharge pipe, would all be considered acceptable.

c. The effluent screen must be cleaned at manufacturer-recommended intervals, or more often, if use patterns indicate.

d. Where an ejector pump, grinder pump or non-clog pump is proposed for use prior to the septic tank, an effluent screen must be installed on the outlet of the septic tank.

e. The handle of the effluent screen must be installed within twelve inches below the top of the riser.

**10. Grease Interceptor Tanks**

a. All commercial food service facilities and other facilities generating fats, oils and greases in their waste must install a grease interceptor tank.

b. Grease interceptor tanks shall treat only those portions of the total wastewater flow in which grease and oils are generated.

c. The grease interceptor must have a minimum of two compartments and must be sized proportionate to the amount of fats, oils and grease it receives, the peak flow rate through the tank, and the expected cleaning frequency.

d. The inlet and outlet tees or baffles must extend into the bottom 1/3 of the liquid volume, but must be at least 12 inches off the inside floor of the interceptor.

e. The inlet and outlet tees or baffles must extend at least 5 inches above the liquid level and must provide for a free vent area across the liquid surface.

**11. Floor Drains**

a. Floors drains from any facility, workshop or garage shall not be connected to any OWTS unless that system consists solely of a sealed vault or holding tank.

# Section 11 – Design Criteria: Soil Treatment Area

## 1. General Requirements

a. The size and design of the soil treatment area must be based on the results of the site and soil evaluation, design criteria, and construction standards for the proposed site and OWTS selected.

b. All new soil treatment areas must receive effluent through method of a dosing siphon or pump. Gravity flow systems are not allowed in newly constructed soil treatment areas.

## 2. Sizing of the Soil Treatment Area

a. 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.

b. Long-term acceptance rates (LTARs) are shown in Table 11-1 and 11-1A.

c. Factors for adjusting the size of the soil treatment area are in Table 11-2 and 11-3.

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

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

e. Size adjustment factors for methods of application are in Table 11-2.

f. Size adjustment factors for types of distribution media are in Table 11-3.

g. A required soil treatment area receiving TL1 effluent may be multiplied by one size adjustment factor from Table 11-2, Table 11-3, or both.

h. A soil treatment area receiving TL2, TL2N, TL3, or TL3N effluent must be pressure dosed.

   i. For products that combine distribution and higher level treatment within the same component, pressure distribution of the effluent over the soil treatment area must be used.

   ii. TL2 – TL3N effluent may be applied by gravity flow in soil types 3, 3A, 4, 4A, or 5 for designs where reductions in the soil treatment area size or vertical/horizontal separation reductions are not being requested.

i. The distribution media in Table 11-3 may be used for distribution of higher level treatment system effluent, but an additional reduction factor from Table 11-3 must not be used. Sizing reductions for higher level treatment systems are achieved through increased LTAR's provided in Table 11-1.

j. If the width of a proprietary manufactured distribution product is within 90 percent of the width of the excavation, it may be approved as being equivalent to the full width of the excavation, if information is provided that demonstrates distribution over the full width. Thus, the product must cover at least 90 percent of the excavated area in either a trench or bed configuration in order to receive sizing adjustments provided in Table 11-3.

## Table 11-1 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-Type** | **USDA Soil Structure-Grade** | **Percolation Rate (MPI)** | **Tx Level 1[1]** | **Tx Level 2[1]** | **Tx Level 2N[1]** | **Tx Level 3[1]** | **Tx Level 3N[1]*** |
| R | >35% Rock (>2mm): See Table 10-1A | | | | | >35% Rock (>2mm): See Table 10-1A | | | |
| 1 | Sand, Loamy Sand | Single Grain | 0 (Structureless) | 5-15 | 0.80 | 1.40 | 1.40 | 1.55 | 1.55 |
| 2 | Sandy Loam, Loam, Silt Loam | PR (Prismatic) BK (Blocky) GR (Granular) | 2 (Moderate) 3 (Strong) | 16-25 | 0.60 | 1.0 | 1.0 | 1.1 | 1.1 |
| 2A | Sandy Loam, Loam, Silt Loam | PR, BK, GR Massive | 1 (Weak) 0 (Structureless) | 26-40 | 0.50 | 0.80 | 0.80 | 0.90 | 0.90 |
| 3 | Sandy Clay Loam, Clay Loam, Silty Clay Loam | PR, BK, GR | 2, 3 | 41-60 | 0.35 | 0.55 | 0.55 | 0.65 | 0.65 |
| 3A | Sandy Clay Loam, Clay Loam, Silty Clay Loam | PR, BK, GR, Massive | 1 0 (Structureless) | 61-75 | 0.30 | 0.45 | 0.45 | 0.55 | 0.55 |
| 4 | Sandy Clay, Clay, Silty Clay | PR, BK, GR | 2, 3 | 76-90 | 0.20 | 0.30 | 0.30 | 0.30 | 0.30 |
| 4A | Sandy Clay, Clay, Silty Clay | PR, BK, GR Massive | 1 0 (Structureless) | 91-120 | 0.15 | 0.20 | 0.20 | 0.20 | 0.20 |
| 5 | Soil Types 2-4A | Platy | 1, 2, 3 | 121+ | 0.10 | 0.15 | 0.15 | 0.15 | 0.15 |

1 Treatment levels are defined in Table 7-3.

* Higher long-term acceptance rates for Treatment Level 3N may be allowed for OWTS required to have a discharge permit, if the capability of the design to achieve a higher long-term acceptance rate can be substantiated

## Table 11-1A Design Criteria for Soils with High Rock Content (Type "R" Soils) [1,2,3,4]

| Soil Type, Percentage of Rock, LTAR, Distribution | | | | Required Sand or Media Depth Relative to the Quality of Effluent Applied to the Distribution System | | | | |
|---|---|---|---|---|---|---|---|---|
| **Soil Type** | **Percentage and Size of Rock[5]** | **Maximum LTAR (Gal./sq.ft./ day)** | **Type of Distribution Required** | **Treatment Level 1[6]** | **Treatment Level 2** | **Treatment Level 2N** | **Treatment Level 3** | **Treatment Level 3N** |
| R-0 | Soil Type[7] 1 with more than 35% Rock (>2mm) | Unlined Sand Filter: 1.0 for "Preferred Sand Media"; 0.8 for "Secondary Sand Media" | Pressure Distribution[8] | Minimum 3-foot deep Unlined Sand Filter | Minimum 3-foot deep Unlined Sand Filter | Minimum 2.5-foot deep Unlined Sand Filter | Minimum 2.5-foot deep Unlined Sand Filter | Minimum 2-foot deep Unlined Sand Filter |
| R-1; Option 1 | Soil Type[7] 2 – 5, >35 - 65% Rock (>2mm) ; with ≥50% of the Rock <20 mm (3/4 inch) | Use TL1 LTAR from Table 10-1 for the soil type corresponding to the soil matrix, with a maximum LTAR of 0.8 | Pressure Distribution[8] | Minimum 2-foot deep Unlined Sand Filter | Minimum 1-foot deep Unlined Sand Filter | Minimum 1-foot deep Unlined Sand Filter | Sand media not required | Sand media not required |
| R-1; Option 2 | Soil Type[7] 2 and 2A, >35 - 65% Rock (>2mm); with ≥50% of the Rock <20 mm (3/4 inch) | The allowable LTAR's are defined in each individual treatment level column in this Table | Pressure Distribution[8] | Remove, mix, replace 4 feet of existing material; with a maximum LTAR of 0.6 | Remove, mix, replace 2 feet of existing material; with a maximum LTAR of 0.7 | Remove, mix, replace 2 feet of existing material; with a maximum LTAR of 0.7 | Remove, mix, replace 2 feet of existing material; with a maximum LTAR of 0.8 | Remove, mix, replace 2 feet of existing material; with a maximum LTAR of 0.8 |
| R-2 | Soil Type[7] 2 – 5, >65 Rock (>2mm), **OR** ≥50% of Rock >20 mm (3/4 inch) | Use TL1 LTAR from Table 10-1 for the soil type corresponding to the soil matrix, with a maximum LTAR of 0.8 | Timed, Pressure Distribution[8] | Minimum 3-foot deep Unlined sand filter | Minimum 3-foot deep Unlined Sand Filter | Minimum 2.5-foot deep Unlined Sand Filter | Minimum 2.5-foot deep Unlined Sand Filter | Minimum 2-foot deep Unlined Sand Filter |

1 General guidance for Table 10-1A: The intent of the soil type R-0 is to define a material that consists of a high percentage of rock, or rock fragments, and has a percolation rate of less than 5 mpi. Soil types R-1 and R-2 consist of a high percentage of rock or rock fragments, but have a percolation rate of greater than 5 mpi. Soil types R-0 and R-2 are considered to be a "limiting layer".

2. No sizing adjustments are allowed for systems placed in type "R" soils. The maximum LTAR's are provided in this table.

3 The design of type "R" soil treatment systems must conform to sections 12.3.b and c

4 All systems installed in a type "R" soil must be designed by a professional engineer.

5 The percentage of rock may be determined by a gradation conducted per ASTM standards, or an appropriate field evaluation by volume.

6 Type "R" soil treatment systems that are designed per the criteria noted in the Treatment Level 1 column of this table do not require O/M oversight by the LPHA.

7 The "Percentage and Size of Rock" column references the soil types noted in Table 11-1.

8 Design of the pressure distribution system for type "R" soils shall comply with the requirements of sections 12.3.b.ii, iii, v,vii,viii.

**3. Allowable Soil Treatment Area Sizing Adjustments:**

a. 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.

b. 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.

c. Sizing adjustments for use of the higher level treatment categories listed in Table 11-1 will only apply provided the system is inspected and maintained as specified in the requirements of Section 16, Operating Permits.

**Table 11-2 Size Adjustment Factors for Methods of Application in Soil Treatment Areas Accepting Treatment Levels 1, 2, 2N, 3 and 3N Effluent**

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

**Table 11-3 Size Adjustment Factors for Types of Distribution Media in Soil Treatment Areas for Treatment Level 1 Systems**

| Type of Soil Treatment Area | Type of Distribution Media Used in Soil Treatment Area[1] | | |
|---|---|---|---|
| | Category 1 | Category 2 | Category 3 |
| | Rock or Tire Chips | Other Manufactured Media | Chambers or Enhanced Manufactured Media |
| **Trench or Bed** | 1.0 | 0.9 | 0.7 |

1. All proprietary distribution products must receive acceptance and the applicable reduction through Division review per the applicable requirements of section 43.13 of Regulation #43.

