ADAMS COUNTY
HEALTH DEPARTMENT

REGULATION O-26

On-Site Wastewater Treatment Systems

PROMULGATED BY THE BOARD OF HEALTH OF ADAMS COUNTY, COLORADO

Effective Date:
January 5, 2026

Pursuant to Title 25-10-101, et seq. Colorado Revised Statutes, and the Colorado Department of Public Health and Environment Water Quality Control Commission On-Site Wastewater Treatment System Regulation #43, 5 CCR 1002-43.

This document describes the rules and regulations for the use and permitting of On-Site Wastewater Treatment Systems in Adams County. This Regulation is intended for anyone seeking a permit, designing a system, installing a system, repairing a system, or using a system.

TABLE OF CONTENTS

SECTION 1 AUTHORITY, SCOPE, AND APPLICABILITY

1.1 Authority

A. This Regulation is promulgated pursuant to the On-Site Wastewater Treatment System Act, C.R.S. §25-10-101, et seq.

1.2 Declaration

A. In order to preserve the environment and protect 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 standards, rules and regulations for On-Site Wastewater Treatment Systems (OWTS) in Adams County, State of Colorado, and to provide the authority for the administration and enforcement of such minimum standards, rules and regulations.

B. The Board of Health of Adams County finds, determines and declares these Regulations and standards to be necessary for the preservation of the public health and welfare of the inhabitants of Adams County, State of Colorado. These Regulations are adopted by the Board of Health of Adams County on the 20th day of November, 2025, and become effective 5th day of January, 2026.

C. This Regulation will apply to On-Site Wastewater Treatment Systems as defined in C.R.S. Section §25-10-103 (12).

1.3 Purpose

A. The purpose of these Regulations, as authorized by C.R.S. §25-10-101, et seq., is to provide guidance and establish minimum standards (including the enforcement thereof) for the location, construction, performance, installation, alteration and use of OWTS within Adams County, State of Colorado, and concerning the application for and issuance of permits, the inspection, testing, and supervision of installed systems, the use, maintenance, and cleaning of systems and the disposal of waste material.

1.4 Severability

A. Should any section, paragraph, sentence, clause or phrase of these Regulations be declared unconstitutional or invalid for any reason, such portion must be deemed separate and distinct and will not affect the validity of the remaining portion of these Regulations.

1.5 Effluent Discharged to Surface Waters

A. Any system that will discharge into State Waters must be designed by a professional engineer. The discharge permit application must be submitted for preliminary approval to the Department. Once approved by the Department, the application must be submitted to the Water Quality Control Division for review in accordance with the Water Quality Control Act, C.R.S. §25-8-101, et seq., and all applicable regulations of the Water Quality Control Commission. Compliance with such a permit will be deemed full compliance with this Regulation.

1.6 Applicability

A. Regulation Coverage

1) An OWTS with design capacity less than or equal to 2,000 gallons per day (gpd) must comply with these Regulations and the OWTS Act. These Regulations govern all aspects of OWTS permits, performance, location, construction, alteration, installation, and use.

2) An OWTS with design capacity greater than 2,000 gallons per day (gpd) must comply with CDPHE Regulation 43, site location and design approval in C.R.S. §25-8-702, and the discharge permit requirements in the Water Quality Control Act, C.R.S. §25-8-501, et seq.

a) Applicable Commission regulations include, but are not limited to, the following:

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

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

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

iv) Regulation 43 - On-Site Wastewater Treatment System Regulation (5 CCR-1002-43).

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

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

b) The requirements for maintenance and standards of performance for systems greater than 2,000 gallons per day (gpd) must be determined by the site application approval and discharge permit.

B. In the interest of facilitating communication of Department concerns regarding a design being reviewed by the Division, the Department 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 Regulation 43.

1.7 Materials 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 January 1, 2026, and do not include later amendments to the incorporated material.

SECTION 2 DEFINITIONS

Absorption system - means a leaching field and adjacent soils or other system for the treatment of sewage in an On-Site 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.

Act or OWTS Act - means the On-Site Wastewater Treatment Systems Act, C.R.S. 25-10-101, et seq.

Alteration - or **Alter** - means to change in character or composition of the OWTS. This includes any modification to the OWTS resulting in a small yet significant difference.

Applicant - means a person who submits an application for a permit for an On-Site Wastewater Treatment System.

Auxiliary Building - means a non-residential structure, located on the same lot or parcel as the principal structure, and for an incidental use to the principal structure.

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 and 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 is intended for sleeping purposes; or as defined by the local board of health, as stated in the local OWTS regulation.

Board of Health - means the Board of Health of Adams County.

Biochemical Oxygen Demand, Five-Day (BOD_5) - means the quantitative measure of the amount of oxygen consumed by bacteria while stabilizing, digesting, or treating biodegradable organic matter under aerobic conditions over a five (5) day incubation period; expressed in milligrams per liter (mg/L).

Biochemical Oxygen Demand, Carbonaceous Five Day ($CBOD_5$) - 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 (5) 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 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 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.

CDPHE - means the Colorado Department of Public Health and Environment created by C.R.S. §25-1-102.

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 C.R.S. §25-8-201.

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 8.12.

Component - means a subsection of an On-Site Wastewater Treatment System; a component may include multiple devices.

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 into consistence can be found in the Natural Resources Conservation Service Field Book for Describing and Sampling Soils, National Soils Survey Center NRCS-USDA, Version 3.0, Sept. 2012 (NRCS Field Book)

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 historic soil strata.

Dawson Arkose - means the Dawson Arkose formation of the Front Range of Colorado within the hydrogeological area known as the "Denver Basin". Although cementation of the Dawson Arkose can vary from non-cemented to indurated, in some locations, the Dawson Arkose has the characteristics of Type 3A and 4A soils, from Table 10 in Appendix A. A moist sample of Dawson Arkose will typically exhibit cohesive behavior which allows the Dawson Arkose to form into a mass, which has low to high compressive strength when dried.

Deep gravel system - means a soil treatment area for repairs only where the trenches utilize a depth of gravel greater than six (6) inches below the distribution pipe and sidewall area is allowed according to a formula specified in this Regulation.

Deficiency - See Malfunction.

Department - as used in these Regulations, means the Adams County Health Department.

Design - means: 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, On-Site Wastewater Treatment System - means a practitioner who utilizes site evaluation and investigation information to select an appropriate OWTS and prepares a design document in conformance with this Regulation.

Disinfection - means the process of destroying pathogenic microorganisms in sewage through the application of ultraviolet light, chlorination, or ozonation.

Distribution - means the process of dispersing wastewater or effluent to one (1) 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 department 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. C.R.S. §25-8-103 (5).

Dosing - means a high rate periodic discharge into a soil treatment area.

Dosing, demand - means a 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 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 (10%) by weight of the media is finer than the size specified.

Effluent - means the liquid flowing out of a component or device of an On-Site Wastewater Treatment System.

Effluent filter - means a removable, cleanable (or disposable) device installed on the outlet piping of a septic tank for the purpose of retaining solids larger than one-eighth inch and/or modulating effluent flow rate.

Effluent pipe - means non-perforated pipe that conveys effluent from one On-Site Wastewater Treatment System component to the next.

Environmental Health Specialist (EHS) - 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 On-Site Wastewater Treatment component that uses evaporation, transpiration, and absorption for dispersal of effluent.

Evapotranspiration system - means an On-Site Wastewater Treatment component with a continuous, impermeable liner that uses evapotranspiration and transpiration for dispersal of effluent.

Failure - means a condition existing within any component of an OWTS 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 OWTS component that are deemed by the Department 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 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 floodplain 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 (1) 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 twenty-four (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 must 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.

Groundwater condition - means a condition in the soil profile where a seasonal or current ground water surface has been identified, thus creating a vertical separation requirement to the infiltrative surface of a soil treatment area.

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 that receives discontinuous storm influenced flows, for a short duration, in direct response to a rain event and is not interconnected to a groundwater source.

Health officer - means the chief administrative and executive officer of the Department, or the appointed health officer of the Board of Health. Health officer includes a director of the Department.

Higher level treatment - means designated treatment levels other than treatment level 1 (see Table 4).

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 a pipe, chamber, or other component used to transport and distribute effluent.

Leach field - See Soil treatment Area

Limiting layer - means a horizon or condition in the soil profile that exhibits a limited capability for treatment, but will readily accept the effluent. Generally speaking, this includes fractured bedrock, and type R-0 soils (see Tables 11, 12, and 13).

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 thirty (30) mil.

Linear loading rate - means the amount of effluent applied per linear foot along the contour (gpd/linear ft.).

Long-term acceptance rate - (**LTAR**) – means a design parameter expressing the rate that effluent enters the infiltrative surface of the soil treatment area at equilibrium, measured in volume per area per time, e.g. gallons per square foot per day (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 or modification in order to function as originally intended.

Manufactured media - See Media, other manufactured and Media, enhanced 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 that includes synthetic media contained within one or more external permeable outer layers which promote the movement of the effluent, and is placed on a specified sand base 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 On-Site 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 (50%) reduction of influent nitrogen strength which is the minimum objective of NSF/ANSI Standard 245 - Wastewater Treatment Systems - Nitrogen Reduction (2023 version).

NDDS - means a Non-Pressurized Drip Dispersal System.

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 renewable permit that addresses specific operation and/or maintenance requirements for an existing OWTS that includes mechanical or electrical treatment components, or a system that is designed to meet specific wastewater treatment levels as set forth in these Regulations.

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 (1) 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 Department.

Permeability - means the property of a material which permits movement of water through the material.

Permit - means a permit for the construction or alteration, installation, and use or for the repair of an On-Site 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.

Pit privy - privy over an unlined excavation.

Vault privy - privy over a vault.

Professional engineer - means an engineer licensed in Colorado, in accordance with section 12- 120-201, et. seq., C.R.S. and practicing within their areas of expertise, consistent with 4 CCR 730- 1.

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 (2) years of graduate work. C.R.S. §23-41-208.

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 provided to illustrate the progress or completion of the installation of an OWTS, or components of the OWTS; typically based on field inspections by the designer or the department.

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.

Regulations - means this Regulation O-26, adopted by the Board of Health of Adams County.

Regulation 43 - means the CDPHE Water Quality Control Commission On-Site Wastewater Treatment System Regulation 43, 5 CCR 1002-43, Effective June 15, 2025.

Remediation system - means a treatment system, chemical/biological additive or physical process that is proposed to restore the soil treatment area of an OWTS to intended performance.

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

Replacement system - See Repair.

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

Restrictive layer- means a condition in the soil profile that restricts the vertical movement of the effluent. This may include impervious bedrock, glacial till, platy soils, sodic soils, or soils with a cementation class of "strongly cemented" or greater.

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 under-drain 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 overflowing to the succeeding trench through a drop box. The effluent does not pass through the distribution media before it enters any succeeding trenches. The effluent is dispersed through a drop box at the proximal end of the system, allowing for portions of the absorption are to be isolated.

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 C.R.S. §25-8-103.

Site evaluation - means a comprehensive analysis of soil and site conditions for an OWTS.

Site evaluator - means a practitioner who conducts preconstruction site evaluations, including visiting a site and performing soil analysis, a site survey, or other activities necessary to determine the suitability of a site for an OWTS.

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 (1) 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 - means the physical location where final treatment and dispersal of effluent occurs. Soil treatment area includes drainfields, mounds, 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 (2) sections that are dosed on a frequent rotating basis.

State Waters - has the meaning set forth under C.R.S. §25-8-103.

Strength, wastewater - means the concentration of constituents of wastewater or effluent; usually expressed in mg/L.

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 10, and has the required vertical thickness below the infiltrative surface and above a limiting layer.

System - See On-Site Wastewater Treatment System

Systems cleaner - means a person licensed by the Department and engaged in and who holds themselves out as a specialist in the cleaning and pumping of On-Site Wastewater Treatment Systems and removal of the residues deposited in the operation thereof.

Systems contractor - means a person licensed by the Department and engaged in and who holds themselves out as a specialist in the installation, renovation, and repair of On-Site Wastewater Treatment Systems.

Systems maintenance provider - means a person engaged in and who holds themselves out as a specialist in routine or periodic actions taken to assure that the On-site Wastewater Treatment System is functioning as intended, and/or that the On-site Wastewater Treatment System is meeting performance requirements.

Tiny Home - means a structure (a non-recreational vehicle) that has only one bedroom and has 400 sq. ft. or less of livable space, including lofts. In this instance, the OWTS may be sized for only one bedroom.

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 - means a person engaged in and who holds themselves out as a specialist in conducting evaluations and observations of an existing On-site Wastewater Treatment System serving a structure that is proposed for property transfer, to assess if the system is functioning as intended.

Treatment level - 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 three (3) feet or less containing distribution media and one (1) 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 (60%) of the soil weight is finer and D10 is the corresponding value at 10 percent (10%) finer. (A soil having a uniformity coefficient smaller than four (4) would be considered "uniform" for purposes of this Regulation.)

Use Permit - means a permit authorizing the use of an OWTS as more fully set forth in Section 4 of this regulation.

Use Permit, Higher Level Treatment - means a permit authorizing the use of a Higher Level Treatment system as more fully set forth in Section 5 of this regulation.

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 greater than two thousand gallons per day at full occupancy, the vault would be considered a domestic wastewater treatment works. Vaults are On-Site Wastewater Treatment Systems.

Visual and tactile evaluation of soil - means the determination of 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 course - means a natural or artificial channel through which water flows, either continuously or intermittently and exhibits a connection to an actual or elevated groundwater table. A water course includes the bed of a channel that flows only seasonally (e.g., creek, stream, irrigation ditch). Hollows, ravines, or roadside ditches that are normally dry are not considered a water course.

Water Quality Control Commission - See Commission

Water Quality Control Division - See Division

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.

SECTION 3 NEW, REPAIR, EXPANSION, AND PRODUCT DEVELOPMENT PERMITS, AND INSPECTION

3.1 Permit Required

A. No person or persons may install, alter, repair or use an On-Site Wastewater Treatment System (OWTS) within Adams County, State of Colorado, unless such person holds a valid permit, issued by the Department in the name of the property owner for the specific construction, remodeling, installation, or use, proposed at the location described on the permit.

B. A permit must be required for the expanded use of an OWTS. The OWTS must be replaced or modified to handle the increased design flow unless it is determined that the existing system is adequately designed and constructed for the higher design flow rate.

3.2 Fees

A. A non-refundable fee is required of applicants for accepting and processing an application for a permit to construct and install any new system, for the repair or alteration of any existing system, or the use of any system as set forth in Sections 4 and 5, herein. The fee must be payable to the Department at the time the application is made to the Department.

B. The Board of Health must establish the amount of fees for each type of permit by resolution, as amended from time to time, which must be available upon request. Fees are established pursuant to the provisions of the Act.

C. The Board of Health may make provision for the waiver of any fee required for an OWTS.

D. Surcharge

1) The Department must collect a fee for each permit issued for a new, repaired, or upgraded OWTS and transmit funds to the Colorado Department of Public Health and Environment for use in funding the state's OWTS program, as identified in the On-site Wastewater Treatment System Act 25-10-107(3) C.R.S. until replaced by fee(s) becoming effective in Regulation 102 adopted under Section 25-8-210(1)(a)(X) C.R.S.

3.3 Permit Application Requirements and Procedures Information Required

A. Minimum Permit Application Requirements

1) Owner name and contact information;

2) Property address;

3) Property legal description;

4) Type of permit;

5) Report from Site and Soil Evaluation (Section 8.1);

6) System design with a legible, accurate site plan which shows pertinent physical features on subject property, and on adjacent properties, as noted in Table 6 in Appendix A;

7) Other information, data, plans, specifications and tests as required by the Department;

8) 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 must not prejudice the right of the Department to develop its own information from its own source at its own expense.

3.4 Permit Expiration

A. Permits to install and construct an OWTS must expire at the end of 12 months from date of issue unless the permit is extended to a fixed date upon written request by the applicant and at the discretion of the Department.

3.5 Changes in Condition after Permit Issuance

A. Any changes or relocation of proposed structures or additions to the site and soil evaluation report without approval by the Department may void the permit.

B. No change of design of an OWTS after the permit has been issued may be made unless authorized in writing by the Department.

3.6 Denial of a Permit

A. Denials of permits must be made in writing by the Department stating reasons for the denial and requirements for reconsideration of the application.

B. 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.

C. Any applicant who is denied a construction permit, or any person who is adversely affected by the denial or issuance of a permit, within 30 days following such denial, may request a hearing before the Board of Health.

D. Upon a finding, by the Board of Health after the review of a denial of a permit as provided by C.R.S. §25-10-111, that an applicant for OWTS has demonstrated that said system will be constructed and used in such a manner as to comply with the declaration and intent of these Regulations and all applicable state and local rules and regulations and required terms and conditions in any permit issued pursuant thereto, a permit may be issued therefore.

3.7 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 Department or its employees may be liable for the failure or malfunctioning of any system nor act as a certification of the equipment used in the system (or any component thereof used in its operation); nor act as a certification that the system for which the permit was issued ensures continuous compliance with the provision of the OWTS Act, or rules and the regulations adopted thereunder or any terms and conditions of a permit.

3.8 Primary Enforcement Responsibility

A. The primary responsibility for enforcement of the provisions of the OWTS Act, Regulation 43 and these Regulations will lie with the Board of Health.

B. In the event that the Board of Health fails to administer and enforce the provisions of the said Section and the regulations adopted under the OWTS Act, the Division may assume such functions of the Department or Board of Health as may be necessary to protect the public health and environment. C.R.S. §25-10-110.

3.9 Repair Permits

A. Application to repair and for emergency use of a malfunctioning system must be made within two (2) business days by any owner or occupant after receiving notice from the Department that the system serving their property is not functioning in compliance with these Regulations. The date of expiration for repair permits must not extend beyond 30 days from the date of issuance and must not be renewed unless such person can show good cause in writing to the Department and can demonstrate that no hazard or nuisance exists on the property.

B. Concurrently with the issuance of a repair permit, the Department may issue an emergency use permit authorizing continued use of a malfunctioning system on an emergency basis for a period not to exceed the period stated in the repair permit. Such an emergency use permit may be extended, for good cause shown, in the event repairs cannot be completed in the period stated in the repair permit through no fault of the owner or occupant and only if the owner or occupant will continue to make repairs to the system.

C. A Major Repair Permit is required for the following types of repairs or alterations:

1) Replacement of an existing soil treatment area with or without the addition of a lift station.

2) Addition of a soil treatment area with or without the addition of a lift station.

3) Expansion of an existing soil treatment area with or without the addition of a lift station.

4) Implementation of a soil-based remediation system

D. A Minor Repair Permit is required for the following types of repairs or alterations:

1) Addition or replacement of a septic tank

2) Implementation of a septic tank-based remediation system

3) Addition of a lift station or pump and associated piping, where a lift station, pump or piping were not part of the original OWTS system.

3.10 Variance Procedure

A. Request for Variance

1) An applicant for a permit to construct a new OWTS or to repair or expand an OWTS may request a variance from any provision of this Regulation, except as prohibited in Section 3.10.C.

B. Variance requests must be accompanied by:

1) Site-specific request identifying the specific criteria from which a variance is being requested;

2) 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 the Regulation. Examples of conditions which exist, or measures which might be taken, include but are not limited to the following:

a) Evidence of a natural or manmade physical barrier to the movement of effluent to or toward the feature from which the variance is requested;

b) Placement of a manmade physical barrier to the movement of effluent to or toward the feature from which the variance is requested;

c) 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 Higher Level Treatment;

d) A discussion of alternatives considered in lieu of the requested variance;

e) 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;

f) A statement of the hardship that creates the necessity for the variance; and

g) The Department has the authority to impose site-specific requirements and conditions on any variance granted.

C. Prohibitions on the Granting of Variance Requests

1) No variance may be issued where the property can accommodate a conforming OWTS.

2) No variance may be issued to mitigate an error in construction involving any element of property improvements.

3) No variance may be allowed solely for economic gain.

4) No variance may be issued, if it will result in a setback reduction to an offsite physical feature that does not conform to the minimum setbacks defined in Table 6 in Appendix A of this Regulation without the Board of Health considering any concerns of the owner of property containing said feature. Property lines are considered offsite features. The owner of the property containing said feature must be notified of the time and date of the hearing.

5) No variance may be issued, if it reduces the separation to ground water or bedrock based on the level of treatment in Table 7 in Appendix A.

6) No variance from the horizontal setback from a well may be issued unless it also meets the variance requirements of the Board of Examiners of Water Well Construction and Pump Installation Contractors.

D. Variances for Repair of Failing Systems

1) When a proposed variance for a system repair or upgrade would result in encroachment on minimum distances to physical features on neighboring properties required by the Department, the requirements in 3.10.B above must be followed.

2) 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.

E. Burden of Proof

1) 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 this Regulation.

F. Public Hearing

1) Upon receipt of the request for a variance and the required information in Section 3.10.B, the Department must schedule a public hearing before the Board of Health. The Department will issue a Public Notice of the Hearing and send notice via certified mail, with a minimum 20-day reply time from the date of mailing to all adjacent property owners. The applicant and their engineer may attend the hearing and present testimony regarding the request for a variance. Applicants may be represented by legal counsel at any public hearing or meeting.

G. Outcome of the Variance Proceeding

1) Following the Public Hearing, the Board of Health must vote on the proposed variance. Approval of the variance requires a majority vote of the Board of Health. The applicant will receive written notification of the decision regarding the request for a variance.

2) The Board of Health may impose requirements and conditions on any variance granted, and the notice of an approval of the variance will include any conditions of the approval. The notice of a denial of a variance must include the basis for the denial.

3) Variances and any conditions thereof must be recorded on the deed to the property and any expenses associated with that recording must be the responsibility of the party obtaining the variance.

H. Findings on Appeal

1) A request for review must be made within 60 days after denial of an application by the Department.

2) The applicant must bear the burden of supplying the Board of Health with sufficient evidence to document that the denied system will be constructed and used in such a manner that will result in no greater risk than that associated with compliance with the requirements of Regulation 43, comply with the declaration and intent of this Regulation, and comply with all applicable state and local regulations and required terms and conditions in any permit.

3) Such review must be conducted pursuant to the requirements of C.R.S. §24-4-105.

3.11 Site Inspection Following Permit Application and Prior to Permit Issuance

A. After receiving an application as required in Section 3.3 for an OWTS permit, the application must be reviewed by the Department and an inspection of the premises (site visit), unless previously made, must be made by the Department. A determination may be made by the Department as to the suitability of the site and of the proposed design based upon observation of a test pit as required in Section 8.5 to verify depth of the ground water table, suitable soil, depth to bedrock, in addition to ground slope and pertinent physical features.

3.12 Department Review and Determination

A. The Department must review each application along with test results and other required information. The Department must determine if the proposed system design is in compliance with the Act, and these Regulations adopted thereunder after which a permit may be issued.

3.13 Final Inspection - Non-Engineered (Conventional System)

A. It is the responsibility of the system contractor to notify the Department when construction, installation, alteration, or repair has been sufficiently completed to allow inspection of the conventional system before the system is placed in use.

B. Inspection of the system by the Department must be conducted after being notified that the conventional system is ready for inspection.

C. Final inspection and approval of conventional OWTS must be made by the Department before fill is placed to cover any part of the system to confirm that it was installed according to the permit requirements.

D. The Department will determine if work has been performed in accordance with the permit requirements and will determine if the system complies with the Act, and these Regulations adopted thereunder.

E. A scaled record 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 related to locating and maintaining the OWTS components, must be prepared and submitted to the Department.

F. If the property line is within 15 feet of any system component, the line must be marked before final inspection by the Department.

G. At the completion of the installation of the OWTS, the designer must submit to the Department a letter stating that the system has been installed in conformance with the plans and specifications approved by the Department and a scaled record drawing of the system as required in Section 3.13.E. The letter must include a list of all inspections made and whether those inspections were satisfactory.

3.14 Final Inspection - Engineered System

A. It is the responsibility of the systems contractor to notify the professional engineer and the Department when construction, installation, alteration, or repair has been sufficiently completed to allow inspection of the engineered system before the system is placed in use. The system installer must notify the professional engineer to make all specified inspections during the course of construction.

B. Final inspection and approval of all engineered OWTS must be made by the professional engineer before fill is placed to cover any part of the system.

C. Final inspection and approval of the engineered OWTS must be made by the Department before fill is placed to cover any part of the system confirming that it was installed according to the permit requirements.

D. Engineered systems must be inspected by or under the supervision of the professional engineer responsible for the design. If the professional engineer is not available, another Registered Professional Engineer may provide the inspections and will become the professional engineer of record and be responsible for the system.

E. A scaled record 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 related to locating and maintaining the OWTS components, must be prepared and submitted to the Department.

F. The Department will determine if work has been performed in accordance with the permit requirements and will determine if the system complies with the Act, and these Regulations adopted thereunder.

G. If the property line is within 15 feet of any system component, the line must be marked before final inspection by the Department. At the completion of the installation of an engineered system, the engineer must submit to the Department a letter stating that the system has been installed in conformance with the plans and specifications approved by the Department and the scaled record drawing of the system as required in Section 3.14.E. The engineer's letter must include a list of all inspections made and whether those inspections were satisfactory.

3.15 Authorization to Enter Upon Property

A. For the purpose of inspection and enforcing applicable rules and regulations and the terms and conditions of any permit issued in these Regulations, authorized members of the Department may enter upon private property at reasonable times and upon reasonable notice for the purpose of determining whether operating OWTS are functioning in compliance with the Act, Regulation 43, with these Regulations and with the terms and conditions of any permit issued thereunder, as well as to inspect and conduct tests in evaluating any permit application. The owner or occupant of the property having an OWTS must permit authorized members of the Department access to the property to conduct required tests, take samples, monitor compliance, and make inspections.

3.16 Product Development Permit

A. For products that have not received Division acceptance under Section 16.4, the manufacturer may apply to the Department for a product development permit. Requirements for proprietary treatment product acceptance are located in Section 16.4 of this regulation.

B. For products or types of systems which have not been otherwise accepted by the Division pursuant to Section 16.4, the local board of health may approve an application for a product development permit only if the system has been designed by a professional engineer, and only if the application meets all requirements of sections 3.16.C through 3.16.K.

C. Before a product development permit is issued by the Department, 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.

1) Applicant must provide evidence of nationally accepted third-party testing of the product to be evaluated, or;

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

a) Test data must be provided from a minimum of four (4) sites.

b) Each system must be tested over a period of at least one (1) year.

c) Each system must be sampled at least three (3) times during the year with at least one (1) sample obtained during cold weather conditions.

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

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

D. 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.

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

1) 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 under testing;

2) A description of the product under development including performance goals;

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

4) Design documents as required in Section 8.10 of this Regulation.

F. The Department 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 Division and the Department.

I. The Department may revoke or amend a product development permit, if the continued operation or presence of the product under development:

1) Presents a risk to the public health or environment;

2) Causes adverse effects on the proper function of the OWTS on the site;

3) Leaks or discharges effluent on the surface of the ground; or

4) If the developer of the product fails to comply with any requirements stipulated on the permit by the Department or the Division.

5) If the product development permit is revoked, the product developer must install a replacement OWTS in compliance with this Regulation and within the time frame established by the Department.

6) Once the system is installed and approved, the Department must supply the Division with a copy of the completed OWTS permit.

