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1.0 Purpose of Regulations.

- A) The Butte-Silver Bow City-County Board of Health recognizes the importance of the proper treatment and disposal of wastewater. Diseases such as dysentery, infectious hepatitis, typhoid, paratyphoid, and various types of diarrheal infections are transmitted through fecal contamination of food and water. Improper treatment and disposal of wastewater plays an important role in the transmission of these diseases. Wastewater also contains many chemicals, which can adversely affect drinking water quality if disposed of improperly. Every effort should be made to prevent such hazards. Proper treatment and disposal of wastewater is essential for preventing disease and protecting drinking water.
- B) Safe treatment and disposal of all wastewater is necessary to protect public health and the environment and to prevent disease. Therefore, wastewater must be treated and disposed of so that it will not:
  - 1) contaminate any existing or future drinking water supply.
  - 2) pollute or contaminate any surface or ground water.
  - 3) be accessible to insects, rodents or other carriers of disease that may come into contact with food or drinking water.
  - 4) be a health hazard by being accessible to children or others who cannot fully care for themselves.
  - 5) be a nuisance due to odor or unsightly appearance.
  - 6) violate other laws or regulations governing water pollution or wastewater disposal.
- C) Using the above as a basis, the Butte-Silver Bow City-County Board of Health has developed these regulations. The standards, based on proven technology, for the siting, design, construction, installation and maintenance of wastewater treatment systems are adopted to insure the proper treatment and disposal of wastewater and to reduce and prevent potential public health hazards. The technical standards are adopted with the recognition research and technology has the potential to affect the standards and that for a given site, more than one type of system may be appropriate. When appropriate, the Environmental Health Department (EHD) may allow the design and construction of wastewater treatment systems, which reflect the most current research and technology that best protects the public health and to give recognition to system equivalency. Stringent monitoring and research data may be required.
- D) Copies of any cited materials or reference materials are available from the health department. Cited references may be viewed at various locations throughout the County. Contact the Environmental Health Department (EHD), for a list of locations. Copies are also available from MDEQ, Water Quality Division.
- E) Users of these regulations need to be aware that subsurface sewage treatment systems are considered by the Environmental Protection Agency to be Class V injection wells and may require associated permits. Of particular concern are systems receiving wastewater from industries and/or automotive service stations.

1.1 Authority and Scope of Regulations.

- A) These regulations are made pursuant to, but not by way of limitation, the Montana Code Annotated (MCA):
  - 1) Section 50-2-116(1)(i).
  - 2) Section 50-2-116(2)(j).
  - 3) Section 50-2-130(2).
- B) Pursuant to Administrative Rules of Montana (ARM) Section 17.36.902:
  - 1) It is illegal to construct, alter, extend, or utilize an on-site wastewater treatment or disposal system that may:
    - a) contaminate any actual or potential drinking water supply.
    - b) cause a public health hazard as a result of access to insects, rodents or other possible carriers of disease to humans.
    - c) cause a public hazard by being accessible to persons or animals.
    - d) violate any law or regulation governing water pollution or wastewater treatment and disposal.
    - e) pollute or contaminate state waters, in violation of 75-5-605, MCA.

- f) degrade state waters unless authorized pursuant to 75-5-303, MCA.
  - g) cause a nuisance due to odor, unsightly appearance or other consideration.
- C) Pursuant to 50-2-116(1)(i), MCA, these regulations govern the permitting of the following public and private wastewater treatment systems:
- 1) Individual/Shared
  - 2) Multiple-user
  - 3) Commercial
  - 4) Public
- D) All structures requiring facilities for the supply of water or the disposition of sewage or solid waste or the construction of water supply or sewage or solid waste disposal facilities shall use a legally permitted wastewater treatment system with the following exceptions:
- 1) The WWTS was installed prior to January 1, 1966, and is not obsolete. Such systems must meet the requirements of Section 1.0 (B) of this regulation and the general requirements of 17.36.901, ARM, et.seq; or
  - 2) The WWTS is a public treatment system approved by the MDEQ prior to July 1, 2001.
- E) If an MDEQ approved public collection and treatment system is within 200 feet of the property which requires a new or replacement WWTS, and the owner of the public collection and treatment system approves the connection, wastewater must be discharged to the public system in accordance with 17.36.9.
- F) The following sources have been utilized to produce these regulations:
- 1) Circular DEQ 4, which sets forth requirements for site evaluation, septic tank construction and the siting, design, construction and operation of WWTS for individual residential, multiple-family and non-residential buildings.
  - 2) "On-Site Subsurface Wastewater Treatment Systems" 17.36.901, ARM, et. seq.
  - 3) "Sanitation in Subdivisions Act" Title 76, Chapter 4, MCA.
  - 4) "Subdivision/On-Site Subsurface Wastewater Treatment", 17.36.101, ARM, et. seq.
  - 5) "Water Quality Act" Title 75, Chapter 5, MCA.
  - 6) "Nondegradation of Water Quality", 16.20.701, ARM, et. seq.
  - 7) "Mixing Zones in Surface and Ground Water", 16.20.1801, ARM, et. seq.
  - 8) "Predetermined Non-significant Activities" 17.30, ARM, et. seq.

1.2 Effective Date, History and Enactment.

- A) Effective Date: All provisions established under this regulation shall become effective as of March 1<sup>st</sup> 1993.

1.3 Review of Regulation Procedures.

- A) The Board may, as deemed necessary, conduct a detailed review of these regulations. Revisions shall be made as needed to insure proper administration and to allow for improved methods of wastewater treatment.
- B) EHD shall have the authority to alter forms referenced in these regulations as necessary for proper administration.
- C) Fees shall be set by the Butte-Silver Bow City-County Board of Health in accordance with 50-2-116, MCA.
- D) If a change in any regulation promulgated by the State of Montana effects these regulations or application thereof pursuant to the requirements of 50-2-116 and 50-2-130, MCA, the Board, in its discretion, may temporarily revise these regulations until such time the changes can be properly made in accordance with the Butte-Silver Bow City-County Health Code. Such temporary revision shall not exceed 90 days.

## SECTION 2 DEFINITIONS

**Administrative Rules of Montana (ARM)** • the rules enacted under statutory authority of the MCA.

**Absorption Area** • the area determined by multiplying the length and width of the bottom area of the disposal trench or bed.

**Absorption Bed** • an absorption system that consists of excavations greater than 3 feet in width where the distribution system is laid for the purpose of distributing pretreated waste effluent into the ground.

**Absorption System** • any secondary treatment system, including absorption trenches, elevated sand mounds, evapotranspiration absorption (ETA), gray water irrigation, and subsurface drip systems, used for subsurface disposal of pretreated waste effluent into the ground.

**Absorption Trench** • an absorption system that consists of excavations 18 to 36 inches in width where the distribution system is laid for the purpose of distributing pretreated waste effluent into the ground.

**Advanced Treatment** • a treatment process that provides effluent quality in excess of primary treatment.

**Aerobic Sewage Treatment Unit** • a sewage treatment plant that incorporates a means of introducing air and oxygen into the sewage so as to provide aerobic biochemical stabilization during detention period. Aerobic sewage treatment facilities may include anaerobic processes as part of the treatment system.

**Alter** • physically changing a WWTS by relocating, adding to or subtracting from all or portions of a system or increasing the flow into a system above that particular system's design flow. Increasing flow includes adding bedrooms to a residence. Environmental Health Department (EHD) shall have the sole discretion to determine if an enlargement or change in use is an increase in use or alteration.

**Applicant** • any person, institution, public or private corporation, partnership, or other entity as noted on the application for a permit for a WWTS. The applicant does not have signature authority unless they are the legal property owner or their authorized agent.

**Approval** • the official consent given in writing by the Butte-Silver Bow City-County Board of Health and/or the Health Officer and/or his/her representative.

- A) **Application Approval** • issuance of a WWTS **permit to construct** is authorization to install a system as per the approved plans and any permit conditions.
- B) **Installation Approval** • upon inspection and certification by the responsible party and given compilation of all measurements and field notes, permission given to backfill the system.
- C) **Final Approval** • approval granted upon review and acceptance of the system certification and as-built drawing. The permit to construct then becomes a **permit to operate** the system as approved.

**Approved Subdivision** • a subdivision of land, which has received approval from MDEQ and has a Release of Sanitary Restrictions or Certificate of Subdivision Plat Approval Statement filed in the C & R (See Certificate of Subdivision Plat Approval or Release of Sanitary Restrictions).

**As-built** • a post-construction drawing, which accurately depicts the location and configuration of all WWTS components and other on-site features as required per Appendix G and requirements specified on the permit. The as-built drawing and system certification form are required by the Environmental Health Department as certification of the system installation.

**Authorized Agent** • for the purpose of obtaining a WWTS permit, a person lawfully designated by the legal property owner authorizing that person to work and sign on the property owner's behalf.

**Backfill** • soil used to cover underground portions of a WWTS.

**Bedrock** • material that cannot readily (easily) be excavated by power equipment, or material that is jointed, fractured, or has cohesive structure that does not allow water to pass through or has insufficient quantities of fines within fractures or layers to allow for the adequate treatment of wastewater.