**4. Design of Distribution Systems**

a. General

i. The infiltrative surface and distribution laterals must be level.

ii. The infiltrative surface must be no deeper than four feet below grade unless TL2N or higher effluent is applied to the distribution media and the system is inspected and maintained as specified in the requirements of Section 16. The depth of the infiltrative surface will be measured on the up-slope side of the trench or bed.

iii. 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.

iv. Pipe for gravity distribution must be no less than three inches in diameter.

v. A 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.

vi. 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.

vii. Backfilling and compaction of soil treatment areas must 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.

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

ix. If the natural grade at or within 35 feet of the soil treatment area is greater than 30 percent, then following is required:

1. A 30 mil PVC liner shall be placed on each end and on the down slope side of the absorption system excavation in a manner such that all exposed soils are covered;

2. A berm shall be constructed in accordance with the Clear Creek County Best Management Practice Manual upslope of the absorption system to divert surface water run-off from the absorption system.

b. Distribution Laterals

i. Distribution between laterals in a soil treatment area must be as level as possible. Uneven settling of portions of the distribution system following construction must be addressed by provisions in the design to adjust flows between laterals.

ii. Distribution laterals receiving a gravity fed flow may not be longer than 100 feet.

iii. Distribution laterals receiving a pressure dosed effluent or effluent applied to the center of the laterals or chambers may not be longer than 150 feet.

iv. For absorption beds, the separating distance between parallel gravity distribution laterals must not exceed six feet (center-to-center), and a distribution lateral must be located within three feet of each sidewall and endwall.

v. 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 pipes may be looped.

vi. To promote equal distribution to the soil treatment area, the forcemain or effluent pipe must be connected to as near to the middle of the distribution header as possible. However it must be offset from any distribution lateral to prevent preferential flow.

vii. Orifices must be oriented downward unless pressure distribution is used and provision for pipe drainage is included.

c. Pressure Distribution

i. The design of a pressure distribution system must include:

1. Dose size and frequency for either proposed flows and soil type, or media long-term acceptance rate;

2. Pipe diameter and strength requirements;

3. Orifice size and spacing;

4. A 30 – 72 inch operating head at the distal end orifice;

5. Pump/siphon information; Total Dynamic Head; gallons/minute;

6. Drain-back volume from forcemain; and

7. Calculations, or a design software reference, that indicates the selected component sizing will provide equal flow within each active zone of the distribution system, and provide no more than a 10% flow differential from the initial orifice to the most distal end orifice within each zone.

ii. The separating distance between parallel distribution pipes in a pressure distribution absorption bed must not exceed four feet, and the outer distribution pipe must be located within two feet of each sidewall and endwall. Specific requirements for the design of sand filters are noted in Section 12.3.b

iii. Flushing assemblies must be installed at the distal end of each lateral and be accessible from finished grade. A sweeping 90 degree or bends limited to 45 degree must be provided.

iv. The Department requires that all effluent be screened prior to discharging to a pressure distribution system. This may be accomplished by an effluent screen in

the septic tank or pump chamber, or a filter placed on the discharge pipe from the pump or siphon.

**5. Soil Treatment Area Requirements**

a. Trenches

i. Trenches must be three feet wide or less.

ii. The separating distance between trenches must be a minimum of four feet sidewall-to-sidewall.

iii. Distribution laterals used in a trench must be as close to the center of the trench as possible.

b. Beds

i. Maximum width for a bed must be 12 feet, unless the bed receives effluent meeting Treatment Level 2 quality or better.

ii. The separating distance between beds must be a minimum of six feet sidewall-to-sidewall.

c. 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 pipe 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.

b. Alternating Systems

i. An alternating system must have two or more zones that must be alternated on an annual or more frequent basis.

ii. For repairs, each section must be a minimum of 50 percent of the total required soil treatment area. For new installations, each separate soil treatment area must meet the minimum sizing requirements of this regulation.

iii. A diversion valve or other approved diversion mechanism that requires the owner or operator to manually alternate zones of the OWTS may be installed on the septic tank effluent line allowing soil treatment area sections to be alternated.

iv. The diversion mechanism must be readily accessible from the finished grade.

c. Sequencing Zone Systems

i. Sequencing zone systems have two or more soil treatment area sections that are dosed on a frequent rotating basis.

ii. Where soil conditions are similar between the sections, each section area must 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.

iii. An automatic distribution valve must be used.

iv. Dosing of each system must be evaluated by the design engineer based on projected daily flow rates, number of zones, and soil types.

d. Inspection Ports

i. A 4-inch inspection port accessible from ground surface must be installed at the terminal end of each lateral in a trench system and at each corner of a bed system. The bottom of the inspection port tube must extend to the infiltrative surface and not be connected to the end of a distribution pipe.

ii. Inspection ports in chambers must be installed according to manufacturer's instructions if the infiltrative surface is visible and effluent levels can be observed from the inspection port

iii. Additional inspection ports connected to distribution pipes may be required.

iv. The Department may require an inspection port at the initial end of each lateral in a trench system.

v. The top of inspection ports may be terminated below the final grade if each is housed in a component such as a valve box for a lawn irrigation system and has a removable cover at the ground surface.

**6. Storage/Distribution Media**

a. Rock and Pipe

i. The perforated 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. AASHTO M 43 size No. 3 coarse aggregate meets this specification.

ii. At least six inches of gravel, rock or other material must be placed below the pipe. The gravel, rock or other material must fill around the pipe and be at least two inches above the top of the distribution pipe.

iii. 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. Chambers

i. Chambers must be installed with the base of the unit on in-situ soil or, if placed on acceptable media, the manufacturer's installation instructions must be followed so as to prevent chambers from settling into the media.

ii. Installation must be according to manufacturer's instructions.

iii. Effluent may be distributed by pump or siphon.

c. Media, Enhanced, or Other Manufactured

i. Manufactured media must be installed with the base on the in-situ soil or placed on acceptable media meeting the manufacturer's specifications for proprietary distribution products or combined treatment/distribution products.

ii. Installation must be according to manufacturer's instructions.

iii. Pressure distribution is required for TL2-TL3N effluent, unless otherwise noted in this regulation.

d. 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 pipes, driplines, relief valves, and control systems.

v. Provisions must be made for filtering, back-flushing, or other cleaning.

e. 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.

**7. Soil Replacement Systems**

a. The construction of a soil replacement system is permitted to bring the soil treatment area into compliance with the requirements of this regulation.

b. When a soil type “R” is removed, the following requirements must be met:

i. All added soil must comply with the following specifications:

1. Added soil must meet the specifications of either “preferred” or “secondary” sand filter media, as specified in section 12.3.b

2. The long-term applicable rates as specified in Table 11-1A must be used. No additional sizing adjustments are allowed.

3. The depth of the added media must comply with the requirements of Table 11-1A.

a. In order to utilize the reduced vertical separation requirements for TL2N, 3 or TL3N quality effluent, an Operating Permit is required as specified in Section 16.

4. A gradation of the sand media used must be provided. The gradation must be dated no more than one month prior to the installation date. However, a gradation of the actual material placed in the excavation is recommended.

5. All added soil must be completely settled prior to installation of components as specified and approved by the design engineer.

6. Pressure distribution must be used.

c. The removal and reinstallation of in-situ soil may only be allowed where the soils are determined to be a soil type “R-1” (Option 2). The design must comply with the requirements for this soil type noted in Table 11-1A (Soil Type R-1, Option 2).

d. When a sand media is added to soil treatment area or to an excavation where a soil type 1-5 (Table 11-1) is the underlying soil, the following requirements must be met:

i. Added soil must meet the specifications of either “preferred” or “secondary” sand filter media, as specified in section 12.3.b

ii. Unless the design follows the criteria for a sand filter or mound system design as required in Section 12 the TL1 long-term acceptance rate for the receiving soil must be used.

iii. A gradation of the sand media used must be provided. The gradation must be dated no more than one month prior to the installation date. However, a gradation of the actual material placed in the excavation is recommended.

iv. All added soil must be completely settled prior to installation of components.

**8. Repairs**

a. 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, deep beds and seepage pits may be considered for repairs only. Other options are vaults or higher level treatment systems.

b. Repairs to failing systems must conform to setbacks identified in 8-1 when possible. When this is not possible using all available methods described in this regulation, the Department may permit reductions to setbacks.

    i. At no point will a setback reduction be approved by the Department less than what the existing separation is to existing OWTS. In maximizing this setback distance, all methods available in Section 11.8.a must be utilized including but not limited to the use of Higher Level Treatment, wide beds, seepage pits, etc., where allowed.

    ii. Any setback reduction beyond what the existing failing system presents must be approved by the Clear Creek County Board of Health as outlined in Section 20.

c. Wide Beds

    i. For repairs, beds may be wider than 12 feet without being required to receive effluent meeting Treatment Level 2N quality or better.

d. Deep Beds

    i. For repairs, the infiltrative surface of a bed may be no deeper than five feet.

    ii. Size adjustments as provided for in Table 11-2 and 11-3 must not be applied. System sizing will be based strictly on the soil type and corresponding LTAR.

e. Deep Gravel Trenches

    i. The length of an absorption trench 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:

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

    ii. Where:

        1. L = length of trench prior to adjustment for deep gravel

        2. W = width of trench in feet

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

    iii. Maximum allowable additional depth is five feet.

iv. Percolation tests or soil profile test pit excavations must be performed at the proposed infiltrative surface depth.

v. Size adjustments as provided for in Table 11-2 and Table 11-3must not be applied to deep gravel trenches.

f. Seepage Pits

i. Seepage pits for new construction are prohibited.

ii. For repairs, potential for risk to public health and water quality may be evaluated by the. If risk is low in the determination, a seepage pit without higher level treatment may be used.

iii. If the risks are not low, higher level treatment of at least TL2N must be attained prior to discharge to these systems for final dispersal.

iv. A seepage pit must consist of a buried structure of precast perforated concrete, or cinder or concrete block laid dry with open joints.

1. Pits must be provided with both vertical sidewall and top supporting structural concrete or other material of equal structural integrity.

2. The excavation must be larger than the structure by at least 12 inches on each side and may not exceed 5 feet beyond the structure wall.

3. The over-excavated volume must be filled with clean, graded gravel or rock, which may range in size from ½ inch to 2 ½ inches. AASHTO M 43 size No 3 coarse aggregate meets this specification.