SECTION 4 USE PERMITS

4.1 Initial Issuance of Use Permit

A. As of the effective date of this Regulation, systems that have never completed the permitting or approval process established by the Department must be deemed to be operating without a valid Use Permit, until a Use Permit has been issued as more fully set forth in this Section 4.

4.2 Events Requiring a Use Permit

A. The owner or seller of a property served by an OWTS shall obtain an inspection report and the issuance of a Use Permit, as applicable, dated within 12 months prior to the occurrence of one (1) or more of the following events:

1) The sale of the property, as more fully defined in Section 4.3, herein;

2) A remodel that includes any additional flow to the current system;

3) A change in use of the property from residential to commercial, or commercial to commercial;

4) Engineer flow determination - flow evaluation;

5) Connection of a modular unit or mobile home to the system; and

6) Other conditions that the Department deem appropriate.

B. In the case of a sale, as indicated in Section 4.3, if the property owner does not obtain a use permit prior to a covered transaction, the purchaser of the property is then required to obtain a Use Permit.

4.3 Sale

A. For the purposes of these Regulations, the term “sale” means the transfer, sale or conveyance of any real property served by an OWTS, and therefore subject to these Regulations, but excludes the following types of transfers:

1) Change in ownership solely to include or exclude a spouse or child;

2) Transfer subject to life estate;

3) Transfer to effect foreclosure or forfeiture of real property, provided, however, the subsequent sale of the foreclosed property by the foreclosing entity requires the issuance or renewal of a Use Permit;

4) Transfer by redemption from a tax sale, provided, however, the subsequent sale of the redeemed property by the redeeming entity requires the issuance or renewal of a Use Permit;

5) Transfer creating or ending joint ownership if at least one person is an original owner of the property and/or their spouse or children;

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 to a trust or to themselves as trustee(s) of a trust estate; and

9) New homes that have not yet been occupied.

4.4 Application Requirements

A. The applicant must submit the following items to the Department when applying for a Use Permit or Renewal of a Use Permit:

1) Completed application on the form(s) provided by the Department, including:

a) Owner's name and contact information;

b) Physical address of property;

c) Legal description of property;

d) Name of Inspector; Inspector's NAWT or other applicable certification number;

e) Date and time of the inspection(s); and

2) Inspection report(s) completed within the previous 12 months of the event in Section 4.2.A., above, noting the condition of the septic tank and any mechanical components such as pumps, alarms, or higher level treatment systems, and the condition of the soil treatment area, including a septic tank pumping receipt, when applicable, based on the inspection report.

a) The inspection report(s) must be provided on the form(s) provided by the Department.

b) The inspection report(s) must be completed by an approved Use Permit Inspector, as hereinafter defined in Section 4.9.

c) All components that are found to be in a state of malfunction must be noted and disclosed within the inspection report.

3) A non-refundable Use Permit fee or Renewal of a Use Permit fee in the amount established by resolution of the Board of Health, as amended from time to time. The fee will be payable to the Department at the time the application is made.

4.5 Minimum Criteria for Renewal of a Use Permit

A. In order to obtain a Renewal of a Use Permit, the inspection of the existing OWTS system must verify that the OWTS system meets, at a minimum, the following criteria and conditions:

1) Submittal of an inspection report on Department approved forms; and

2) Verification that all deficiencies identified during the inspection, as set forth in the "Inspection Report" have been corrected in accordance with these Regulations.

3) If it is determined that OWTS system meets the foregoing criteria, the Department must issue a Renewal of a Use Permit, setting forth the terms and conditions of approval.

4.6 Minimum Criteria for Issuance 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 the issuance of a Use Permit:

1) A structurally sound septic tank, in good working order, and provided with safe and secure lids;

2) All internal devices and appurtenances such as tees, effluent filters and baffles that were originally provided with the tank or added later must be intact and in working order;

3) Alarms, control devices, and components necessary for the operation of the system are present and in good working order;

4) Tanks must be inspected to assure that they are structurally sound and that all components such as lids, baffles, tees, vents, etc. are present and in good condition. The scum and sludge level in the tanks must be measured and tanks must be pumped if the scum and sludge depth exceeds 25% of the operating

volume of the tank. The liquid level in the tank must not be lower than the outlet invert;

5) A soil treatment area, or other means of subsurface wastewater treatment, must be present and not in a state of failure;

6) Cesspools must be properly abandoned and a conforming OWTS must be installed. Where site conditions preclude the installation of a conforming OWTS, the criteria for repairs established within section 3.9 must be followed.

7) There are no unapproved wastewater discharges from the system or structures; and

8) Any items meeting the conditions of a "Failure," as defined in this Regulation have been corrected to the acceptance of the Department.

4.7 Issuance of a Use Permit

A. The Use Permit must set forth the terms and conditions of approval, as follows:

1) Statement of the size, type and capacity of the system and a record drawing, either from the Department's records (verified by the inspector) or from the inspection reports;

2) A copy of the inspection report that was provided to the Department.

3) Evidence of past system failures as shown in the Department's records;

4) Circumstances or factors that may have affected the ability of the inspector to evaluate the system;

5) Whether the system meets the permitting requirements of the Department; and

6) Other information the Department may deem appropriate

B. The Use Permit will remain valid until the date of real estate closing or for a maximum period of twelve months, whichever comes first.

C. Waiver of a Use Permit

1) If it is determined by the Department that an OWTS does not meet the requirements for issuance of a Use Permit, a conditional Use Permit may be issued, provided that the purchaser of the property agrees to obtain a permit and complete all necessary repairs to the system (or connect to a sanitation district, if appropriate) within 30 days of occupancy of the structure. If a permitted repair is required, the repairs must be completed by the expiration date of the permit.

D. Revocation of a Use Permit

1) A Use Permit may 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.

E. Penalties

1) Failure to obtain a Use Permit for a covered transaction as provided by this Regulation will subject the owner who failed to obtain the Use Permit to the penalties as more fully set forth in C.R.S. §25-10-113.

4.8 Malfunctioning Systems

A. Systems found to be malfunctioning during inspection by the Use Permit Inspector must be repaired in accordance with the terms of these Regulations.

4.9 Use Permit Inspectors

A. A Use Permit Inspector must be a person currently licensed or certified by a nationally recognized inspector training and certification program such as the National Association of Wastewater Technicians (NAWT), National Sanitation Foundation (NSF), or approved equivalent certification.

SECTION 5 USE PERMITS – HIGHER LEVEL TREATMENT

5.1 Applicability

A. A Use Permit under this Section means a Use Permit for a higher level treatment system.

B. A Use Permit is required for any system with a reduced soil treatment area or reduced vertical or horizontal separation distance as a result of higher level treatment, as defined by these Regulations.

C. A Use Permit is required for any Non-pressurized Drip Dispersal System (NDDS) installed on or after January 1st, 2026, as defined by these Regulations.

D. A Use Permit may be required by the Department for systems that the Department determines to be in high-risk conditions. This determination does not prevent the Department from rescinding the determination at a later date.

E. A Use Permit must be maintained and renewed until the system is either abandoned or the Department authorizes the decommissioning or removal of the higher level treatment unit.

F. The Department must not authorize the removal of a higher level treatment unit unless the OWTS would conform to the requirements for TL1 systems, including minimum distance setbacks set forth in Table 6 in Appendix A, and vertical separation from the STA infiltrative surface to any limiting layer as set forth in Table 7 in Appendix A.

G. The Board of Health may adopt fees for the administration of Use Permits – Higher Level Treatment.

5.2 Minimum Application Requirements

A. Application for a Use Permit must include:

1) Owner name and contact information;

2) Address and legal description of property;

3) Location of OWTS specifying location of septic tank, higher level treatment system, soil treatment area and other components;

4) Description of OWTS installed;

5) Level of treatment to be provided;

6) Type of higher level treatment system;

7) Name of service provider;

8) Copy of operation and maintenance service contract of at least one year duration; and

9) A non-refundable Use Permit fee or Renewal of a Use Permit fee in the amount established by resolution of the Board of Health, as amended from time to time. The fee will be payable to the Department at the time the application is made.

5.3 Use Permit Requirements

A. A Use Permit must specify the following for each higher level treatment component that requires routine maintenance, including:

1) Type, make and model of the component(s) requiring maintenance;

2) Name and qualifications of the service provider;

3) Length of service contract;

4) Required service intervals per Section 5.5;

5) Reporting requirements; to include, as a minimum:

   a) Dates system was inspected and/or maintained

   b) Name and contact information of inspector and/or maintenance provider

   c) Condition of system at inspection

   d) Maintenance tasks performed

6) Sampling requirements, if applicable.

5.4 Inspection and Maintenance Requirements

A. For proprietary systems, inspection and maintenance of the system must be performed by a service provider in accordance with the manufacturer's recommendations or Section 5.4.B, whichever is more stringent. For older proprietary systems where manufacturer recommendations are unavailable, inspection and maintenance must be performed in accordance with Section 5.4.B.

B. For public domain systems, inspection and maintenance are determined by the professional engineer or the following requirements, whichever is more stringent. Not all requirements will apply to all types of higher level treatment systems.

   1) Tanks must be inspected to assure that they are structurally sound and that all components such as lids, baffles, tees, vents, etc. are present and in good condition.

   2) The scum and sludge level in the tanks must be measured and tanks must be pumped if the scum or sludge depth exceeds 25% of the operating volume of the treatment tank or is less than four (4) inches from the bottom of the treatment unit. The liquid level in the tank must not be lower than the outlet invert.

   3) Effluent filters must be inspected and cleaned at an appropriate interval to assure proper function.

   4) Each motor, pump and all associated appurtenances must be inspected to assure that they are operating properly.

   5) Internal electrical connections must be inspected to assure that they are not damaged or otherwise subject to corrosion or damage that could cause a failure or electrical short circuit.

   6) The control panel and its appurtenances must be inspected to assure that all components such as timers, event recorders or counters, audible and visual alarms, auto-dialers, etc. are functioning properly. Batteries must be checked and replaced as needed.

7) Components intended to agitate or introduce air into the wastewater such as impellers, air jets, bubblers, air diffusers, aspirators, paddles, etc. must be inspected to assure that they are functioning properly and are free from lint, hair and other debris. Blowers or compressors must be inspected to assure they are operating properly and that vents are clear and air filters are cleaned or replaced. If so equipped, the ammeter or voltage regulator must be checked to verify that the motor is not drawing excess current.

8) All components such as media filters, sand filters, suspended growth media, etc. must be inspected to verify that there is no damage, excess sludge buildup, clogging, filter bridging, etc. and that spray or dispersal nozzles are free from debris and functioning properly.

9) The STA must be inspected to verify that no wastewater is being discharged onto the surface of the ground and that it is not being impacted by erosion, runoff, excess or improper vegetation, or compaction.

10) The service provider must also note any unusual or abnormal conditions such as excessive or strong odors, noise, improper wastewater color and odor, etc. that may indicate an operational problem with the system.

11) Upon completion of the service inspection the service provider must close and secure all inspection and access ports and reset the control panel and restore the system for normal operation.

5.5 Frequency of Inspection and Maintenance

A. Frequency of inspection and maintenance must be on a schedule the most frequent of the following:

1) Manufacturer recommendations for proprietary systems or design criteria requirements for public domain technology;

2) Department requirements; or

3) For higher level treatment systems and disinfection systems, two inspections at six-month intervals for the first year of operation; followed by annual inspections for the life of the system.

5.6 Renewal of a Use Permit

A. Upon expiration of a Use Permit, the owner must submit an application to renew the permit.

5.7 Revocation of a Use Permit

A. The Department may revoke a Use Permit for non-compliance with the permit conditions or the requirements of these Regulations.

5.8 Penalties

A. The Department may assess penalties for non-renewal of a Use Permit or non-compliance with the terms of the permit as provided for in Sections 17 and 18 of these Regulations.

5.9 Maintenance Provider Requirements

A. A maintenance provider must, at a minimum:

1) Perform inspection, maintenance and sampling as set forth in the Use Permit;

2) Provide a copy of their inspection report and sampling results to the owner;

3) Report the findings of their inspection and sample test results, if required, in a manner acceptable to the Department;

4) Report any additional alarm conditions or service calls to the Department;

5) Notify the Department within seven (7) days if an O&M contract is terminated prior to the original termination date as set forth on the Use Permit;

6) Obtain certification as a NAWT Operation and Maintenance 1 and 2 service provider or approved equivalent within two (2) years from the effective date of this Regulation and complete all necessary requirements to maintain certification(s); and

7) 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.

5.10 Owner Responsibilities

A. An owner must, at a minimum:

1) Ensure OWTS is operating, maintained and performing according to the required standards for the designated treatment level;

2) Maintain an active service contract with a maintenance provider at all times; and

3) Each time their current contract with a maintenance provider is renewed or replaced, send a copy to the Department within 30 days of signing.

SECTION 6 OPERATION AND MAINTENANCE

6.1 Responsibility

A. The owner must be responsible for maintenance of an OWTS unless the responsibility has been contractually assigned to a tenant or a third party or a public, quasi-public, or political subdivision.

6.2 Rules and Regulations - Board of Health Authority to Adopt

A. The Board of Health may adopt rules and regulations for:

1) The scheduling of maintenance and cleaning of systems;

2) Practices adequate to ensure performance of an OWTS; and/or

3) Submission of proof of maintenance and cleaning to the Department by the owner of the system.

6.3 Permitting and Oversight of Maintenance for Soil Treatment Area Reductions and Vertical and Horizontal Separation Distance Reductions Based on Use of Higher Level Treatment

A. Purpose

1) Reductions in requirements for soil treatment areas, vertical separation distances to limiting layers or reductions in horizontal separation distances by using higher level treatment systems are based on the criteria that these systems are functioning as designed. If these criteria are not met, failure or malfunction is likely, which could result in impairment to public health and water quality.

B. The Board of Health may permit reductions in the size of soil treatment areas and horizontal and vertical separation distances based on higher level treatment of effluent, subject to the requirements for a Use Permit – Higher Level Treatment in Section 5 of this Regulation. The Department may designate a separate entity to conduct and maintain the oversight of this program. However, enforcement of the requirements of this Regulation will remain with the local board of health. System monitoring may be required.

6.4 Service Label

A. For higher level treatment systems or other components under a service contract, a clearly visible, permanently attached label or plate giving instructions for obtaining service must be placed at a conspicuous location.

6.5 Maintenance and Cleaning

A. In order to ensure good working order, all septic tanks must be inspected once every four years and pumped when the accumulation of sludge and scum is greater than 25% of the operating volume of the treatment tank; as established in section 5.4.B.2. Dosing tanks must be inspected and pumped if sludge accumulation is observed.

6.6 Monitoring and Sampling

A. Sampling may be required by the Department in conjunction with an enforcement action or to ensure compliance with the provisions of this regulation, as provided in Section 6.6.A.1 below.

1) Sampling and analysis must be performed according to American Public Health Association, American Water Works Association, and Water Environment Federation: Standard Methods for the Examination of Water and Wastewater, 24th edition, 2022 (International Standard Book Number: ISBN-10: 0875532993, ISBN-13: 978-0875532992).

B. Any owner or occupant of property on which an OWTS is located may request the Department to collect and test an effluent sample from the system. The Department may perform such collection and testing services. The owner or occupant must pay for the cost of these services.

1) 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.

C. Conditions that provide for the Department to require routine water quality monitoring include:

1) Indications of inadequate performance;

2) Location in sensitive areas;

3) Systems designed to meet TL3ND standards;

4) Treatment systems other than those discharging through a soil treatment area or sand filter system;

5) Remediation systems; and/or

6) Systems under use permits (See sections 4 and 5) or product development permits.

6.7 Disposal of Waste Materials

A. All material pumped from an OWTS during a cleaning procedure must be disposed at a site approved by local county officials or the Department in a manner which does not create a hazard to public health, a nuisance, or an undue risk of pollution, and which complies with all applicable state and local rules and regulations.

6.8 Termination of Use or Abandonment of an OWTS

A. The Department must be notified, in writing, when a tank, vault, seepage pit, or cesspool is abandoned, and a pump receipt provided.

B. The contents of a septic tank, vault, seepage pit, or cesspool, the use of which has been terminated, must be removed and properly disposed of.

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

D. If the tank will remain in place:

1) The tank must be pumped to remove as much waste as possible;

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

3) The top must be collapsed, and the sides may be broken into the void;

4) The remaining void must be filled with gravel, sand or compacted soil; and

5) The filled excavation must be graded to surroundings, allowing for settling.

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

SECTION 7 REGULATION OF SYSTEMS CONTRACTORS AND SYSTEM CLEANERS

7.1 Systems Contractor License

A. No person shall install, alter, or repair an OWTS unless they hold a valid Systems Contractor License issued by the Department.

B. A system contractor license is issued to the individual who provides documentation of completion of the National Association of Wastewater Technicians (NAWT) Installers

Course or approved equivalent. Successful completion of the CDPHE Part A Systems Contractor Examination may be substituted until the next NAWT Installer Course is available. The license follows the individual if they change employment. Each systems contractor must have a minimum of one (1) owner or employee with a valid systems contractor license at all times.

C. Application for Systems Contractor's Licenses or renewals must be made on forms supplied by the Department.

D. Prior to the issuance or renewal of a license, the Department may require the applicant to demonstrate adequate knowledge of these Regulations. This may include, but is not limited to, passing an exam prepared by the Department or attending educational conferences conducted by the Department.

E. Licenses expire on December 31st of each year. A license which lapses because of failure to renew is subject to the fee established for a new license upon reapplication.

7.2 Systems Cleaner License

A. No person shall engage in the cleaning of OWTS Systems or the transportation of sewage to a disposal site unless they hold a valid Systems Cleaner License issued by the Department.

B. Application for a Systems Cleaner's License or renewals must be made upon forms supplied by the Department. In addition to the application form, the Systems Cleaner must submit to the Department the following information:

1) Copies of contracts with facilities approved by local county officials or the Department for accepting septage;

2) A record of the total volume of septage disposed at each facility in the past year; and

3) Documentation of completion of the NAWT Vacuum Truck Course or NAWT Operation and Maintenance 1 Course or approved equivalent.

C. Prior to the issuance or renewal of a license, the Department may require the applicant to demonstrate adequate knowledge of these Regulations. This may include, but is not limited to, passing an exam prepared by the Department or attending educational conferences conducted by the Department.

D. Licenses expire on December 31st of each year. A license which lapses because of failure to renew must be subject to the fee established for a new license upon reapplication.

7.3 License Fees

A. A non-refundable fee in the amount established by resolution of the Board of Health, as amended from time to time, must be required of applicants for systems contractor and systems cleaner licenses. The fee must be payable to the Department at the time the license application is made.

7.4 Revocation of a Systems Contractor or Systems Cleaner License

A. A systems contractor or cleaner's license may be revoked for failure to comply with these Regulations. Revocation may take place only after a hearing before the Board of Health. The license holder must be given not less than ten (10) days' notice of the hearing and may be represented at the hearing by counsel.

B. Written notice of revocation, specifying the violations, must be served upon the holder of the license. Service of notice as required in this Section must be provided by the Colorado Rules of Civil Procedure, or by registered or certified mail, return receipt requested, deliverable to addressee only.

C. Failure of a systems cleaner to keep records, submit records or quarterly reports upon request, show evidence of proper disposal or violation of any of the other terms or conditions of these Regulations or the Act, may be cause for the Department to initiate revocation of license proceedings.

D. A person who has previously had a license revoked may be denied renewal by the Board of Health.

7.5 Standards of Performance Required of Holders of Systems Contractor License

A. The systems contractor is responsible for proper installation of the OWTS. Installation, alteration, or repair of any OWTS must be in compliance with these Regulations and with the conditions set out in the application and installation permit.

B. Notice of a requested inspection must be given by the license holder not less than 48 hours before the inspection is to be made.

C. A license holder must have made certain that an installation permit has been obtained prior to starting construction and the installer must install the system in compliance with all plans and specifications as submitted by the applicant and approved by the Department.

D. System contractors must have a copy of the permit, plans, and specifications on the property at all times that construction of the system is occurring and at the time of final inspection if requested by the Department.

E. The Systems Contractor must provide the Department or system designer, prior to or at the time of the Department's or system designer's final inspection of the system installation, a scale record drawing accurately locating all parts of the system in

relationship to the dwelling and/or property lines and give at least two (2) measured points from a fixed location to the first compartment of the septic tank and two (2) corners of the longest dimension of the soil treatment area with the measurements indicated on the drawing. (See Diagram 1 in Appendix B). The record drawing must be drawn to scale on forms provided by the Department. Final approval of the system installation may be withheld for failure to submit the record drawing.

F. The Systems Contractor is required by the Department, upon completion of the system installation, to appropriately mark and flag the system to identify its location in order to prevent vehicles or persons building the structure from driving over any part of the system. The contractor should also notify the general contractor of the above information.

G. The licensed Systems Contractor is responsible for maintaining certification as a Certified Installer through the NAWT or certification from an approved equivalent.

7.6 Standard of Performance Required of Holders of Systems Cleaner License

A. A license holder, when cleaning tanks or aeration plants, must remove the liquid, sludge and scum from both compartments of divided tanks and both tanks that are in series, leaving only enough sludge to act as a seed for continuing operation. Three (3) inches of remaining residue is recommended. Tanks must not be washed or disinfected after pumping. The outlet tees or baffles of tanks must be checked for proper installation and/or damage provided they can be observed as part of the routine pumping process. Missing or damaged tees or baffles on the outlet side of tanks must be reported to the owner and the Department for immediate repair.

B. A license holder must maintain their equipment to ensure that no spillage of sewage will occur during transportation, and that their employees are not subjected to undue health hazards.

C. A license holder must dispose of the collected sewage only at sites approved by local county officials, or the Department in a manner which does not create a hazard to the public health, a nuisance or an undue risk of pollution and which complies with state and local rules and applicable Regulations.

D. For each tank pumped, a license holder is required to keep a record of location serviced, volume of septage pumped, disposal facility, and condition of tank tees or baffles. These records must be kept on forms approved by the Department. When requested by the Department, the license holder must submit records for review by the Department. No later than December 31 of each year, the Systems Cleaner must submit to the Department copies of contracts with facilities approved by local county officials or the Department for accepting septage.

E. The licensed Systems Cleaner is responsible for maintaining certification as a Certified NAWT Vacuum Truck Operator or Certified NAWT Operation and Maintenance 1 Provider or certification from an approved equivalent.

SECTION 8 SITE AND SOIL EVALUATION

8.1 Requirements for a Site and Soil Evaluation

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

B. Each site evaluation must consist of:

1) Preliminary investigation;

2) Reconnaissance visit;

3) Detailed soil investigation; and

4) Report and site plan.

8.2 Preliminary Site Investigation

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

1) Property Information:

2) Address;

3) Legal description;

4) Existing structures;

5) Location of existing or proposed wells on the subject and adjacent properties;

6) Department records;

7) Location of physical features, on and off the property that will require setbacks as identified in Tables 6 and 7 in Appendix A;

8) Preliminary soil treatment area size estimate based on information on existing or planned facility and this Regulation;

9) Additional published information that may be useful to the site specific evaluation; as available:

   a) Soil Information

   b) Topography

   c) Survey;

   d) Easements;

   e) Floodplain maps;

   f) Delineated wetland maps;

   g) Geology and basin maps and descriptions;

   h) Aerial photographs;

   i) Climate information; and

   j) Delineated wetlands maps.

10) Additional information as required by Department, if requested.

8.3 Reconnaissance Visit

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:

   1) Landscape position;

   2) Topography;

   3) Vegetation;

   4) Natural and cultural features; and

   5) Current and historic land use.

B. The reconnaissance evaluation may be conducted concurrently with the detailed soil investigation.

8.4 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:

1) Visual and tactile evaluation of two (2) 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;

2) 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;

3) 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 10, the designer must use the more restrictive LTAR in determining the size of the soil treatment area; and

4) The engineer or technician conducting the soil profile test pit excavations or percolation tests must, upon completion of the percolation test or pit evaluation, clearly flag or otherwise mark each excavation or hole to allow easy location by others. Excavations left open and unattended must be suitably barricaded to prevent unauthorized access and to address safety concerns.

8.5 Visual and Tactile Soil Evaluation

A. Procedure for performing visual and tactile evaluations of soil to determine a long term acceptance rate:

1) Evaluation of two (2) or more soil profile test pit excavations must be performed to determine soil types, limiting layers, restrictive layers, groundwater conditions, and the best depth for the infiltrative surface. The total number of soil profile test pit excavations beyond the required two must be based on the judgment of the competent technician

2) At least one (1) of the soil profile test pit excavations must be performed in the portion of the soil treatment area anticipated to have the most limiting or restrictive conditions.

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

4) Layers and interfaces that interfere with the treatment and dispersal of effluent must be noted. Thus, any restrictive soil characteristic such as consistence, as defined by cementation class also needs to be evaluated.

5) When cemented soils are encountered, the evaluation must identify the cementation class from rupture resistance as provided in Table 18, “Rupture Resistance”.

   a) Per the “Rupture Resistance” Table noted in item 8.5.A.5 above, when the “Cementation Class” is identified within the soil profile as “strongly cemented”, “very strongly cemented”, or “indurated” that layer will be classified as a “restrictive layer”.

   b) Cemented soils will typically have characteristics of Type 3A or 4A soils (Table 10). Long term acceptance rates should coincide with the appropriate soil type classification or be adjusted to address the level of cementation.

6) 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.

7) 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.

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

9) 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.

10) 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 10 or Table 11. The treatment depth is two (2) to four (4) feet depending on the required thickness for the treatment level below the infiltrative surface from Items 4A and 4B, Table 7.

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

B. In order to address public safety concerns, the regulatory intent is to backfill all soil profile test pits promptly after the soil evaluation is complete.

C. The Department may require a joint evaluation of the soils along with the engineer and/or competent technician in circumstances the Department may deem appropriate.

8.6 Soil Descriptions for Determination of a Limiting Layer

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

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

2) Depth to the bedrock;

3) Depth to the periodically saturated soil as determined by:

a) Redoximorphic features and other indicators of water levels, or

b) Depth of standing water in the soil observation excavation, measured from the ground surface, if observed, unless redoximorphic features indicate a higher level.

8.7 Dawson Arkose

A. See Section 8.5.A.5 for considerations regarding Dawson Arkose.

8.8 Percolation Test Procedure

A. When a percolation test is determined to be necessary to obtain additional information regarding soil permeability, the following procedures for performing percolation tests must be followed:

1) The percolation testing must be performed by a professional engineer or by a trained person under the supervision of a professional engineer or by a competent technician.

2) Number of test holes and location

a) Soil percolation tests must be performed in at least three (3) test holes in the area in which the soil treatment area is to be located, spaced evenly over the proposed area.

b) 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.

3) Dimensions

a) The percolation test hole must have a diameter of eight (8) to 12 inches and be terminated a minimum of six (6) inches and a maximum of 18 inches below the proposed infiltrative surface.

4) Change in Soil

a) If a change of soil type, color or structure is present within those soils comprising the depth of soil below the infiltrative surface as required in Table 7 in Appendix A 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.

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

6) Preparation of Percolation Test Holes

a) Excavate the hole to the depth and diameter required.

b) 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.

c) Remove all loose soil from the hole.

d) Add two (2) inches of very coarse sand or fine gravel to protect the bottom of the hole from scouring and sediment.

7) Presoak

a) 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.

b) 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 (4) 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 Type 1 soils (sand and loamy sand, Table 10), 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.