**Bedroom** • any room used for sleeping. An unfinished basement must be considered as an additional bedroom.

**Blackwater** • liquid and solid human body waste and the carriage waters generated through toilet usage.

**Board or BOH** • the Butte-Silver Bow City-County Board of Health.

**BOD<sub>5</sub> (five-day biochemical oxygen demand)** • the quantity of oxygen used in the biochemical oxidation of organic matter in 5 days at 20 degrees centigrade under specified conditions and reported as milligrams per liter (mg/L).

**Building Drain** • the pipe extending from the interior plumbing to a point 2 feet outside the foundation wall.

**Building Sewer** • the pipe connecting the house or building drain to the public sewer or private sewer.

**BSBCCHD** • the Butte-Silver Bow City-County Health Department.

**C & R** • Butte-Silver Bow Clerk and Recorder's Office.

**Certificate of Subdivision Plat Approval** • a statement issued by MDEQ approving a reviewed parcel for structures requiring a water supply and sewer (see Approved Subdivision or Release of Sanitary Restrictions).

**Cesspool** • an unlined pit utilized for the disposal of wastewater. Obsolete and disallowed under State regulations.

**Cleanout** • an access to a sewer line at least 4 inches in diameter, extending from the sewer line to the ground surface, used for access to clean a sewer line.

**Coefficient of Uniformity (CU)** • is equal to  $D_{60}/D_{10}$ , where  $D_{60}$  is the grain diameter (in mm) corresponding to 60 percent passing and  $D_{10}$  is the grain diameter (in mm) corresponding to 10 percent passing, by weight.

**Commercial** • any venture associated with commerce or trade.

**Composting Toilet** • a toilet which connects to a watertight compartment or vault designed to receive composting materials sufficient to reduce waste by aerobic decomposition.

**Construct or Construction** • any excavation for and/or installation of a WWTS.

**Contaminate** • an increase in the concentration of organic matter, chemicals, viruses, or bacteria in water to a degree which is likely to affect present or future beneficial uses of the water or which violates any applicable ground water or surface water standards.

**Covenant** • a recorded agreement stating certain activities and/or practices are required or prohibited. Subdivision covenants are not enforceable by BSBCCHD.

**Day** • a calendar day.

**Design flow** • the peak flow (daily or instantaneous, as appropriate) for sizing hydraulic facilities, such as pumps, piping, storage, and drainfields and means the average daily flow for sizing other treatment systems.

**Director** • the Butte Silver-Bow City-County Health Department Health Officer/Director.

**Distribution Box** • a watertight receptacle that receives septic tank effluent and distributes it equally into two or more pipes leading to the absorption system.

**Distribution Method** • means of dispersing effluent to a pretreatment device and/or a final absorption system. Three methods are commonly used as follows:

- A) **Gravity** • effluent delivered via gravity equal to the volume displaced by influent from the structure being served. No mechanical means are employed. The degree of dispersal is limited.
- B) **Dosing** • the periodic discharge of a set volume of effluent accomplished through the use of a pump or siphon. The degree of dispersal is improved, utilizing more of the absorption area per dose.
- C) **Pressure Distribution** • the periodic discharge of a set volume of effluent, typically utilizing a pump, where all pipes are pressurized providing uniform distribution across the entire absorption area.

**Distribution Pipe** • a perforated pipe used for the dispersal of effluent.

**Dosing Chamber or Dose Tank** • a watertight receptacle that stores raw or pretreated wastewater for periodic discharge to subsequent treatment units or dispersal areas. Pumps or siphons with appropriate switches and alarms are mounted in the tank to discharge the accumulated liquid.

**Dosing Frequency** • the number of times per day that effluent is applied to a drainfield, sand filter, or sand mound.

**Dosing Volume** • the volume of effluent (in gallons) applied to a drainfield, sand filter, or sand mound each time a pump is turned on or each time a siphon functions.

**Drainage Way** • any natural or artificial watercourse, trench, ditch, swale, or similar depression into which surface water flows.

**Drain Rock** • the rock used in a drainfield, sand mound, or sand filter. Drain rock must be washed, must range in size from ¾ inch to 2-1/2 inches, and must contain no more than 2 percent passing the #8 sieve. The material must be of sufficient competency to resist slaking or dissolution. Gravels of shale, sandstone, or limestone may degrade and are not allowed.

**Drop Box** • a watertight receptacle for collecting and distributing effluent in a successive failure or sloped absorption system.

**Dwelling or Residence** • any structure, building, or portion thereof, which is intended or designed for human occupancy and supplied with water by a piped water system.

**Effective Size** • the sieve size in millimeters (mm) allowing only 10 percent of the material to pass as determined by wet-test sieve analysis method ASTM C 117-95 .

**Effluent** • partially treated sewage from a septic tank or other treatment facility.

**Effluent Filter** • an effluent treatment device installed on the outlet of a septic tank designed to prevent the passage of suspended matter larger than 1/8 inch in size.

**Effluent Pump** • a pump used to convey wastewater that has been partially treated from a septic tank or other treatment facility. This wastewater has had settleable or floatable solids removed.

**EHD** • the Environmental Health Department.

**Enforcement Division** • the agency within MDEQ that enforces state water quality laws.

**Engineer (PE)** • a professional engineer registered in the State of Montana. All work submitted by a PE must be signed and sealed per the rules and regulations governing professional engineers.

**Expansion** • an increase in system capacity. EHD will use the design capacity and/or number of bedrooms as noted on a previous WWTS permit and/or other available county records to determine if the proposal is an expansion.

**Experimental System** • any wastewater treatment device or system not specifically listed in Circular DEQ 4.

**Failed System** • an absorption system that does not accept waste at the rate of application (hydraulic failure) or when a septic tank suffers structural failure or whenever a system violates Section 1 of this regulation (treatment failure).

**Fats, Oils, Grease (FOG)** • a component of sewage typically originating from food stuffs (animal fats or vegetable oils) or consisting of compounds of alcohol or glycerol with fatty acids (soaps and lotions).

**Fill** • soil that has been displaced from its original location.

**Floodplain** • the area adjoining a watercourse or drainway which would be covered by the floodwater of a flood of 100-year frequency except for sheet flood areas that receive less than one foot of water per occurrence and are defined as Zone B areas by the Federal Emergency Management Agency (FEMA). The floodplain consists of the floodway and the floodway fringe (Zone A), as defined in 36.15.101, ARM. (To Be Determined by the BSB Floodplain Administrator.)

**Floodway** • that portion of the floodplain which includes the stream channel and adjacent overbank areas that must be reserved in order to discharge a base flood without cumulatively increasing the water surface elevation more than one-half (1/2) foot. This does not include those areas designated Zone A on the National Flood Insurance Rate Maps (FIRM).

**Flow** • the actual volume in gallons of wastewater entering a system per day.

**GPD** • gallons per day.

**Gray Water** • any wastewater other than that containing toilet wastes or industrial wastes.

**Grease Trap** • a device designed to separate grease and oils from the effluent.

**Ground Water Table** • the upper surface of ground water in the zone of saturation of a geologic formation; includes the upper surface of a perched water table (see also “Seasonal High Ground Water”).

**Health Officer** • The Butte Silver Bow Health Officer/Director.

**High Permeability Soil** • a soil with a percolation rate faster than six (6) minutes per inch.

**High-Strength Waste** • effluent from a septic tank or other treatment device that has BOD<sub>5</sub> greater than 300 mg/L, and/or TSS greater than 150mg/L, and/or fats, oils, and grease greater than 25mg/L.

**High Water** • the highest level reached by a body of water.

**High Water Line** • the mark left after high water has receded.

**Holding Tank** • a watertight receptacle for retaining, but not treating wastewater. Any outlet from the tank must be sealed to prevent the tank from discharging wastewater.

**Impervious Layer** • any layer of material in the soil profile that has a percolation rate slower than 240 minutes per inch.

**Incinerating Toilets** – means a self contained unit consisting of a traditional commode-type seat connected to a holding tank and a gas fired or electric heating system to incinerate waste products deposited in the holding tank. The incineration by products are primarily water and fine ash.

**Increased Use** • the enlargement or change in use of a structure served by a WWTS where the enlargement or change in use is likely to increase the effluent flow and/or wastewater strength from the structure. This includes but is not limited to the addition to a residence of one or more spaces that can be used as bedrooms.

**Individual Wastewater Treatment System** • a system designed to serve one living unit or commercial unit. Two individual WWTS are not allowed under one permit even though they may be located in the same area. The term does not include a public sewage system as defined in 75-6-102, MCA.

**Infiltrative Surface** • the soil interface that receives the effluent wastewater below the drain rock or sand.

**Influent** • the wastewater flow stream prior to any treatment.

**Installer** • an individual who holds a valid registration of competency to construct, repair, replace, or alter a WWTS under these regulations.

**Irrigation**• those systems that provide subsurface application of wastewater to any planted material by means of a piping system.