4. 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.

5. 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.

6. 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 of the excavated area.

7. The bottom of the pit excavation must be greater than four feet above a limiting layer.

v. 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.

g. Wastewater Ponds

i. Construction of new wastewater ponds is prohibited.

ii. For repairs of an existing wastewater pond, the potential for risk to public health and water quality may be evaluated by the Department. If risk is low in the determination, the repair of a wastewater pond may be permitted, however the following criteria must be followed:

1. A septic tank must precede the wastewater pond.

2. The depth of the design volume of the wastewater pond must be at least five feet.

3. A wastewater pond must have two feet of free board above the design volume of the pond.

4. A wastewater pond must be fenced to keep out livestock, pets, vermin, and unauthorized people.

5. Wastewater ponds must be designed on the basis of monthly water balance including design flow, precipitation, evaporation, and seepage.

6. 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.

7. If the evapotranspiration does not exceed the rate of inflow of effluent from the structure, a soil treatment area meeting the requirements of this regulation must be installed to accept the excess flow.

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.

h. Vaults

i. Criteria for vaults are in Section 13 of this regulation.

i. Higher Level Treatment Options

i. Reduction in required soil treatment area size for repairs is possible with higher level treatment.

j. Remediation Systems

i. The intent of a remediation technology or process is to sufficiently increase the infiltration rate through the infiltrative surface at the bottom of an existing trench or bed and restore permeability to the soil below. Treatment levels as defined in Table 7-3 are not granted to remediation technologies.

ii. The Department may permit the use of remediation technologies or processes to address an existing failure or malfunction within a soil treatment area.

iii. The use of a remediation technology or process constitutes an alteration to the OWTS, and therefore the owner must obtain a permit for this work.

iv. Upon approval of the Department, a system owner may choose to try a remediation technology or process to see if an existing problem with the soil treatment area will be resolved. The system owner bears the risk and cost of this attempt and is aware that an additional repair may be required.

v. Remediation technologies and processes must not adversely affect groundwater, surface water, any existing components, the long-term effectiveness of the soil treatment area, or the environment.

vi. If the remediation technology or process does not correct the problem with the system, a conforming OWTS must be installed per the requirements in this regulation within a time frame determined by the Department.

vii. Monitoring and/or maintenance of the remediation technology or process as a stipulation of permit issuance.

# Section 12 – Design Criteria: Higher Level Treatment

## 1. General

a. Higher level treatment systems may be public domain technology systems or proprietary systems.

   i. Public domain technology systems must be designed, installed and maintained according to established criteria and additional criteria established by the Clear Creek Environmental Health Department. When design criteria are not specifically provided in 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.

   ii. Proprietary systems must be designed, installed, and maintained according to manufacturer's instructions and additional criteria identified by the Colorado Department of Public Health and Environment in the Technology Review and Acceptance process, section 43.13 of Regulation #43.

b. Reductions to soil treatment area or separation distances based on higher level treatment only apply when the requirements of Section 16 are met. The owner of a property that utilizes higher level treatment must obtain and maintain an Operating Permit issued by the Clear Creek Environmental Health Department.

c. Soil treatment areas for higher level treatment systems must be pressure dosed.

d. Systems must be capable of accommodating all anticipated flows and organic loads.

e. 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.

f. 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.

## 2. Treatment Levels for Higher Level Treatment Systems

a. The treatment levels identified in Table 7-3 are specified in this section for public domain technology, and proprietary treatment systems will be assigned a treatment level by the technology review and acceptance process in section 43.13 of Regulation #43. Adequate maintenance for each must be required and documented as required by Section 16.

## 3. Sand Filters

a. A lined or unlined intermittent sand filter, or recirculating sand filter, may be used as a higher level treatment system prior to dispersing the effluent into a soil treatment area.

b. Intermittent (Single Pass) Sand Filters; General Requirements

   i. The treatment level for intermittent sand filters is considered TL3.

ii. Not all combinations of the variables noted below will result in a proper distribution system design. The design engineer must justify through calculations or design software that the selected values will concur with industry standards.

1. Distribution pipe size: 3/4 inch – 1.5 inches (PVC Class 200, min.)

2. 2 inch distribution pipe may only be used where other design modifications cannot overcome a greater than 10% variation in the pressure head between the initial and distal orifices.

3. Distribution pipe spacing: 18 inches – 48 inches

4. Orifice size: 1/8 inches – 3/8 inches (Also see 12.3.b.ii.5 below)

5. Orifice spacing: 18 inches – 48 inches

6. Operating head at the distal end of distribution pipes: 30 inches – 72 inches (60 inches typ.). Larger orifices allow for an operating head at the lower end of this range, while smaller orifices will necessitate an operating head at the higher end of this range.

iii. Dosing

1. Pressure distribution is required. The design of the distribution system must also comply with the requirements of Section 11.4.c.i.

2. Number of cycles/day: Will vary with design (Short, frequent doses are preferred.)

3. Proposed dose volume: Will vary with design (0.25 – 1.0) gallons/orifice/dose, or 3-5 times distribution pipe volume

4. Timed dosing is recommended where design considerations allow.

iv. Sand Filter Treatment Media

1. The depth of the sand media below the distribution system must be at least 24 inches unless otherwise noted in Table 11-1A for type “R” soils.

2. “Preferred” sand media requirements:

   a. Effective size: 0.25-0.60 mm

   b. (Uniformity coefficient: ≤ 4.0

   c. (Percent fines passing #200 sieve: ≤ 3.0

3. “Secondary” sand media requirements:

   a. Effective size: 0.15-0.60 mm

   b. (Uniformity coefficient: ≤7.0

c. Percent fines passing #200 sieve: ≤ 3.0

4. A gradation of the sand media used must be provided. The gradation must be dated no more than one month prior to the installation date. However, a gradation of the actual material placed in the excavation is recommended.

v. Gravel Requirements

1. Clean, graded gravel, or rock, must range in size from 1/2 inch to 2 1/2 inches. AASHTO M 43-05 (2005 version) size No.3 coarse aggregate meets this specification.

2. The gravel must surround the distribution pipes used to disperse the effluent and must be at least 6 inches below and 2 inches above the pipes.

3. Division accepted manufactured media may be used as an alternative to specified gravel.

vi. Filter Fabric Requirements

1. The top layer of gravel must be covered with a non-woven permeable geotextile fabric meeting a maximum thickness rating of 2.0 ounces per square yard or equivalent pervious material.

vii. Final Cover Material

1. 8 inches – 10 inches of Type 1 or 2 soil with an additional 2 inches top soil

2. Size adjustment factors provided in Tables 11-2 and 11-3 are not applicable for sand filters.

viii. Sand filters must not be used to treat wastewater that does not conform to TL1 treatment level or better.

c. Unlined (Open Bottom) Sand Filters

i. All requirements of Section 12.3.b.i-vii will apply to unlined sand filters.

ii. Application rates:

1. Maximum hydraulic loading rate for TL1 effluent applied to “Preferred Sand Media” in an unlined sand filter is 1.0 gal./sq.ft./day, or the long-term acceptance rate of the receiving soil for TL3 (Table 11-1) whichever results in the larger area.

2. Maximum hydraulic loading rate for TL1 effluent applied to “Secondary Sand Media” in an unlined sand filter is 0.8 gal./sq.ft./day, or the long term acceptance rate of the receiving soil for TL3 (Table 11-1) whichever results in the larger area.

3. Maximum hydraulic loading rate for TL2, TL2N, TL3, or TL3N effluent applied to "Preferred" or "Secondary" Sand Media in an unlined sand filter must be the long-term acceptance rate of the receiving soil for TL3, (Table 11-1).

iii. The upper infiltrative surface of an unlined sand filter receiving TL1 – TL2 effluent must be at least three feet above a limiting layer.

iv. The upper infiltrative surface of an unlined sand filter receiving TL2N-TL3 effluent must be at least two and one-half feet above a limiting layer.

v. The upper infiltrative surface of an unlined sand filter receiving TL3N effluent must be at least two feet above a limiting layer.

d. Lined Sand Filters

i. All requirements of Section 12.3.b.i-vii will apply to unlined sand filters.

1. Application rates:

a. Hydraulic loading rate for TL1 effluent applied to "Preferred Sand Media" in a lined sand filter is 1.0 gal./sq.ft./day.

b. Hydraulic loading rate for TL1 effluent applied to "Secondary Sand Media" in a lined sand filter is 0.8 gal./sq.ft./day.

2. The minimum depth of the sand media in a lined sand filter must be two feet.

3. An intermediate layer of pea gravel, two inches in thickness, must be placed between the sand filter media and the course under-drain media to prevent the migration of sand into the lower layer of under-drain gravel. ASTM C 33-16 (2016 version), No. 8, coarse aggregate meets this specification.

4. A minimum four-inch diameter slotted SCH40 PVC [ASTM Standard D 2729-17 (2017 version)] under-drain pipe must be used to collect the treated effluent. The under-drain pipe must be installed in the center of a 5 inches thick bed of washed, graded gravel, or rock ranging in size from 1/2 inch to 2 1/2 inches. AASHTO M 43-05 (2005 version), No.3 coarse aggregate meets this specification.

5. Lined sand filters must have an impervious liner on the sides and bottom of the filter. The liner must consist of a minimum 30 mil thick PVC material or equivalent.

6. Effluent collected by the under-drain must be dispersed to a soil treatment area. The soil treatment area may be sized with a maximum long-term acceptance rate of the receiving soil for TL3 effluent.

e. Recirculating Sand Filter

i. Treatment level:

1. Treatment level provided within recirculating sand filters is TL3.

ii. Not all combinations of the variables noted below will result in a proper distribution system design. Engineer must justify through calculations or design software that the selected values will concur with industry standards.

1. Distribution pipe size: 3/4 inch – 2 inches (PVC Class 200, min.)

2. Distribution pipe spacing: 18 inches – 36 inches (24 inches typ.)

3. Orifice size: 1/8 inch – ¼ inch

4. Orifice spacing: 18 inches – 36 inches (24 inches typ.)

5. Pressure head at end of distribution pipe: 24 inches – 72 inches (60 inches typ.)

iii. Dosing

1. Timed dosed, pressure distribution is required. The design of the distribution system must comply with the requirements of Section 11.4.c.i.

a. Recirculation ratio: 3:1 – 5:1

b. Gallons/orifice/dose: 1 – 3 (2.0 typ.)

c. Hydraulic loading: 3 - 5 gal./sq.ft./day (4 – 5 typ.)

d. Dosing time “ON”; <2.5 min. (<2.0 typ.)

e. Number of cycles/day: 48 – 120

iv. Top gravel requirements:

1. Washed, graded gravel, or rock, must range in size from 1/2 inch to 2 1/2 inches. AASHTO M 43-05 (2005 version), No.3 coarse aggregate meets this specification.