8) Percolation Rate Measurement

a) With the exception of Type 1 Soils (sand and loamy sand) in Table 10 in Appendix A, percolation rate measurements must be made on the day following the presoak procedure.

b) If water remains in the percolation test hole after the swelling period, adjust the depth to approximately six (6) 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.

c) 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 (6) 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 (4) hours, refilling to six (6) inches over the top of the gravel as necessary. The drop in water level that occurs during the final 30- minute period is used to calculate the percolation rate. If the water level drops during prior periods provide sufficient information, the procedure may be modified to suit local circumstances. The requirement to conduct a four (4) hour test under this Section is waived if three (3) successive water-level drops do not vary by more than one-sixteenth (1/16) inch; however, in no case may a test under this Section be less than two (2) hours in duration.

9) Sandy Soils

a) In Type 1 soils or other soils in which the first six (6) 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 (10) minutes and the test conducted for one (1) hour. The drop that occurs during the final ten (10) minutes must be used to calculate the percolation rate.

b) 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 (1) minute per inch.

10) Dawson Arkose

a) In Dawson Arkose, the test must be a minimum of four (4) hours, or until the last three (3) successive drops vary by less than one (1) minute per inch, whichever is greater.

11) Percolation Rate Determination and Reporting

a) 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 10 in Appendix A.

b) The technician performing the percolation tests must 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 8.9.G. The information in Sections 8.9.G.1 through 8.9.G.5 may be included but are 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.

B. 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.

8.9 Soils Report and Site Plan

A. A written report must describe the results of the preliminary investigation, reconnaissance visit, and detailed evaluations. The report may be in text and/or tabular form and must include a scale drawing locating features relative to the proposed OWTS location and test locations. The report may be included as part of the OWTS design document. The report must include, but is not limited to:

1) The company name, address, telephone number, e-mail address, and name of individual, credentials and qualifications of the individual conducting the site evaluation;

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

3) Dates of preliminary and detailed evaluations;

4) 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;

5) Setback distances to features listed in Table 6 in Appendix A;

6) Setback distances to features listed in Table 7 in Appendix A, existing on the site or within applicable setback limits, whichever is greater;

7) A drawing created to a scale that provides the complete property boundary lines. The minimum drawing size is eight and one-half (8.5) inches by 11 inches. If the property is too large to adequately show site evaluation information, a detailed 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:

a) 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, detention ponds, retention ponds, and property lines;

b) Contours or slope direction and percent slope;

c) The location of any visible or known unsuitable, disturbed or compacted soils;

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

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

8) Anticipated construction-related issues, if applicable;

9) 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

10) 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.

8.10 Design Document

A. 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.

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

C. The design document must contain all planned details necessary for permitting, installation and maintenance, including:

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

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

3) A scale drawing showing location of each OWTS component and distances to water supplies, surface water, easements, physical and health impact features on

both the subject and adjacent properties requiring setbacks. Diagram 1 in Appendix B is an example of a scale record drawing of an OWTS;

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

5) Contours or slope direction and percentage slope for the area of the OWTS

6) Elevation or depth of infiltrative surface of the soil treatment area, the septic tank invert, and all other components of the OWTS. For sites with minimal elevation change, providing the depth of the components from grade is acceptable. However, where the site has noticeable elevation changes, it is the expectation that the proposed elevations of all components, relative to a site benchmark, be provided;

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

8) References to design manuals or other technical materials used;

9) Installation procedures, as applicable;

10) Operation and maintenance manuals or instructions; and

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

8.11 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 method.

8.12 Qualifications for a Competent Technician

A. Design

1) Competencies needed:

a) Knowledge and ability to prepare required design documents

b) Understand principles of OWTS siting and design

c) Understand function and capacities of system components

d) Understand sizing and design criteria of system components

e) Identify and select appropriate components for site surface and subsurface conditions

f) Understand construction and installation methods and operation and maintenance requirements of OWTS

2) Demonstrations of competence in design

a) Obtaining an approved designer certification through a certifying organization.

i) If the certification course includes an exam to verify acceptable completion of the course, a passing grade on the exam must be attained.

b) The Division or Department may approve training for OWTS design.

B. Percolation Tests

1) Competencies needed:

a) Set up equipment

b) Perform and run percolation tests according to the procedure in this Regulation

c) Record results and calculate percolation rates

2) Possible demonstrations of competence in percolation tests:

a) Attend an approved training or workshop for soil evaluation for OWTS including both class and field work. If the training or workshop includes an exam to verify acceptable completion of the course, a passing grade on the exam must be attained.

C. Visual and Tactile Evaluation of Soil

1) Competencies needed:

a) Identify soil types by hand texturing and observation

b) Identify presence or absence of soil structure

c) Identify type and grade of soil structure

d) Identify soil consistence/cementation;

e) Recognize evidence of highest seasonal water surface

f) Identify limiting layers, restrictive layers, and groundwater conditions;

g) Determine the appropriate depth for infiltrative surface of OWTS, soil profile test pits, and for percolation tests, if used; and

h) Understand basic principles of OWTS siting and design

i) Possible demonstrations of competence in visual and tactile evaluation of soil:

j) Attend an approved training or workshop for soil evaluation for OWTS including both class and field work. If the training or workshop includes an exam to verify acceptable completion of the course, a passing grade on the exam must be attained.

k) The Division or Department must approve training for visual and tactile evaluation of soil.

SECTION 9 WASTEWATER FLOW AND STRENGTH

9.1 Wastewater Flows

A. The Department may require the installation of a meter to measure flow into the facility or the OWTS.

B. Single-Family Residential Homes:

1) Design flow per person is 75 gallons per day (gpd).

2) The minimum design flow for a new home must be for a two (2) bedroom house unless otherwise noted in this Regulation. The minimum design flow for the repair or replacement of an OWTS of an existing one-bedroom home must, at a minimum, be for one (1) bedroom unless bedrooms are added.

3) For homes up to and including four (4) bedrooms, the assumed number of persons per bedroom is two (2) for design purposes.

4) For homes with more than four (4) bedrooms, the assumed number of persons is eight (8) persons (first four (4) bedrooms x two (2) persons per bedroom) plus one (1) additional person for each bedroom more than four (4) bedrooms.

5) Table 2 in Appendix A summarizes the design flows for single-family residential homes.

9.2 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 of each fixture proposed.

D. If the auxiliary building has a separate OWTS, the system must be sized on the basis of Table 2 in Appendix A and a septic tank detention time of 48 hours.

E. A person must not connect more than one (1) 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.

9.3 Multi-Family and Commercial On-Site Wastewater Treatment System

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

1) Table 3 in Appendix A; or

2) An analysis of peak flows and strengths from at least three (3) comparable facilities or from the facility, if it is an existing facility, must be submitted to the Department for approval. The analysis must include:

a) 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.

b) Total Suspended Solids and BOD5 or CBOD5 tests at times of full use. At least three (3) samples taken at least one (1) week apart are required. Sampling that provides equivalent and representative data through “composite sampling” may be allowed.

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

d) When a specific use is proposed which is not addressed within Table 3, and where flow data from similar facilities is not available, the design document must provide reference to an alternate regulatory or industry standard for OWTS from where the proposed flow and water quality data was obtained. Estimates must include peak flows relative to full occupancy.

9.4 Flow Equalization

A. Flow equalization may be used if a facility has flows that vary from day to day by more than four (4) times the average flow.

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

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

D. Flow equalization may be used only if:

1) The facility is non-residential

2) The facility is only used for one (1) purpose

3) Flows will follow a predictable pattern

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

5) Timed dosed pressure distribution or timed dosed NDDS must be used. The soil treatment area reduction for pressure distribution (Table 12) must not be used in addition to the flow equalization reduction.

6) Contingency plans must be specific for expanding the capacity of the OWTS in the event of changed use at the facility.

9.5 Wastewater Strength

A. Table 4 in Appendix A includes levels of treatment that can be achieved by various OWTS components, excluding the soil treatment area. Systems qualifying for these treatment levels, except TL1 produced by a septic tank alone, must be approved under Section 16.4 of this Regulation.

B. High strength waste must be reduced to at least TL1 quality or better before applying to a soil treatment area. Waste strength levels defined in Table 4 and Table 5 must be used to determine compliance.

SECTION 10 MINIMUM HORIZONTAL Distances

10.1 Required Minimum Horizontal Distances - Applicability

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 6 in

Appendix A. The setback requirements are applicable for minimum system performance and treatment levels with specific modifications allowed for higher treatment levels as provided in Table 7 in Appendix A. All distance setback modifications must be analyzed and approved by the Board of Health or The Department and be in complete compliance with the variance or administrative procedures identified within this Regulation and those of the Board of Health. Acceptable methods of analyzing horizontal separation distances with higher treatment levels include but are not limited to:

1) Analyzing the intended uses of impacted surface and/or ground waters

2) Contacting adjacent property owners for potential conflicts with property line encroachments

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

10.2 Reduction in Minimum Distances - Higher Level Treatment

A. 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 5.

10.3 Dry Gulches, Cut Banks and Fill Areas

A. Separation distances to dry gulches, cut banks and fill areas in Table 6 in Appendix A must apply unless the designer or professional 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 in close proximity. If there is potential for erosion or instability, the separation distance must be increased until the risk is minimized.

10.4 Site Evaluation, Design, and Treatment Level Considerations for Use of Table 7

A. Components of an OWTS listed in Table 6 in Appendix A must be installed or located in accordance with the minimum distance requirements provided in the table or such

increased distances provided by the Board of Health Regulations, unless otherwise noted below:

1) If a property can accommodate the installation of an OWTS no closer than the required minimum 10-foot property line setback, it must do so. If the proposal complies with the requirements of this section and is deemed acceptable by the Department, the Department may administratively allow a reduction to the setback.

2) The property line setback must not be reduced to any less than 3 ft., unless a variance by the Board of Health is provided.

3) The property line setback encroachment must be proposed at the time of permit application and must include the following information:

    a) A statement from the applicant and/or designing engineer providing the reason for the reduced property line setback request.

    b) The applicant must demonstrate that the allowance of encroachment of the property line setback will not inhibit the development of surrounding properties (i.e. by allowing the encroachment of the property line setback, a neighboring property would not be able to meet the minimum setback requirement between the subject OWTS and a proposed adjacent well).

    c) The applicant must demonstrate that all activities associated with the installation of the proposed OWTS will not encroach on a neighboring property, and/or provide written permission from the adjacent owner or property manager of said property allowing the encroachment of machinery or excavated materials in order to install the proposed OWTS.

    d) The proposed OWTS must comply with all other required setbacks noted in Table 6. The Department approval of the encroachment must only be for the referenced property line setback.

    e) The applicant must submit a survey of the property line(s) that the proposed setback encroachment will impact. The survey must include:

        i) A survey completed by a Colorado registered professional land surveyor in accordance with section 12-120-301 *et seq*., C.R.S.

        ii) A legal description and drawing of the subject property. Said drawing must also include the location of the proposed OWTS, onsite and adjacent wells.

        iii) The surveyor must clearly mark the surveyed property line(s) in a manner that is clearly defined and will not degrade over time due to exposure to

the elements. The markings must remain in place until after system construction and final approval by the Department.

4) Prohibitions

a) Approval of an encroachment of the property line setback must not be provided after installation of the OWTS. Any post-construction reduction will require a variance by the Board of Health.

b) A reduction in the setback to a property line may only be granted where a minimum separation of six feet between soil treatment areas on all adjacent properties is provided.

c) The size of the soil treatment area must comply with Section 13.3 of this regulation.

d) Property line setback reductions are prohibited where multiple systems on the subject property are proposed and the combined capacity of the systems exceeds 2,000 GPD.

B. Table 7 in Appendix A provides the required site evaluation, design, and treatment level considerations necessary to evaluate the site and to design and locate the soil treatment area component of an OWTS.

1) Items 1, 2, and 3 in Table 7 in Appendix A address the allowable horizontal setback distance between the soil treatment area and the following physical features:

a) Setback distance from soil treatment area to on-site well

b) Setback distance from soil treatment area to water features

c) Setback distance from soil treatment area to a dry gulch or cut bank

C. Item 4 in Table 7 in Appendix A 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 7 in Appendix A to be applied to the soil treatment area that is necessary in order to accommodate the site conditions.

SECTION 11 DESIGN CRITERIA - GENERAL

11.1 Overview

A. The OWTS for single-family homes must be designed to accommodate the proposed flows from the structure as defined in Section 9.1. Flow estimates for multi-family or commercial OWTS must comply with Section 9.3. Expected waste strength as noted in Table 3, Table 4, and Table 5 must also be addressed where applicable. 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.

B. Diagram 5 in Appendix B shows a typical OWTS comprised of a single septic tank with gravity flow from the septic tank to a rock and pipe bed.

11.2 Performance

A. OWTS must be designed and constructed to achieve the treatment level specified by the design.

11.3 Reliability

A. 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.

B. Spray-type foams that harden are not acceptable as a sealant for OWTS components.

11.4 Accessibility for Inspection, Maintenance and Servicing

A. Where the top of the septic tank is below finished grade, septic tanks must have watertight risers over each access manhole and all risers must extend to or above final grade, unless otherwise specified in this regulation. All risers must be a minimum of 20 inches inside diameter, unless otherwise specified in this regulation. All risers, except concrete risers, must be connected to the top of the tank with a tank adapter ring. The tank adapter ring must be cast into the tank, bonded to the top of the tank, or bolted into the top of the tank.

B. Concrete septic tanks and other concrete tanks containing treatment units must be installed no deeper than four (4) feet from the top of finished grade to the top of the tank. Fiberglass, Fiberglass-Reinforced Polyester, and Plastic Tanks must be no deeper than allowed by the manufacturer, or four (4) feet, whichever is less. This requirement may be waived for repairs or expansions.

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

1) 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.

2) Access risers for all new septic tanks, seepage pits, or vaults, must include a structurally sound interior grate, or other similar secondary safety feature, securely installed below the tank lid to prevent persons, pets, or wildlife from falling into the tank.

3) Components that require access for maintenance must be accessible from the ground surface. This includes but is not limited to maintenance of pumps, siphons, valves, distribution boxes, drop boxes, cleanouts, effluent filters, inlet and outlet baffles, aerators, treatment equipment and other devices.

4) 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.

11.5 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 the 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.

11.6 Electrical Equipment - If Used

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). A local electrical permit is required.

B. All electrical components must be protected from moisture and corrosive gases.

C. Electrical wires must be a minimum of 24 inches below grade or as required in the local electrical requirements. If shallower than 24 inches, wires must be placed in conduit and/or a Ground Fault Interrupter must be present.

11.7 Indicators of Failure or Malfunctioning for Systems Utilizing Mechanical Apparatus

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

11.8 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 Department or other issuer of a permit.

11.9 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 professional engineer must provide clear, concise written instructions covering the components which, when followed, must assure proper installation and safe and satisfactory operation and maintenance.

11.10 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. Construction equipment not necessary to install the OWTS must be kept off 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 has changed.

11.11 Floodplains and Floodways

A. 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 and the local emergency agency. Additional requirements are provided below:

1) OWTS installations in floodplain zones beginning with letters “A” or “V” are considered high-risk areas. Systems installed in these areas must be designed by a professional engineer.

2) Repairs of an existing system must meet the requirements of the Federal Emergency Management Agency and the local emergency agency as feasible.

3) The system as approved by the Department must 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 flooding.

4) An OWTS installation, repair, or expansion must not be installed in a designated 100-year floodplain where a conforming OWTS outside the floodplain can be installed.

5) A repair or expansion within a floodplain requires a professional engineer to certify that an OWTS cannot be installed outside of the floodplain.

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 system repair or expansion that may affect the floodway delineation, appropriate procedures must be followed including revision of the floodway designation, if necessary.

1) A repair or expansion within a floodway requires a professional engineer to certify that an OWTS cannot be installed outside of the floodway. OWTS installations in a floodway must be designed by a professional engineer.

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

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

1) Be designed by a professional engineer;

2) Receive only such biodegradable wastes for treatment and distribution as are compatible with those biological treatment processes that occur within the septic tank, any additional treatment unit and the soil treatment area. This does not include industrial, animal, or process waste; and

3) 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, this Department may require a permit for this type of use.

SECTION 12 DESIGN CRITERIA - COMPONENTS

12.1 Tanks and Vaults

A. Watertightness

1) 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 any point other than designed openings.

2) 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.

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

B. Tank Installation

1) All tanks are to be installed level and placed on a uniform surface or bedding which does not contain rocks, roots or other items that could create point loading on the tank.

2) If imported bedding is needed, common options include a 5" depth of compacted pea gravel or similar material.

C. Tank Anchoring

1) 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. Risers must be included in the buoyancy calculations.

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

3) If a manufacturer does not provide recommendations for provisions to compensate for buoyancy, or if the professional engineer chooses to provide their own designs, the anchoring system design must be prepared by the professional engineer.

D. Identification and Data Marking

1) 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:

a) Name of manufacturer;

b) Model or serial number, if available;

c) Effective volume and unit of measure;

d) Maximum depth of earth cover and external loads the tank is designed to resist; and

e) Inlet and outlet identifications, if relevant.

12.2 Septic Tanks

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

B. Sizing Requirements:

1) Sizing for residential capacity for new installations must be based upon the number of bedrooms according to Table 9 in Appendix A, except as otherwise specified in this regulation.

2) 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.

3) 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.

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

5) Where a grinder pump is installed prior to the septic tank, the required tank volume must be increased by at least 500 gallons above the required volumes provided in Table 9.

6) If a proprietary aerobic treatment component is installed, the minimum septic tank (or trash tank) volume may be reduced to the volume as determined by the manufacturer. This volume will typically be provided on the CDPHE product acceptance document, which can be found on the CDPHE OWTS webpage.

C. Inspection and Testing of Septic Tank Watertightness

1) Testing of septic tanks must be performed and evaluated as specified in Section 9 (Standard Specification for Precast Septic Tanks) of ASTM C1227-22 (2022 version or earlier) for concrete tanks or in Standard IAPMO/ANSI Z1000 (2019 version) (American Standards for Prefabricated Septic Tanks) for other prefabricated septic tanks.

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

3) The inspection in the field must be conducted by the Department and be performed after the tank installation but before backfilling.

4) 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.

D. Septic Tank Design and Dimension Criteria

1) A septic tank must have two (2) or more compartments or more than one (1) tank may be used in series, unless otherwise noted in this regulation. The first compartment of a two-compartment tank or the first tank in a series must hold no less than one-half (1/2) of the required effective volume.

2) Inlet invert must be at least two (2) inches higher than the outlet invert.

3) Each inlet tee or baffle must extend above the surface of the liquid at least five (5) inches and must extend a minimum of eight (8) 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.

a) Inlet tee must consist of a sweeping bend.

4) Each outlet tee or baffle must extend at least five (5) inches above and fourteen (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 filter must be located so that the effluent filter has sufficient clearance to be removed through the access opening with a riser in place.

5) The distance from the outlet invert to the underside of the tank top must be at least ten (10) inches.

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

7) 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 (35-40%) of the liquid depth measured from the liquid surface.

8) At least one (1) access opening no less than 20 inches across must be provided in each compartment of a septic tank.

9) Risers must be installed in conformance with Section 11.4 of this Regulation.

10) A septic tank must have a minimum of 25 square feet of liquid surface area and have at least a six (6) 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 (6) feet. The requirements for liquid surface area and separation between inlet and outlet may be waived for tanks with less than 750 gallons of effective volume.

11) Tanks proposed to be located below vehicular traffic areas must have the appropriate AASHTO H-20 or HS-20 ratings for such use.

E. Concrete Septic Tank Structural Design

1) Concrete septic tanks must comply with the structural design criteria of ASTM C1227-22 (2022 version) (Standard Specification for Precast Septic Tanks).

2) 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 water-tightness standard of this Regulation.

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

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

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

1) All fiberglass, fiberglass-reinforced polyester, and plastic tanks must meet the minimum design and structural criteria of the most current version of IAPMO/ANSI Z1000 (2019 version) (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.

2) 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.

3) 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 (5%) in shape as a result of loads imposed.

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

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

G. Septic Tank Depth

1) Concrete septic tanks and other concrete tanks containing treatment units, must be installed no deeper than four (4) feet, from the top of finished grade to the top of the tank. This requirement may be waived for repairs or expansions.

2) Fiberglass, Fiberglass-Reinforced Polyester, and Plastic Tanks must be installed no deeper than allowed by the manufacturer, or four (4) feet, whichever is less. This requirement may be waived for repairs or expansions.

H. Metal tanks are prohibited.

I. For use in newly installed or replacement OWTS, septic tanks must have received approval from CDPHE.

12.3 Pipe Standards and Bedding Requirements

A. Pipe Standards

1) All wastewater pipes used in portions of 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 wastewater.

2) Where non-perforated plastic pipe and fittings are used for gravity flow, the minimum wall thickness of the pipe must conform to ASTM Standard D 3034-21 (2021 version) or equivalent or greater strength. Schedule 40 pipe is preferred.

3) Perforated distribution pipe surrounded by rock within a soil treatment area must have a minimum wall thickness and perforations conforming to ASTM Standard D2729-21 (2021 version) or equivalent or greater strength. Corrugated polyethylene pipe with a smooth interior that meets ASTM F667/F667M (2021 version) or AASHTO M252-24 (2024 version) specifications or equivalent may be used.

4) Schedule 40 [ASTM Standard D3034-24 (2024 version)] or pipe of equivalent or greater strength must be used where pipe is installed in the following locations:

   a) Under driveways, roadways, or other areas where vehicular traffic is expected. Properly compacted select bedding material must be installed in such cases. Additional frost protection, such as installing 2” foam board or double-encasement of the pipe is recommended;

   b) Five feet prior to and beyond all tanks; and

   c) In instances where sewer line setback distances are granted a variance for any reason.

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

   e) Pressure pipe must be rated for the intended use to accommodate pump discharge pressure. Cellular (foam) core piping must not be used in pressurized systems.

B. Excavation

1) Excavations for pipelines, fittings, and appurtenances must be open trench to the depth, grade and in the direction necessary. The trench bottom must be graded to provide a smooth, firm and stable foundation at every point throughout the length of the pipe, fitting or appurtenance. Should large gravel, cobbles, rocks, clods, or other unsuitable material be encountered at the trench bottom, they must be removed. (See Diagram 3 in Appendix B). Where necessary, approved fill as specified in Section 12.3.C must be placed to provide uniform support between the pipe, fitting or appurtenance and undisturbed trench bottom. Each joint must be recessed in undisturbed soil or approved fill in such a manner as to relieve the bell of the pipe of all load and to ensure continuous bearing along the pipe barrel upon the pipe subgrade (trench bottom).

2) Sewer line from the building to the tank must be installed a minimum of 22 inches deep to the invert of the pipe if feasible to do so. If sewer line is required to be

installed shallower than 22 inches, design considerations must be included to prevent freezing.

C. Bedding and Approved Bedding Materials

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

2) Approved bedding must be as specified in Table 8 in Appendix A. Select bedding material must consist of loose, granular material. All voids between the pipe and undisturbed soils must be filled with approved bedding. Approved bedding must be worked into place or tamped, as necessary, to consolidate the fill material and completely fill all void space between the pipe and undisturbed trench bottom. (See Diagram 3 in Appendix B). Alternate bedding materials and/or methods may be allowed upon prior approval from the Department. Bedding material may consist of onsite job- excavated or imported material. The Department may require that an alternate fill material or method be specified and approved by a Registered Professional Engineer.

D. Pipe Grade and Size

1) The grade of the building sewer must be at least two percent (2%) (two [2] foot-fall per one hundred [100] feet or one-fourth [1/4] inch per foot). Buildings must be planned so that a proper slope can be obtained. Where the terrain is extremely flat, the Department may allow a slope of only five-tenths percent (0.5%) (six [6] inch-fall per one hundred [100] feet or one-sixteenth [1/16] inch per foot).

2) Building sewer pipe from the foundation to the septic tank must be no less than four (4) inches in diameter.

E. Cleanouts required between the building and the septic tank

1) Cleanouts must consist of a sanitary wye, riser to grade and secure cap. All cleanouts must be extended to or easily accessible from grade.

2) If a cleanout is not already provided outside of the building, a two-way cleanout, with a diameter no smaller than that of the building sewer, must be installed between the building and the septic tank, as close to the home as practical, but at a distance no further than 50 feet off the outside wall. Local Building Codes may also apply.

3) Building sewer must have a cleanout installed at intervals of not more than 100 feet.

4) 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 50 feet upstream of this fitting. Where more than one change of direction greater than 45 degrees occurs within 50 feet of a developed length of piping, the cleanout for the first change of direction may serve as the cleanout for all changes of direction within those 50 feet of developed length of pipe.

5) Bends ahead of the septic tank should be limited to 45 degrees or less wherever possible. If 90-degree bends cannot be avoided, they should be made with two (2) 45-degree ells, or a long sweep quarter curve.

12.4 Diverter Valve

A. A diverter valve, if used, must consist of the following:

1) A pre-manufactured valve body

2) For manually activated valves, a valve key, of sufficient length to reach the valve body from the ground surface

3) A riser and water-tight access lid or cap, installed at grade

12.5 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 (1) 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.

12.6 Drop Box

A. In sequential 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 must 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.

12.7 Stepdown/Relief Pipe

A. In sequential distribution, a non-perforated pipe may be used to transfer the effluent to the following trench when the effluent in a trench has received the designed level for overflow from that trench.

12.8 Wastewater Pumping and Dosing Siphon Systems

A. Pumps

1) A non-clog pump opening must have at least two (2) inch diameter solids handling capacity where raw wastewater is pumped. A pump opening must not have more than three-quarter (3/4) inch diameter solids handling capacity if previously settled effluent is pumped.

2) Pumps must be certified to the applicable UL or CSA electrical safety standard, bear the seal of approval of CSA, UL, or an equivalent testing program and be constructed of corrosion resistant materials.

3) Grinder pumps must also be certified to NSF/ANSI Standard 46 (2022 or earlier version) and bear the seal of approval of the NSF or equivalent testing and certification program.

4) Where a grinder pump is used prior to the septic tank, an effluent filter is required to be installed on the outlet of the septic tank. Additional tank requirements are provided in Section 12.2.B.5.

5) Where a grinder pump is used prior to the septic tank, the effluent pipe from the grinder pump must be connected to the sewer line prior to the inlet of the septic tank.

6) Pumps must be installed at least two (2) inches off the floor of the tank.

B. Floats and Switches

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

2) 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. Components used to hold the floats must be securely attached and of a material that is resistant to corrosion and will not absorb water.

3) Float switches must be certified to the applicable UL or CSA electrical safety standard, bear the seal of approval of CSA, UL, or an equivalent certification program and be constructed of corrosion resistant materials.

4) 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

1) 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.

2) 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 Department that the minimum 48-hour detention time will not be decreased. The pump must be screened with a device to remove solids greater than one-eighth of an inch (1/8”), assuring 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 12.2.D.4. Siphons must not be installed in the second compartment of a two-compartment tank.

3) 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 12.2.D.4.

D. Pump or Siphon Discharge Piping

1) 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.

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

3) The pipe must be sized to maintain a velocity of two (2) or more feet per second.

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

E. Access

1) The pump or dosing system tank, chamber, or compartment must have a minimum 24- inch nominal 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.

2) The access riser must have a watertight connection to the pump or dosing chamber/compartment to prevent infiltration or exfiltration. All other intrusions to the riser for electrical or other component access must also be watertight.