**Key** means to hollow out in the form of a furrow or groove

**Laterals** • the individual legs of an absorption area or the individual lines of perforated piping laid in an absorption bed.

**Level 1a treatment** a subsurface wastewater treatment system that: (a) removes at least 50%, but less than 60%, of the total nitrogen as measured from the raw sewage load to the system; or (b) discharges a total nitrogen effluent concentration of greater than 30mg/L . The term does not include treatment system for industrial waste. A level 1a designation allows the use of 30 mg/L nitrate (as N) as the nitrate effluent concentration for mixing zone calculations.

**Level 1b treatment** means a subsurface wastewater treatment system that: removes at least 34%, but less than 50%, of the total nitrogen as measured from the raw sewage load to the system; or (b) discharges a total nitrogen effluent concentration of greater than 30 mg/L , but not greater than 40 mg/L. The term does not include treatment systems for industrial waste. A level 1b designation allows the use of 40 mg/L nitrate (as N) as the nitrate effluent concentration for mixing zone calculations.

**Level 2 treatment** means a subsurface wastewater treatment system that: (a) removes at least 60% of total nitrogen as measured from the raw sewage load to the system; or (b) discharges a total nitrogen effluent concentration of 24 mg/L or less. The term does not include treatment systems for industrial waste.

**Limiting Layer** • an impervious layer or seasonal high ground water.

**Manifold** • a solid (nonperforated) main wastewater line that distributes effluent to individual distribution pipes.

**MDEQ** • the Montana Department of Environmental Quality.

**Monitoring Well** • an inspection and/or sampling port, and may be one of two types:

- A) **Ground Water Level Monitoring Well** • this type of monitoring well may be used to measure ground water levels.
- B) **Chemical/Biological Monitoring Well** • this type of monitoring well will be required for ground water sampling of chemical and/or biological parameters. The monitoring well must be constructed in accordance with Appendix L and must meet all specifications as required in 36.21.801, ARM.

**Montana Codes Annotated (MCA)** • the legislative laws of Montana.

**Multiple-User Sewage System** • a nonpublic sewage system that serves, or is intended to serve, 3 through 14 living units and/or 3 through 14 commercial establishments. The total population served may not exceed 24. In estimating the population served, EHD shall multiply the number of living units times the county average of persons per living unit based on the most recent census data. Individual or shared commercial sewage systems with design flows greater than 700 gallons per day are considered as multiple-user for purposes of design requirements.



**Nondegradation Review** • an analysis of potential nitrogen and phosphorous impacts to state waters in order to verify that no significant changes in water quality will result from a proposed WWTS pursuant to 75-5-300, MCA.

**Nuisance** • anything that is indecent or offensive to the senses as defined by 27-30-101, MCA.

**Obsolete** • a WWTS or component thereof may be considered obsolete due to component/system type and/or change in usage.

- A) Components/system types considered to be obsolete include outhouses, cesspools, seepage pits, and metal tanks.
- B) Change in usage pertains to any WWTS serving a structure producing wastewater that exceeds original design capacity in terms of quantity and/or strength. This applies to systems installed prior to January 1, 1966, and those installed thereafter. The design or system capacity may have to be determined.
- C) RSR stipulations of system components (primary and secondary treatment) that are not in compliance with these regulations.

**Percolation Test or “perc test”**• a standardized test used to assess the infiltration rate of soils and to aid in sizing absorption areas and in determining site suitability (Appendix J). **Soil profile information may be used over percolation test results**

**Permit** • a legal document issued by the EHD. The permit number will apply to the following two stages of authorization:

- A) **Permit to Construct** • upon issuance a permit allows the construction, repair, replacement, or alteration of a WWTS as approved.
- B) **Permit to Operate** • upon final approval of the system installation being given by EHD, a permit becomes an authorization to operate the WWTS as approved.

**Permit Fee** • those fees associated with the processing of a permit application for a particular system.

**Permitting and Compliance Division** • the primary state agency within MDEQ that administers state water quality laws.

**Person** • any legal entity, organization or human being according to Montana Law.

**Pressure Distribution**• an effluent distribution system where all pipes are pressurized and the effluent is pumped or delivered by siphon to the next portion of the treatment system in a specific time interval.

**Pretreatment** • the wastewater treatment that takes place after primary treatment but prior to discharge to any sewage dispersal system. Pretreatment may include, but is not limited to pH adjustment, oil and grease removal, BOD<sub>5</sub>, TSS reduction, screening, and detoxification.

**Primary Absorption Area** • the first of two required absorption areas to be utilized at a given site for a WWTS. (See also replacement absorption area).

**Primary Treatment** • a treatment system, such as a septic tank, that provides retention time to settle the solids in raw wastewater and that retains scum within the system.

**Private Sewer** • a sewer receiving the discharge from one building sewer and conveying it to a public sewer system or an on-site WWTS.

**Professional Engineer** • an engineer licensed or otherwise authorized to practice engineering in Montana pursuant to Title 37, Chapter 67, MCA.

**Project** • the construction, repair, replacement, or alteration of a WWTS.

**Property Owner** • the legal title-holder of a parcel of land.

**Public Notification** • a notice that is published per the requirements of the BSBCCHD.

**Public Wastewater Treatment System** • a system of collection, transportation, treatment, or dispersal of sewage that is designed to serve or serves 15 or more living units or connections or 25 or more persons daily for a period of at least 60 days out of the calendar year [75-6-102, MCA]. In estimating the population that will be served by a proposed residential system, the EHD shall multiply the number of living units times 2.5 people per living unit, so that 10 or more proposed residential connections will be considered a public system.

**Registration of Competency** • a registration issued by the EHD to an individual who has demonstrated sufficient evidence of competence to either install WWTS in Butte-Silver Bow County.

**Release of Sanitary Restrictions (RSR)** • the lifting of sanitary restrictions as imposed by the Sanitation in Subdivisions Act (76-4-121, MCA). (See Approved Subdivision or Certificate of Subdivision Plat Approval)

**Repair** • repairing or replacing any component of a WWTS. Repairs are considered major when any part of the WWTS is moved from its original permitted location or when repairs are made to accommodate additional flows. Minor repairs do not result in the relocation of any component of a WWTS or are not made as a result of additional flows. Minor repairs do not need a new permit but all such repairs should be noted on the original permit. The replacement of a septic tank is not considered a minor repair. EHD shall make the determination if a repair is major or minor.

**Replacement Absorption Area** • an area set aside for a 100% replacement of the primary absorption area in the event of a failure or when upgrading a WWTS into compliance with current regulations. Setback, soil and siting requirements in this regulation apply equally to both primary and replacement systems.

**Residential Strength Wastewater** • effluent from a septic tank or other treatment device with a BOD<sub>5</sub> less than or equal to 300 mg/L, TSS less than or equal to 150 mg/L, and fats, oils, and grease less than or equal to 25 mg/L.

**Review Fee** • a fee assessed to compensate EHD for time required to review an application. Review fees are non-refundable.

**Reviewing Authority** • MDEQ/EHD, a division of local government delegated to review public sewage systems pursuant to 17.38.102, ARM, a local unit of government that has adopted these standards pursuant to 76-3-504, MCA, or a local Board of Health that has adopted these standards pursuant to 50-2-116, MCA.

**Sanitary Restriction** • a prohibition against the erection of any dwelling, shelter, or building requiring facilities for the supply of water or the disposition of sewage or solid waste or the construction of water supply or sewage or solid waste disposal facilities until MDEQ has approved plans for those facilities. The property must have a "Release of Sanitary Restrictions" (RSR) if it falls into one of the categories outlined in Appendix B.

**Sealed Pit Privy** • a watertight holding tank designed to receive non-water carried toilet waste.

**Seasonal High Ground Water** • the closest vertical distance that water comes to the natural ground surface at any given time of the year. When observed, mottling (soil color patterns) or other indicators of previous saturation levels must be reported.

**Seasonal Residence** • a residence that is occupied for not more than 120 days in a calendar year and which would not qualify as the primary residence of a taxpayer for federal income tax purposes related to capital gains on the sale or exchange of residential property.

**Septic Tank** • a watertight storage tank receiving raw sewage and providing primary treatment by means of settling, anaerobic digestion, and scum removal.

**Sewage/Wastewater** • water-carried waste products from residences, public buildings, institutions, or other buildings, including discharge from human beings or animals, together with ground water infiltration and surface water present.

**Sewer Invert** • inside bottom (or flow line) of a sewer pipe.

**Sewer Line** • the PVC pipe connecting the house to the septic (see also transport line).

**Shared Sewage System** • a WWTS that serves or is intended to serve two living units and/or commercial structures.

**Siphon** • a pipe fashioned in an inverted U shape and filled until atmospheric pressure is sufficient to force a liquid from a reservoir in one end of the pipe over a barrier and out the other end. Siphons are sometimes used to dose a drainfield from a dosing tank or chamber.

**Site Evaluation** • the determination that a particular site is suitable or not suitable for a WWTS. Standards for site evaluations are outlined in these regulations.