2. The gravel must surround the distribution pipes used to disperse the effluent and must be at least 6 inches below and 2 inches above the pipes.

3. State accepted manufactured media may be used as an alternative to specified gravel.

4. Soil cover is prohibited. The upper gravel layer must be open to the atmosphere.

v. Filter media requirements:

1. Effective size: 1.5 – 2.5 mm

2. Uniformity coefficient: ≤ 3

3. Fines passing #200 sieve: ≤ 1.0

4. Media depth (min.): ≥24 inches

vi. Intermediate gravel layer:

1. An intermediate layer of pea gravel, two inches in thickness, must be placed between the coarse underdrain media and the sand filter media to prevent the migration of sand into the lower layer of under-drain gravel (ASTM C 33-16 (2016 version), No. 8, coarse aggregate).

vii. Under-drain requirements:

1. A minimum four-inch diameter slotted SCH40 [ASTM Standard D 2729-17 (2017 version)]. PVC under-drain pipe must be used to collect the treated effluent. The under-drain pipe must be installed in the center of a 5 inches thick bed of washed, graded gravel, or rock ranging in size from 1/2 inch to 2 1/2 inches. AASHTO M 43-05 (2005 version), No.3 coarse aggregate meets this specification.

i. PVC liner requirements:

1. 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. Effluent collected from the recirculating sand filter must be discharged to a soil treatment area. The soil treatment area may be sized with a maximum long-term acceptance rate of the receiving soil for TL3N effluent.

**4. Mound Systems**

a. When the infiltrative surface area of the media receiving wastewater effluent is at or above the natural ground surface at any point, it shall be considered a mound system.

b. Mound systems that provide a minimum of 24 inches of sand treatment media may use the application rates for the in-situ receiving soil for TL3 effluent (Table 11-1). Size adjustment factors within Table 11-3 must not be applied to mound designs where TL3 application rates are used. However they may be applied if TL1 application rates are used.

c. Mound systems must conform to the design requirements of Section 12.3.c.i-v for unlined (open bottom) sand filters, with the following exceptions.

i. A mound system may include less than 24 inches of imported sand media on a site where a lesser depth of sand media is sufficient to meet vertical separation

requirements above a limiting layer. Application rates for the in-situ receiving soil for TL1 effluent must be used when less than 24 inches of sand media is used, unless higher level treatment is provided prior to dispersal into the mound system.

ii. For the design of a mound system where less than 24 inches of sand media is proposed, and application rates for TL1 are used, the size adjustment factors within Table 10-3 may be used.

d. The basal area must be determined using the LTAR from Table 11-1 for the in-situ receiving soil under the mound.

e. Linear loading rates must be determined. The evaluation of many factors is required for an accurate determination of the linear loading rate. While application rates for the in-situ receiving soil under the mound is a main component, placement on the slope, and percent of slope must also be addressed when defining the linear loading rate. If the movement of the effluent is primarily vertical, then the linear loading rate is not as critical. However, if the movement of the effluent will be primarily horizontal, as would be expected in soil types 3A through 5 (Table 11-1), then the linear loading rate is extremely important and long narrow mounds are strongly recommended.

i. When TL1 effluent is applied to the distribution media of a mound system installed above in-situ soil types 1 through 3 (Table 11-1) and R-0 through R-2 (Table 11-1A), the suggested linear loading rate is between 6 gpd/lin.ft. and 12 gpd/lin.ft. The maximum width of the distribution media in a mound system installed above these soil types is 12 feet when TL1 effluent is applied to the distribution media of a mound system.

ii. When TL2 through 3N effluent is applied to the distribution media of a mound system installed above in-situ soil types 1 through 3 (Table 11-1) and R-0 through R-2 (Table 11-1A), the linear loading rate may exceed 12 gpd/lin.ft.; subsequently the mound may be wider than 12 feet.

iii. When TL1 through TL3N effluent is applied to mound systems installed above in-situ soil types 3A through 5 (Table 11-1), the suggested linear loading rate is between 3 gpd/lin.ft. and 5 gpd/lin.ft. The maximum width of the distribution media in a mound system placed above these soil types is 12 feet.

f. The final cover over a mound system must extend at least twelve inches horizontally beyond the perimeter of the distribution media prior to sloping down to existing grade. The final slope of the mound must be no greater than three feet horizontal to one foot vertical.

g. The surface of the mounded area must be planted with a suitable vegetative cover.

h. A suggested reference for the design and installation of mound systems is, "*The Wisconsin Mound Soil Absorption System: Siting, Design, and Construction Manual, January 2000*". Note that this is suggested guidance, and where the requirements of this regulation differ from those in the referenced mound document, the requirements of this regulation will govern in those cases.

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

a. 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.

b. The treated effluent from a rock plant filter must be distributed to a soil treatment area.

c. Although producing higher level treatment, rock plant filters must not be assigned a treatment level higher than TL1 because of system and seasonal variability.

# Section 13 – Design Criteria: Alternative Systems

## 1. Evapotranspiration and Evapotranspiration/Absorption Systems

a. Non-Pressurized Drip Dispersal System (NDDS):

i. An NDDS is considered a type of evapotranspiration/absorption system. However as specific design criteria is provided for an NDDS, they are exempt from the additional requirements of sections 13.1.b, c and d.

ii. *The Colorado Professionals in Onsite Wastewater Guidelines for the Design and Installation of Non-Pressurized Drip Dispersal Systems (NDDS),* September, *2016* is the procedural guideline in the design of a NDDS and must be followed when an NDDS is proposed.

iii. The width of an NDDS system may be wider than 12 feet.

b. The following section provides general criteria which must be followed when an evapotranspiration or evapotranspiration/absorption bed is proposed.

i. The design may only be permitted in arid climates where the annual evaporation rate exceeds the annual precipitation rate by more than 20 percent, and where site characteristics dictate that conventional methods of effluent dispersal are not appropriate.

ii. The design may only be permitted in soil types 4, 4A and 5.

iii. If data for the Pan Evaporation Rate is provided, it must be multiplied by 0.70, or less, to obtain the equivalent Lake Evaporation Rate.

iv. The width of the bed may be wider than 12 feet.

v. The required capillary or wicking sand must meet the gradation requirements in Table 13-1 and be approved by the design engineer. This sand is to be covered by a crowned, thin layer of loamy-sand mix and appropriate vegetation that will assist in drawing the water to the surface.

i. Adjustment factors as provided in Table 11-2 and 11-3 must not be used.

**Table 13-1 Gradation of Wicking Sand for Evapotranspiration Beds (Fine Sand)**

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

c. For systems designed strictly as an evapotranspiration bed, the following criteria must be met:

   i. Design data to be furnished must include, but shall not be limited to: system dimensions, distribution system design, specifications of distribution media and wicking sand, liner material if used, bedding, properties of the soil under the system, vegetation cover, and a water balance calculation including annual precipitation and storage requirements for periods of the year when evapotranspiration does not occur.

   ii. The following formula must be used for determining the minimum area necessary for total evapotranspiration of septic tank effluent:

$$Area\ (in\ sqft) = \frac{Design\ Flow\ (in\ GPD)\ \times 586}{Lake\ Evaporation\ Rate\ at\ the\ Site\ (in\ per\ year)}$$

   ** Additional area may be required based on the annual water balance calculations.

   iii. Designs will include a rock and pipe, or other Division approved proprietary distribution product, with the centerline of the distribution system 6 to 8 feet on center. A thin non-woven fabric may be placed above the distribution system. Capillary wicking of the effluent is accomplished by a uniform depth layer of the specified sand media (capillary wicks), no more than 24 inches deep, placed between and above the distribution media. The base of the evapotranspiration bed may be no more than 30 inches below finished grade.

   iv. Capillary wicks which penetrate between the distribution system to the bottom of the bed, must be at least 15 percent of the bed surface area. The wicks must be uniformly spaced throughout the system.

   v. Except for dwellings, if the system is designed for summer use only, as determined by the Department, the surface area may be multiplied by 0.6 to obtain the required area.

d. For systems designed as an evapotranspiration/absorption bed, the following criteria must be met.

   i. Data to be furnished must include, but is not limited to: system dimensions, distribution system design, specifications of wicking sand, properties of the soil under the evapotranspiration/absorption bed, provision for vegetation cover, and a water balance calculation including annual precipitation and storage requirements for periods of the year when evapotranspiration does not occur.

   ii. Design will include a rock and pipe, or other Division approved proprietary distribution product, with the centerline of the distribution system 6 to 8 feet on center. A thin non-woven fabric may be placed above the distribution media. Capillary wicking of the effluent is accomplished by a uniform depth layer of the specified sand media (capillary wicks) no more than 24 inches deep placed between and above the distribution media. The infiltrative surface may be no more than 30 inches below finished grade.

iii. Capillary wicks which penetrate between the distribution system to the bottom of the bed, must be at least 15 percent of the bed surface area. The wicks must be uniformly spaced throughout the bed.

iv. Amount of storage and evapotranspiration capacities may be reduced by the volume of effluent absorbed by the underlying soil based on the long-term acceptance rate for that soil type and the formulas provided below.

v. The following formula must be used for determining the minimum area necessary for evapotranspiration/absorption of septic tank effluent:

$$Area\ (sqft) = \frac{Flow\ (GPD)}{(LTAR + ETR)}$$

vi. LTAR refers to the long-term acceptance rate of the underlying soil as provided in Table 11-1 for TL1 effluent.

ii. ETR refers to the evapotranspiration rate derived from the following formula:

$$ETR\ \left(\frac{gal}{day}sqft\right) = \frac{Lake\ Evaporation\ Rate\ at\ the\ Site\ (inch\ \ per\ year)}{586}$$

iii. Additional area may be required based on the annual water balance calculations.

**2. Seepage Pits**

a. The construction of new seepage pits for the treatment and dispersal of on-site wastewater on new sites is prohibited.

b. For repairs involving seepage pits, see Section 11.8.f.