F. Splice Box (Junction box)

1) Splice boxes must be located outside and attached to the pump system access riser and be accessible from the ground surface. If no riser is present, splice boxes must be located on an approved pedestal located adjacent to the pump access manhole.

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

G. Controls

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

a) The pump system must have an audible and visual alarm notification in the event an excessively high water condition occurs;

b) The pump must be connected to a control breaker separate from the alarm breaker and from any other control system circuits;

c) An electrical disconnect must be provided within the line of sight of the pump chamber;

d) 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);

e) 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; and

f) Must bear the seal indicating acceptable product testing from a U.S. Department of Labor, Occupational Safety and Health Administration Nationally Recognized Testing Laboratory (NRTL) (https://www.osha.gov/dts/otpca/nrtl/nrtllist.html), such as Underwriters Laboratory (UL), Electrical Testing Lab (ETL), or Canadian Standards Association (CSA).

g) The bottom of the control panel must be at least 30 inches above grade.

12.9 Effluent Filters

A. An effluent filter, a pump vault equipped with a filter cartridge, or a filter on the discharge pipe must be included in all new OWTS installations.

B. Effluent filters are required for permitted repairs where the original design of the OWTS specified that an effluent filter be included.

C. When effluent filters are required, the septic tank outlet, or the outlet of the last septic tank in series, must include an effluent filter that retains solids greater than one-eighth

inch (1/8”) in size. Effluent filters must be sized to meet the estimated daily design flow and waste strength.

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

E. An alarm may be installed on an effluent filter indicating the need for maintenance. Adams County Health Department highly recommends adding an alarm to any septic tank compartment that contains an effluent filter. The Department may require any effluent filter to be equipped with an alarm.

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

G. The handle of the effluent filter must extend to within 12 inches of grade. Effluent filters are effective at reducing BOD and TSS in the effluent, however they must be maintained on a regular basis by cleaning them as per the manufacturer recommended methods and intervals.

12.10 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 must 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.

SECTION 13 DESIGN CRITERIA - SOIL TREATMENT AREA

13.1 Size and Design - Basis

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

13.2 Engineered Systems

A. At proposed soil treatment area locations receiving domestic wastewater, where any of the following conditions are present, the OWTS must be designed by a professional engineer and approved by the Department:

1) For OWTS installed in soil types 3A, 4, 4A, 5, FBR, DBR, R-0, R-1, R-2 and R-3, as specified in Tables 10 and 11 of this regulation;

2) For OWTS that include components which provide Treatment Levels TL2, TL2N, TL3, TL3N and TL3ND effluent; or an NDDS;

3) The maximum seasonal level of the ground water surface is less than four feet below the bottom of the proposed infiltrative surface;

4) Where a limiting layer, restrictive layer, or groundwater condition exists less than four feet below the bottom of the proposed infiltrative surface;

5) In floodplains or floodways, as required in Section 11.11;

6) The ground slope is in excess of 20%;

7) Pressure distribution is used; or

8) OWTS for business, commercial, industrial, institutional use, or multi-family dwellings.

13.3 Calculation of Infiltrative Surface of 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 provided in Table 10 and Table 11 in Appendix A.

C. If the site evaluation includes a percolation test in addition to a visual tactile evaluation of a soil profile test pit excavation, and the visual tactile evaluation and percolation test results do not coincide with the same LTAR in Table 10 in Appendix A, the designer must use the lesser LTAR in determining the size of the soil treatment area.

D. The minimum required area in square feet for a soil treatment area is determined by the following formula:

$$Minimum\ required\ soil\ treatment\ area = \left(\frac{Design\ Flow}{LTAR}\right) * Applicable\ size\ Adjustment\ Factor(s)$$

1) Where “Minimum required soil treatment area” is measured in square feet, “Design Flow” is measured in gallons per day, “LTAR” is measured in gallons per day per square foot, and the “Size Adjustment Factor(s)” are unitless.

2) Size adjustment factors for methods of application are in Table 14 in Appendix A.

3) Size adjustment factors for types of distribution media are in Table 15 in Appendix A.

4) A soil treatment area receiving TL1 effluent must be multiplied by the size adjustment factors from within Table 14 and Table 15 in Appendix A, unless the size adjustment factor is below 1.0, or unless otherwise specified in this regulation. A system may be oversized beyond the minimum required soil treatment area at the discretion of the designer or engineer.

5) The distribution media options within Table 15 may be used for distribution of higher level treatment system effluent (TL2 – TL3ND), however, the size reduction factors within Table 15 must not be used. Sizing reductions for higher level treatment systems are achieved through increased LTARs provided in Table 10.

E. A soil treatment area receiving TL2, TL2N, TL3, TL3N, or TL3ND effluent must be pressure dosed.

F. 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.

G. TL2, TL2N, TL3, TL3N, and TL3ND effluent may be applied by gravity flow in soil types 3, 3A, or 4, for designs where reductions in the soil treatment area size or vertical/horizontal separation reductions are not being requested.

13.4 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, unless otherwise noted in this regulation.

B. For the purpose of Table 14 in Appendix A, a “baseline system,” i.e. adjustment factor of 1.00, is considered TL1 applied by gravity to a gravel-filled trench.

C. Sizing adjustments are not allowed for systems placed in type “R” soils. The maximum LTARs are provided in Section 14.3.D.2.

D. Long term acceptance rates for use of the higher level treatment categories listed in Table 10 in Appendix A will only apply provided the system is inspected and maintained as required in Section 5.

13.5 Design of Distribution Systems

A. General

1) The infiltrative surface and distribution laterals must be level.

2) The infiltrative surface must be no deeper than four feet below grade unless TL2 or higher effluent is applied to the distribution media, and the system is inspected and maintained as specified in the requirements of Section 5. The depth of the infiltrative surface will be measured on the up-slope side of the trench or bed.

3) Where a conforming soil treatment area is reasonably accessible, the soil treatment area must not be placed below a paved surface, or an area where vehicular traffic occurs or is expected. If a compliant site for the soil treatment area cannot be identified, it may be placed below a paved surface when all of the following conditions are met:

a) The effluent must be treated to TL2 or higher prior to being applied to the distribution media.

b) The distribution system must be designed to accommodate the vehicular loading.

c) Size adjustment factors in Tables 14 and 15 must not be applied.

4) 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.

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

6) A final cover of soil suitable for vegetation at least 10 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. The backfill material must be void of cobbles, boulders, building debris, or other non-permeable material. The preferred soil cover is a sandy loam textured material, topped with two to three inches of topsoil.

7) Following construction, the ground surface must be graded to divert storm water 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.

8) 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. It must also allow for the establishment of vegetative cover, minimize settlement, and maintain proper drainage.

9) Dosing may be used for soil treatment area distribution unless otherwise stated in this regulation. The dose must be sized to account for the daily flow and the dosing frequency.

B. Distribution Laterals

1) Distribution laterals must meet the requirements of Section 12.3 as applicable.

2) 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.

3) The maximum length of distribution laterals must not exceed 150 feet.

4) Distribution laterals longer than 100 feet must be pressure dosed, or the application of the effluent must be at the center of the lateral through a distribution box.

5) 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 end wall.

6) The end of non-pressurized distribution pipe must be capped, unless it is in a bed, where the ends of the pipes may be looped.

7) To promote equal distribution to the soil treatment area, the effluent pipe on a gravity flow system must be connected to as near to the middle of the distribution header as possible. However, it must be offset from any distribution lateral so as not to provide a direct pathway into a single lateral. Note that the installation of a distribution box with flow levelers is preferred, as this will further assist in better distribution of the effluent.

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

C. Inspection Ports

1) A four-inch inspection port accessible from the 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 must extend to the infiltrative surface and not be connected to the end of a distribution pipe.

2) Inspection ports must be perforated or saw-cut on the bottom portion in contact with the media to allow for ponded effluent to infiltrate into the inspection port and provide an accurate determination of the depth of ponded effluent.

3) The top of the inspection ports must be saw-cut at pipe quadrants to the depth of the top cap to allow for cap removal for inspection and replacement following the inspection, unless a screw cap is used for the inspection port as specified in Section 13.5.C.4.

4) Inspection ports must have a cap to minimize water intrusion into the soil treatment area through the ports. Screw-on caps are prohibited unless the inspection port is secured to prevent the port from rotating when opening the screw cap.

5) Inspection ports in chambers may be installed according to manufacturer's instructions if the infiltrative surface and effluent levels can be observed from the inspection port.

6) Additional inspection ports connected to distribution pipes may be installed.

7) 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.

8) Perforations/slots in the inspection ports of a rock and pipe installation must be provided from near the base of the pipe and must extend to at least eight inches above the infiltrative surface. Multiple slots or orifices must be provided.

D. Trenches

1) Trenches must be three (3) feet wide or less.

2) The separating distance between trenches must be a minimum of four (4 feet, sidewall- to-sidewall).

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

E. Beds

1) Maximum width for a bed must be 12 feet, unless the bed receives effluent meeting TL2 quality or better, or is a repair.

2) The separating distance between beds must be a minimum of six (6) feet sidewall-to- sidewall.

F. Serial and Sequential Distribution

1) New serial distribution systems, where the effluent must pass through the first trench in order to access subsequent trenches, are prohibited.

2) A 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.

3) 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.

4) 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 near the top of the gravel or chamber outlet before flowing to succeeding treatment areas. Note that is a sequential distribution configuration, effluent does not pass through the first trench before it enters subsequent trenches.

G. Storage/Distribution Media

1) Rock and Pipe

a) The pipe must be surrounded by clean, graded gravel, rock or other material of equal efficiency which must range in size from one-half (1/2) inch to two and one- half (2 ½) inches. AASHTO M-43-05 (2005 version) size No. 3 coarse aggregate meets this specification.

b) 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 at least two inches above the top of the distribution pipe.

c) 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.

d) See Diagram 5 for a cross section of rock and pipe.

2) Tire Chips

a) The pipe may be surrounded with clean, uniformly sized tire chips.

b) Tire chips must be nominally two (2) inches in size and may range from one-half (1/2) inch to a maximum of four (4) inches in any one direction.

c) Wire strands must not protrude from the tire chips more than 3/4 of an inch.

d) Tire chips must be free from balls of wire and fine particles less than two (2) mm across.

e) 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.

3) Chambers

a) 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 to prevent chambers from settling into the media.

b) Effluent pipes from the distribution box or manifold must enter the chamber at least six inches above the base of the chamber on standard height chambers, and at least 3 inches above the base of the chamber on the low profile models.

c) Installation must be according to manufacturer's instructions.

d) The width of the chamber unit, relative to the excavation of the bed or trench, must conform to Section 16.5.A.4. This section states that if the total area covered by chambers is at least 90 percent of the excavated area, it may be approved as being the equivalent square footage of the total excavation. The area below the chamber endcaps must not be included in the calculations of the soil treatment area.

e) Effluent may be distributed by gravity, pump, or siphon.

f) Pipe installed along the length of chambers must not be installed on the infiltrative surface.

4) Enhanced Manufactured Media or Other Manufactured Media

a) 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.

b) Installation must be according to manufacturer's instructions.

c) Pressure distribution is required for TL2-TL3N effluent, unless otherwise noted in this Regulation.

H. Pressure Distribution

1) Design plans for pressure distribution systems must identify the exact specifications for the following items:

   a) General Design Parameters: Not all combinations of the variables noted below will result in a proper distribution system design. The design engineer must justify through calculations and / or design software that the selected values will concur with the requirements noted below.

   b) Dose size and frequency, for either proposed flows and soil type, or media long- term acceptance rate. The proposed dose volume will vary with design between 0.25 – 1.0 Gallons / orifice / dose, or 3 – 5 times distribution pipe volume.

   c) Float settings to achieve desired dose volume.

   d) Pipe diameter and strength requirements. (¾ inch – 1.5 inches PVC Class 200 minimum). 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.

   e) Orifice size and spacing must be 1/8 inches – 3/8 inches with spacing between 18 and 48 inches.

   f) Operating head at the distal end of distribution pipes:

      i) For systems with orifices 5/32 inches or less, the minimum squirt height is five feet above the lateral invert.

      ii) For systems with orifices 3/16 inches or greater, the minimum squirt height must be at least 12 inches above final grade, but never less than 30 inches above the lateral invert.

      iii) As part of the final inspection of an OWTS installation with pressure distribution, a residual head test (squirt height), at the distal end of each lateral, must be conducted to determine the adequacy of system design and construction. Results from this inspection must be included within both the engineer's certification and the final permit acceptance documents.

   g) Pump/siphon information; Total Dynamic Head; gallon/minute

   h) Drain-back volume from force main, when applicable.

2) To promote equal distribution within the soil treatment area, the force main within a pressure distribution system must be connected to as near to the middle of the distribution header as possible. This connection must be offset from any

distribution lateral to prevent preferential flow to a single lateral. An allowable alternative to this configuration is provided below:

3) Connections to the end of the distribution header are only allowed for soil treatment areas having a width of 12’ or less, and no more than 4 laterals. For such configurations, a minimum 2” diameter manifold is required.

4) 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. Additional requirements for the design of sand filters are noted in Section 14.3.

5) Flushing valve assemblies must be installed at the distal end of each lateral and be accessible from finished grade. A sweeping 90-degree bend or bends limited to 45 degrees are suggested. Diagram 7 in Appendix B illustrates the components of a typical pressure distribution system.

6) Effluent must be screened to retain solids 1/8 inch or greater prior to dosing a pressure distribution system. An effluent filter may be installed at the tank outlet, or within a screened pump vault. The filter may also be installed within the discharge line inside the pump chamber.

I. Drip Dispersal Systems

1) 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. Adjustment factors in Tables 12 and 13 may not be used.

2) Driplines must be installed on manufacturer’s spacing recommendations.

3) Drain back must be provided for all driplines, pipes and pumps.

4) Provisions must be made to minimize freezing in the distribution lines, driplines, relief valves, and control systems.

5) Provisions must be made for filtering, back-flushing or other required maintenance.

13.6 Alternating and Sequencing Zone Systems

A. Alternating Systems

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

2) For repairs, each section must be a minimum of 50% of the total required soil treatment area. For new installations, each separate soil treatment area must meet the minimum sizing requirements of this Regulation.

3) 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.

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

B. Sequencing Zone Systems

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

2) 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.

3) An automatic distribution valve must be used.

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

13.7 Soil Replacement

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:

1) Added soil must meet the specifications of imported treatment sand media, as specified in Section 14.3.B.6.

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

3) The depth of the added media must comply with the requirements of Table 11.

4) A gradation report of the sand media used must be provided. The gradation report must be dated no more than four months 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 professional engineer.

6) Pressure distribution must be used.

C. When sand media is added to the soil treatment area or to an excavation where a soil type 1-5 (Table 10) is the underlying soil, the following requirements must be met:

1) Added soil must meet the specifications of imported treatment sand media, as specified in Section 14.3.B.6. Unless the design follows the criteria for a sand filter or mound system design where ≥24 inches of sand is installed as required in Sections 14.3 and 14.4, or a higher level treatment system has been installed and the Department implements an maintenance over sight program as provided in Section 6.3, the TL1 long-term acceptance rate of the most restrictive soil within 12 inches below the sand base must be used.

2) For sites where the proposed soil treatment area had been previously filled, the existing fill material must be removed and replaced with imported treatment sand meeting the specifications of Section 14.3. The excavation must also extend at least 12 inches below the original grade (grade prior to fill). Only existing fill material meeting the requirements of soil type 1 will be allowed to remain.

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

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

5) The soil treatment area may be dosed or gravity fed if using a TL1 long term acceptance rate.

13.8 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 Table 6 when possible. When this is not possible using all available methods described above, the Department may permit reductions to setbacks. At no point will a setback reduction be approved by the Department less than what the existing separation is to the existing OWTS. In maximizing this setback distance, all methods available in Section 13.8.A must be utilized, including, but not limited to, the use of Higher-Level Treatment, wide beds, seepage pits, etc., where allowed. Any setback reduction beyond what the existing failing system presents must be approved by the Board of Health as outlined in Section 3.10.

C. Soils information obtained for the previous OWTS installation may be used if the information meets the requirements of Section 8.5.A. Otherwise, an additional soils investigation will be required.

D. Deep Beds

1) For repairs, the infiltrative surface of a bed must be no deeper than five feet. Size adjustments as provided for in Tables 12 and 13 must not be applied. System sizing will be based strictly on the soil type and corresponding LTAR.

E. Wide Beds

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

F. Deep Gravel Trenches

1) Deep Gravel Trenches may only be installed in soil type 1, 2, 2A, and 3. Installations in soil types 3A, 4, 4A, and 5 and R are prohibited.

2) 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 = $L \times (W+2)/(W+1+2D)$

Where:

a) L = length of trench in feet prior to adjustment for deep gravel

b) W = width of trench in feet

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

3) Vertical separation requirements provided in Table 7 (item 4) must be met.

4) Maximum allowable depth from existing grade to the trench bottom is five feet.

5) Evaluation of soil profile test pit excavations or percolation tests must be performed at the proposed infiltrative surface depth.

6) Size adjustments as provided for in Tables 12 and 13 must not be applied to deep gravel trenches.

G. Seepage Pits

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

2) 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.

3) Reductions in the vertical, horizontal separation or system sizing requirements for the use of higher level treatment systems with seepage pits are not allowed.

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

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

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

7) 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 43-05 (2005 version) size No 3 coarse aggregate meets this specification.

8) 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.

9) 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.

10) 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.

11) The bottom of the pit excavation must be greater than four feet above a limiting layer, restrictive layer, or groundwater condition.

12) 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.

13) The requirements for the design and construction of seepage pits for the treatment and dispersal of on-site wastewater on new sites are defined in Section 15.7.

H. Wastewater Ponds

1) Construction of new wastewater ponds is prohibited.

2) 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 of the Department, the repair of a wastewater pond may be permitted, however the following criteria must be followed:

a) A septic tank must precede the wastewater pond.

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

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

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

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

f) 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.

g) If the evapotranspiration does not exceed the rate of inflow of effluent from the structure, a soil treatment area meeting the requirements of these Regulations must be installed to accept the excess flow.

h) 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.

i) Wastewater ponds must be designed by a professional engineer.

I. Vaults

1) Criteria for vaults are in Section 12.1 of this Regulation.

J. Higher Level Treatment Options

1) Reduction in required soil treatment area for repairs is possible with higher level treatment only where the requirements of Section 6.3 are met for an Oversight and Maintenance Program.

2) Design criteria for higher level treatment systems are in Section 14.

K. Remediation technologies and processes

1) 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 defined in Table 4 are not granted to remediation technologies.

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

3) 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 from the Department.

4) 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.

5) 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.

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

7) The Department may require monitoring and/or maintenance of the remediation technology or process as a stipulation of permit issuance.

SECTION 14 DESIGN CRITERIA - HIGHER LEVEL TREATMENT SYSTEMS

14.1 General

A. Higher level treatment systems must be designed by a professional engineer.

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

C. Public domain technology systems must be designed, installed and maintained according to established criteria and any additional criteria established by the 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.

D. Proprietary systems must be designed, installed, and maintained according to manufacturer’s instructions and additional criteria identified in the Technology Review and Acceptance process, Section 16.4.

E. Application rates for unlined sand filters and mound systems provided within sections 14.3 and 14.4 may be applied without the implementation of a Department maintenance oversight program as described in Section 6.3.

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

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

H. Ventilation and air systems

1) 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.

2) Covers, barriers, or other protection

a) All systems must be installed to include protection of openings against entry of insects, rodents, other vectors and unauthorized persons.

14.2 Treatment Levels

A. The treatment levels identified in Table 4 are specified in this Section for public domain technology. Proprietary treatment systems will be assigned a treatment level by the technology review and acceptance process in Section 16.4. Adequate maintenance for each system is required and must be documented as in Section 6.

14.3 Sand Filters

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

B. Intermittent (Single Pass, Lined or Unlined) Sand Filters; General Requirements

1) Diagrams 8 and 9 in Appendix B illustrate typical sand filter components.

2) The treatment level for intermittent sand filters is considered TL3.

3) Size adjustment factors provided in Tables 14 and 15 are not applicable for sand filters.

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

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

i) 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.

b) Distribution pipe spacing: 18 inches – 48 inches

c) Orifice size: 1/8 inches – 3/8 inches

d) Orifice spacing: 18 inches – 48 inches

e) Operating head at the distal end of distribution pipes must comply with the requirements of 13.5.G.1.f.

5) Dosing

a) Pressure distribution is required. The design of the distribution system must also comply with the requirements of Section 13.5.G.

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

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

d) Timed dosing is recommended where design considerations allow.

6) Sand Filter Treatment Media

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

b) “Imported Treatment Sand” media requirements:

i) Effective size: 0.15-0.60 mm

ii) Uniformity coefficient: ≤ 7.0

iii) Percent fines passing #200 sieve must be ≤ 3.0

iv) 100% must pass the 3/8 sieve; ≥95% must pass the #4 sieve; >65% must pass the #10 sieve (2mm).

v) A gradation of the sand media used must be provided.

vi) The gradation must be dated no more than four months prior to the installation date. However, a gradation of the actual material placed in the excavation is recommended.

vii) The gradation must be provided to the Department on letterhead from either the source gravel pit or an independent materials testing laboratory.

7) Gravel Requirements

a) 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.

b) The gravel must surround the distribution pipes used to disperse the effluent and must be at least six inches below and two inches above the pipes.

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

8) Filter Fabric Requirements

a) 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.

9) Final Cover Material

a) 8 inches – 10 inches of Type 1 or 2 soil with an additional two inches of topsoil.

10) Size adjustment factors provided in Tables 12 and 13 are not applicable for sand filters.

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

12) Diagrams 8 and 9 in Appendix B illustrate typical sand filter components.

C. Unlined (Open Bottom) Sand Filters

1) All requirements of 14.3.B will apply to unlined sand filters.

2) Application Rates for the distribution media where a minimum of 24 inches of imported treatment sand is installed:

a) Maximum hydraulic loading rate for TL1 effluent applied to “imported treatment sand” in an unlined sand filter is 0.8 gal./sq. ft./day.

b) Maximum hydraulic loading rate for TL2, TL2N, TL3, or TL3N or TL3ND effluent applied to “imported treatment sand” is the soil type 1 LTAR for the treatment level of the effluent received, TL2, or TL3 (Table 10)

3) Application rates for the in-situ soil where a minimum of 24 inches of imported treatment sand is installed:

    a) Maximum hydraulic loading rate for the in-situ soil when TL1-TL3ND effluent is applied to the "imported treatment sand" is equivalent to the LTAR listed in the column titled "Treatment Levels 3, 3N, and 3ND" of Table 10 of the most restrictive soil within 12 inches below the sand base.

4) The upper infiltrative surface of an unlined sand filter receiving TL1 effluent must be at least three feet above a limiting layer or groundwater condition, unless the following soil conditions exist:

    a) The in-site receiving soil is identified as "DBR" or "R-1". In such cases, the vertical separation requirement is two feet.

5) The upper infiltrative surface of an unlined sand filter receiving TL2 or TL2N effluent must be at least 2 feet and one-half feet above a limiting layer or groundwater condition, unless the following conditions exist:

    a) The in-situ receiving soil is identified as "DBR" or "R-1". In such cases, the vertical separation requirement is one foot.

6) The upper infiltrative surface of an unlined sand filter receiving TL3 or TL3N effluent must be at least two feet above a limiting layer or groundwater condition, unless the following conditions exist:

    a) The in-situ receiving soil is identified as "DBR" or "R-1". In such cases, the vertical separation requirement is one foot.

7) The upper infiltrative surface of an unlined sand filter receiving TL3ND effluent must be at least one foot above a limiting layer, or groundwater condition.

8) Where adjacent sand filters are installed, the base of the excavation for each sand filter must be no closer than six feet, sidewall to sidewall.

D. Single-Pass Sand Filters

1) All requirements for application rates provided within section 14.3.B will apply to lined sand filters.

2) Application rates for the distribution media where a minimum of 24 inches of imported treatment sand is installed: Maximum hydraulic loading rate for TL1 effluent applied to imported treatment sand in a lined sand filter is 0.8 gal./sq. ft./day. 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 33-23 (2023 version), No. 8, coarse aggregate meets this specification.

4) A minimum four-inch diameter slotted SCH40 PVC [ASTM Standard D2729-21 (2021 version)] under-drain pipe must be used to collect the treated effluent. The under-drain pipe must be installed in the center of a five 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.

7) The base of the liner must be at least two feet above an actual or seasonal high ground water elevation.

E. Lined, Recirculating Sand Filter

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

2) General design parameters: 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.

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

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

c) Orifice size: 1/8 inch – 1/ 4 inch

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

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

3) Dosing

a) Timed dosed, pressure distribution is required. The design of the distribution system must comply with the requirements of Section 13.5.G.

b) Recirculation ratio: 3:1 – 5:1

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

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

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

f) Number of cycles/day: 48 – 120

4) Top gravel requirements

a) 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.

b) The gravel must surround the distribution pipes used to disperse the effluent and must be at least six inches below and two inches above the pipes.

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

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

5) Filter media requirements

a) Effective size: 1.5 – 2.5 mm

b) Uniformity coefficient: ≤ 3

c) Percent fines passing #200 sieve: ≤ 1.0

d) Media depth (min.): ≥24 inches

6) Intermediate gravel layer

a) 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 33-23 (2023 version), No. 8, coarse aggregate).

7) Under-drain requirements

a) A minimum four-inch diameter slotted SCH40 PVC under-drain pipe must be used to collect the treated effluent. The under-drain pipe must be installed in the center of a five inch 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.

8) PVC liner requirements

a) 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.

b) The base of the liner must be at least two feet above an actual or seasonal high ground water elevation.

c) 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.

14.4 Mound Systems

A. When the infiltrative surface area of the imported sand media receiving wastewater effluent is at or above the natural ground surface at any point, it is considered a mound system. Mound designs can include a variety of parameters:

1) A mound installation where all of the imported sand is installed above existing grade.

2) A mound installation where the top of the imported sand is installed entirely above existing grade, but the base of the imported sand is installed below existing grade.

3) A mound installation where the top of the imported sand is installed both above and below existing grade.

B. Sand Fill Loading Rate (Top of imported treatment sand)

1) For mound systems that receive TL1 effluent and provide a minimum of 24 inches of imported treatment sand media, the LTAR for the imported treatment sand is 0.8 gal/sq. ft./day.

2) For mound systems that receive TL2-TL3ND effluent and provide a minimum of 24 inches of imported treatment sand media, the upper infiltrative surface of the imported treatment sand is to be sized on the soil type 1 LTAR for the treatment level of the effluent received, as provided in Table 10; TL2 or TL3.

3) Where TL1 effluent dispersed to the distribution media in mound systems where less than 24 inches of sand is installed, the LTAR of the imported treatment sand

is the TL1 LTAR of the most restrictive soil layer within 36 inches of the upper infiltrative surface (top of imported sand).

4) Where TL2-TL3ND effluent dispersed to the distribution media in mound systems where less than 24 inches of sand is installed, the system is to be sized on the LTAR of the most restrictive soil layer within 36 inches of the upper infiltrative surface (top of imported sand), relative to the treatment level of the effluent received; TL2 or TL3. Note that in order to utilize the loading rates provided by the treated effluent, the Department must have adopted a program for oversight of inspection and maintenance as provided in section 5 and 6. Otherwise, the TL1 application rates apply.