**Site Evaluator (SE)** • an individual who holds a valid registration of competency to assess and report on the suitability of a site for a WWTS under these regulations. The site evaluator shall demonstrate to EHD competency in the design of certain types of WWTS appropriate for the site conditions.

**Slope** • the quotient of the vertical rise divided by the horizontal run and is expressed as a percentage.

**Soil Consistence** • attributes of soil material as expressed in degree of cohesion and adhesion or in resistance to deformation or rupture. For the purposes of these regulations consistence includes resistance of soil material to rupture, resistance to penetration, plasticity, toughness, and stickiness of puddle soil material, and the manner in which the soil

material behaves when subject to compression. Although several tests are described, only those should be applied which may be useful.

**Soil Profile** • a detailed description of the soil strata to a depth of at least eight (8) feet, using the U.S. Department of Agriculture's Soil Classification System. Deeper soil profile descriptions may be required by EHD (e.g. for deep absorption systems). The description of the soil shall be provided by a SE or PE.

**Standard Trench** • an excavation that is 12 to 36 inches in depth and 2 feet in width for systems utilizing gravity or dosed and may be 3 feet in width for systems utilizing pressure distribution. Standard trench construction uses PVC pipe and drainrock as detailed in these regulations.

**Subsurface Drain** • foundation drains, vertical drains, french drains or other drainage systems designed to permanently lower the ground water table.

**Surface Water** • any body of water or watercourse, including lakes, ponds, rivers, creeks, streams, intermittent streams, irrigation ditches, seeps, and swamps.

**Swamp or Seep** • an area that generally contains visible surface water during most years and is not a lake, pond or stream.

**Synthetic Drainage Fabric** • a non-woven drainage fabric with a minimum weight per square yard of 4 ounces, a water flow rate of 100 to 200 gallons per minute per square foot, and an apparent opening size equivalent to a #50 to #110 sieve.

**System Certification** • a written acknowledgment that a particular system was constructed and functioning in accordance with approved plans and regulations at the time of installation. System certification is required on all systems installed in Silver Bow County. Standards for the certification are contained within this regulation.

**Trailer Court** • a tract of land providing two (2) or more mobile home lots for lease or rent to the public. This term also refers to mobile home parks. Trailer courts must be licensed by the Montana Department of Public Health and Human Services (MDPHHS) and approved by the State of Montana Department of Environmental Quality (DEQ).

**Transport Line** • means the PolyVinyl Chloride (PVC) pipe or other approved material which transports wastewater from the septic and/or pump tank(s) to the secondary treatment.

**TSS (Total Suspended Solids)** • solids in sewage that can be removed readily by standard filtering procedures in a laboratory and is reported as milligrams per liter (mg/L).

**Uniform Distribution** • a means to distribute effluent into a sand filter, sand mound, or drainfield such that the difference in flow (measured in gallons per day per square foot) throughout the drainfield, sand filter, or sand mound is less than 10 percent.

**Upgrade** • the addition of a component and/or treatment technology to an existing system beyond what was previously permitted.

**Variance** • official permission from the BSBCCHD (Board of Health,) to deviate from state and/or local regulations governing on-site WWTS (16.17.105 and 106, ARM).

**Variance Fee** • a fee assessed to those applications requiring or requesting a variance. Variance fees are non-refundable if public notification has taken place.

**Wastewater/Sewage** • liquid waste that is discharged from a dwelling, building, or other facility, including household, commercial, or industrial wastes; human excreta; or animal and vegetable matter in suspension or solution and includes gray water.

**Wastewater Treatment System(s) (WWTS)** • a system for the sanitary collection, transportation, treatment, and disposal of wastewater, operated in accordance with BSBCCHD.

**Wetlands** • areas which meet the criteria established by the United States Corp of Engineers in Section 404 of the Clean Water Act.

**Work Day (Working Day)** • 7:30 AM to 4:30 PM Monday through Friday excluding national, state or local holidays.

### SECTION 3 APPLICATIONS FOR PERMIT

3.0 Pursuant to 50-2-116(1)(i), MCA, these regulations govern the permitting of the following public and private wastewater treatment systems:

- A) Individual/Shared
  - B) Multiple-user
  - C) Commercial
  - D) Public
- 3.1 It is unlawful and a misdemeanor for any person to construct a new wastewater treatment system or to repair, replace, or alter an existing system within Butte Silver-Bow County unless that person holds a valid permit to construct issued by EHD for the specific construction, repair, replacement or alteration.
- 3.2 It is unlawful to operate an obsolete wastewater treatment system within Butte-Silver Bow County.
- 3.3 Any new installation, repair, replacement, or alteration of any portion of or all of an existing system will require that the entire system meet these regulations for location, design and construction of a WWTS. This includes but is not limited to the following:
- A) Application for the replacement or upgrade of a septic tank and/or pump chamber will require verification that the dispersal area meets these regulations-(i.e. pressure distribution is required for dispersal areas >1,000 square feet).
  - B) Application for the replacement or upgrade of a dispersal area will require verification that the septic tank and/ or pump chamber meets these regulations (i.e. metal tanks and seepage pits are considered obsolete, 1500 gallon septic tank is required for 4 to 5 bedroom homes).
  - C) Where the RSR stipulates system components (primary and secondary treatment) that are not in compliance with these regulations, EHD may require adherence to these regulations.
  - D) For a proposed upgrade, repair and/or alteration of a system permitted under BSBCCHD regulations in effect from March 1993 to December 31, 2000, a one-time exclusion may be granted from full conformance with these regulations under the following conditions:
    - 1) The system that would be allowed by the exclusion is
      - a) Unlikely to cause pollution of state waters in violation of 75-5-605, MCA; and
      - b) Will protect the quality and potability of water for public water supplies and domestic uses, and will protect the quality of water for other beneficial uses, including those uses specified in 76-4-101, MCA; and
      - c) Will not adversely affect public health, safety and welfare; and
      - d) The exclusion will not conflict with the requirements of 17.36.907(3), ARM.
    - 2) The upgrade, repair and/or alteration does not conflict with the purpose of current BSBCCHD regulations and must, at a minimum, meet the requirements of Butte-Silver Bow City-County Regulations for Wastewater Treatment Systems, effective March of 1993.
    - 3) The property owner submits a certification (available from EHD) which documents:
      - a.) The specific areas where the system does not conform to these regulations;
      - b) Acknowledgement that the system may be required to be brought into full compliance with these regulations if and when any subdivision of the property is proposed.
    - 4) The exclusion from having to meet the full requirements of these regulations as described above.
- 3.4 The application for a WWTS permit establishes the property owner's consent, which allows EHD to enter the property for determining compliance with the site requirements.
- 3.5 All information submitted with the application becomes the property of EHD and may not be returned. Such information is available for public viewing and copying according to 75.5.105, MCA. Special precautions may be made within the law, and at EHD's discretion, to protect proprietary information.
- 3.6 To protect the property owner's interest, proof of compliance or the ability to comply with other agencies, districts, or other governmental entities bylaws, ordinances, zoning laws, rules or regulations, may be required when deemed necessary by EHD.

- 3.7 For the purpose of permit application review, parcels of land in Butte-Silver Bow County fall within one of three general categories:
- A) Parcels that have undergone subdivision review.
    - 1) These parcels have been reviewed under the Sanitation in Subdivision Act and issued a Certificate of Subdivision Plat Approval statement, which constitutes a Release of Sanitary Restrictions (RSR). State and local RSR documents must be filed with the C & R prior to a permit being issued. Copies of this document should be available at EHD and/or at the C & R.
    - 2) The Certificate of Subdivision Plat Approval/RSR contains conditions and stipulations for the development of the described lot(s). These stipulations include the number and type of structures allowed. In older plat approval statements where this is not stipulated, approval is assumed to be for one single-family dwelling or one commercial establishment per lot.
    - 3) Most plat approval statements include requirements for drinking water supply type and location and WWTS type, size and location. Older plat approvals may not stipulate locations or WWTS type and sizing requirements. The latter may require a new site evaluation report be obtained for permit application. Nondegradation analysis may also be required for lots subdivided prior to the adoption of the Sanitation in Subdivision Act (February 28, 1961).
    - 4) Where the RSR stipulates system components and/or sizing (primary and secondary treatment) that are not in compliance with these regulations, EHD will require adherence to these regulations.
    - 5) Any desired changes to the conditions and stipulations contained in a Certificate of Subdivision Plat Approval will require an amended plat approval prior to submittal of a local permit application.
  - B) Parcels that are not or were not subject to subdivision review under the Sanitation in Subdivision Act.
    - 1) Some parcels are not or were not subject to State review at the time they were created. Factors affecting the need for subdivision review include, but are not limited to; the date of filing, number of lots created, lot creation by court order, highway construction exemption, lots created for mortgage purposes, etc.
    - 2) These parcels require a site evaluation be conducted and site-specific information submitted with a permit application as required by these regulations. Review of the water supply and WWTS will be done at the local level.
    - 3) These parcels require nondegradation review and site-specific information submitted with a permit.
    - 4) Local permit issuance is only for the installation of the approved WWTS as designed. Subsequent subdivision of a parcel may be subject to additional local and/or state review.
  - C) Parcels that were created incorrectly or through an exemption that leaves sanitary restrictions in place.
    - 1) Some parcels were created without review under the Sanitation in Subdivision Act although such review was required under laws in effect at the time. Other parcels were exempt from review under the condition that no development which required water supply or which generated wastewater would occur.
    - 2) These parcels will be required to be reviewed under the Sanitation in Subdivision Act before a local permit application will be accepted.
- 3.8 Permits will be issued only for parcels within Butte-Silver Bow County that are properly recorded with the C & R. Where there is an approved Certificate of Subdivision Plat Approval Statement, as issued by MDEQ, this also must be properly recorded with the C & R.
- 3.9 A WWTS permit governs only the installation and operation of wastewater treatment systems. A WWTS permit is not to be considered as a building permit or any other permit that may be required by other agencies to build a structure in Butte-Silver Bow County.
- 3.10 Recommendations or requirements set forth in the permit do not bind or obligate EHD to guarantee the operation or longevity of any system. A WWTS permit or an inspection by EHD staff does not guarantee the workmanship or operation of any system.
- 3.11 EHD does not design WWTS.
- 3.12 EHD requires PE oversight of the system design for more complex WWTS as outlined in the following table. At our discretion, EHD may require PE oversight in situations with complicated site conditions and/or system design.