**3. Vault (other than vault privy)**

a. Vaults for full time use in new construction are prohibited where a property can accommodate an OWTS with a soil treatment area.

b. Vaults for full time use may be permitted when a failing OWTS cannot be replaced.

c. A variance for residential use may be granted if the dwelling is on land where the installation of an OWTS with a soil treatment area cannot be permitted and has been approved by the Department.

d. A vault for residential use, if permitted, must have a minimum 1,000 gallon effective volume or capable of holding a minimum of the 48-hour design wastewater flow, whichever is larger.

e. A vault for non-residential use, if permitted, must have a minimum 500 gallon effective volume or be capable of holding a minimum of the 48-hour design wastewater flow, whichever is larger.

f. 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.

g. 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.

**4. Vault Privy**

a. Vault privies are prohibited for residential use.

b. Existing vault privies for residential uses must be abandoned and a conforming OWTS must be installed.

c. For nonresidential uses, the effective volume of the vault must be no less than 400 gallons and it must be constructed of concrete or plastic. The vaults for privies must meet the structural and watertightness standards of vaults.

i. 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.

**5. Pit Privy**

a. The new construction of pit privies is prohibited**.**

b. Existing pit privies must be abandoned and a conforming OWTS must be installed.

**6. Incinerating, Composting and Portable Chemical Toilets**

a. The Department may permit incinerating, composting and chemical toilets. The use of an incinerating, composting or chemical toilet will not reduce the required size of the OWTS as noted in Section 9.1.

b. 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.

c. 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 Clear Creek County 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 local public health agency. Compartment and appurtenances related to the unit must include fly-tight and vector-proof construction and exterior ventilation.

d. Composting Toilets

i. Composting toilets must meet the requirements of NSF/ANSI Standard 41 (2016 version) and bear the seal of approval of the NSF or an equivalent testing and certification program.

ii. 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.

iii. 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.

iv. 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 local public health agency. Disposal methods must prevent contamination of water and not cause a public health nuisance. Disposal using solid waste practices is recommended.

v. If a system will be installed where low temperature may be a factor, design and installation must address the effects of the low temperature.

vi. Composting toilets must be operated according to manufacturer's specifications.

vii. A permit is required for the use of a composting toilet

e. Incinerating Toilets

i. 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.

ii. Incinerating toilets must meet the requirements of the NSF Protocol P157 (2014 version) and bear the seal of approval of the NSF or an equivalent testing and certification program.

iii. Incinerating toilets must be operated according to manufacturer's specifications.

f. Portable Chemical Toilets

i. Portable chemical toilets are prohibited for residential use, or in permanently occupied structures, except:

1. During construction, or

2. Under emergency circumstances where a temporary permit allowing conditional use has been issued by the Clear Creek Environmental Health Department.

**7. Slit Trench Latrine**

a. The new construction of slit latrines is prohibited**.**

b. Existing slit latrines must be abandoned and a conforming OWTS must be installed.

**8. Treatment Systems Other Than Those Discharging Through a Soil Treatment Area or Sand Filter System**

a. Effluent Discharged to Surface Waters

i. 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 Clear Creek County Board of Health. Once approved by the Board, 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 will be deemed full compliance with this regulation.

b. Systems that discharge other than through a soil treatment area or a sand filter system must:

i. Be designed by a professional engineer;

ii. Be reviewed by the Clear Creek County Board of Health; and

iii. Not pose a potential health hazard or private or public nuisance or undue risk of contamination.

iv. Not allow drainage of effluent off of the property of origin.

v. The Clear Creek County Board of Health may choose to permit only systems that do not allow drainage of effluent off the property of origin.

vi. The following minimum performance criteria must be required for all permitted systems pursuant to this section:

1. 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:

a. The geometric mean of the *E. coli* density must not exceed 15 per 100 milliliters when averaged over any five consecutive samples, and no single sample result for *E. coli* can exceed 126 per 100 milliliters.

b. The arithmetic mean of the standard five-day carbonaceous biochemical oxygen demand ($CBOD_5$) must not exceed ten

milligrams per liter when averaged over any three consecutive samples.

c. The arithmetic mean of the total suspended solids must not exceed ten milligrams per liter when averaged over any three consecutive samples.

2. 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:

a. The geometric mean of the *E. coli* density must not exceed 126 per 100 milliliters when averaged over any five consecutive samples, and no single sample can exceed 325 *E. coli* per 100 milliliters.

b. The arithmetic mean of the standard five-day carbonaceous biochemical oxygen demand ($CBOD_5$) must not exceed 25 milligrams per liter when averaged over any three consecutive samples.

c. The arithmetic mean of the total suspended solids must not exceed 30 milligrams per liter when averaged over any three consecutive samples.

vii. To determine compliance with the standards contained in this section, the required sampling frequency for *E. coli*, $CBOD_5$, 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 Clear Creek Environmental Health Department for compliance with the permit requirements.

viii. Methods of Analysis - Sampling Points:

1. 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.

2. The sampling point must be a location that is representative of final discharge from the system.

# Section 14 – Product Development Permits

## 1. General Requirements and Provision for Product Development Permits

a. The Clear Creek Environmental Health Department does not approve Proprietary Treatment or Distribution Systems. 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 Regulation #43 and this regulation, or proprietary products that have received Division review and acceptance before the Clear Creek Environmental Health Department may approve them for use. See Regulation #43 section 43.13 for details on technology review and acceptance.

b. For types of systems which have not been otherwise accepted by the Division pursuant to Regulation 43, Section 43.13.D, the Board may approve an application for product development permit 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 system installed.

c. Before a product development permit is issued, the Division must determine that the product to be tested qualifies for testing under the product development evaluation based on information submitted to the Division.

    i. Applicant must provide evidence of nationally accepted third-party testing of the product to be evaluated, or

    ii. Provide test data from multiple single-family homes under normal working conditions that meet the following criteria:

        1. Test data must be provided from a minimum of four sites.

        2. Each system must be tested over a period of at least one year.

        3. Each system must be sampled at least three times during the year with at least one sample obtained during cold weather conditions.

        4. Laboratory results for all parameters for which acceptance is being requested must be submitted.

d. The Department must not arbitrarily deny any person the right to consideration of an application for such a system and must apply reasonable performance standards in 37 determining whether to approve such an application; 25-10-108 (2), C.R.S.

e. A completed application for a product development permit must be submitted to the Department at least 30 days in advance of installation of the product or system.

f. An application for a product development permit must include the following:

i. Proof of the ability to install a replacement OWTS in compliance with the requirements of this regulations in a timely manner in the event of a failure or malfunction of the system under testing;

ii. A description of the product under development including performance goals;

iii. Documentation signed by the owner of the proposed product development site allowing access to the Department and Division for inspection of the site; and

iv. Design documents as required in Section 6.2 of this regulation.

v. Other than the performance standards identified in Section 15.1.c above, the Board of Health may stipulate additional requirements for the product development permit necessary to ensure that the system performs as intended.

g. A Product Development Permit is a site-specific permit. Product development testing at multiple sites requires a product development permit for each site.

h. During the term of the Product Development Permit, all data collected is to be submitted to the Department and the Division.

i. The Department may revoke or amend a Product Development Permit, if the continued operation or presence of the product under development:

i. Presents a risk to the public health or environment;

ii. Causes adverse effects on the proper function of the OWTS on the site;

iii. Leaks or discharges effluent on the surface of the ground; or

iv. If the developer of the product fails to comply with any requirements stipulated on the permit by the Department or the Division.

j. If the product development permit is revoked, the product developer must install the replacement system within the time frame established by the Department.

k. Once the system is installed and approved, the Department must supply the Division with a copy of the completed OWTS permit.

# Section 15 – Operating Permits

## 1. Applicability

a. An Operating Permit must be obtained for any OWTS that utilizes reduction in soil treatment area size, vertical separation distances to limiting layers or reductions in horizontal separation distances by using higher level treatment.

b. OWTS that only incorporate pumps or lift stations are exempt from this section.

c. An Operation and Maintenance contract must be with a Service Provider. A Service Provider is any person engaged in the business of servicing or maintaining an OWTS, and holds a valid National Association of Wastewater Technicians (NAWT) Operation and Maintenance 1 & 2 credential or its equivalent. Inspectors for higher level treatment systems must have training relevant to the specific system or certification by the equipment manufacturer.

d. The Service Provider shall maintain and provide to the Department a current, valid credential.

e. The owner of such a system shall obtain an operating permit:

   i. At the time of installation, repair, alteration, or upgrade of a system pursuant to this section;

   ii. When a transfer of title inspection is conducted;

   iii. At the expiration of a current O&M contract;

f. An Operating Permit shall be maintained and renewed until:

   i. The system is abandoned for connection to a sanitation district;

   ii. The Department authorizes the removal of the components requiring regular maintenance; or

   iii. The higher level treatment is abandoned and approved by the health officer.

      1. Higher level treatment shall not be abandoned unless the OWTS will conform to the requirements for TL1 treatment level systems, including minimum distance setbacks set forth in Table 8-1 and vertical separation from the STA infiltrative surface to any limiting condition set forth in Table 8-2.

g. For higher level treatment and 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.

**2. Minimum Application Requirements**

a. An applicant must submit a complete, written application on a form provided by the Department. Such application must include, at a minimum:

i. Owner name and contact information;

ii. Address and legal description of the property;

iii. Service Provider name and contact information;

iv. Record Drawing of system. See Section 4.10 for more information;

v. Copy of current Operation and Maintenance Contract;

vi. Full fees pursuant to Section 3.10 shall accompany this application.

**3. Minimum Operation and Maintenance Inspection Report Requirements**

a. At the completion of an inspection, the Service Provider must submit the following information after each inspection:

i. A summary of the type of system installed;

ii. Level of treatment the system is approved to provide;

iii. Date the system was inspected and maintained;

iv. Name and contact information of inspector and/or maintenance provider;

v. Condition of system at inspection;

vi. Maintenance tasks performed;

vii. Copies of permits, if required, for maintenance needing to be performed;

viii. Condition of system at completion of maintenance activity.

**4. Frequency of Inspection and Maintenance Required**

a. Inspection and maintenance must be conducted at regular intervals for whichever of the following is most frequent;

i. Manufacturer recommendations for proprietary systems or design criteria as required per the permitted design for public domain technology;

ii. For higher level treatment systems, two inspections at six-month intervals for the first year of operation, followed by annuals inspections for the life of the system.