C. Soil Loading Rate (Base of imported treatment sand)

1) Mound systems that provide a minimum of 24 inches of imported treatment sand media may use the TL3 application rates shown in Table 10 of the most restrictive in-situ soil layer within 12 inches of the imported sand base. Size adjustment factors within Table 15 must not be applied to mound designs where TL3 application rates are used. However, the adjustment factors may be applied if TL1 application rates are used.

2) A mound system may include less than 24 inches of imported treatment sand media on a site where a lesser depth of sand media is sufficient to meet vertical separation requirements above a “limiting layer” or “groundwater condition”, as specified in Table 7. When less than 24 inches of treatment sand is imported, the following criteria apply:

a) Where TL1 effluent is applied, TL1 application rates for the most restrictive in-situ soil layer within 36 inches of the top of the imported sand must be used. Size adjustment factors within Table 15 may be used.

b) Adams County Health Department provides an oversight program as referenced in Sections 5 and 6, so for effluent that is treated to TL2-TL3ND quality prior to dispersal into the distribution media, the LTAR is the soil loading rate of the most restrictive in-situ soil layer within 12 inches of the imported sand base for the treatment level of the effluent received, as provided in Table 10; TL2 or TL3. Vertical separation requirements of Table 7 must be met, relative to the treatment level of the effluent received. Size adjustment factors within Tables 14 and 15 must not be used.

D. Linear loading rates

1) The design engineer must evaluate many factors to achieve 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 3 to 5 (Table 10), then the linear loading rate is extremely important and long narrow mounds are necessary.

2) When TL1 effluent is applied to the distribution media of a mound system installed above in-situ soil types with permeabilities less than 60 min./inch (Table 10 and Table 11), the suggested linear loading rate is between 6 gpd/linear ft. and 12 gpd/linear 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.

3) When TL2 to TL3ND effluent is applied to the distribution media of a mound system installed above in-situ soil types with permeabilities less than 60 min./inch (Table 10 and Table 11), the linear loading rate may exceed 12 gpd/linear ft. Subsequently, the mound may be wider than 12 feet.

4) When TL1 to TL3ND effluent is applied to all mound systems installed above in-situ soil types with permeabilities exceeding 60 min./inch (Table 10 and Table 11), the suggested linear loading rate is between 3 gpd/linear ft. and 5 gpd/linear ft. The maximum width of the distribution media in a mound system placed above these soil types is 12 feet, however once calculated, a lesser width may be required.

5) The final cover over a mound system must extend at least 12 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.

6) The surface of the mounded area must be planted with a suitable vegetative cover to prevent erosion and promote run-off.

E. Suggested references 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 these Regulations differ from those in the referenced mound documents, the requirements of these Regulations will govern in those cases.

14.5 Rock Plant Filter (Constructed Wetland) Treatment before a Soil Treatment Area

A. A rock plant filter system must be designed by a professional engineer.

B. 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.

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

D. 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 15 DESIGN CRITERIA – OTHER SYSTEMS

15.1 Evapotranspiration and Evapotranspiration/Absorption Systems

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

1) 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.

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

3) The system must be designed by a professional engineer.

4) 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.

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

6) The required capillary or wicking sand must meet the gradation requirements in Table 17 and be approved by the professional engineer. The gradation of the wicking sand must be submitted to Adams County Health Department on letterhead from either the source gravel pit, or independent materials testing laboratory. The gradation must be dated not more than one month prior to the installation date.

7) 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.

8) Adjustment factors as provided in Tables 12 and 13 must not be used.

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

1) Design data to be furnished must include but is not 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.

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

   Area (in square feet)* = Design Flow (in gallons per day) x 586 / Lake Evaporation Rate at the Site (in inches per year)

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

3) Designs will include a rock and pipe, or other Division approved proprietary distribution product, with the centerline of the distribution system laterals no more than 6 feet on center and within 3 feet of the sidewall or endwall. 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.

4) 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.

5) 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.

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

1) 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.

2) Design will include a rock and pipe, or other Division approved proprietary distribution product, with the centerline of the distribution system laterals no more than 6 feet on center. A thin non-woven fabric as defined within Section 13.5.F. 1.C may be replaced 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 must be no more than 30 inches below finished grade.

3) 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.

4) The 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 in Section 15.1.C.5 below.

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

Area (sq. ft.)* = Flow (gpd)/(LTAR + ETR)

a) LTAR refers to the long-term acceptance rate of the underlying soil as provided in Table 10 for TL1 effluent.

b) ETR refers to the evapotranspiration rate derived from the following formula:

ETR (gal./day sq. ft.) = Lake Evaporation Rate at the Site (in inches per year)/586

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

15.2 Non-Pressurized Drip Dispersal Systems (NDDS)

A. An NDDS is considered a type of evapotranspiration/absorption system. However, as specific design criteria are provided for an NDDS (see Sections 15.2.D and 15.2.E), they are exempt from the additional requirements of pressure distribution, and items within section 15.1.A, B, and C.

B. New NDDS installations are prohibited unless they have maintenance and oversight in place for the life of the system. The owner of the NDDS system must maintain a valid renewable use permit for the life of the system. All provisions of Section 5 regarding higher level treatment use permits will apply to NDDS. NDDS must have a service contract in place at all times and must be inspected on a regular basis.

C. The requirements for a service contract and periodic inspection will not apply to repairs or expansion of existing NDDS.

D. The Colorado Professionals in Onsite Wastewater Guidelines for the Design and Installation of Non-Pressurized Drip Dispersal Systems (NDDS), October 2024, is the procedural guideline in the design of a NDDS and must be followed when an NDDS is proposed.

E. An NDDS bed may be wider than 12 feet.

F. NDDS must be designed by a Registered Professional Engineer.

15.3 Vaults Other Than Vault Privies

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 are prohibited at sites that cannot provide access for pumping and general system maintenance.

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

D. Vaults may be permitted for limited use occupancy on a property which cannot accommodate an OWTS with soil treatment area.

E. A vault may be permitted if the facility is on land where the installation of an OWTS with a soil treatment area is not permitted.

F. Vaults may be permitted for systems where some of the wastewater flows are separated, such as toilet waste only, or a private recreational vehicle dump station, into a vault. The portion not retained in the vault must be treated in an OWTS sized per the requirements of this Regulation

G. Variances may be granted for specialized commercial uses.

H. A vault must be accessible for routine pumping and maintenance.

I. A vault, if permitted by the Department, must have a minimum 1000-gallon effective volume or be capable of holding a minimum of the 48-hour design wastewater flow, whichever is larger.

J. A visual or an audible signal device or both, indicating filling to a maximum of 75 percent (75%) capacity, must be installed to indicate when pumping is necessary.

K. Concrete vaults must meet the strength and water tightness 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.

L. Vaults must be watertight and meet the requirements of Sections 11.4 and 12.1.A.1).

M. Vaults may be permitted for commercial recreational vehicle waste disposal.

N. Metal vaults are prohibited.

15.4 Privies

A. Vault Privies

1) Effective volume of the vault must be no less than 400 gallons, and it must be constructed of concrete, fiberglass, or plastic. The vaults for privies must meet the structural and water tightness requirements of Section 12.2.E or 12.2.F, as applicable.

2) 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.

B. Pit Privies

1) The installation of new pit privies is prohibited.

2) Existing pit privies

a) The bottom of the pit must be located above at least four feet of suitable soil and four feet above a limiting layer.

b) The pit must have at least 400 gallons of effective volume.

c) The superstructure must provide complete privacy and have fly- and rodent-tight construction, an earth mound around the top of the pit 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.

15.5 Incinerating, Composting and Chemical Toilets

A. The Board of Health may permit incinerating, composting and chemical toilets. Chemical toilets are limited to situations identified in Section 15.5.E. The use of an incinerating, composting or chemical toilet will not reduce the required size of the OWTS as stated in Section 11.1.

B. 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

the 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 Department. Compartment and appurtenances related to the unit must include fly-tight and vector-proof construction and exterior ventilation.

C. Incinerating Toilets

1) 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.

2) Incinerating Toilets Acceptance Requirements

a) Incinerating toilets must meet the requirements of the NSF Protocol P157 (2022 version) and bear the seal of approval of the NSF or an equivalent testing and certification program.

b) Incinerating toilets must be operated according to manufacturer's specifications and instructions. An approved incinerating toilet must be designed, installed, and maintained in accordance with all applicable federal, state, and local building, plumbing, and air-pollution requirements.

D. Composting Toilets

1) Composting toilets must meet the requirements of NSF/ANSI Standard 41 (2023 version) and bear the seal of approval of the NSF or an equivalent testing and certification program.

2) 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.

3) 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.

4) Residue from the composting toilet must be removed when it is filled to 75 percent (75%) of capacity. Residue from the unit must be properly disposed of by methods recommended by the manufacturer and acceptable to the Department. Disposal methods must prevent contamination of water and not cause a public health nuisance. Disposal using solid waste practices is recommended.

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

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

E. Portable Chemical Toilets

1) A portable chemical toilet may be used by permit from the Department or other agency with authority to issue permits for portable chemical toilets.

2) Use of a portable chemical toilet in permanently occupied buildings is prohibited except during construction or under emergency circumstances as determined by the Department. Proper ventilation of a chemical toilet used inside must be required.

F. Slit Trench Latrines

1) The use and installation of slit trench latrines is prohibited.

15.6 Treatment Systems Other Than Those Discharging Through a Soil Treatment Area or Sand Filter System

A. For systems discharging to State Waters, see Section 1.5.

B. Systems that discharge other than through soil treatment areas, sand filter systems, vaults, vault privies, or composting toilets must:

1) Be designed by a professional engineer

2) Be reviewed by the Board of Health

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

4) Not allow drainage of effluent off of the property of origin.

5) The Board of Health may choose to permit only systems that do not allow drainage of effluent off the property of origin.

6) The following minimum performance criteria must be required for all permitted systems pursuant to this Section:

a) If effluent discharge is made into areas in which the possibility exists for occasional direct human contact with the effluent discharge, the effluent at the point of discharge must meet the minimum treatment criteria of TL3 effluent and specifically adhere to each of the following standards:

i) The geometric mean of the E. coli density must not exceed 15 per 100 milliliters when averaged over any five (5) consecutive samples, and no single sample result for E. coli can exceed 126 per 100 milliliters.

ii) The arithmetic mean of the standard five (5) day carbonaceous biochemical oxygen demand (CBOD5) must not exceed ten (10) milligrams per liter when averaged over any three (3) consecutive samples.

iii) The arithmetic mean of the total suspended solids must not exceed ten (10) milligrams per liter when averaged over any three (3) consecutive samples.

b) If the effluent discharge is made into an area restricted as to protect against the likelihood of direct human contact with the discharged effluent, the effluent at the point of discharge must meet the treatment criteria of TL2 effluent and specifically adhere to each of the following standards:

i) The geometric mean of the E. coli density must not exceed 126 per 100 milliliters when averaged over any five (5) consecutive samples, and no single sample can exceed 325 E. coli per 100 milliliters.

ii) The arithmetic mean of the standard five (5) day carbonaceous biochemical oxygen demand (CBOD5) must not exceed 25 milligrams per liter when averaged over any three (3) consecutive samples.

iii) The arithmetic mean of the total suspended solids must not exceed 30 milligrams per liter when averaged over any three (3) consecutive samples.

C. To determine compliance with the standards contained in this Section, the required sampling frequency for E. coli, CBOD5, and total suspended solid levels must be performed at least once per month when the system is in operation and the results submitted to the Department for compliance with the permit requirements.

D. 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, 24th edition, 2022 (ISBN-10: 0875532993 and ISBN-13: 978-0875532998).

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

15.7 Seepage Pits

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

1) The seepage pit is designed by a professional engineer; and

2) The design includes higher level treatment of at least TL2

3) The design requirements for new seepage pits must also comply with requirements as defined in 13.8.F.3).

4) Pressure distribution is not required for dispersal into a seepage pit.

15.8 Disinfection Systems

A. Disinfection components must meet the requirements of NSF / ANSI Standard 385 (version 2022), or prior acceptance through NSF / ANSI Standard 46 – version 2022 or earlier and bear the seal of approval of the NSF or an equivalent testing program. This component may be installed between the higher-level treatment system and the pump tank, or within the pump tank.

B. All methods of disinfection must effectively reduce the fecal coliform count to <200 organisms per 100 mL.

C. If chlorination is used as the disinfection method, a free chlorine residual of two tenths of a milligram per liter (0.2 mg/l) must be maintained in the pump tank.

D. The use of disinfection systems is only allowed provided the effluent is treated to TL3N quality prior to entering the disinfection system, and the system has an oversight and maintenance program in place that conforms to Section 6.3.

SECTION 16 Technology Review and Acceptance

16.1 OWTS Technologies – Public and Proprietary

A. OWTS technologies must either be public domain, including but not limited to rock and pipe distribution systems, sand filters with pressure distribution and mound systems, with criteria for design, installation, maintenance and use as described in this Regulation, or proprietary products that have received Division review and acceptance before the Department may permit them for use.

16.2 Division Review

A. The Division must review and provide either comment or acceptance to the manufacturer for proprietary products in these technology categories:

B. Proprietary treatment products (e.g. treatment systems);

C. Proprietary distribution products (e.g. manufactured distribution products or subsurface dripline);

D. Septic tanks;

E. Others as needed.

16.3 Product Acceptance Requirements

A. General:

1) To qualify for product acceptance, manufacturers desiring to sell or distribute proprietary products in Colorado must submit a completed application to the Division in the format provided by the Division and a report describing in detail the test procedures and data confirming the performance and properties of the product claimed by the manufacturer. Products within a single series or model line sharing distinct similarities in design, materials, capacities, configuration, and claiming the same level of treatment may be accepted under a single application. Products outside of the series or model line must be accepted under separate applications. The following information must be included in the application:

a) Manufacturer's name, mailing address, street address, and phone number;

b) Contact individual's name, mailing address, street address, phone number and email address. The contact individual must be vested with the authority to represent the manufacturer in the acceptance process;

c) Category of product (e.g., proprietary treatment product and treatment level requested, proprietary distribution product, septic tank);

d) Name, including specific brand and model, of the proprietary product;

e) A description of the functions of the proprietary product, along with any known limitations on the use of the product;

f) Product description and technical information, including dimensioned drawings; materials and characteristics; component design specifications; and volumes, design capacity, and flow assumptions and calculations, as relevant;

g) Siting and installation requirements;

h) Product performance information in appropriate product Section;

i) Detailed description, procedure and schedule of routine service and maintenance events;

j) Copies of manufacturer's literature to include sales and promotion, design, installation, operation and maintenance, and owner instructions; and

k) Identification of information subject to protection from disclosure and trade secrets, if any.

B. Upon receipt of an application, the Division must verify that the application is complete and meets the requirements for which the product is being evaluated. If the application is found to be complete, and the requirements of this Section needed to accept the product are met, the Division will place the product on a list of accepted proprietary products for the type of product. Installation and use of accepted products must comply with the requirements noted on the acceptance document provided by the Division.

C. Manufacturers must have readily accessible and up to date information for designers, regulators, product owners, and other interested parties about their product including:

1) Product manuals;

2) Design instructions;

3) Installation instructions;

4) Operation and maintenance instructions; and

5) A list of representatives and manufacturer-certified service providers in Colorado, if any. If none exist, information on how service on the product will be provided in Colorado.

D. If, at any time after a proprietary product has been accepted for use, the Division receives information that the product so accepted does not meet the required standards, or in any way constitutes a public health or environmental hazard, the Division may, at its discretion, revoke the product acceptance. The Division shall notify the manufacturer and the Department agencies within 30 days of any revocation.

16.4 Proprietary Treatment Product Acceptance Requirements

A. If a proprietary treatment product is submitted to meet a specific treatment level, a report with test procedures and data must be submitted to the Division to demonstrate that it can meet the treatment level for which the approval is being requested on a consistent basis in actual installations. The Division must approve the test methods and programs. Test results from product certification testing must also be submitted.

B. If a product is accepted for a specific treatment level, the product may also be used for applications requiring lower treatment levels. Reductions based on higher level

treatment must not be applied unless the Department has a maintenance oversight program in place as described in Section 5.

C. Field Performance Testing

1) Testing must be performed by a neutral third party.

2) Testing for residential applications must be performed on a minimum of 12 single-family homes under normal operating conditions unless otherwise noted below:

a) If the proprietary treatment product is requesting TL2 acceptance and that product has received NSF/ANSI 40 certification (2023 or earlier version), the number of home sites to be tested may be reduced to six. The NSF/ANSI 40 (2023 or earlier version) certification must be submitted if the reduced number of test sites is requested.

b) If the proprietary treatment product is requesting TL2N or TL3N acceptance and that product has received NSF/ANSI 245 (2023 or earlier version) certification, the number of home sites to be tested may be reduced to six. The NSF/ANSI 245 (2023 or earlier version) certification must be submitted if the reduced number of test sites is requested.

3) Each system must be tested over a period of at least one (1) year.

4) Each system must be sampled at least four (4) times during the year with the sampling evenly distributed throughout the year.

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

6) Testing may be performed in Colorado under a Product Development Permit.

7) Testing may be performed in locations other than Colorado. However, as part of the testing, the manufacturer must define, to the acceptance of the Division, what adjustments or modifications to the product will be required to compensate for the following conditions:

a) Increased elevation results in lower atmospheric pressure and lower oxygen content. Adjustments or modifications to the treatment process may be required to compensate for these conditions, and those adjustments or modifications must be specified.

b) Winter season conditions in Colorado include cold temperatures that may affect product performance. Adjustments or modifications to the treatment process may be required to compensate for these conditions, and those

adjustments or modifications must be specified. This item must be addressed if nitrogen reductions are claimed.

8) The report conclusions must indicate the proprietary treatment unit can consistently be expected to meet the treatment level for which acceptance is being requested.

9) The report must include estimated operating costs for the first five (5) years of the treatment system's life. This must include both estimated annual electricity or other energy costs, and routine inspection and maintenance costs, including replacement of parts.

a) Energy and other costs are to be based on typical Denver, Colorado, costs at the time of the acceptance request.

b) Replacement part costs must include shipping and handling.

c) If media or other major part replacement is expected during the normal life of the system, the cost of replacement and the typical replacement interval must be included even if replacement is not expected within five (5) years.

D. The manufacturer must identify the provisions that they have developed for the training of installers and service providers specific to their product line.

E. Following the adoption of Regulation 43 in 2013, that regulation provided limited provisions for the continued acceptance of treatment level 2 proprietary products that had been previously accepted for use in Colorado prior to June 30, 2013, Under NSF/ANSI 40 (2023 or earlier version) or equivalent testing. Only treatment products with a CDPHE acceptance letter dated after June 30, 2013 will be accepted for use in Colorado.

16.5 Proprietary Distribution Product Acceptance Requirements

A. Proprietary manufactured distribution products must:

1) Be constructed or manufactured from materials that are non-decaying and non-deteriorating and do not leach chemicals when exposed to septic tank effluent and the subsurface soil environment;

2) For gravity distribution systems, the product must provide liquid storage volume at least equal to the storage volume within the assumed 30 percent (30%) void space in a rock and pipe distribution system assuming six (6) inches of rock below the pipe and two (2) inches above the pipe;

3) Maintain the integrity of the trench or bed. The material used, by its nature and its manufacturer-prescribed installation procedures, must withstand the physical

forces of the soil sidewalls, soil backfill, and the weight of equipment used in the backfilling; and

4) If the width of a proprietary manufactured distribution product is within 90 percent (90%) 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 15.

B. Chambers:

1) Must include a sidewall that is structurally sound and capable of allowing aeration of the infiltrative surface and exfiltration of effluent while minimizing the intrusion of soil.

2) Chambers construction must meet IAPMO Property Standards, PS 63 (2019 version).

C. Enhanced manufactured media:

1) The product must include synthetic media contained within one or more external permeable outer layers that promote the movement of the effluent and prevent the intrusion of soil from above the synthetic media. Manufacturer must demonstrate that the product has been adequately tested and functions as intended.

2) For enhanced manufactured media that requires a specified layer of sand or other media to be placed below the actual product, the vertical separation requirements of these Regulations will be determined from the base of the sand or other media, as the sand or media is an integral part of the component.

3) For products that allow for sand extensions beyond the actual manufactured component, the distance of sand allowed from the edge of the excavation to the manufactured component may be up to six inches in a trench system and 24 inches in a bed system.

4) If sand media is proposed by the manufacturer as an integral part of the distribution product, it must meet the size and uniformity specifications as noted by the manufacturer.

D. Other manufactured media:

1) In order to receive sizing adjustments provided in Table 15, the product must cover at least 90 percent of the excavated area in either a trench or bed configuration without the use of gravel, stone or other aggregate containing fines, which may compromise soil permeability.

E. Proprietary subsurface dripline products:

1) Be warranted by the manufacturer for use with OWTS effluent;

2) Specify required treatment level of influent to the driplines;

3) Be designed for resistance to root intrusion; and

4) Incorporate emitters that may be controlled either by use of pressure-compensation emitters or with a pressure regulator.

16.6 Septic Tank Acceptance Requirements

A. Septic tank design must conform to the requirements of Section 12.2 of this Regulation.

B. Each manufacturer must annually test five percent (5%) of its tanks for watertightness at the manufacturing facility, unless the tanks are certified for use as a septic tank by the International Association of Plumbing and Mechanical Officials (IAPMO) or Canadian Standards Association (CSA), or the manufacturer participates in the Plant Certification Program of the National Precast Concrete Association (NPCA).

C. Watertightness results must be sent to the Division on an annual basis unless otherwise addressed in Section 16.6.B above. The manufacturer must provide information that specifies measures taken to repair a tank that fails the watertightness test. The manufacturer must also define the measures taken to prevent similar problems in future tanks.

D. IAPMO, CSA, and NPCA certifications must be submitted to the Division for acceptance. Current certifications must be submitted to the Division on an annual basis.

16.7 Other Product Acceptance Requirements

A. The Division may adopt review and acceptance requirements for additional products as needed.

SECTION 17 GENERAL PROHIBITIONS AND PENALTIES

17.1 General Prohibitions; C.R.S. §25-10-112

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

1) A permit to construct or remodel a building or structure which includes plumbing that is not serviced by a sewage treatment works until the Department has issued a permit for an OWTS.

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

B. No person shall:

1) Construct or maintain any dwelling or other occupied structure which is not equipped with adequate facilities for the sanitary disposal of sewage. "Adequate facilities" do not include OWTS that are deemed to be failed, or any such condition that the Department determines to be a public health and/or safety concern.

2) Construct a new occupied structure that includes plumbing, without connecting to a domestic wastewater treatment works or obtaining an OWTS permit issued by the Department and installing a compliant OWTS.

3) Repair, replace, or alter an existing OWTS, or accessory components, without obtaining authorization, or an OWTS permit, from the Department.

C. The construction of new cesspools is prohibited, and the repair of existing cesspools is prohibited. Where an existing cesspool is failing, a conforming OWTS must be installed. Where space is not available for a conforming OWTS, the criteria for repairs established within Section 13.8 must be followed.

D. A person must not connect more than one (1) 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.

E. An OWTS must receive only such biodegradable wastes for treatment and distribution as are compatible with those biological treatment processes that occur within the septic tank, any additional treatment unit, and the soil treatment area. This does not include industrial, animal, or process waste.

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

17.2 Prohibition of On-Site Wastewater Treatment 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.

17.3 Penalties; C.R.S. §25-10-113

A. Any person who commits any of the following acts or violates any of the provisions of this Section commits a civil infraction as in C.R.S. §18-1.3-503, and as otherwise may be permitted in the OWTS Act:

1) Constructs, alters, installs, or permits the use of any OWTS without first applying for and receiving a permit as provided for in C.R.S. §25-10-106;

2) Constructs, alters, or installs an OWTS in a manner which involves a knowing and material variation from the terms or specifications contained in the application, permit or variance;

3) Violates the terms of a cease and desist order that has become final under the terms of C.R.S. §25-10-106 (1) (k);

4) Conducts a business as a systems contractor without having obtained the license provided for in C.R.S. §25-10-109 (1);

5) Conducts a business as a systems cleaner without having obtained the license provided for in C.R.S. §25-10-109 (2);

6) Falsifies or maintains improper records concerning system cleaning activities not performed or performed improperly; or

7) Willfully fails to submit proof of proper maintenance and cleaning of a system as required by these Regulations.

17.4 Civil Penalty

A. Assessment

1) Upon a finding by the Board of Health that a person is in violation of this Regulation, or of rules adopted and promulgated pursuant to section 25-10-104, the Board of Health may assess a penalty of up to fifty ($50.00) dollars for each day of violation, pursuant to C.R.S. §25-10-113 (2). In determining the amount of the penalty to be assessed, the 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.

B. Appeal of Civil Penalty Assessment

1) A person subject to a penalty assessed pursuant to Section 17.3 may appeal the penalty to the Board of Health by requesting a hearing before the Board of Health. The request must be filed within thirty (30) days after the penalty assessment is issued. The Board of Health shall conduct a hearing upon the request in accordance with C.R.S. §24-4-105.

SECTION 18 ENFORCEMENT

18.1 Hearings

A. Hearings shall be administered pursuant to the requirements of the OWTS Act.

18.2 Notice of Violation

A. Whenever the Department determines that there has been a violation of any provision of these Regulations, the Department shall give notice of such violation to the responsible person. Such notice shall be in writing and shall particularize the violation, provide a reasonable time for correction, and be addressed to the owner and/or occupant of the property concerned.

18.3 Cease and Desist Orders

A. The Department may issue an order to cease and desist from the use of any OWTS or sewage treatment works which is found by the health officer not to be functioning in compliance with the OWTS Act, Regulation 43 or these Regulations, is found to constitute a nuisance or a hazard to public health, or has not otherwise received timely repairs under the provisions of C.R.S. §25- 10-106 (1) (j). Such an order may be issued only after a hearing which shall be conducted by the Health Officer of the Department not less than 48 hours after written notice thereof is given to the owner or occupant of the property on which the system is located. The order shall require that the owner or occupant bring the system into compliance or eliminate the health hazard within thirty (30) days, or thereafter cease and desist from the use of the system. A cease and desist order issued by the Health Officer shall be reviewable in the district court for the county wherein the system is located and upon a petition filed not later than ten days after the order is issued.

SECTION 19 BOARD OF HEALTH ADMINISTRATIVE PROCEDURES

19.1 Revocation of Systems Contractors or Cleaners Licenses

A. A systems contractor's or cleaner's license may be revoked for failure to comply with these Regulations. Revocation shall take place only after a hearing before the Board of Health. The license holder shall be given not less than ten (10) days' notice of the hearing and may be represented at the hearing by counsel.

19.2 Prohibition of On-Site Wastewater Treatment Systems in Unsuitable Areas

A. A 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.

19.3 Rules and Regulations for Maintenance and Cleaning of On-Site Wastewater Treatment Systems

A. The Board of Health may adopt rules and regulations for the scheduling of maintenance and cleaning of systems and practices adequate to ensure proper functioning of acceptable systems, and may require proof of proper maintenance and cleaning pursuant to any such schedules and practices to be submitted periodically to the Department by the owner of the system.

19.4 Findings on Appeal

A. A request for review must be made within 60 days after denial of an application by the Department.

B. The applicant must bear the burden of supplying the Board of Health with sufficient evidence to document that the denied system shall be constructed and used in such a manner that will result in no greater risk than that associated with compliance with the requirements of the Regulation, comply with the declaration and intent of these Regulations, and comply with all applicable state and local regulations and required terms and conditions in any permit.