3.13 Applications and Signature Authority.

- A) An application for a permit shall be made on BSBCCHD forms and shall be signed only by the legal property owner(s) or the legal property owner(s) authorized agent.
- B) The application and submittal package must include, but not necessarily be limited to, the information outlined in Appendix.
- C) The property owner(s) or authorized agent is responsible for the accuracy of the information supplied with the application and shall certify the accuracy of the information provided to EHD by signing the application.

3.14 Permit Fees.

- A) Refer to the schedule in Appendix C.
- B) All fees must be paid prior to service.
- C) Permit fees are subject to change following review and discussion by the Board of Health at any public meeting for which public notification has been given.

3.15 Review of Applications.

- A) EHD shall review all applications on a “first come/first served” basis.
- B) EHD will attempt to expedite the review of all applications but reserves the right to a review period of thirty (30) calendar days maximum from the date an application is received.

At EHD’s discretion, review of larger and/or more complicated systems may be forward to MDEQ or an engineering firm under contract. The costs incurred for this review will be the responsibility of the property

- C) owner. The property owner may request in writing a cost estimate prior to the review by an outside party. All fees must be submitted prior to the permit being issued. For these situations, EHD will not be bound by the thirty (30) calendar day review period.

- D) Review of an application will result in one of the following:

- 1) an issued permit to construct.
- 2) a written request for additional information.
  - a) If upon review the application is found to be incomplete or additional information is required, EHD will provide in writing an outline of additional information required.
  - b) The property owner/authorized agent will have thirty (30) days from the date of the letter to respond.

\*\* One 30-day extension of the original response period may be granted, at EHD’s discretion, if a written extension request is submitted before the initial 30-day period has passed. The written request must state the reason(s) the time extension is needed.

**Table 3-1**

**Individual Responsible For System Design And Installation**

<b>Type of System</b>	<b>Individual Responsible for System Design and Installation Installer, Site Evaluator or Professional Engineer</b>
Tank Installation Only	Installer, SE, or PE
Standard Absorption Systems	Installer, SE, or PE
Deep Absorption Systems	Installer, SE, or PE
At-Grade Absorption Systems	Installer, SE, or PE
Sand-Lined Absorption Systems	Installer, SE, or PE
Gravelless Absorption Systems	Installer, SE, or PE
Elevated Sand Mound Systems	PE only
Intermittent Sand Filter Systems	PE only
Recirculating Trickling Filter Systems	PE only
Evapotranspiration-Absorption Systems	PE only
Restricted Systems	PE only
Experimental Systems	PE only
Replacement Systems	
Septic Tank & Pump Chambers	Installer, SE, or PE
Absorption Beds	Installer, SE, or PE
Fill "Systems"	PE only
Artificially Drained Site	PE only
Cut "Systems"	PE only
Holding Tanks	Installer, SE, or PE
Sealed Pit Privies	Installer, SE, or PE
Any system with a design flow $\geq$ 2500 gpd.	PE only
<b>Distribution Methods</b>	
Gravity	Installer, SE, or PE
Dosed	Installer, SE, or PE
Pressure Distribution	Installer, SE, or PE

- c) Should EHD need to write a second request for additional information related to the same project, the property owner/authorized agent will have fifteen (15) days to respond. If the required information is not received, EHD may deny the application.

3) denial of the application will include written reason(s) for the denial (Section 4).

- E) If upon review the application is found to be incomplete or additional information is required, the 30 day review period will recommence from the date EHD receives the required information.
- F) A WWTS permit to construct shall be issued by EHD upon finding that the application is complete and in compliance with the site requirements and these regulations.

**3.16 Permit to Construct**

- A) EHD may note specific written conditions on the permit to insure compliance with these regulations.
- B) Construction of the WWTS may begin upon issuance of the permit.
- C) A WWTS permit to construct is valid for 24 months, during which time the system must be installed, with notification of installation received by EHD (Section 7).
- D) If EHD has not received notification of installation within 24 months after the date of issuance, the permit shall be voided. Fees from voided permits are non-refundable and can not be applied to new permits.
- E) Any property owner whose permit has been voided must apply for a new permit and must comply with regulations in effect at the time of the new submittal date.

**SECTION 4  
DENIAL OF APPLICATIONS AND REVOCATION OF PERMITS**

- 4.0 EHD may deny a WWTS application if:
- A) The proposed project does not comply with the requirements of these regulations.
  - B) The property owner/authorized agent has failed to supply all information necessary to make a determination whether or not the proposed WWTS complies with these regulations as discussed in Section 3.
  - C) If a site is being reviewed under the Sanitation in Subdivision Act, Title 76, Chapter 4, MCA, or the Platting Act, Title 76, Chapter 3, MCA, or the Butte-Silver Bow County Subdivision regulations, no permit can be issued for any structure on that parcel until the subdivision is approved and the appropriate approval documents are filed with the C & R. If the subdivision is reviewed and disapproved and the owner proposes building a structure on a portion of the property that can comply with these regulations and it does not conflict with any provision of the disapproval, application for a WWTS permit can be made as outlined in this regulation.
  - D) If EHD has reservations concerning the effectiveness or appropriateness of a specific system at a proposed site, a permit may not be issued. The EHD shall make this determination. The EHD decision may be appealed as per Section 6 of these regulations.
  - E) EHD reserves the right to limit the number of certain types of experimental systems within Butte-Silver Bow County. EHD shall make this determination. Factors influencing the EHD decision may include proven effectiveness of the proposed system, monitoring results or lack of monitoring results from similar systems within the county and total number of similar systems installed within the county.
  - F) Projects proposed on any parcel that may be affected by floodplain may be referred to the Butte-Silver Bow County Floodplain Administrators office for review and approval before further review by EHD.
- 4.1 EHD may revoke or invalidate a WWTS permit if:
- A) Information is withheld, falsified or inaccurately supplied by the property owner or their authorized agent.
  - B) Unapproved changes in plans or specifications are made after a WWTS permit has been issued.
  - C) The installed system does not receive a system certification and final approval as per Section 7 of this regulation.
  - D) EHD does not receive required monitoring results in a timely manner or within 30 days of specified monitoring periods.
  - E) The property owner fails to comply with any conditions stipulated as part of the permit approval, any variance approval and/or in the Certificate of Subdivision Plat Approval Statement.
  - F) The WWTS is found to be in conflict with the requirements of the Sanitation in Subdivisions Act, these regulations and/or the approved plans.
  - G) Any provision of a Certificate of Subdivision Plat Approval Statement has been violated or there is departure from the approved plans, specifications or lot layouts in the subdivision.
  - H) The quantity or strength of the wastewater generated exceeds that for which the system was approved.
- 4.2 Permit fees, shall be processed for a refund within 30 days of the denial notice. Refunds will be made to the person(s) or entity that paid the original submittal fees. No fees are returned for revoked or invalidated permits.
- 4.3 All information submitted with the application remains the property of EHD and may not be returned.

**SECTION 5  
SITE EVALUATIONS**

- 5.0 Information concerning soil and site characteristics is necessary to determine if suitable conditions exist for on-site wastewater treatment and dispersal. This information is also critical for the design of a WWTS appropriate for the site being evaluated. Both primary and replacement areas must be shown to be suitable for WWTS construction and may require different design criteria or system requirements.