**5. Property Owner Responsibility**

a. Ensure OWTS is operating, maintained and performing according to the required standards for the designated treatment level;

b. Maintain an active service contract with a Service Provider at all times; and

c. Each time the current contract with a maintenance provider is renewed or replaced, a copy of the contract must be sent to the Department within 30 days of signing.

**6. Service Provider Responsibility**

a. Must notify the Department when a service contract has been terminated.

b. Must obtain appropriate training/certification for specific proprietary treatment products as provided by the manufacturer necessary to provide the required operation and maintenance for said products.

c. Must obtain and maintain NAWT Operation and Maintenance 1 and 2 certifications at all times.

**7. Monitoring and Sampling**

a. For an OWTS for which monitoring of effluent is required, the Department or delegated third party must collect and test effluent samples to ensure compliance with the provisions of this regulation.

b. Sampling may be required by the Department in conjunction with an enforcement action.

c. If the Department or a delegated third party collects and tests effluent samples, a fee not to exceed that which is allowed by the OWTS Act may be charged for each sample collected and tested. Payment of such charge must be stated in the permit as a condition for its continued use.

d. Conditions when the Department can require routine monitoring:

   i. Indications of inadequate performance;

   ii. Location in sensitive areas;

   iii. Experimental systems; and/or

   iv. Systems under product development permits.

e. Sampling and analysis must be performed according to American Public Health Association, American Water Works Association, and Water Environment Federation: Standards Methods for the Examination of Water and Wastewater, 21st edition.

# Section 16 – Use Permits

## 1. Applicability

a. A Use Permit must be obtained prior to the following situations, unless exempted in Section 16.1.b:

   i. Transfer of title of property;

   ii. At the time of Building Permit submittal for undocumented systems;

   iii. Change of use of a building, facility or landsite;

   iv. Any time deemed appropriate by the Department.

b. A property is exempt from this section, if:

   i. If the OWTS for a residential property was installed and approved by the Clear Creek Environmental Health Department less than five years between the date of property conveyance and issuance of the certificate of occupancy by the Building Department;

   ii. If an OWTS was installed but never connected to a swelling or structure;

c. A Use Permit obtained will remain valid until the date of real estate closing or for a maximum period of twelve months, whichever comes first.

d. A Transfer of Title Inspection must be conducted by a Transfer of Title Inspector. A Transfer of Title Inspector is a person engaged in the business of inspecting OWTS and who is a NAWT or NSF-certified Onsite Wastewater Inspector or equivalent. Inspectors for higher level treatment systems must have training relevant to the specific system or certification by the equipment manufacturer.

## 2. Minimum Application and Inspection Report Requirement

a. Application for Use Permit shall be made on forms provided by or approved by the Department. Such application shall include the following information and documentation.

   i. Current owner name and contact at the time of application;

   ii. Physical address of the property and legal description;

   iii. Name of Transfer of Title Inspector and company, and NAWT certification number;

   iv. Name and contact for real estate agent, if applicable;

   v. Copy of  listing or publication showing the number of bedrooms in the structure, if applicable

b. Inspection Report, must include at a minimum

i. Date and time of inspection;

ii. Record Drawing, see Section 4.11 for details;

iii. Details of existing system on property (including but not limited to tank size, pump specifications, field size and layout);

iv. A septic tank inspection report completed within the previous 12 months, including a septic tank pumping receipt;

v. An inspection report completed within the previous 12 months for any mechanical components such as pumps, alarms or higher level treatment systems; and

vi. An inspection report completed within the previous 12 months providing a detailed report noting the condition of the soil treatment area, tanks, lines, and other major components.

vii. All components that are found in a state of malfunction, or that do not meet the criteria for approval, must be disclosed within the inspection report.

c. A copy of the Operating Permit and maintenance contract, if applicable;

d. Full fees pursuant to Section 3.10, must accompany the application;

e. Any other information required by the Department.

**3. Minimum Criteria for Approval of a Use Permit**

a. Items noted in the inspection report that do not comply with the following criteria and conditions must be corrected along with necessary permits and inspections, prior to issuance of a Use Permit:

b. All tanks must be structurally sound and in good working order and provided with safe and secure lids;

i. If during the inspection, tank lids are not to or above grade, lids must be brought to or above grade for approval;

ii. Metal tanks must be abandoned and replaced with a conforming tank if found during an inspection.

c. All internal devices and appurtenances such as tees, effluent screens and baffles that were originally provided with the tank or added later must be intact and in working order;

i. If during the inspection tees, effluent screens an baffles are not easily accessible for service and maintenance, they must be brought into compliance with this regulation.

d. Alarms, control devices, and components necessary for the operation of the system are present and in good working order;

e. A soil treatment area, or other means of subsurface wastewater treatment, must be present and not in a state of failure;

f. There are no unapproved wastewater discharges from the system or structure;

g. The OWTS has not been altered from its approved, permitted design and configuration as document in Department records;

h. Any items meeting the conditions of a “Failure” as defined in this regulation have been corrected to the acceptance of the Department; and

i. Number of bedrooms stated on the listing or publication, or as provided on the Bedroom Acknowledgement during Building Permit submittal, must not exceed approved system design capability.

**4. Issuance of a Use Permit**

a. When the conditions set forth in Section 16.3 have been met, the Department will issue a Use Permit, setting forth the terms and conditions of approval as appropriate:

i. Size, type, capacity of existing system, number of approved bedrooms and record drawing;

ii. Evidence of past failures or malfunctions within the previous three years from the date of application as found in Department records;

iii. Circumstances or factors that may have affected the ability of the inspector to evaluate the system;

iv. Whether the system meets the permitting requirements of the Department;

v. Any other information the Department deems appropriate.

**5. Waiver of a Use Permit**

a. If it is determined by the Department that an OWTS does not meet the requirements for issuance of a Use Permit, a conditional acceptance document may be issued, provided that the purchaser of the property provides a written agreement to obtain a permit and complete all necessary repairs to the system (or connect to a sanitation district, if appropriate) within the time frame established by the Department and these Regulations.

**6. Failure to Obtain a Use Permit**

a. If an application is submitted for a Use Permit, and it is determined by the Department that a Use Permit cannot be issued, the owner will be contacted by the phone number and email provided on the application, notifying them of why the Use Permit could not be issued.

b. Failure to obtain a Use Permit for a covered transaction as provided by this regulation will subject the owner who failed to obtain the document to a penalty assessed under section 25-10-113, C.R.S.

c. If a transfer of title occurs before obtaining a Use Permit, the new owner is required to obtain a Use Permit within 30 days of the closing date. If the inspection report yields that the system cannot be approved for a Use Permit, the new owner is required to mitigate any failures, malfunctions or other system deficiencies as specified in this regulation.

**7. Revocation of a Use Permit**

a. A Use Permit must be revoked if it is determined that the system is no longer functioning in accordance with this regulation or that false or misleading material statements were made on the application or inspection reports.

b. The Use Permit holder will be given ten days written notice by the Department regarding why the permit was revoked.

c. An owner may appeal the revocation per the provisions in Section 19.

# Section 17 – Licensed System Installers and Homeowner Installers

## 1. General Requirements Licensed Installers

a. Any person engaged in the business of installing, constructing, altering, or repairing an OWTS shall hold a valid System Installer License issued by the Clear Creek Environmental Health Department. Employees of a Licensed System Installer need not be individually licensed. It is the responsibility of the Licensed System Installer to ensure that all employees working on an OWTS are fully competent to install the system under their company license.

b. An applicant for a System Installer License shall pass a test that demonstrates knowledge of these Regulations. A passing grade on the licensure test, shall be valid only as long as the person passing the test remains employed by the Licensed System Installer. Full fees must be submitted pursuant to Section 3.10.

c. The license is valid for one year from the date of issuance. A license that lapses because of failure to renew or is revoked, or suspended, shall be subject to the fee established for a new license upon re-application. If the date of re-application is more than one year after the date the license expired, the applicant shall also be required to comply with Section 18.1.b.

## 2. Licensed System Installer Minimum Requirements

a. A Licensed System Installer, must at a minimum:

i. Verify that a permit to install, repair, upgrade or alter an OWTS has been issued by the Department prior to commencing installation and maintain a copy of the permit, the engineering design and specifications, and inspection sign-off card;

ii. Post the permit inspection sign-off card at the building site in a conspicuous and accessible location. Approval or denial of inspections will be recorded on this card. Inspections must not be conducted by the Department if this card is not posted at the building site;

iii. Verify that there have been no changes in the site conditions under which the permit was issued prior to commencing construction, installation, alteration, upgrade or repair. If any condition on the permit, design documentation, or requirements provided for in these Regulations cannot be met, the Licensed System Installer shall notify the Department before proceeding;

iv. Perform all work in compliance with these Regulations and the conditions specified on the permit and supporting approved, engineering design; and

v. Suspend work and notify the Department should there be any change in site conditions after construction begins that would prevent the installation of the system in accordance with permit conditions or as otherwise provided for in these Regulations. Construction may resume only after written authorization by the Department

**3. License Revocation and Suspension**

a. The Board of Health may revoke or suspend a System Installer License for failure to comply with these Regulations.

b. Revocation or suspension shall take place only after a hearing before the Board of Health. The Licensed System Installer shall be given no less than ten days' written notice of the hearing sent by personal service or registered or certified mail, return receipt requested. The written notice shall specify the violations which are pertinent to the hearing. A Licensed System Installer shall stop all work until the Board of Health reaches a decision after the hearing.

c. The Licensed System Installer will be given written notice of the decision and findings of the Board of Health. If the Board of Health finds violations, the written notice of decision will specify the violations to the licensed Systems Contractor. Such notices will be given to the licensed Systems Contractor by personal service or registered or certified mail, return receipt requested.

d. A suspended license will be reinstated after completion of the suspension period that was determined by the Board of Health, not to exceed six months, at which time the Licensed System Installer will be given written notice of the reinstatement of their license. Such notices will be given to the Licensed System Installer by personal service or registered or certified mail, return receipt requested. The license shall still expire at the end of the one year period stated on the license.

e. A Licensed System Installer may reapply for a new license after revocation only after the System Installer has demonstrated to the health officer the conditions that caused the revocation have been corrected or rectified.