C. Such review must be conducted pursuant to the requirements of C.R.S. §24-4-105.

19.5 Hearing and Review of Variance Requests

A. Upon receipt of the request for a variance and the required information in Section 3.10.B the Department will schedule a public hearing before the Board of Health. The Department will issue a Public Notice of the Hearing and send notice via certified mail, with a minimum 20 day reply time from the date of mailing to all adjacent property owners. The applicant and their engineer may attend the hearing and present testimony regarding the request for a variance.

B. Following the public hearing, the Board of Health shall vote on the proposed variance. Approval of the variance requires a majority vote of the Board of Health.

C. The applicant will receive written notification of the decision regarding the request for a variance.

D. The Board of Health may impose requirements and conditions on the variance granted and the notice of an approval of the variance will include any conditions of approval. The notice of a denial or a variance shall include those reasons which form the basis for the denial.

E. The variance and any conditions thereof shall be recorded on the deed to the property and any expenses associated with that recording shall be the responsibility of the party obtaining the variance.

APPENDIX A - TABLES

TABLE 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
BOD_5	Biochemical Oxygen Demand, Five-Day
C.R.S.	Colorado Revised Statutes
CBOD	Carbonaceous Biochemical Oxygen Demand
$CBOD_5$	Carbonaceous Biochemical Oxygen Demand, Five-Day
CSA	Canadian Standards Association
ETL	Electrical Testing Lab
gpd	gallons per day
IAPMO	International Association of Plumbing and Mechanical Officials
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
NDDS	Non-pressurized Drip Dispersal System
NPCA	National Precast Concrete Association
NRCS	Natural Resources Conservation Service
NSF	NSF International
OWTS	On-Site Wastewater Treatment System(s)
STA	Soil Treatment Area
TL	Treatment Level
TN	Total Nitrogen
TSS	Total Suspended Solids
UL	Underwriters' Laboratories
USDA	United States Department of Agriculture

TABLE 2: SINGLE-FAMILY RESIDENTIAL DESIGN FLOWS			
# of Bedrooms	**Occupancy (# of Persons)**	**Wastewater Flow Per Person (gallons/day)**	**Design Flow (gallons/day)**
2	4	75	300
3	6	75	450
4	8	75	600
5	9	75	675
6	10	75	750
7	11	75	825
8	12	75	900
9	13	75	975
10	14	75	1,050
For each additional bedroom above 10	1	75	75

TABLE 3: ESTIMATE OF AVERAGE DAILY WASTEWATER FLOW AND BOD_5 LOAD PER PERSON UNLESS OTHERWISE NOTED[5]		
RESIDENTIAL WASTEWATER	**GPD**	**BOD_5 IN POUNDS PER DAY**
Single-family dwellings, Auxiliary Dwelling Units[3]	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
Residential, other		
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, per person	75	.20
Mobile home park, per space	300	.80
Vacation home rental; per additional bed space provided; in addition to the 150 gal./bedroom[4]	50	.20
COMMERCIAL WASTEWATER		
Facilities with day-use or transient visitors/facilities Examples: Airports or bus stations per passenger; fairgrounds per person attending; ball parks, racetracks, stadiums, theaters or auditoriums per seat	5	.02
Airport per employee	10	.06
Banquet halls per seat with food preparation, per event	7.5	.06
Banquet halls per seat with no food preparation, per event	5	.02
Barber and beauty shops per chair	100	.70[1]
Bowling alleys per lane - toilet wastes only	5	.03[1]
Convenience Stores with self-serve beverages	See Footnote 7	See Footnote 7
Country club per member	30	.02
County club per employee	20	.06
Dentist offices per non-wet chair	50	.14
Doctor offices per doctor	250	.80[1]
Farm workers, factories and plants exclusive of industrial wastewater, per employee per eight-hour shift – no showers	20	.05

Farm workers, factories and plants exclusive of industrial wastewater, per employee per eight-hour shift - showers provided	35	.08
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		
Coffee shop per customer	3.5	.50 [1, 8]
Restaurant, open, 1 or 2 meals per seat	50	.06/meal served
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		
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]	7.5	.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, per additional school worker	15	.06
RECREATIONAL AND SEASONAL WASTEWATER USE		
Camps, day, no meals served	15	.12
Children's camp, overnight with meals and showers	50	.12
Luxury resort[6]	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_5 levels may require 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 a "tiny home", the OWTS may be sized as a one-bedroom home.
4. As stated in Section 9.1.B.6, the Department may increase the "per bedroom" design flows for vacation home rentals relative to the expected maximum occupancy of the home. These flows are in addition to the 150 gal./bedroom requirement.
5. Note that discharges from non-domestic sources such as process waste, industrial waste, microbreweries, dog kennels, veterinary clinics, horse barns, etc. are not addressed in this regulation. Such discharges must obtain permitting as a Class V Injection Well through the EPA, as appropriate.
6. A "Luxury Resort" will typically include a spa, restaurant/bar, pool, etc.
7. Wastewater from convenience stores will likely meet the requirements of high strength waste. Studies indicate that BOD_5 effluent levels will range between 500 – 1500 mg/L. The exact levels will depend on products available (i.e.: coffee, soda, etc.), number of patrons, and how often the excess from each product is disposed. Flows from each facility can also vary substantially depending on location and the size of the store. Locations adjacent to freeways could have significantly more flow than a site located in a residential area. Subsequently, the design engineer must provide data from similar facilities in order to afford an estimation of projected peak daily flows.
8. Wastewater from coffee shops will likely meet the requirements of high strength waste. Studies indicate that BOD_5 effluent levels may exceed 500 mg/L. The exact levels will depend on the drink options (i.e.: latte, espresso, etc.), number of patrons, and how often the excess from each product is disposed. Flows from each facility can also vary substantially depending on location and the size of the store. Subsequently, the design engineer must provide data from similar facilities in order to afford an estimation of projected peak daily flows.

TABLE 4: TREATMENT LEVELS[6]					
Treatment Level	**BOD_5 (mg/L)**	**$CBOD_5$[1] (mg/L)**	**TSS (mg/L)**	**Total Nitrogen (mg/L)**	**Fecal Coliform[5] (count/100 mL)**
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	-
TL3ND	-	10	10	20	≤200

Shading indicates higher level treatment.

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.
5. TL3ND requires effluent to be treated to TL3N standards prior to disinfection. The disinfection must meet the requirements of Section 15.8.
6. With the exception of fecal coliform, treatment level requirements are based on values obtained from composite sampling.

TABLE 5: HIGH STRENGTH WASTEWATER[1]			
	BOD5 (mg/L)	**TSS (mg/L)**	**Fats, Oils, Grease (FOG) (mg/L)**
Septic Tank Influent	>300	>200	>50
Septic Tank Effluent	>180	>80	>25

1. 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.

TABLE 6: MINIMUM HORIZONTAL DISTANCES IN FEET BETWEEN OWTS COMPONENTS AND WATER, PHYSICAL, AND HEALTH IMPACT FEATURES[7,10]									
	Spring, well[1,9], suction line, under-ground potable water supply cistern[4]	**Potable water supply line[2]**	**Structure with basement, crawl space or footing drains**	**Structure without basement, crawl space or footing drains**	**Property lines[11], upslope curtain drain**	**Subsurface drain, intermittent agricultural irrigation lateral[7], lined pond or irrigation channel, drywell, stormwater structure, storm sewer, or stormwater conveyance channel**	**Surface water, lake, water course, open irrigation channel, stream, wetland**	**Dry gulch, cut bank, fill area (from crest), in-ground swimming pool**	**Septic tank, higher level treatment unit, dosing tank, vault or privy**
Septic tank, higher level treatment unit, dosing tank, effluent pipe[2], vault, or vault privy	50[2]	10[2]	5	5	10	10	50	10	--
Building sewer	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	100[3]	25[2]	20	10	10	25	50[3]	25	5
Lined sand filter	60	10[2]	15	10	10	10	25	10	5
Lined evapotranspiration field or outside of berm of lined wastewater pond	60	10[2]	15	15	10	10	25	10	5
Open unlined sand filter in soil with a percolation rate slower than 60 MPI, unlined evapotranspiration system, outside of berm of unlined wastewater pond, or system not relying on STA for treatment other than aerosol	100	25[2]	20	10	10	25	25	15	10
Pit privy	100	50[2]	25	25	25	25	100	25	N/A
System not relying on STA for dispersal	100[3]	10[2]	125	125[5]	10	0	25[3]	10	10

See the next page for footnotes for this table.

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 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 Department.

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. All horizontal setbacks to a potable water supply 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, (Division of Water Resources). 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 for new construction through a variance is to 75 feet; and must meet the requirements of Table 7 of this regulation. Setbacks for existing wells must comply with requirements of Section 3.10.D.
2. Crossings or encroachments may be permitted at the points as noted above provided that the potable 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 [ASTM Standard D3034-24 (2024 version)] of sufficient diameter to easily slide over and completely encase the conveyance must be used. Rigid end caps of at least Schedule 40 rating [ASTM Standard D3034-24 (2024 version)] 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 is to be sealed with an approved underground sealant compatible with the piping used. Piping of equal or higher strength may also be used. Other methods of separation between the potable water pipe and a component of the OWTS that provide equal protection are allowed. These may include, but are not limited to, concrete or controlled flowable fill encasement extending no less than 10 feet each side of the crossing, or an impermeable geo-membrane curtain extending at least two feet below the potable water pipe and no less than 10 feet each side of the crossing. These methods must be reviewed and approved by the Department.
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 Department has a maintenance oversight program in accordance with Section 5 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 well or underground 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 25 feet. Noted setbacks are not required to above ground cisterns.

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. Where ditch companies have a specific right of easement for “reasonable and necessary use to access, operate, and maintain ditches”, all OWTS components must maintain a minimum of 25’ setback from the crest of the ditch/channel.
8. Sites with multiple OWTS on a single property where the total flows are >2,000 gpd must meet the increased required setbacks as provided in WQSA-6 (Policy 6).
9. Per 2 CCR 402-10 (6.4.2), geothermal wells shall be located at least 100 feet to the nearest source or potential source of contamination, unless a variance has been obtained from the state engineer.
10. Setback from a utility easement: While a specific setback for components of an OWTS to a utility easement is not specifically identified, the intent of the regulation is provided herein. The setback from utility easements is dependent on whether the utility is above or below ground. For above ground utilities, components of an OWTS must not be installed in areas where construction or maintenance vehicles may be required to travel in order to gain access to the utility. For utilities installed below grade, the objective is to setback the utility far enough away from the soil treatment area so that sewage will not seep into a utility trench excavation. The setback is also necessary to prevent construction or maintenance vehicles from driving on any component of an OWTS. Where remote properties have a blanket utility easement, the owner/operator of the OWTS will be responsible for providing signage or physical barriers as needed to reduce the risk of vehicular traffic or other disturbance to the OWTS. In all instances, a five-foot setback will typically address most concerns.
11. In specific circumstances, the Department may allow for a reduced setback from a property line to the OWTS; per the requirements of Section 10.4.A.1.

TABLE 7: MINIMUM SEPARATION DISTANCE REQUIREMENTS IN FEET FROM SOIL TREATMENT AREA, RELATIVE TO TREATMENT LEVEL PROVIDED[3]						
			PRESSURE DOSING REQUIRED[4]			
ITEM	OWTS DESIGN CONSIDERATION	TL1 AND TL2	TL2N	TL3	TL3N	TL3ND
HORIZONTAL SEPARATION DISTANCES						
1	Distance from soil treatment area to wells[5]	100 feet	100 feet	100 feet	100 feet[1]	100 feet[1]
2	Distance from effluent pipes & soil treatment area to pond, creek, lake, or other surface water feature	50 feet	25 feet	25 feet	25 feet	25 feet
3	Distance from soil treatment area to dry gulch or cut bank	25 feet	10 feet	10 feet	10 feet	10 feet
VERTICAL SEPARATION DISTANCES						
4A	Treatment depth in feet from infiltrative surface to a limiting layer or groundwater condition	4 feet[2] (3 feet with pressure dosing)	2.5 feet	2.5 feet	2 feet	1 foot
4B	Treatment depth in feet from infiltrative surface to a limiting layer, or groundwater condition with the inclusion of an unlined sand filter	3 feet for TL1[2], 2.5 feet for TL2[2]	2.5 feet	2 feet	2 feet	1 foot

NOTE: Treatment levels are defined in Table 4. Reductions in separation distances with higher level treatment are available as the Department Regulations have included provisions for operation and maintenance.

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 TL3N and TL3ND effluent, a reduction to 75 feet is allowed if a variance from the Water Well Construction Regulations is obtained. Note that the Division

of Water Resources does not address inquiries for existing wells. Local agencies must follow the same review principles, as provided within division's guidance document; "Variances for water wells"; March 2019.

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.
3. Refers to the quality of effluent applied to the distribution media.
4. Pressure dosing is required for all TL2N, TL3, TL3N, and TL3ND systems.
5. 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.

TABLE 8: APPROVED PIPE BEDDING MATERIAL	
SIEVE SIZE	**PERCENT PASSING**
3/8”	100
#4	70-80
#8	10-25
#16	0-10
#200	0-1

TABLE 9: MINIMUM SEPTIC TANK SIZE BASED ON NUMBER OF BEDROOMS	
NUMBER OF BEDROOMS	**TANK CAPACITY (GALLONS)**
2 or 3	1,000
4	1,250
5	1,500
6	1,750
7	2,000
8	2,250
9	2,500
Each Additional	250

Note: The septic tank capacities listed above may differ if a grinder pump and/or a higher level treatment system are installed. Refer to Sections 12.2.B.5 and 12.2.B.6 of this regulation.

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

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

1. Treatment levels are defined in Table 4.
2. The determination of long-term acceptance rates must also include an evaluation of soil consistence (identification of "cementation class"). Refer to the Rupture Resistance chart, Table 18. Moderately to very strongly cemented soils will typically have characteristics of Type 3A or 4A soils. Long term acceptance rates should be reduced to coincide with the expected permeabilities.
3. Soil types 4A and 5 will require the effluent to be dispersed via pressure distribution, with a minimum of two alternately dosed zones.
4. Higher long-term acceptance rates for Treatment Levels 3N and 3ND 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: DESIGN CRITERIA FOR SOILS WITH HIGH ROCK CONTENT (TYPE "R" SOILS)[1,2,3,4]							
Soil type, percent of rock, size of sock, excavation difficulty, and soil permeability[3]				**Required sand depth relative to the quality of effluent applied to the distribution cell[7]**			
Soil Type[1]	**Soil Matrix Type, Percent of Rock, and Size of Rock[3,4]**	**Excavation Difficulty[1]**	**Soil Permeability (MPI)[1, 2]**	**Treatment Level 1[7, 8]**	**Treatment Level 2 and 2N[7]**	**Treatment Level 3 and 3N[7]**	**Treatment Level 3ND[7]**
FBR	In-situ Fractured Bedrock (FBR)	Low, Moderate, High, Very High, Extremely High	0 - >90, usually rapid in highly fractured bedrock	Minimum 3-foot deep unlined sand filter	Minimum 2.5-foot deep Unlined Sand Filter	Minimum 2-foot deep Unlined Sand Filter	Minimum 1-foot deep Unlined Sand Filter
DBR	In-situ Deteriorated Bedrock (DBR)	Low, Moderate, High	41 – >90, typically slower than expected for the texture	Minimum 2-foot deep unlined sand filter	Minimum 1-foot deep Unlined Sand Filter	Sand media not required	Sand media not required
R-0	Soil Type[3] 1where more than 35% rock is greater than 2mm in size	Low - Tile spade with arm pressure	0 to 15	Minimum 3-foot deep unlined sand filter	Minimum 2.5-foot deep Unlined Sand Filter	Minimum 2-foot deep Unlined Sand Filter	Minimum 1-foot deep Unlined Sand Filter
R-1	Soil Type[3] 2 – 4,with 35 - 65% rock (>2mm); where 50% or more of the rock is less than 20mm (3/4 inch)	Low - Tile spade with arm pressure to Moderate - Tile spade with foot pressure	16 to 90, varies relative to soil type and cementation class	Minimum 2-foot deep unlined sand filter	Minimum 1-foot deep Unlined Sand Filter	Sand media not required	Sand media not required
R-2	Soil Type[3] 2 – 4,with more than 65% rock (>2mm); OR contains 35-65% rock (>2mm), where 50% or more of rock is more than 20 mm (3/4 inch)	Low - Tile spade with arm pressure to Moderate - Tile spade with foot pressure	16 to 90, varies relative to soil type and cementation class	Minimum 3-foot deep unlined sand filter	Minimum 2.5-foot deep Unlined Sand Filter	Minimum 2-foot deep Unlined Sand Filter	Minimum 1-foot deep Unlined Sand Filter
R-3	Soil Type[3] 2 – 4 (Loam, Clay Loam, Clay) with 65% or more of the rock greater than 2 mm OR Soil Type[3] 4A and 5 (Structureless clay, or other platy structured soil) with more than 35% rock	High – Tile spade is difficult, pick using over-the-head swing is easy. Very High – Pick with over-the head swing is moderate to markedly difficult. Extremely High – Pick with over-the-head swing is nearly impossible.	Greater than 90	Minimum 3-foot deep unlined sand filter	Minimum 2.5-foot deep Unlined Sand Filter	Minimum 2-foot deep Unlined Sand Filter	Minimum 1-foot deep Unlined Sand Filter

See the next page for footnotes for this table.

1) General guidance for Table 11:

a) FBR: Fractured Bedrock – As this category encompasses a variety of site conditions where the percentage of rock, excavation difficulty, and permeability may vary substantially, all information must be used by the design engineer to determine the proper long term acceptance rate. Table 12 provides guidance for this determination.

b) DBR: Deteriorated Bedrock – As this category encompasses a variety of site conditions where the percentage of rock, excavation difficulty, and permeability may vary substantially, all information must be used by the design engineer to determine the proper long term acceptance rate. Table 13 provides criteria for this determination.

c) Soil Type R-0 is a limiting layer due to rapid permeability and a high rock content that provides limited surface area for adequate treatment.

d) Soil Types R-2 and R-3 are restrictive layers due to reduced permeability and/or a high rock content, each providing a limited surface area for adequate treatment. In many cases, the only difference between an R-2 and R-3 soil type will be the "excavation difficulty" and/or soil permeability.

e) An OWTS installed in "Type R Soils" must disperse effluent through an unlined sand filter, unl

i) Treatment Level 3ND is attained and the requirements of 43.12.F are met.

ii) Site conditions are determined to be a soil Type DBR, or R-1, and Treatment Level 3 or 3N effluent is attained prior to dispersal to the soil treatment area.

f) "Excavation Difficulty" is provided in Table 13.

2) Provisions for determining the long-term acceptance rates for soils referenced in this chart are provided in Section 14.3.C. The design of systems in type "R" soils must conform to the requirements of Sections 14.3.C and 14.3.D.

3) The "Soil Matrix Type, Percentage and Size of Rock" column references the soil types described in Table 11.

4) The percentage of rock may be determined by a gradation conducted per ASTM standard D6913-17 (2017 version), or a visual determination as per pages 7-1 through 7-9 of the NRCS Field Book, Version 3, 2021 reprint.

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

6) Pressure distribution is required for all "R" Soil Types and shall comply with the requirements of Sections 13.5.G.

7) Minimum imported sand depths are provided in this table. NOTE HOWEVER THAT AN ADDITIONAL VERTICAL SEPARATION ABOVE A LIMITING LAYER OR GROUNDWATER CONDITION MAY BE NECESSARY TO MEET THE REQUIREMENTS OF TABLE 7.

8) Type "R" soil treatment systems that are designed per the criteria noted in the Treatment Level 1 column of this table do not require operation and maintenance oversight by the Department.

TABLE 12: FRACTURED BEDROCK (FBR) LTAR GUIDANCE		
Distance between fractures in FBR*	**Code**	**LTAR**
<4 inches	1	Soil Type 1
4 to < 18 inches	2	Soil Type 1
18 to < 40 inches	3	Soil Type 2
40 to < 80 inches	4	Soil Type 3
Above 80 inches	5	Soil Type 4

Table 12 is intended to provide guidance to the design engineer in determining the appropriate LTAR for the soil treatment area. Fractured bedrock formations typically consist of many variables, resulting in a wide range of permeabilities. The design engineer should take all factors into consideration before identifying a specific LTAR for each site. In certain instances, percolation tests may be necessary to more accurately identify the appropriate LTAR.

*Describes the dominant (average) horizontal spacing between vertical joints (geogenic cracks or seams) in the bedrock layer.

Reference: NRCS Field Book for Describing and Sampling Soils, Version 3.0; 2021 Reprint; Geology Section, page 1-24. Note: The LTAR identified in this table is not included in the NRCS Field Book.

TABLE 13: LTAR DETERMINATION FOR DETERIORATED BEDROCK (DBR) EXCAVATION DIFFICULTY: THE RELATIVE FORCE OR ENERGY REQUIRED TO EXCAVATE THE SOIL/ROCK.	
Class	**Criteria**
Low	Excavation by tile spade requires arm pressure only; impact energy or foot pressure is not needed
Moderate	Excavation by tile spade requires impact energy or foot pressure; arm pressure is insufficient
High	Excavation by tile spade is difficult but easily done by pick using over-the-head swing
Very High	Excavation by pick with overhead swing is moderately to markedly difficult. Backhoe excavation by 50 – 80 hp tractor CAN be made in moderate time.
Extremely High	Excavation by pick is nearly impossible. Backhoe excavation by 50 - 80 hp tractor CANNOT be made in a reasonable time.

Note: Depending on the “Excavation Difficulty” in a DBR soil, the proposed LTAR must increase by the following: one soil type for “moderate”, two soil types for “high”, and three soil types for “very high” or “extremely high” excavation difficulty from the soil type of the observed soil texture; with a maximum soil type 5 LTAR. Soil types provided in Table 10.

Source: NRCS Field Book for Describing and Sampling Soils, Version 3.0; 2021 Reprint; Consistence Section, page 2-69.

TABLE 14: SIZE ADJUSTMENT FACTORS FOR METHODS OF APPLICATION IN SOIL TREATMENT AREAS RECEIVING TREATMENT LEVELS 1, 2, 2N, 3, 3N, AND 3ND 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	1.0	0.9	0.8
Bed	1.2	1.1	1.0

TABLE 15: SIZE ADJUSTMENT FACTORS FOR TYPES OF DISTRIBUTION MEDIA IN SOIL TREATMENT AREAS FOR RECEIVING TREATMENT LEVEL 1 EFFLUENT[1]			
Type of Soil Treatment Area	**Type of distribution media used in soil treatment area[1]**		
	Category 1: Rock or tire chips	**Category 2: Other manufactured media**	**Category 3: Chambers or enhanced manufactured media**
Trench or bed; Soil types 1 - 4	1.0	0.9	0.7
Trench or bed; Soil types 4A - 5	1.2	1.1	1.0

1) All proprietary distribution products must receive acceptance and the applicable size adjustments through Division review per the applicable requirements of Section 16.5.

TABLE 16: NDDS SIZE ADJUSTMENT FACTORS		
Soil Type	**Percolation Rate**	**Size Adjustment Factor**
1, 2, 2A, & 3[1]	N/A	N/A
3A	61-75	2.2
4	76-90	1.7
4A	91-120	1.5
5	121+	1.4

1) Soil types 1, 2, 2A, & 3 are unsuitable for an NDDS.

TABLE 17: GRADATION OF WICKING SAND FOR EVAPOTRANSPIRATION BEDS	
Sieve Size	**Percent Passing**
4	100
40	50-70
200	<15

TABLE 18: RUPTURE RESISTANCE: BLOCKS, PEDS, CLODS – ESTIMATE THE CLASS BY THE FORCE REQUIRED TO RUPTURE (BREAK) A SOIL UNIT	
Dry Cementation Class	**Minimum force required to rupture specimen**
Loose	Intact specimen not obtainable
Non-cemented	Very slight force between fingers
Extremely weakly cemented	Slight force between fingers
Very weakly cemented	Moderate force between fingers
Weakly cemented	Strong force between fingers
Moderately cemented	Moderate force between hands
Strongly cemented	Foot pressure by full body weight
Very strongly cemented	Ruptured by blow of less than 4.5 lbs. dropped from 6 inches, but not ruptured by full body weight
Indurated	Ruptured by blow of greater than or equal to 4.5 lbs. weight dropped from 6 inches

Modified from: NRCS Field Book for Describing and Sampling Soils, Version 3.0; 2021 Reprint; Consistence Section. Dry rupture resistance applies to soils that are moderately dry or drier.

APPENDIX B - DIAGRAMS

ADAMS COUNTY
HEALTH DEPARTMENT
Your Health. Our Mission.

On-site Wastewater Treatment System Record Drawing

Property Address _____

Permit # _____

System Completion Date _____

Installer Name _____

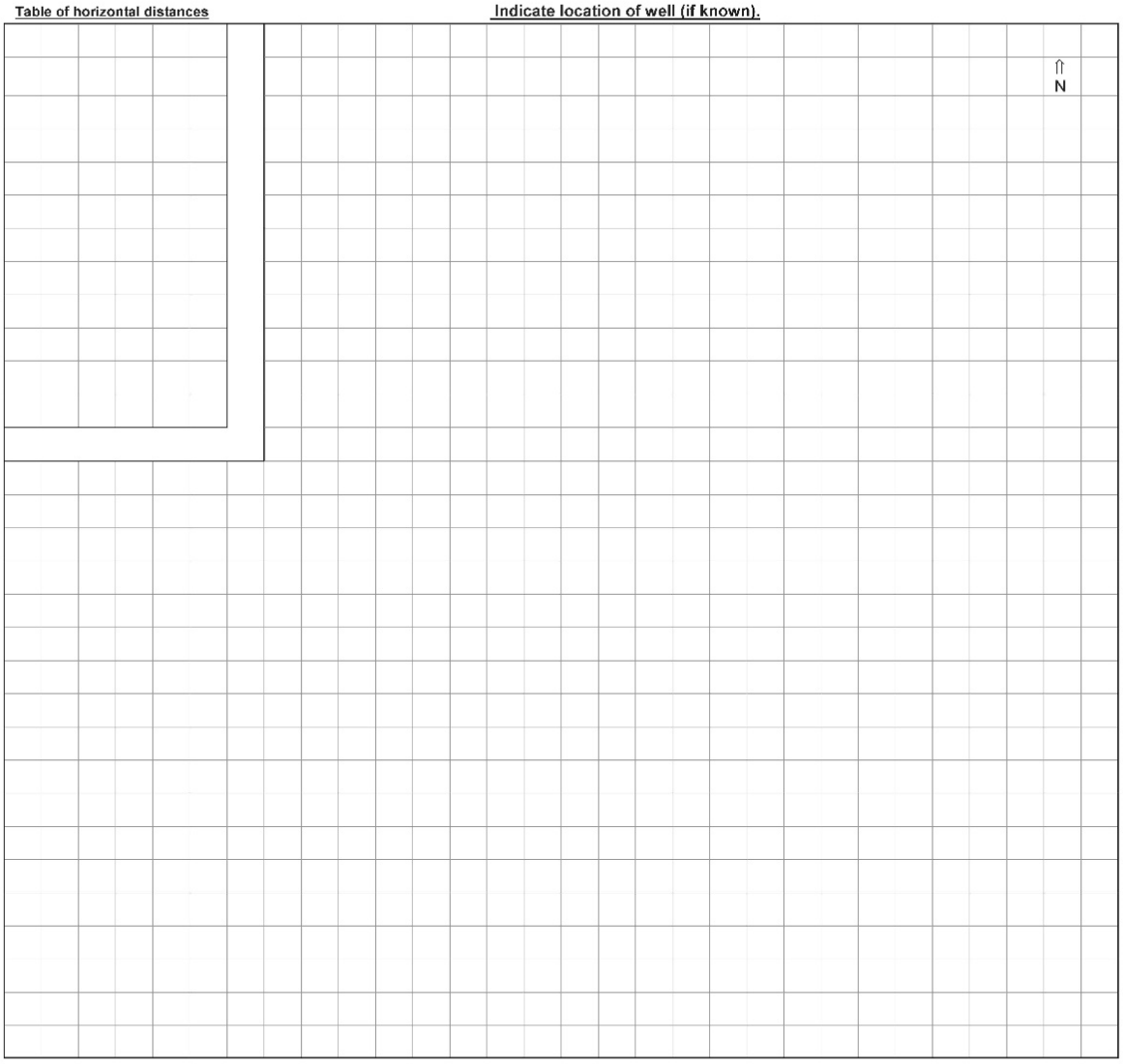
Installer License # _____

Installer Address _____

Installer Phone _____

Table of horizontal distances

Indicate location of well (if known).