- 5.1 Ground water monitoring, if required, shall be performed by a person approved by EHD, for a pre-paid fee assessed in accordance with Appendix C of this regulation. Any site being monitored by the SE or PE must be reported to EHD before monitoring has begun to allow for review.
- 5.2 Site evaluations are required for parcels not subject to the Sanitation in Subdivisions Act as well as some older subdivided parcels whose Certificate of Subdivision Plat Approval Statements do not stipulate locations and/or WWTS type and sizing requirements.
- 5.3 Site evaluations may also be required on some older subdivisions whose RSR stipulates a system or component type and/or a drainfield sizing or application rate that does not meet these regulations. Existing soil information may be used if available.
- 5.4 Site evaluations must be performed by EHD a SE, a PE or an individual in training under the direct supervision of a PE (all work to be co-signed and stamped by the supervising PE).
- 5.5 In general, those factors which must be evaluated are; soil properties, land slope, topographic position, flooding hazard and amount of suitable area available, and setback distances required in Section 16, Table 16-1 of this regulation. For systems with a design wastewater flow greater than 1,000 gallons per day, the potential for ground water mounding must be evaluated. The site evaluation package must include, but not necessarily be limited to, the information listed in Appendix E.

**SECTION 6  
VARIANCES AND APPEALS**

- 6.0 A property owner/authorized agent or any affected person may request a variance from any particular requirement of these regulations or appeal a discretionary decision by filing an application with the Butte-Silver Bow City-County Board of Health in accordance with Appendix F.
- 6.1 If a variance request is approved, the property owner/authorized agent’s signature on the variance application will document permission for EHD to file this form with all affected parcel(s) in the C & R before a WWTS will be issued.
- 6.2 If a variance request is denied, the property owner/authorized agent may, under Section 75-5-305, MCA, appeal to the Board of Environmental Review.

**SECTION 7  
INSPECTIONS AND CERTIFICATIONS**

- 7.0 Applying for a permit establishes owner consent, which allows EHD to enter the property for the purpose of performing inspections to determine compliance with these regulations and the specifications of the permit.
- 7.1 The registered installer must have copies of the approved permit to construct and the approved site plan on site during system installation. EHD may have specified conditions for the system, which will appear on the signed permit.
- 7.2 Installers and SE are given the responsibility to inspect, certify and document the proper installation of certain types of WWTS as noted on their letter of registration. A PE may inspect, certify and document the proper installation of any type of system and is required for some system types. System certification and the as-built drawing are the responsibility of the installer, SE, or PE based on the type of WWTS proposed as outlined in the following table:

**Table 7-1  
Individual Responsible For System Certification And As-built**

Type of System	Individual Responsible for System Certification and As-built
Tank Installation Only	Installer, SE, or PE
Standard Absorption Systems	Installer, SE, or PE
Deep Absorption Systems	Installer, SE, or PE
At-Grade Absorption Systems	Installer, SE, or PE
Sand-Lined Absorption Systems	Installer, SE, or PE
Gravelless Absorption Systems	Installer, SE, or PE

Elevated Sand Mound Systems	PE only
Intermittent Sand Filter Systems	PE only
Recirculating Trickling Filter Systems	PE only
Evapotranspiration-Absorption Systems	PE only
Restricted Systems	PE only
Experimental Systems	PE only
Replacement Systems	
Septic Tank & Pump Chambers	Installer, SE, or PE
Absorption Beds	Installer, SE, or PE
Fill “Systems”	PE only
Artificially Drained Site	PE only
Cut “Systems”	PE only
Holding Tanks	Installer, SE, or PE
Sealed Pit Privies	Installer, SE, or PE
Any system with a design flow $\geq$ 2500 gpd.	PE only
<b>Distribution Methods</b>	
Gravity	Installer, SE, or PE
Dosed	Installer, SE, or PE
Pressure Distribution	Installer, SE, or PE

- 7.3 Upon completion of the system installation, the installer must contact EHD and, if so noted on the permit, the SE or PE responsible for system certification. EHD must be contacted at least 8 hours (**one working day**) in advance of the desired inspection time for scheduling. EHD inspections are scheduled and conducted during the normal working day.
- 7.4 Although EHD will not inspect all system installations, it reserves the right to inspect systems and conduct “spot checks” to determine compliance with these regulations and the approved plans. The system shall remain open and uncovered for at least two (2) hours from the scheduled inspection time so that EHD may assess the installation unless specific permission has been granted by EHD to cover. If EHD has not inspected the system within the 2-hour time frame, and the party responsible for certifying the installation has completed their inspection and taken all necessary measurements, the system may be covered.
- 7.5 An installer, SE or PE may inspect a system installation outside of the normal working day. The system can not be covered unless an inspection has been scheduled with EHD per Section 7.3 above and advance consent given.
- 7.6 If upon inspection, EHD and/or the party responsible for system certification (Section 7.2 above) finds the system deviates from the approved plans or is not in full compliance with these regulations, EHD shall withhold installation approval. The party responsible for system certification shall immediately notify EHD, the property owner/authorized agent and/or installer of the deficiencies and required corrective action. Deficiencies shall be corrected within thirty (30) days of notification, unless EHD approves, in writing, a longer compliance schedule. Failure to correct the deficiencies within the designated time frame may invalidate the permit.
- 7.7 Once the corrections have been made, the party responsible for system certification shall be notified that the system is ready for re-inspection. EHD must also be contacted to schedule a re-inspection time. A re-inspection fee in accordance with Appendix C may be required by EHD prior to scheduling a re-inspection.
- 7.8 Once the party responsible for system certification inspects and the system is determined to be in compliance with these regulations and the approved plans, installation approval may be given for the completed system.
- 7.9 After installation approval has been given, the system shall be back-filled as soon as possible. The system must be covered within five (5) days after installation approval, unless specific permission to extend this period has been granted in writing by EHD.
- 7.10 A completed system certification form (available at EHD) and as-built (Appendix G) is required for all WWTS installed and must be submitted to EHD within 30 days of the date the inspection was scheduled with EHD. Failure to submit a system certification form and as-built for an installed system may result in the invalidation of the permit.

- 7.11 Upon signing the system certification form the person responsible is verifying that the system was installed in the approved location, in accordance with the approved plans and all other requirements of these regulations.
- 7.12 The person responsible for the system certification must also verify that any water well on site at the time of the WWTS inspection was located according to the approved plans. Although an installer, SE or PE is not responsible for the placement or misplacement of a well, certification may not be given to a WWTS installation on a lot previously reviewed and approved under the Montana Sanitation in Subdivisions Act if an on site well was not constructed in the plat approved location. Any well mislocated under these circumstances must be reported to EHD and system certification can not be given until the situation is resolved.
- 7.13 A business or company employing an individual to perform site evaluations, system design, system installation and/or inspection/certification work, will be held responsible for the completion of any outstanding work initiated by that individual should he or she fail to complete it.
- 7.14 EHD is not obligated to accept new work from an installer, SE, PE until the individual has come into compliance with these regulations (i.e. past due as-built and/or system certification submittals).
- 7.15 Inspections are performed only for determining compliance with these regulations and the approved permit. EHD is not responsible for ensuring workmanship. Final approval of a WWTS shall not be construed as a guarantee to the life expectancy or operation of the system.
- 7.16 Final approval of the system will be given upon review and acceptance of the system certification and as-built.

**SECTION 8  
OPERATION OF WASTEWATER TREATMENT SYSTEMS**

- 8.0 With the granting of final approval, the permit to construct becomes a permit to operate.
- 8.1 The property owner is responsible for the proper operation, maintenance and cleaning of the system as well as correcting any nuisance arising from its damage or failure. The owner is responsible for all site or system monitoring requirements being fulfilled.
- 8.2 EHD has the authority to require the owner of a WWTS to maintain and submit records of system inspection, maintenance, cleaning, monitoring, and testing.
- 8.3 It is unlawful and a misdemeanor for any person using a WWTS to dispose of hazardous chemicals such as, but not limited to, gasoline, oil, paint, paint thinner, antifreeze, pesticides and solvents into a system.
- 8.4 EHD is authorized to enter private property during reasonable hours to inspect a WWTS or with due cause, to determine compliance with these regulations.

**SECTION 9  
INSTALLER REGISTRATION**

- 9.0 It is unlawful and a misdemeanor for any person to construct, repair, replace, or alter a WWTS within Butte-Silver Bow County unless that person holds a valid installer's registration of competency.
- 9.1 A registered installer must be on site during the installation of every system.
- 9.2 Installer registrations of competency are not transferable.
- 9.3 Registrations of competency that are valid as of the effective date of these regulations, will expire on January 1<sup>st</sup> of every calendar year. All installers must satisfy Section 9.4 of this regulation for re-registration of competency upon expiration of their registration.
- 9.4 Applications for a registration of competency under these regulations shall be made to EHD, which may grant the registration upon:
  - A) Submittal of a registration application (forms available at EHD), and
  - B) Submittal of the examination fee (Appendix C), and
    - 1) This fee will allow an individual to have one (1) re-test at no additional charge. Additional examinations by the same individual will be assessed an additional fee (e.g. the 3rd test will be assessed the examination fee but the 4th test has no additional charge).