**4. Homeowner Installer Minimum Requirements**

a. The owner of a property for which an OWTS permit has been issued may install that system without holding a Licensed System Installer provided that the owner has passed a test that demonstrates their knowledge of these Regulations, has signed the Owner-Installer Affidavit, and paid the full fees pursuant to Section 3.10.

b. Owner-installers shall be responsible for complying with all applicable requirements of these Regulations.

c. No portion of the work for an owner-installed system shall be subcontracted to any other person who will be compensated for that work unless that subcontractor is a Licensed System Installer.

d. Verify that a permit to install, repair, upgrade or alter an OWTS has been issued by the Department prior to commencing installation and maintain a copy of the permit, the engineering design and specifications, and inspection sign-off card;

e. Post the permit inspection sign-off card at the building site in a conspicuous and accessible location. Approval or denial of inspections will be recorded on this card. Inspections must not be conducted by the Department if this card is not posted at the building site;

f. Verify that there have been no changes in the site conditions under which the permit was issued prior to commencing construction, installation, alteration, upgrade or repair. If any condition on the permit, design documentation, or requirements provided for in these Regulations cannot be met, the Licensed System Installer shall notify the Department before proceeding;

g. Perform all work in compliance with these Regulations and the conditions specified on the permit and supporting approved, engineering design; and

h. Suspend work and notify the Department should there be any change in site conditions after construction begins that would prevent the installation of the system in accordance with permit conditions or as otherwise provided for in these Regulations. Construction may resume only after written authorization by the Department.

# Section 18 – Licensed System Cleaners

## 1. General Requirements

a. Any person engaged in the cleaning or pumping of septic tanks, vaults, holding tanks, or other components of an OWTS or transporting sewage to a disposal site must be a Licensed System Cleaner from the Clear Creek Environmental Health Department. Employees of a Licensed System Cleaner need not be individually licensed. It is the responsibility of the Licensed System Cleaner to ensure that all employees working on an OWTS are fully competent to clean or pump the system under their company license.

b. An applicant for a Systems Cleaner License shall pass a test that demonstrates knowledge of these Regulations. A passing grade on the licensure test, shall be valid only as long as the person passing the test remains employed by the Licensed System Installer. Full fees must be submitted pursuant to Section 3.10.

c. The license is valid for one year from the date of issuance. A license that lapses because of failure to renew or is revoked, or suspended, shall be subject to the fee established for a new license upon re-application. If the date of re-application is more than one year after the date the license expired, the applicant shall also be required to comply with Section 3.10.

## 2. Licensed System Cleaner Minimum Requirements

a. Remove the liquid, sludge, and scum from all compartments of the tank, leaving no more than a three inches of sludge in the bottom of the tank;

b. Inspect the tees, baffles, aerator unit, pumps, alarms, filters, siphons, and other internal or external components of the tank(s) being pumped and notify the property owner if any of these components are damaged or missing;

c. Inspect and clean any filters or other device which require routine maintenance and cleaning, if necessary;

d. Maintain their equipment so that no spills occur during pumping or transportation and that their employees are not subjected to health hazards from exposure to the sewage;

e. Dispose of the collected sewage only at sites approved by the Clear Creek Environmental Health Department, such as a permitted wastewater treatment plants; and

f. Maintain records of the activities completed as required in this section, including the volume of septage pumped, date and address for each septic tank pumped, and the date and disposal site for all collected sewage. The health officer may require a Systems Cleaner to provide documentation regarding their disposal methods and practices.

g. Prior to pumping any tank or any other component the System Cleaner shall observe to see if the liquid level within the tank is either above or below the inlet or outlet inverts and note this condition on their inspection report as an indication that the STA may either be saturated or the tank may be leaking.

### 3. License Revocation and Suspension

a. The Board of Health may revoke or suspend a System Cleaner License for failure to comply with these Regulations.

b. Revocation or suspension shall take place only after a hearing before the Board of Health. The Licensed System Cleaner shall be given no less than ten days' written notice of the hearing sent by personal service or registered or certified mail, return receipt requested. The written notice shall specify the violations which are pertinent to the hearing. A Licensed System Cleaner shall stop all work until the Board of Health reaches a decision after the hearing.

c. The Licensed System Cleaner will be given written notice of the decision and findings of the Board of Health. If the Board of Health finds violations, the written notice of decision will specify the violations to the Licensed System Cleaner. Such notices will be given to the Licensed System Cleaner by personal service or registered or certified mail, return receipt requested.

d. A suspended license will be reinstated after completion of the suspension period that was determined by the Board of Health, not to exceed six months, at which time the Licensed System Cleaner will be given written notice of the reinstatement of their license. Such notices will be given to the Licensed System Installer by personal service or registered or certified mail, return receipt requested. The license shall still expire at the end of the one year period stated on the license.

e. A Licensed System Cleaner may reapply for a new license after revocation only after the System Cleaner has demonstrated to the health officer the conditions that caused the revocation have been corrected or rectified.

# Section 19 – Board of Health Administrative Procedures

## 1. Variances

a. The purpose of this section is to provide a procedure for the Board of Health to consider variance from the design and/or sitting requirements of these Regulations.

b. Any person whose OWTS application has been denied by the pursuant to Section 4.7 may request a variance from these Regulations by the Board of Health.

## 2. Prohibitions on Granting a Variance

a. Variances shall not be granted:

i. Where the property can accommodate a conforming OWTS;

ii. To mitigate an error in construction involving any element of property improvements;

iii. Solely for economic gain;

iv. If it will result in a setback reduction to an offsite physical feature that does not conform to the minimum setbacks defined in Table 8-1 of this regulation without the Clear Creek County Board of Health considering any concerns of the owner of property containing said feature. Property lines are considered offsite features. The property owner containing said feature must be notified of the time and date of the hearing.

v. If it reduces separation to ground water or bedrock based on the level of treatment in Table 8-2

vi. If it reduces the horizontal setback from a well, unless it also meets the variance requirements of the Board of Examiners of Water Well Construction and Pump Installation Contractors.

vii. For the waiver of higher level treatment system operation and maintenance requirements as required in Section 16.

## 3. Criteria of Approval for a Variance

b. The Board of Health may grant a variance from the provision of these Regulations where it is necessary to provide a functional system if the following criteria are met:

i. Granting the variance does not endanger the public health, safety, and welfare and will result in no greater risk to the public health and environment than a system meeting these Regulations. The following must be considered:

1. Does granting the variance negatively impact water quality or the environment more than a system meeting these Regulations; and

2. Does granting the variance create a nuisance.

ii. Granting the variance does not result in the substantial impairment of these Regulations;

iii. Granting the variance will comply with all applicable state regulations;

iv. By reason of exceptional topographic conditions or other extraordinary and exceptional situation or condition of the property, the strict application of such regulation would result in peculiar and exceptional practical difficulties, or exceptional and undue hardship upon the owner of such property.

**4. Minimum Variance Submittal Requirements**

a. Variance applications shall include the following, at a minimum:

i. A site-specific request identifying the specific criteria from which a variance is being requested;

ii. Technical justification by a professional engineer or professional geologist, which indicates the specific conditions which exist and/or the measures which will be taken that support a finding that the variance will result in no greater risk than that associated with compliance with the requirements of these Regulations. Examples of conditions which exist, or measures which might be taken, include but are not limited to the following:

1. Evidence of a natural or manmade physical barrier to the movement of effluent to or toward the feature from which the variance is requested; placement of a manmade physical barrier to the movement of effluent to or toward the feature from which the variance is requested; soil replacement with sand filter media to reduce the infiltration rate of the effluent such that the travel time of the effluent from the soil treatment area to the physical feature is no less than the travel time through the native soils at the prescribed setback and treatment level 2N;

iii. A discussion of alternatives considered in lieu of the requested variance;

iv. Technical documentation for 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

v. A statement of the hardship that creates the necessity for the variance.

b. 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.

**5. Public Hearing Procedures**

a. Every application for a variance shall be made to the Board of Health on a form provided by the Department and shall include all data and documentation that supports the variance request so as to provide all of the information necessary for clear understanding and intelligent action by the Board.

b. The applicant will bear the burden of supplying the Board of Health with sufficient evidence to document that the variance is justified and meets the criteria for approval.

c. An application fee, as established by the Board of Health, shall accompany all applications. See Section 3.10 for more detail.

d. After an application is received, the Board of Health will conduct a public hearing at a regularly scheduled meeting to consider the variance. All adjacent property owners will be mailed written notice of the hearing at least 20 days prior to the hearing date.

e. The Board of Health will take action by written and signed resolution to approve, approve with conditions or deny a request. The required findings and any conditions imposed by the Board on an approval, and the reasons for a denial will be stated in the resolution. A copy of the written and signed resolution will be mailed to the applicant.

f. Once signed by the Board of Health the variance and any conditions thereof, will be recorded on the deed to the property and any expenses associated with that recorded must be the responsibility of the party obtaining the variance.

g. The variance and any conditions thereof will be recorded with the office of the Clear Creek County Clerk and Recorder.

h. The Clear Creek Environmental Health Department may refer variance cases out to other local, state or federal entities for comment prior a hearing, if the Department believes the variance will impact their interests.

**6. Variance for Repair of Failing Systems**

a. 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 the Division, the hearing procedures in Section 20.5 must be followed.

b. For the repair of or upgrade to an existing system where the existing system does not meet the required separation distances and where conditions other than lot size precludes adherence to the required distances, a variance to the separation distances may be requested. The repairs or upgrade must 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.

**7. Appeal of Denial**

a. Any person whose permit application has been denied by the Department pursuant to Section 4.7 may appeal the decision to the Clear Creek County Board of Health. The appeal must be filed with the Department within thirty days of receipt of the notice of denial.

b. The request must be made in writing and must state the facts upon which the applicant bases their request for review, the reasons entitling them to relief and the specific relief or outcome that they are seeking.

c. The applicant will bear the burden of supplying the Clear Creek County Board of Health with sufficient evidence to document that the Department erred in its denial of the permit.

d. The variance process, not the appeals process, should be followed if a proposed system does not meet these Regulations.

e. An application fee, as established by the Clear Creek County Board of Health, must accompany all applications.

**8. Appeal of Clear Creek County Board of Health Decision**

a. An applicant may seek judicial review of the Clear Creek County Board of Health's decision under the provisions of §25-1-515, C.R.S.

# Section 20 – Enforcement Procedures

## 1. Primary Enforcement Responsibility

a. The primary responsibility for enforcement of the provisions of the OWTS Act and these Regulations shall lie with the Department and Board of Health.

b. In the event that the Clear Creek Environmental Health Department fails to administer and enforce the provisions of the regulations adopted under the OWTS Act, the Division may assume such functions of the Department as may be necessary to protect the public health and environment pursuant to §25-10-110, C.R.S.