ACHD S-103

Diagram 1
Sheet 1/2

04/25

ADAMS COUNTY
HEALTH DEPARTMENT
Your Health. Our Mission.

On-site Wastewater Treatment System Record Drawing

Property Address 1234 Joe Smith Street, Exampletown CO

Permit # OWTS---

System Completion Date 04/16/2025

Installer Name Joe Smith

Installer License # CI---

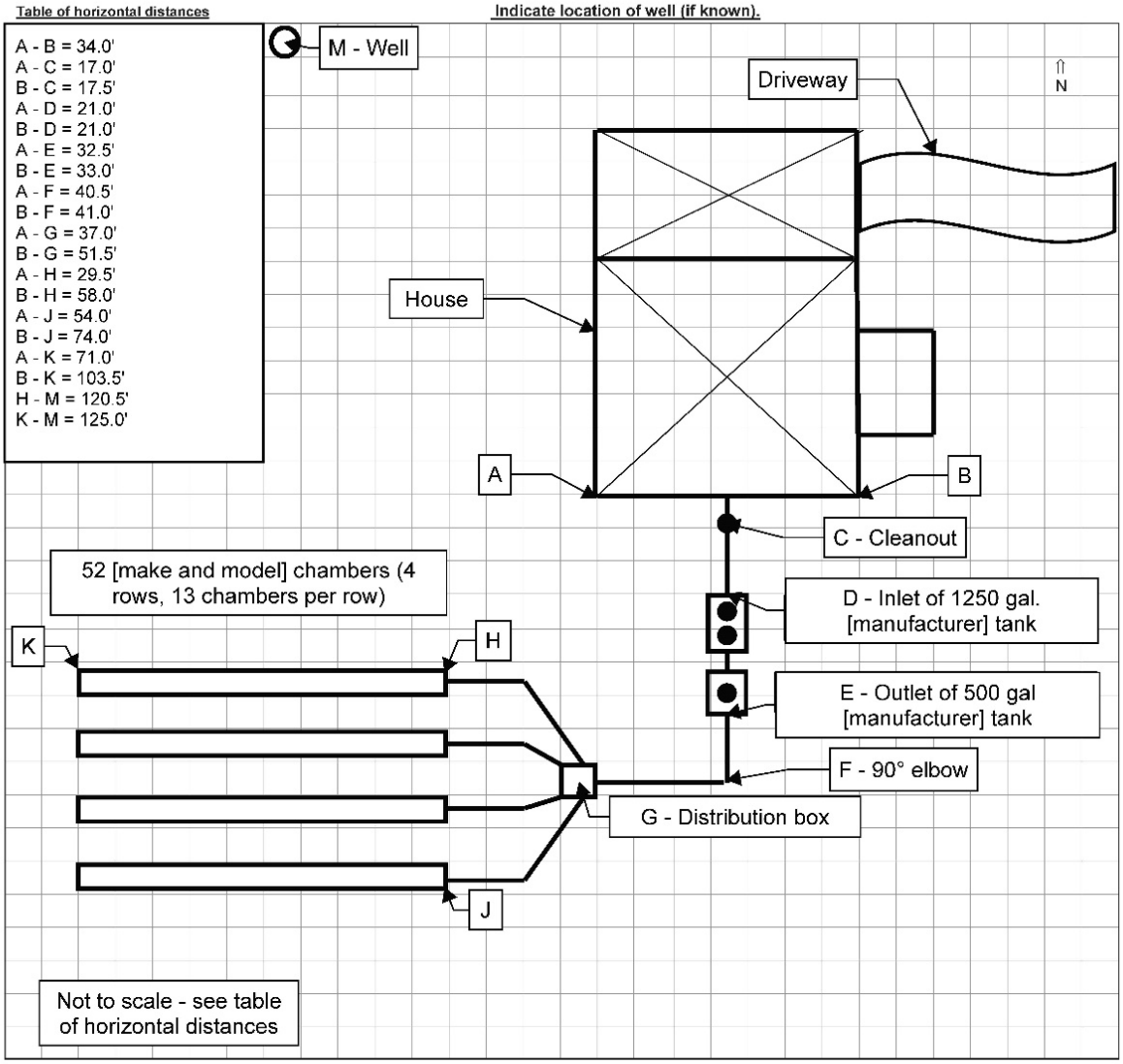
Installer Address Joe Smith Street, Exampletown CO Installer

Installer Phone (303) 555-0125

Table of horizontal distances

A - B = 34.0'
A - C = 17.0'
B - C = 17.5'
A - D = 21.0'
B - D = 21.0'
A - E = 32.5'
B - E = 33.0'
A - F = 40.5'
B - F = 41.0'
A - G = 37.0'
B - G = 51.5'
A - H = 29.5'
B - H = 58.0'
A - J = 54.0'
B - J = 74.0'
A - K = 71.0'
B - K = 103.5'
H - M = 120.5'
K - M = 125.0'

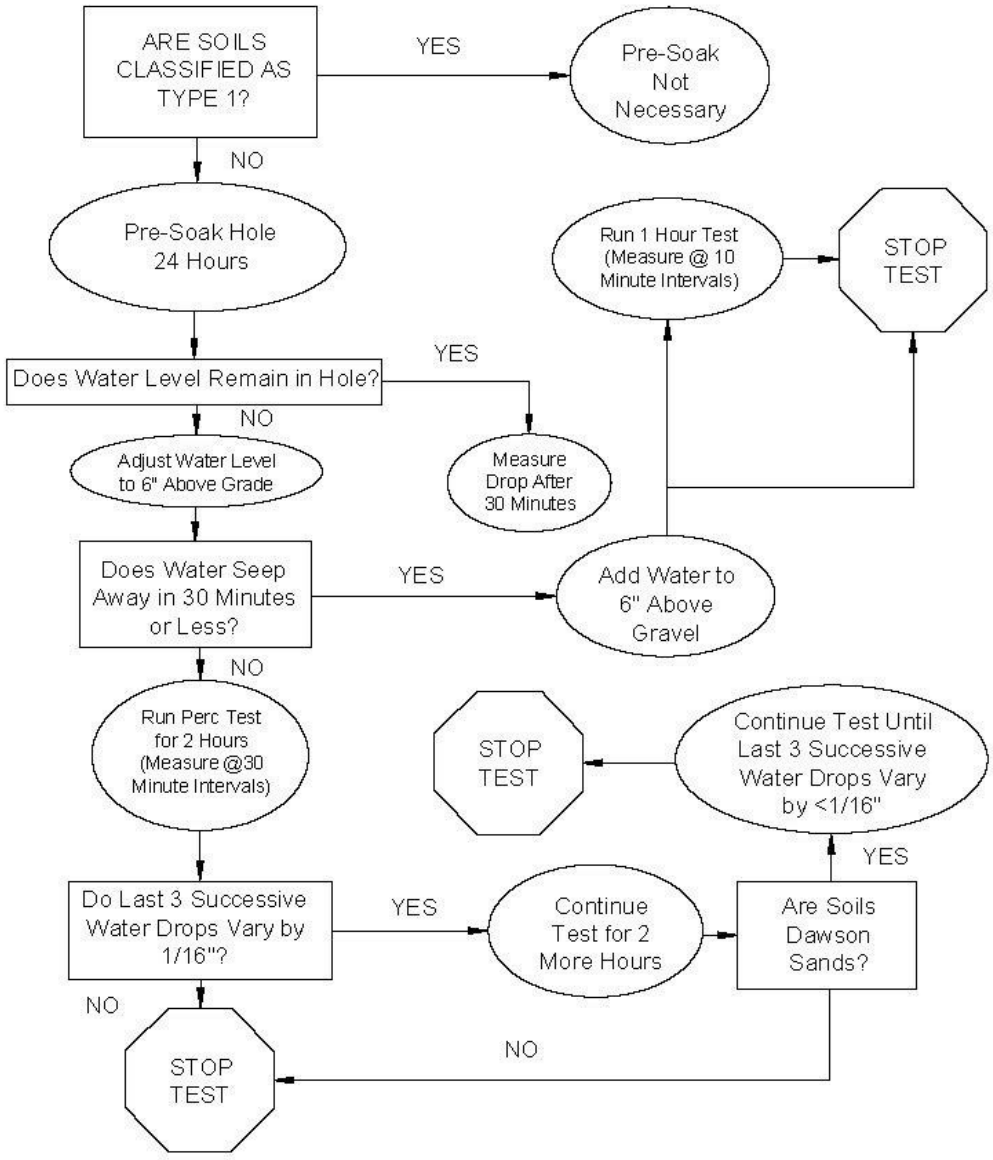
Indicate location of well (if known).



S-481

Diagram 1
Sheet 2/2

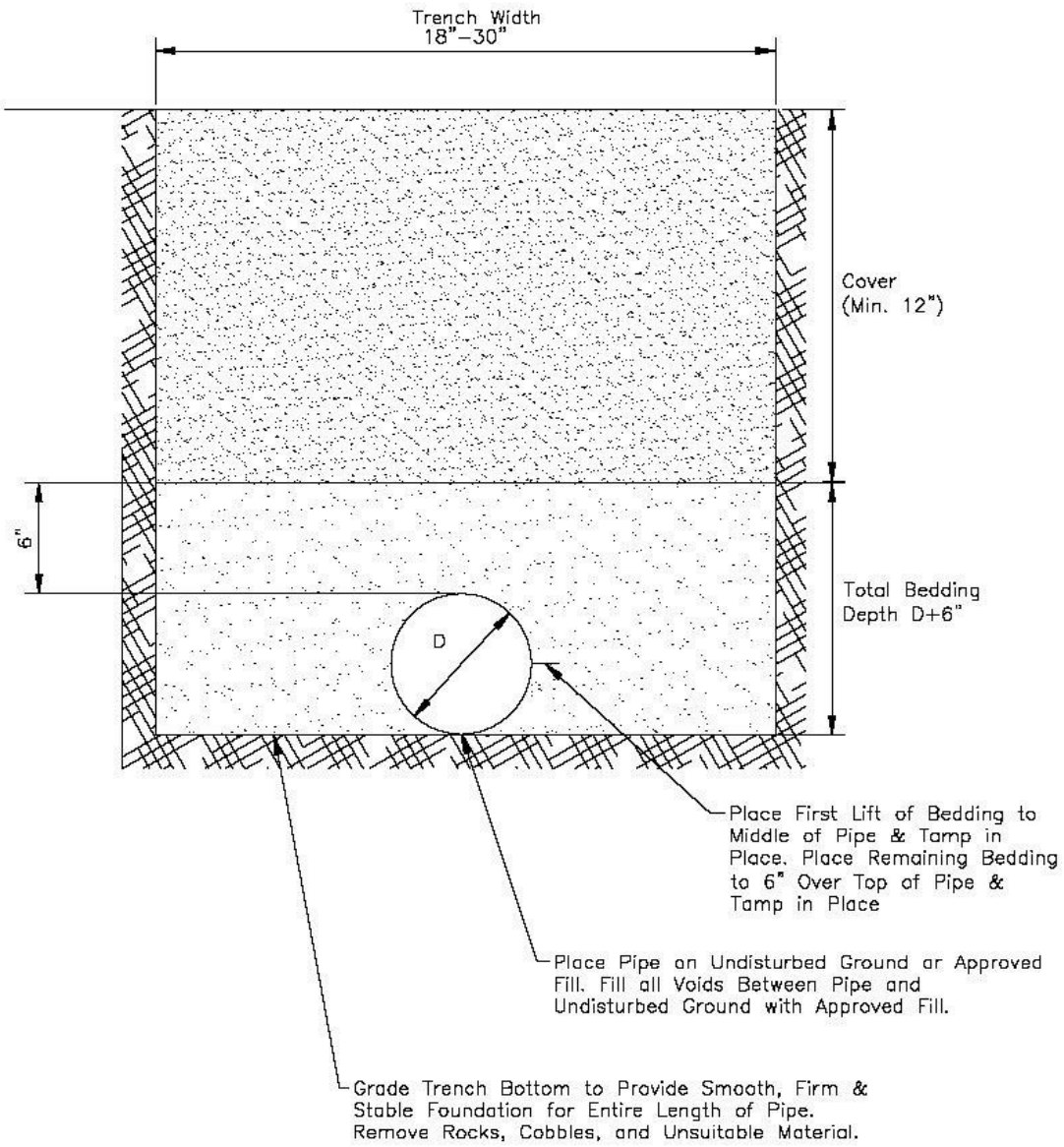
04/25



Percolation Test Procedure

ADAMS COUNTY
HEALTH DEPARTMENT
Your Health. Our Mission.

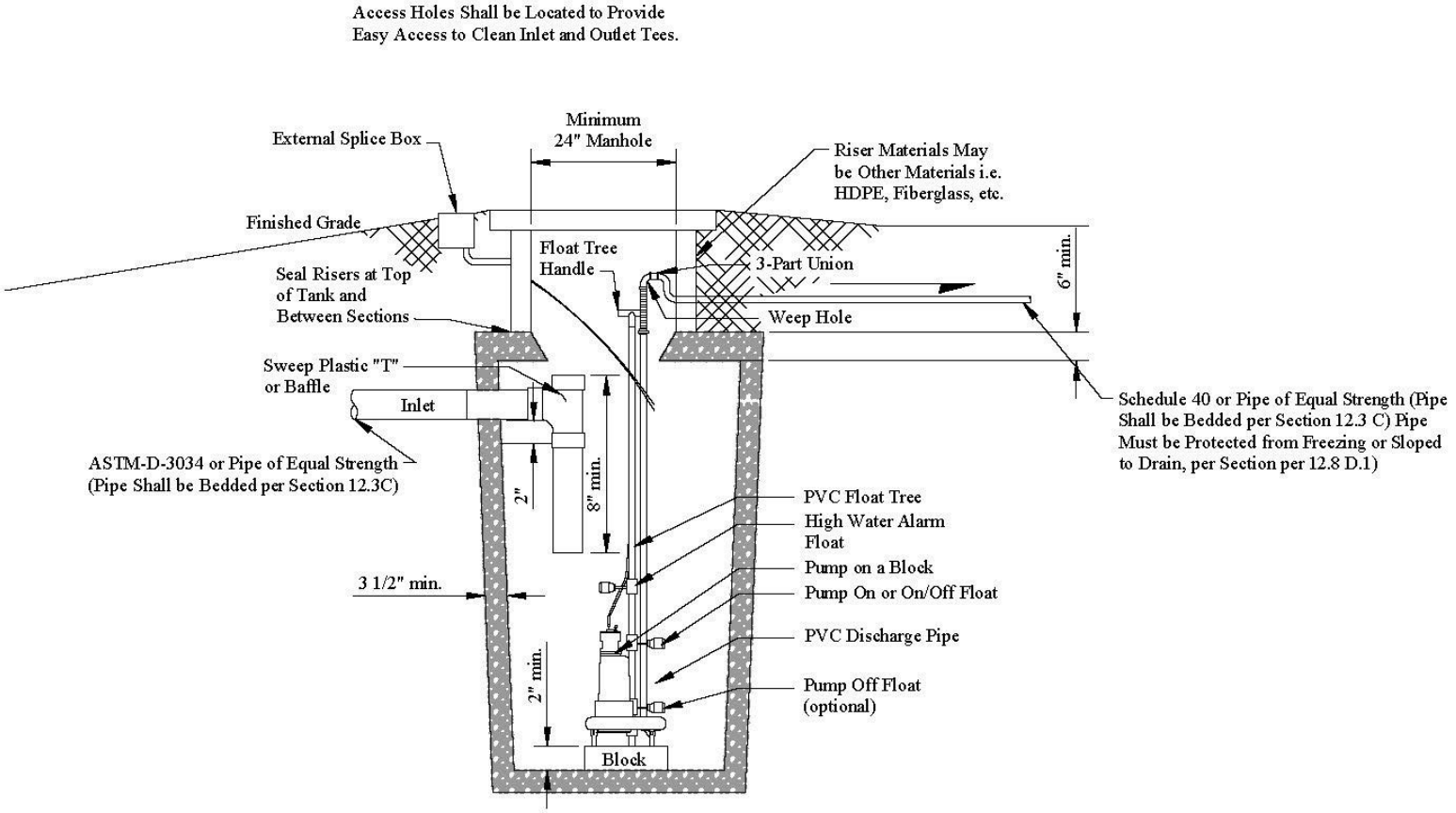
Diagram 2
Sheet 1/1



Pipe Bedding Detail

ADAMS COUNTY
HEALTH DEPARTMENT
Your Health. Our Mission.

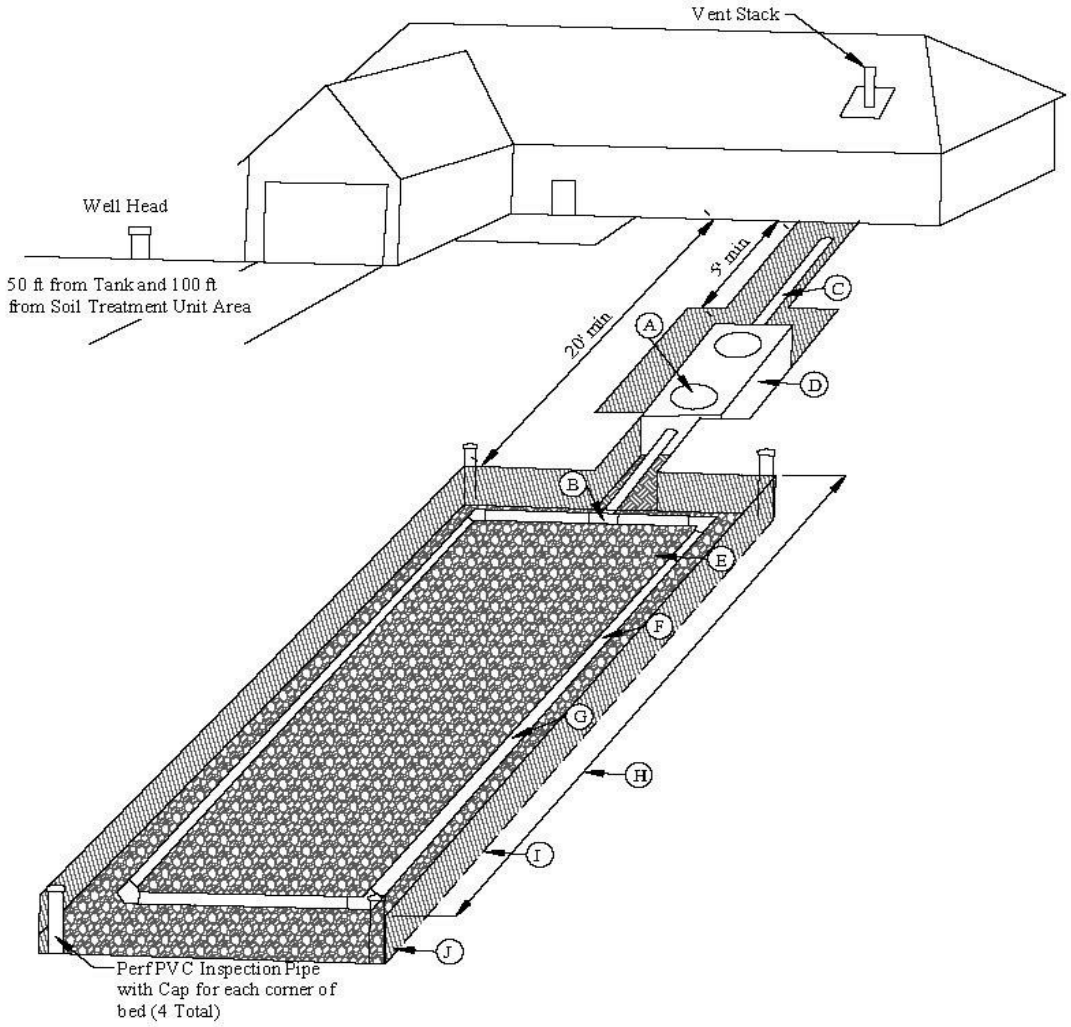
Diagram 3
Sheet 1/1



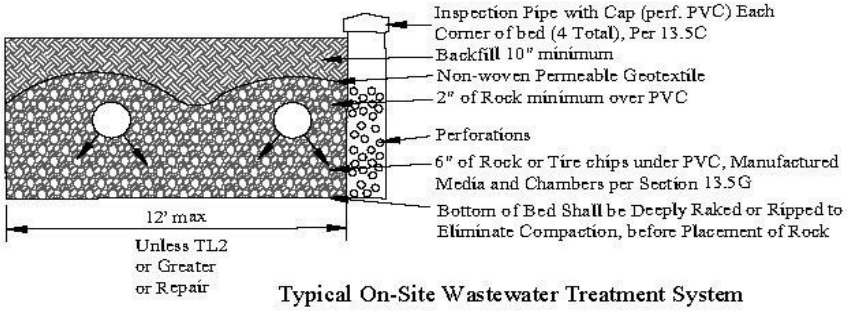
Typical Concrete Dosing Tank

ADAMS COUNTY
HEALTH DEPARTMENT
Your Health. Our Mission.

Diagram 4
Sheet 1/1



No Part of the System can be Backfilled Prior to Inspection



Typical On-Site Wastewater Treatment System

ADAMS COUNTY
HEALTH DEPARTMENT
Your Health. Our Mission.

Diagram 5
Sheet 1/2

TYPICAL ON-SITE WASTEWATER TREATMENT SYSTEM

A. Both manhole lids and risers shall extend to grade.

B. "T" - set level and may be attached at any point.

C. At least one-quarter (1/4) inch per foot (2%) fall. Clean-out required if one hundred (100) feet or more. Pipe shall be bedded per Diagram 3.

D. Two-compartment tank or two (2) tanks in series, set level. both inlet and outlet must have a "T" or baffle.

E. One (1) foot clean, graded rock, one-half (1/2) inch to two and one-half (2-1/2) inch in size, tire chips chambers or manufactured media.

F. Perforated PVC imbedded in rock at least two (2) inches over top and six (6) inches below. Perforated PVC must be three (3) feet from edge of bed and no more than six (6) feet apart.

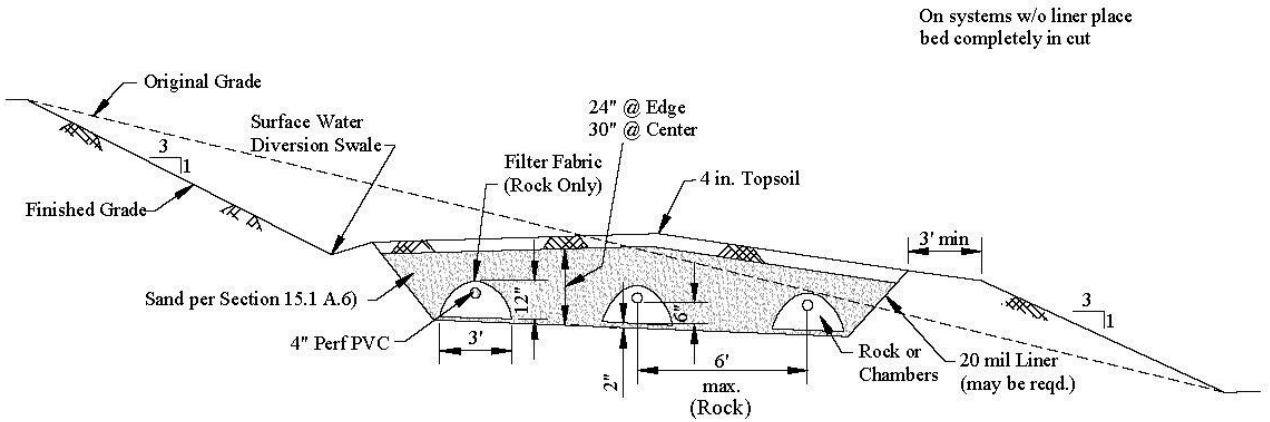
G. Perforated PVC must be level.

H. Soil treatment area (STA) shall not exceed one hundred (100) feet in length unless pressure dosed - must be ten (10) feet from property.

I. STA width shall not exceeded 12 feet, unless receiving TL2 effluent or better or for repair if approved by the Department.

J. STA depth shall not exceed four feet on up-slope side.

Bottom of bed or trench excavated level. STA shall not be excavated when soil is wet enough to smear or compact. Perforated PVC shall be placed so that perforations are opposite each other at the bottom (see end view drawing). The ends must be capped or may be looped.