- 2) There is no limit to the number of times an individual may take the examination. There is a one (1) week waiting period between examinations.
- C) Successful completion of the registration examination with a score of 80% or greater.
  - 1) The Board of Health has determined that an installers exam is necessary as:
    - a) Changing technology requires continuing attention to advances in WWTS design, and
    - b) EHD requires assurance that all installers are familiar with the appropriate State and Butte-Silver Bow County regulations.
- 9.5 Installer registrations of competency under these regulations shall be valid from January 1st through December 31 of every calendar year.
- 9.6 Registrations may be renewed without examination if:
  - A) The applicant has demonstrated knowledge of WWTS layout and installation in the year immediately preceding the application for renewal.
  - B) Renewal application is made within thirty (30) days of the registration expiration.
  - C) The individual submits an updated registration form (forms available at EHD), and
  - D) The individual submits the appropriate fee (Appendix C).
- 9.7 Property Owner Installation Examination
  - A) A property owner wishing to construct, alter or repair a standard WWTS for his/her own residence upon his/her own property may only do so upon approval by the BSBCCHD or passing the installers examination. A passing score on this examination allows a property owner to install one standard absorption trench, gravity distribution system upon their own property only. A property owner may only install other types of WWTS upon passing the appropriate BSBCCHD installer examination. Certification requirements remain per the specific system type.
  - B) Builders who may own several parcels of land or who build structures on these parcels for sale, rent or lease and not for their own residential purposes will not be allowed to install systems as the property owner.
- 9.8 Individuals approved by EHD to install WWTS shall be placed on a registration of competency. Homeowners passing only the homeowners installation examination will not be placed on this registration.
- 9.9 Installer registrations may be denied for any of the following:
  - A) Having constructed, repaired, replaced, or altered a WWTS without a valid permit.
  - B) Having an installer registration revoked within twelve (12) months preceding the application.
- 9.10 EHD shall notify the individual, in writing, of the denial and the reason(s) for the decision.
- 9.11 Installer registrations of competency are the property of EHD and may be revoked by the Health Officer for any of, but not limited to, the following reasons:
  - A) Construction, repair, replacement, or alteration of a WWTS without a permit.
  - B) Misrepresentation or falsification of any data or information submitted to EHD for the purpose of obtaining a permit or to gain approval for a WWTS construction, repair, replacement, alteration or certification.
  - C) Failure to provide a system certification within 30 days of a completed installation.
  - D) Failure to demonstrate competence. The competence of an installer may be challenged by EHD for any of the following reasons:
    - 1) If systems have been installed with gross errors in design or workmanship.
    - 2) If installed systems exhibit poor or negligent workmanship.
- 9.12 EHD shall notify the installer in writing that continued poor or negligent installations, system designs or other non-compliance with state and local regulations will result in the revocation of the registration of competency.
- 9.13 A registered installer may appeal a revocation to the Board under Appendix F of these regulations.

- 9.14 A revocation is for one calendar year from the date of revocation. Re-registration of competency is permitted only after completing the requirements of Section 9.4 of these regulations.
- 9.15 Installers may only certify the system and distribution types as outlined in Table 7-1

## **SECTION 10 ENFORCEMENT**

- 10.0 EHD or the Health Officer/Director
- A) Shall enforce the requirements of these regulations as well as the appropriate state statutes and regulations, and
  - B) May refer cases within their jurisdiction to the County Attorney's office.
- 10.1 When a person violates the provisions under these regulations, EHD or the Health Officer may initiate enforcement or disciplinary actions, or any other legal proceeding authorized by law, including but not limited to any one or a combination of the following:
- A) Informal administrative conferences, convened at the request of EHD or the property owner, to explore facts and resolve problems.
  - B) Orders directed to the owner and/or operator of the system and/or person causing or responsible for the violation of the rules of these regulations.
  - C) Denial, suspension, modification, or revocation of permits, approvals, or registration.
  - D) Civil or criminal action.
- 10.2 Orders authorized under this section include the following:
- A) Orders requiring corrective measures necessary to effect compliance with these regulations which may include a compliance schedule; and
  - B) An order to stop work and/or refrain from using any system or portion of the system or improvements to the system until all permits, registrations and/or approvals required by rule or statute are obtained.
- 10.3 Enforcement orders issued under this section shall:
- A) Be in writing and contain the legal property description of the parcel(s) of land.
  - B) Name the person or persons to whom the order is directed.
  - C) Briefly describe each action or inaction constituting a violation of the rules of these state or local codes.
  - D) Specify any required corrective action, if applicable.
  - E) Specify the effective date of the order, with time or times of compliance.
  - F) Provide notice of the consequences of failure to comply or repeated violation, as appropriate. Such notices may include a statement that continued or repeated violation may subject the violator to:
    - 1) Denial, suspension, or revocation of a permit approval, or registration; and/or
    - 2) Referral to the office of the County Attorney for possible prosecution; and/or
    - 3) Other appropriate remedies.
  - G) Provide the name, business address, and phone number of an appropriate staff person who may be contacted regarding an order.
  - H) Comply with other applicable laws.
- 10.4 Enforcement orders shall be personally served in the manner of service of a summons in a civil action or in a manner showing proof of receipt.
- 10.5 EHD shall have cause to deny the application or re-application for a permit or to revoke, suspend, or modify a required permit of any person who has:
- A) Failed or refused to comply with the provisions of these or any other statutory provision or rule regulating the operation of a WWTS; or

- B) Obtained or attempted to obtain a permit or any other required certificate or approval by misrepresentation.
- 10.6 For the purposes of section 10.5, a person is defined to include:
- A) Property owner/authorized agent, applicant, or permit holder.
  - B) Any individual associated with subsection 10.6 (A) including, but not limited to Board members, officers, managers, partners, association members, agents and third persons acting with the knowledge of such persons
- 10.7 A person who violates any provision of these regulations is guilty of a misdemeanor and on conviction shall be fined not less than \$10 or more than \$200. Each day of violation constitutes a separate offense (50-2-123, 124, MCA).

**SECTION 11  
SEVERABILITY AND CONFLICTS**

- 11.0 Conflict of Ordinances, Effect on Partial Invalidity: In any case where a provision of this regulation is found to be in conflict with a provision of any zoning, building, fire, safety or health ordinance, regulation or code of Butte-Silver Bow County, or any municipality within Butte-Silver Bow County, the provision which, in the opinion of BSBCCHD, establishes the higher standard for the protection of the health and safety of the people, shall prevail.
- 11.1 If any section, subsection, paragraph, sentence, clause, or phrase of the regulation should be declared invalid for any reason whatsoever, such decision shall not affect the remaining portions of these regulations, which shall remain in full force and effect.

**SECTION 12  
WASTEWATER DESIGN FLOW**

- 12.0 The purpose of this section is to provide a method for estimating wastewater flows.
- 12.1 Wastewater design flow for residential dwelling units must be in accordance with the following table.

**Table 12-1  
Residential Wastewater Design Flow**

# of Bedrooms	Design Flow (gpd)
1	150
2	225
3	300
4	350
5	400
Each additional bedroom	add 50

- 12.2 Typical daily flows for a variety of commercial, institutional and recreational establishments are presented in Tables 12-2, 12-3, and 12-4. For design purposes, the typical flows must be used as minimum design flows. Greater design flows may be required where larger flows are likely to occur, such as resort areas. Design flow must be computed using the total number of units in the proposed facility times the typical daily flow in the tables, with no reduction allowed for occupancy rates. Where the system includes several different types of uses from the tables, each use must be computed separately, and the design flow must be based on the sum of all of the uses. Use of the high end of the given range and/or the addition of 10% of the estimated daily design flow may be required as a factor of safety.
- A) A means of flow measurement (such as flow meters or pump run-time meters) may be required.
  - B) As an alternative to the flows listed in the tables, design flow may be based on actual water use data from similar facilities. Because this water use data will typically be monthly averages, the peak design flow must be a minimum of 1.5 times the average flow. System components may be added (or enlarged) to address peak flows to allow drainfields to be sized based on average flow.
- 12.3 Gray water must be provided the same treatment required for other wastewater.
- 12.4 On-site subsurface sewage dispersal systems must be used only for residential strength wastewater. Wastewater exceeding the limits for residential strength wastewater must be pretreated to residential strength prior to discharging to a drainfield, an elevated sand mound, an intermittent sand filter, or an ETA system.

- A) Effluent from recreational vehicle holding tanks have BOD<sub>5</sub> levels as high as 15 times that of residential strength wastewater and must be pretreated accordingly.
- B) Post construction monitoring of the system effluent may be required to document treatment effectiveness in meeting residential strength parameters.