## 2. Notice of Violation

a. Whenever the Department determines there has been a violation of any pertinent provision of these Regulations, the Department will give written notice of such violation to the property owner. Such Notice of Violation will specify the violation(s), provide a reasonable time for correction, not exceed 30 days, and be addressed to the owner of the property concerned.

b. The written Notice of Violation will be given to the property owner by personal service or registered or certified mail, return receipt requested. Service will be complete as to the date of the certificate of mailing or hand delivery.

c. If service is made by posting the Notice of Violation in a conspicuous place, the Department must include in the record a statement as to why the posting was necessary.

d. If it is determined by the Department that the system is failing, the property owner shall apply for a permit to repair the system within two business days of receipt of the Notice of Violation or the Department may proceed with a cease and desist order.

e. If all documentation pursuant to Section 4 has not been submitted to the Department within seven days of the submission of the application, the Department may proceed with a cease and desist order.

f. Upon receipt of a Notice of Violation for a malfunctioning system, the property owner shall pump the septic tank and provide documentation of the pumping to the Department within seven days of the pumping. Additional pumping of the septic tank may be required during the repair process if the Department determines that the malfunction continues to constitute a nuisance or hazard to public health.

## 3. Stop Work Notice

a. If work is done without a permit issued by the Department, the Department must post a stop work notice on the property and issue a Notice of Violation. Work cannot continue until the Department issues the appropriate permit. Failure to cease work will result in a cease and desist and suspension or revocation of the System Installer’s license.

**4. Cease and Desist Orders**

a. The Department may request that the Board of Heath issue an order to cease and desist from the use of any OWTS or sewage treatment works which is found by the Department not to be in compliance with these Regulations or the OWTS Act 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.

b. Such an order may be issued only after a hearing which will be conducted by the Clear Creek County Board of Health not less than 48 hours after written notice thereof is given to the owner of the property on which the system is located. The order shall require that the owner bring the system into compliance or eliminate the health hazard within a reasonable period of time, not to exceed 30 days, or thereafter cease and desist from the use of the system.

c. After the Department verifies the OWTS or sewage treatment works is in compliance with these Regulations or the hazard to public health has been eliminated, the Department will schedule a hearing with the Board of Health to lift the cease and desist order. The Department may issue a letter allowing temporary use of the OWTS or sewage treatment works while the Board of Health hearing to lift the order is pending

d. A cease and desist order issued by the Board of Health 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.

**5. Penalties and Fines**

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~~ civil infraction and shall be punished as provided ~~as defined~~ in §18-1.3-503, C.R.S.

i. Constructs, alters, repairs, installs, or permits the use of any OWTS without first having applied for and received a permit pursuant to Section 4 of these Regulations and § 25-10-106, C.R.S.;

ii. 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;

iii. Violates the terms of a cease and desist order that has become final under the terms of Section 20~~21~~.4, above, and §25-10-106 (1) (k), C.R.S.;

iv. Conducts a business as a Systems Installer without having obtained the license provided for in Section 18 of these Regulations and § 25-10-109 (1), C.R.S.;

v. Conducts a business as a Systems Cleaner without having obtained the license provided for in Section 19 of these Regulations and § 25-10-109 (2), C.R.S.;

vi. Falsifies or maintains improper records concerning system cleaning activities not performed or performed improperly; or

vii. Willfully fails to submit proof of proper maintenance and cleaning of a system as required by these Regulations

b. Upon a finding by the Clear Creek County Board of Health that a person is in violation of this regulation, the Board 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.

i. A person subject to a penalty assessed, may appeal the penalty to the Clear Creek County Board of Health by requesting a hearing before the appropriate body. The request must be filed within thirty days after the penalty assessment is issued. The local board of health shall conduct a hearing upon the request in accordance with section 24-4-105, C.R.S.

# Section 21 – Systems Maintenance and Abandonment

## 1. Responsibility

a. The owner shall be responsible for proper maintenance of an OWTS and for abatement of any nuisance arising from its malfunction, unless the responsibility has been contractually assigned to a tenant or a third party or a public, quasi-public or political subdivision, and that contract is on file with the Department.

b. The owner of a system utilizing higher level treatment shall ensure that the OWTS is operating, maintained, and performing according to the required standards for the designated treatment level. The owner must obtain an Operating Permit pursuant to Section 15.

c. Any person denying responsibility for the proper operation and maintenance of an OWTS shall bear the burden of proof for such denial upon establishment of ownership or possessory rights for the property served by the system.

## 2. Maintenance and Cleaning

a. Unless required as a condition of approval, or set forth in an Operating Permit, the following inspection and maintenance schedule is recommended for all OWTS to ensure good working order:

**Table 22-1 Maintenance Recommendations**

| Type of System | Inspection or Maintenance | Cleaned or Pumped |
|---|---|---|
| **Septic tanks** | Annually | Every 2-4 years |
| **Vaults, privy vaults, holding tanks** | Annually | Between 75-85% capacity |
| **Aeration, mechanical, or higher level treatment units** | Per operating permit conditions | |
| **New technology devices** | Per permit conditions or maintenance agreement | |

## 3. Disposal of Waste Materials

a. Disposal of waste materials (excluding liquid wastes and sludge) removed from a system in the process of maintenance or repair may be accomplished at the site in a manner that complies with State and local regulations, provided it does not create a hazard to public health, a nuisance or risk of pollution of surface or ground water. Liquid wastes and sludge shall be removed by a Licensed System Cleaner for proper disposal.

## 4. Termination of Use of an OWTS

a. A septic tank, vault, or holding tank shall be abandoned in the following manner:

i. The tank may be completely removed and the parts disposed of safely;

ii. If the tank will remain in place:

1. Electrical lines, if present shall be removed;

2. The inlet and outlet lines shall be capped or removed;

3. The tank shall be pumped to remove as much waste as possible;

4. The bottom of the tank shall be broken so that the tank neither floats nor fills with water;

5. The top shall be collapsed and the sides may be broken into the void; and

6. The remaining void shall be filled with gravel, sand, or compacted soil; re-graded to match the surrounding topography and re-vegetated.

b. An absorption bed or trench, mound, or ET system may be abandoned in place by disconnecting and capping the inlet line.

c. A seepage pit, cesspool, or other system that contains a large internal void shall be abandoned by pumping out the liquid contents, capping, or removing the inlet line, then either collapsing the void or filing with soil or other inert materials to prevent subsidence or collapse.

d. A non-vault privy shall be abandoned by pumping any liquid material from the privy pit, treatment with quicklime or other disinfectant, then back-filing the pit with soil or inert materials. A privy structure may remain in place provided that the stool is removed and a solid floor placed in the structure.

e. The Department may require abandonment of a tank or other system component that constitutes a hazard to public health.

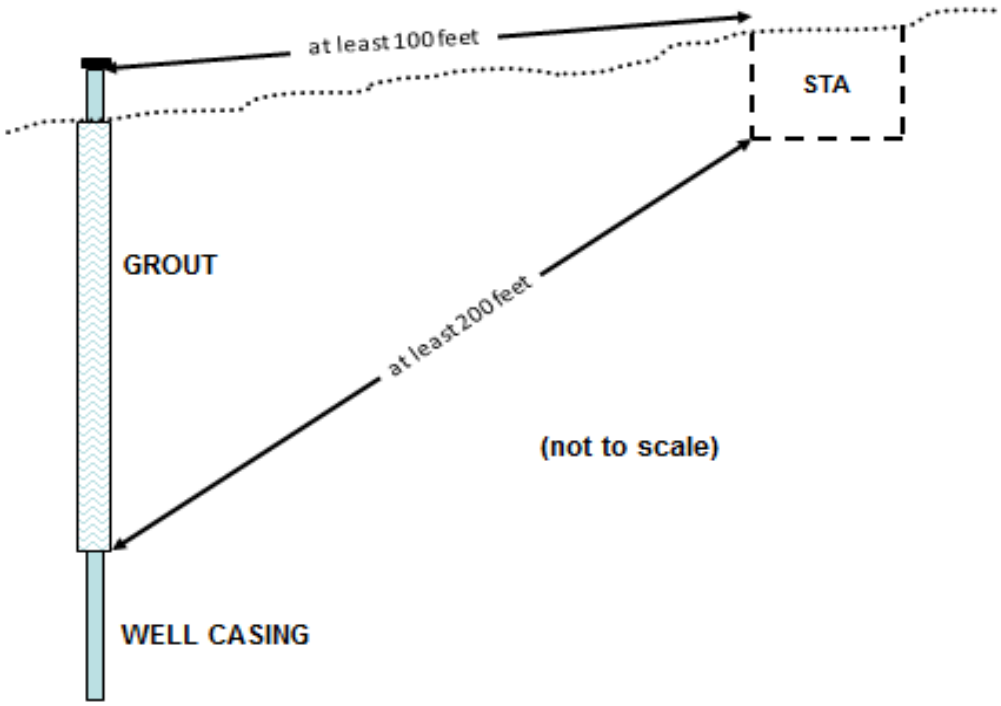
# Appendix A – Deep Grouting of Well

The minimum separation distance between a well and soil treatment area where the bottom of the soil treatment area infiltrative surface is less than a TL2N effluent may be reduced to 100 feet provided that an impervious grout is placed within the annular space of the affected well sufficient to maintain a 200 foot diagonal separation distance between the bottom of the grout and the STA as shown in Figure 1.

**FIGURE 1 - DETERMINATION OF 200-FOOT MINIMUM SEPARATION DISTANCE BETWEEN DEEP-GROUTED WELL AND SOIL TREATMENT AREA**

In support of such a request, the design engineer shall:

1. Provide a scaled drawing showing the depth to which the grouting shall extend to assure the required 200 foot diagonal separation;




2. Specify the type of grouting materials to be used;

3. Specify the manner in which the grout will be introduced into the annular space; and

4. Determine the volume of the grout required to fill the annular space.

The health officer may require the design engineer to certify that the grouting has been done in accordance with their proposal.

Such a reduction will not be allowed where a higher level treatment system can be installed to meet the required minimum setback. However, if the onsite well will be grouted to allow a distance of less than 200 feet to an off-site onsite wastewater treatment system, the grouting may also be used in support of a request for a reduced setback to the onsite well.