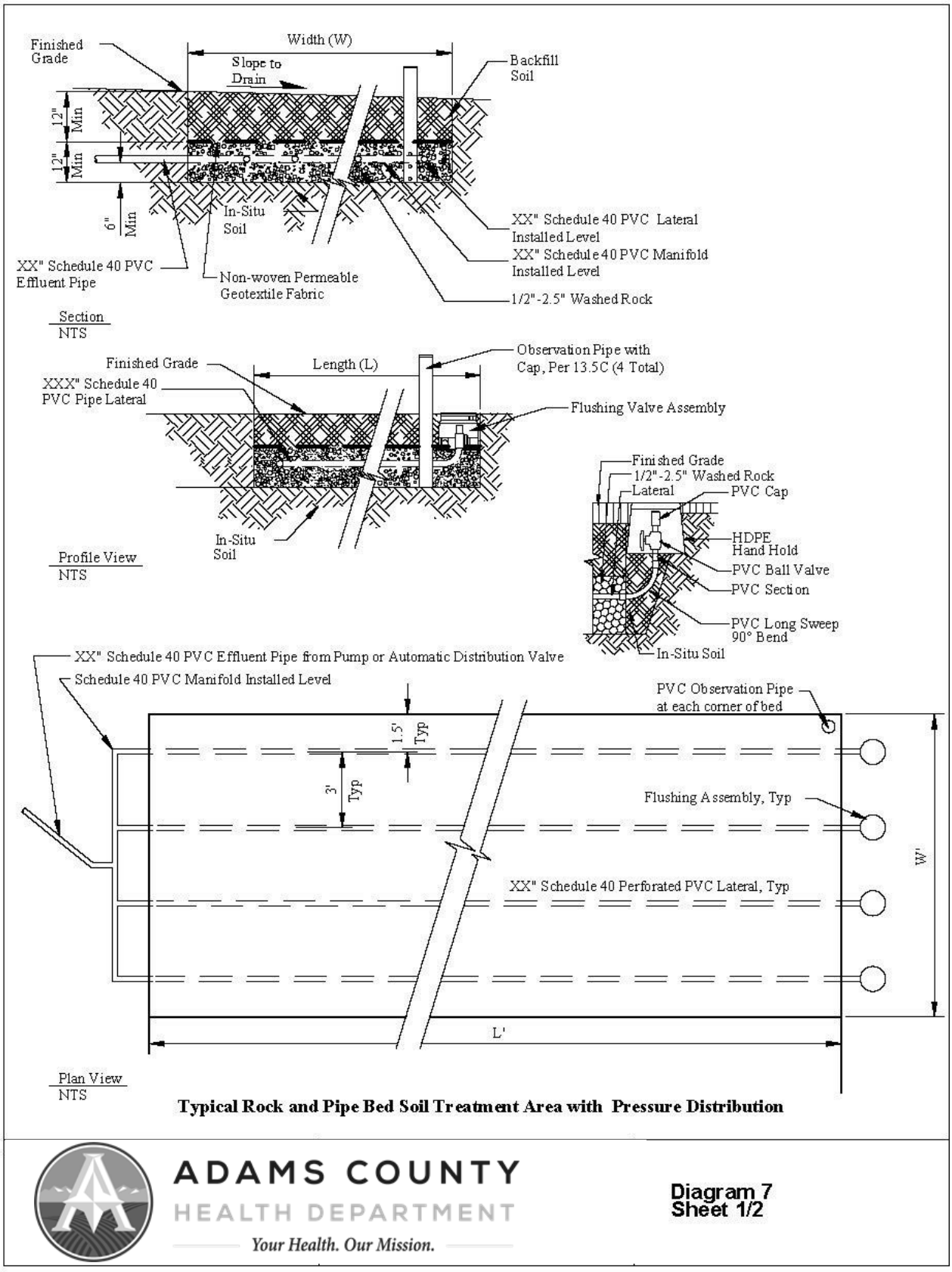


Not To Scale

Typical Evapotranspiration (ET) Bed Section

ADAMS COUNTY
HEALTH DEPARTMENT
Your Health. Our Mission.

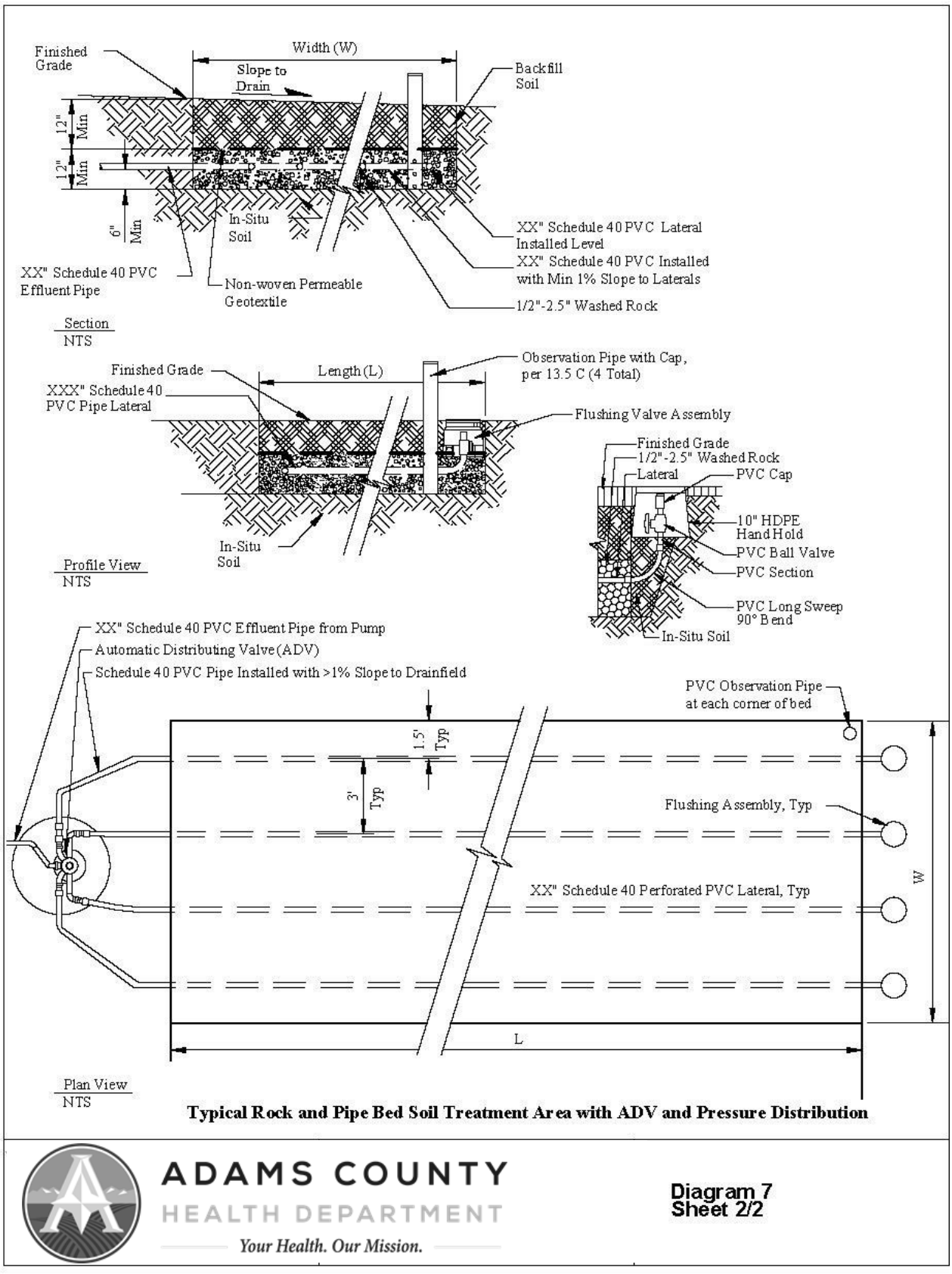
Diagram 6
Sheet 1/1



Typical Rock and Pipe Bed Soil Treatment Area with Pressure Distribution

ADAMS COUNTY
HEALTH DEPARTMENT
Your Health. Our Mission.

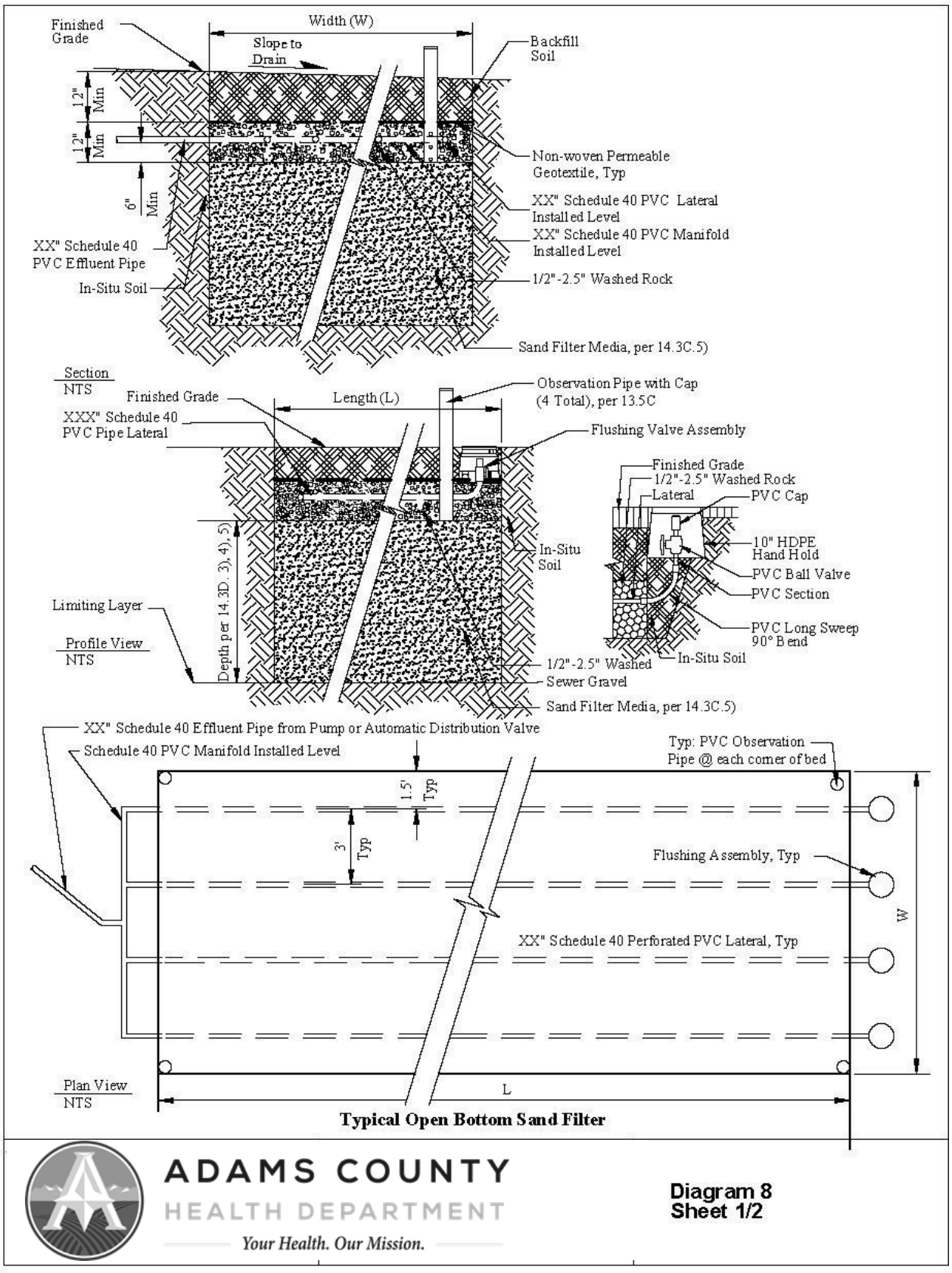
Diagram 7
Sheet 1/2

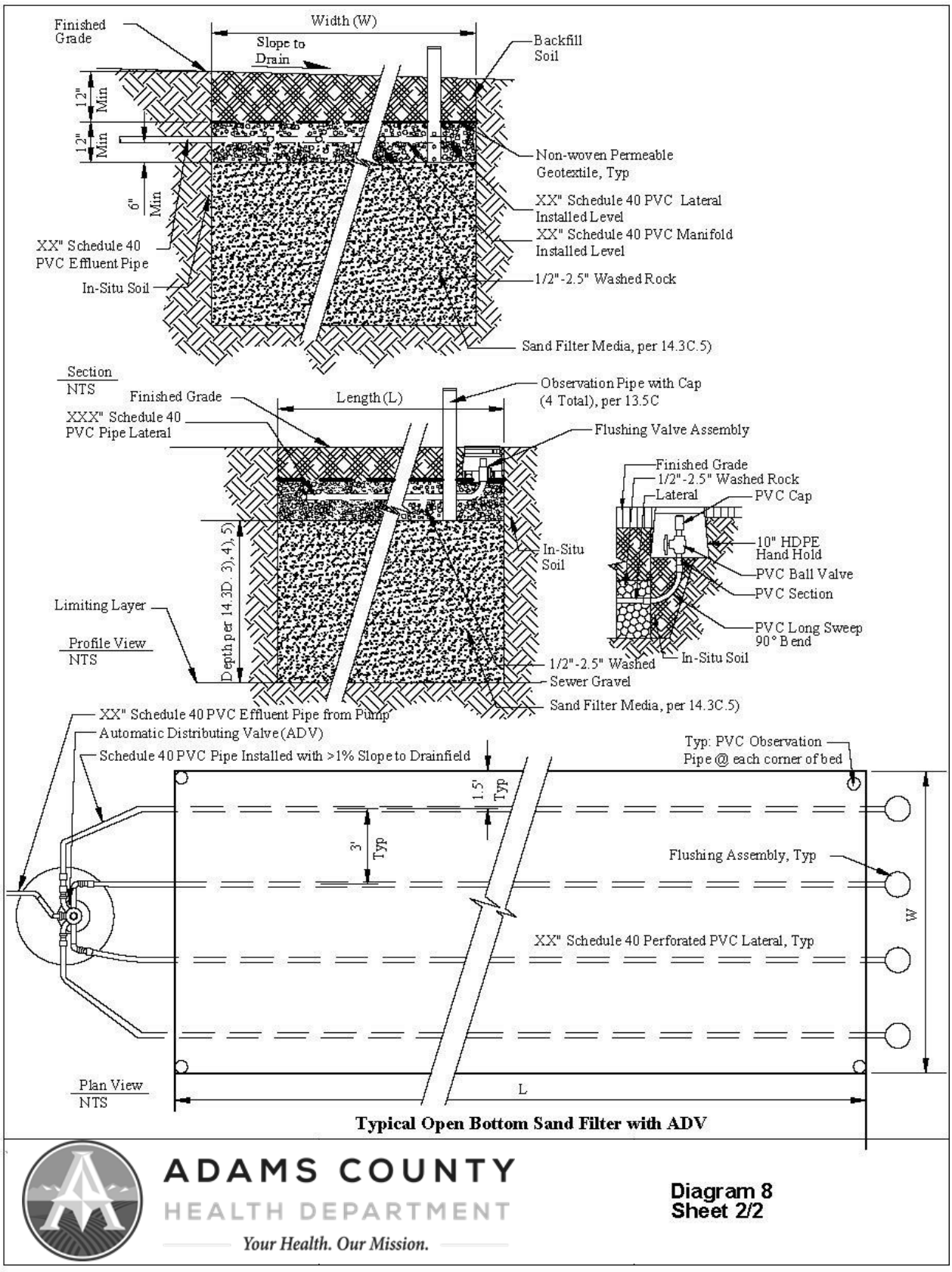


Typical Rock and Pipe Bed Soil Treatment Area with ADV and Pressure Distribution

ADAMS COUNTY
HEALTH DEPARTMENT
Your Health. Our Mission.

Diagram 7
Sheet 2/2

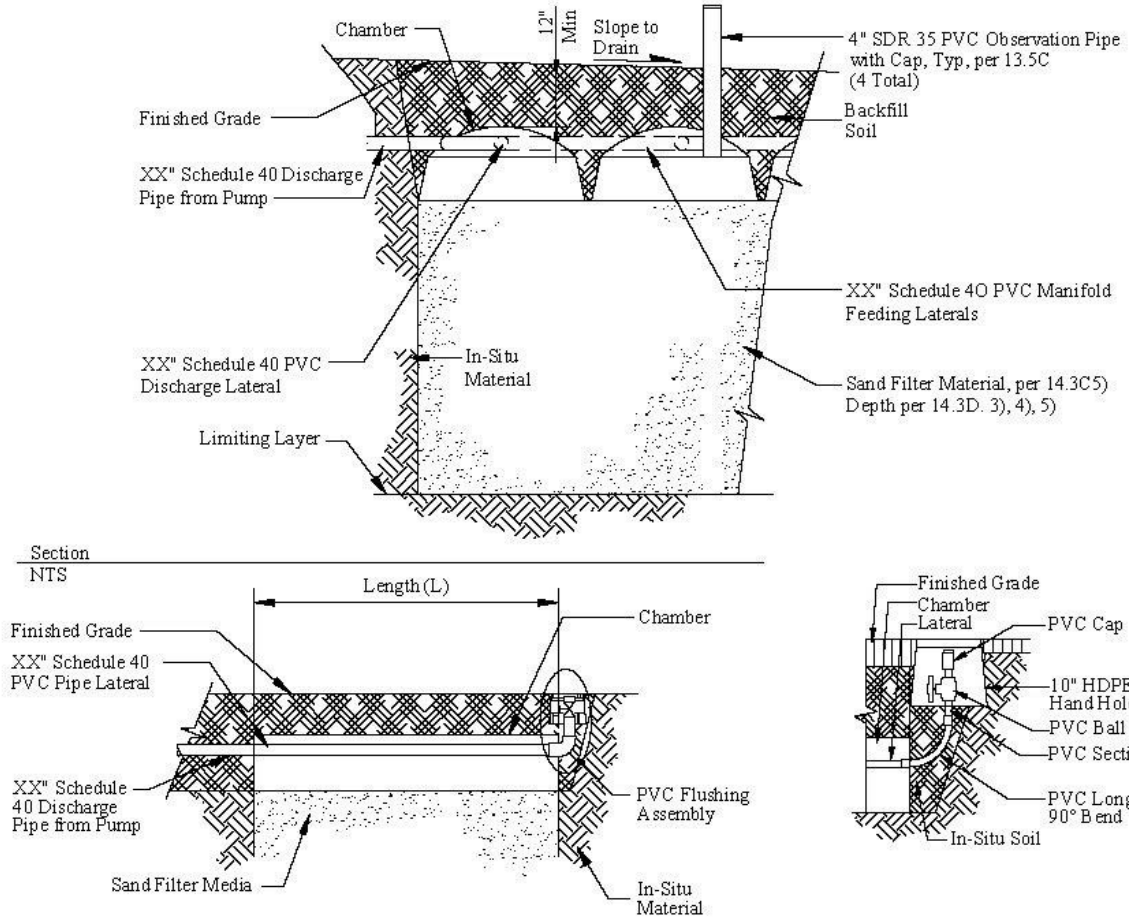

Finished Grade
Width (W)
Slope to Drain
Backfill Soil
12" Min
12" Min
6" Min
Non-woven Permeable Geotextile, Typ
XX" Schedule 40 PVC Lateral Installed Level
XX" Schedule 40 PVC Manifold Installed Level
XX" Schedule 40 PVC Effluent Pipe
In-Situ Soil
1/2"-2.5" Washed Rock
Sand Filter Media, per 14.3C.5)
Section
NTS
Finished Grade
Length (L)
Observation Pipe with Cap (4 Total), per 13.5C
XXX" Schedule 40 PVC Pipe Lateral
Flushing Valve Assembly
Finished Grade
1/2"-2.5" Washed Rock
Lateral
PVC Cap
10" HDPE Hand Hold
PVC Ball Valve
PVC Section
PVC Long Sweep 90° Bend
In-Situ Soil
In-Situ Soil
Limiting Layer
Depth per 14.3D. 3), 4), 5)
Profile View
NTS
1/2"-2.5" Washed
Sewer Gravel
Sand Filter Media, per 14.3C.5)
XX" Schedule 40 Effluent Pipe from Pump or Automatic Distribution Valve
Schedule 40 PVC Manifold Installed Level
Typ: PVC Observation Pipe @ each corner of bed
1.5' Typ
3' Typ
Flushing Assembly, Typ
XX" Schedule 40 Perforated PVC Lateral, Typ
W
Plan View
NTS
L
Typical Open Bottom Sand Filter
ADAMS COUNTY
HEALTH DEPARTMENT
Your Health. Our Mission.
Diagram 8
Sheet 1/2



Typical Open Bottom Sand Filter with ADV

ADAMS COUNTY
HEALTH DEPARTMENT
Your Health. Our Mission.

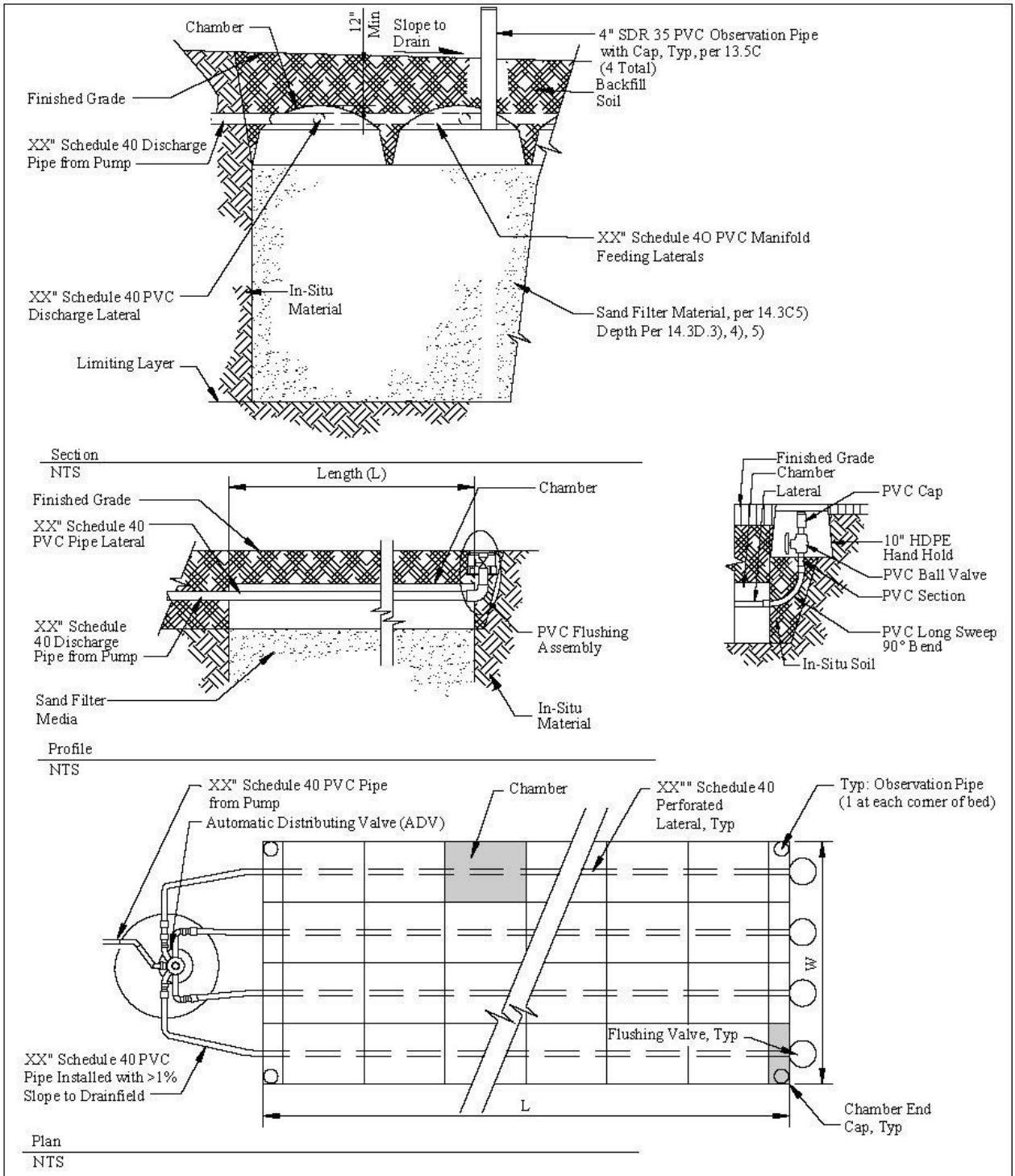
Diagram 8
Sheet 2/2



Typical Open Bottom Sand Filter with Chambers

ADAMS COUNTY
HEALTH DEPARTMENT
Your Health. Our Mission.

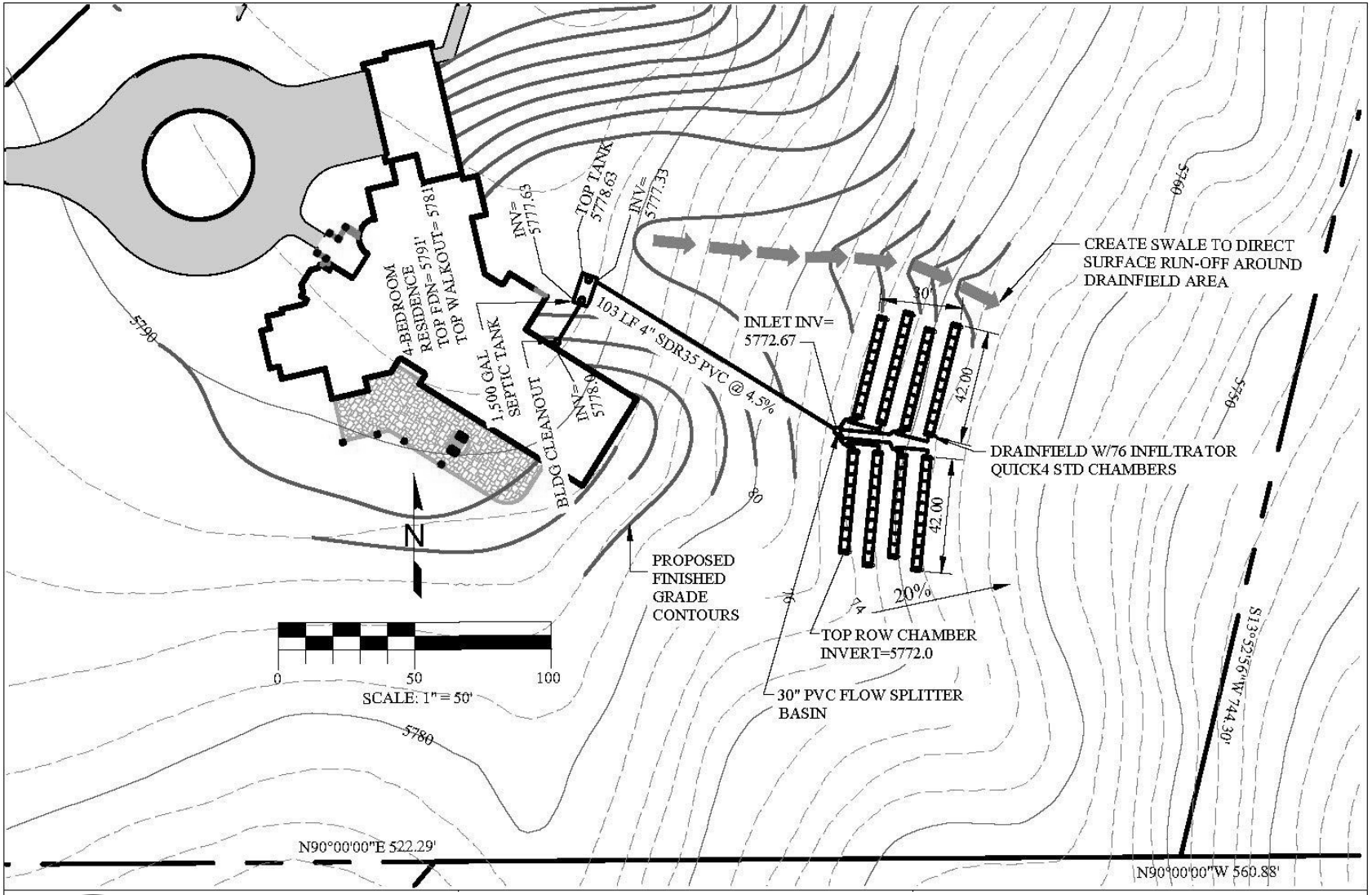
Diagram 9
Sheet 1/2



Typical Open Bottom Sand Filter with Chambers with ADV

ADAMS COUNTY
HEALTH DEPARTMENT
Your Health. Our Mission.

Diagram 9
Sheet 2/2



ADAMS COUNTY
HEALTH DEPARTMENT
Your Health. Our Mission.

Example Scale Drawing of an OWTS

Diagram 10
Sheet 1/1