**Table 12-2  
Typical Wastewater Flows From Commercial Sources**

Source	Unit	Wastewater Range	Flow, gpd/unit Typical
Airport	Passenger	2-4	3
Automobile Service Station	Vehicle Served	7-13	10
	Employee	9-15	12
Bar	Customer	5	3
	Employee	10-16	13
Department Store	Toilet Room	400-600	500
	Employee	8-12	10
Hotel/Motel	Guest	40-56	48
	Employee	7-13	10
Industrial Building (Sanitary waste only)	Employee	10-16	13
Laundry (Self-serve)	Machine Wash	450-650 45-55	580 50
Office	Employee	7-16	13
Restaurant	Meal	2-4	3
Shopping Center	Parking Space	1-2	2
	Employee	7-13	10

**Table 12-3  
Typical Wastewater Flows From Industrial Sources**

Source	Unit	Wastewater Range	Flow, gpd/unit Typical
Church (Not including a kitchen, food service facility, day care, or camp)	Seat		3
Church (Including kitchen, but not including a food service facility, day care, or camp)	Seat		5
Hospital, medical	Bed	125-240	165
	Employee	5-15	10
Hospital, mental	Bed	75-140	100
	Employee	5-15	10
Prison	Inmate	75-150	115
	Employee	5-15	10
Rest home	Resident	50-120	85
School, day:			
With cafeteria, gym, showers	Student	15-30	25
With cafeteria only	Student	10-20	15
Without cafeteria, gym, showers	Student	5-17	11
School, boarding	Student	50-100	75

**Table 12-4  
Typical Wastewater Flows From Recreational Facilities**

Source	Unit	Wastewater Range	Flow, gpd/unit Typical
Apartment, resort	Person	50-70	60
Cabin, resort	Person	8-50	40
Cafeteria	Customer	1-3	2
	Employee	8-12	10
Campground (developed)	Person	20-40	30
Cocktail lounge	Seat	12-25	20
Coffee shop	Customer	4-8	6
	Employee	8-12	10
Country club	Member present	60-130	100
	Employee	10-15	13
Day camp (no meals)	Person	10-15	13
Dining hall	Meal served	4-10	7
Dormitory, bunkhouse	Person	20-50	40
Hotel/Motel, resort	Person	40-60	50
Store, resort	Customer	1-4	3
	Employee	8-12	10
Swimming pool	Customer	5-12	10
	Employee	8-12	10
Theater	Seat	2-4	3
Visitor center	Visitor	4-8	5
Travel trailer parks without individual Hookups for water or sewer	Space		50
Travel trailer parks with individual Hookups for water and/or sewer	Space		100

12.5 Waste segregation

- A) Waste segregation systems consist of dry disposal for human waste, such as various chemical and incinerator type systems with separate disposal for gray water. However, regardless of the type of dry disposal system used, the gray water must be disposed of using an approved WWTS, with no flow or size reduction allowed for the waste segregation
- B) Final sludge disposal must be in compliance with federal regulations, 40 CFR Part 503.

**SECTION 13  
DESIGN OF SEWERS**

13.0 Separation of water and sewer mains

- A) Sewer mains and water mains are lines that serve more than one building.
- B) Sewer mains must be at least 10 feet horizontally from any existing or proposed water line or wellhead. The distance must be measured edge to edge.
- C) Sewer lines crossing water lines must be laid to cross perpendicular and provide a minimum vertical distance of 18 inches between the outside of the water line and the outside of the sewer line. This must be the case whether the water line is above or below the sewer. The crossing must be arranged so that the sewer joints will be equidistant and as far as possible from the water line joints.

13.1 Sewer size, slope, and design flows for building and private sewers

- A) Only sanitary sewage must be placed into the sanitary sewer system. Rainwater from roofs, streets, and other areas, as well as ground water from foundation drains, must be excluded.
- B) Flow used for designing sewers must consider ultimate population to be served.



- C) A building sewer or private sewer must be at least 4 inches in diameter and must be placed at a minimum slope of ¼ inch per foot toward the point of discharge. Where it is impractical to obtain such a slope any such piping which is 4 inches to 6 inches in diameter may have a slope of not less than 1/8 inch per foot when approved by the reviewing authority. Sewers that are 8 inches or larger in diameter must be designed in conformance with the requirements of Circular DEQ 2.
- D) In general, sewers should be designed to receive sewage from basements.
- E) Sewers shall be sufficiently deep to prevent freezing. Insulation must be provided for sewers that cannot be placed deep enough to prevent freezing.
- F) The sewer line between the dwelling or structure and the septic tank should be kept to less than twenty-five (25) feet. Should a greater distance be necessary, at least one clean-out shall be installed for distances up to fifty (50) feet and at least one clean-out for every fifty (50) foot length thereafter. A clean-out is required at any angle greater than 45 degrees.
- G) If any section of the sewer will be subjected to vehicular traffic, then that section shall be designed to withstand the additional load and prevent freezing.

### 13.2 Sewer Materials

- A) Building or private sewers must be PVC.
- B) PVC sewer pipe must meet the requirements of ASTM D 1785 (schedule 40 or 80) and must be joined by an integral bell-and-spigot joint with rubber elastomeric gasket or solvent cement joints.
- C) Transition connections to other materials must be made by adapter fittings or one-piece molded rubber couplings with appropriate bushings for the respective materials. All fittings must be at least of equivalent durability and strength of the pipe itself.
- D) Sewers shall be watertight.

### 13.3 Sewer installation

- A) Sewers must be installed at a uniform slope with straight alignment between clean-outs and/or the septic tank.
- B) Installation specifications must contain appropriate requirements based on the criteria, standards, and requirements established by the industry in its technical publications. Requirements must be set forth in the specifications for the methods of bedding and backfilling the pipe.

### 13.4 Sewer material, design, and installation for larger multiple-user and public WWTS must conform to the requirements of Circular DEQ 4 and/or Circular DEQ 2.

### 13.5 Sewage Pumping Stations

- A) Sewage pumping stations receiving sewage that has not had settleable solids removed and that have design flow rates of 5,000 gpd or greater must be designed in accordance with Circular DEQ 2.
- B) Sewage pumping stations receiving sewage that has not had settleable solids removed and that have design flow rates less than 5,000 gpd must be designed in accordance with Circular DEQ 2, with the following exceptions.
  - 1) Pumps must be capable of passing spheres of at least 2 inches in diameter, or grinder pumps capable of handling raw wastewater must be provided.
  - 2) Discharge lines must be at least 2 inches in diameter if the pump is capable of passing a 2-inch sphere. The discharge line must be sized to provide a minimum velocity of 2 feet per second.
  - 3) Submersible pumps and motors must be designed specifically for totally submerged operation and must meet the requirements of the National Electric Code for such units. In addition, the design must provide for the pumps and motors to be totally submerged at all times.
  - 4) Multiple pumps are not required.
- C) Stations receiving sewage from private sewers that have had the settleable solids removed must be provided with pumps and controls that are corrosion resistant and are listed by Underwriters Laboratories, Canadian Standards Association, or other approved testing and/or accrediting agency as meeting the requirements for National Electric Code Class I, Division 2 locations. As an alternative, submersible pumps and motors must

be designed specifically for totally submerged operation and meet the requirements of the National Electric Code for such units. In addition, the design must provide for the pumps and motors to be totally submerged at all times. An audible or visible alarm must be provided to indicate failure of the system.

13.6 Transport line and Drainfield pipe materials

- A) Septic tanks shall have a minimum ten (10) foot section of ASTM D 1785, schedule 40, PVC pipe exiting the tank. If the system includes a pump tank ASTM D 1785, schedule 40, PVC pipe must be used between the septic and pump tanks.
- B) Gravity transport lines must be fabricated from 4-inch diameter ASTM D 1785, schedule 40, PVC pipe, ASTM D-3034 PVC pipe, or ASTM F810 HDPE.
- C) Gravity distribution lines (perforated laterals) must be fabricated from 4-inch diameter ASTM D-3034 PVC, or ASTM F810 HDPE perforated sewer pipe. Each pipe shall be perforated with two rows of 5/8" diameter holes. Hole spacing shall be a nominal 5" center to center and the rows shall be 120° + / - 5° center to center.
- D) Coiled, perforated-plastic pipe may not be used when installing absorption systems. Straight lengths of pipe must be used.
- E) Pipe used for pressure distribution lines must meet ASTM D1785 or ASTM D2241. Fittings used in the absorption field must be compatible with the materials used in the distribution lines.

**SECTION 14**  
**SEPTIC TANKS AND PRIMARY TREATMENT**

14.0 A septic tank consists of one or more chambers providing primary treatment. All WWTS must provide a primary treatment prior to dispersal to a drainfield or sand mound.

14.1 EHD may require manufacturers of septic or pump tanks constructed and/or installed in Butte-Silver Bow County to obtain PE certification of the materials, design and construction of the tanks to insure compliance with the state and local regulations.

14.2 General

- A) All liquid waste and washwater must discharge into the septic tank. Roof, footing, garage, surface water drainage, and cooling water must be excluded. Backwash from water softeners should not be discharged into septic tanks if the drainfield area has clay soils with shrink/swell properties.
- B) The septic tank must be located where it is readily accessible for inspection and maintenance.
- C) The septic tank shall be bedded on a flat, even surface.
- D) The septic tank shall be installed level.

14.3 Design

- A) Septic tanks must be made of materials resistant to the corrosive environment found in septic tanks. The empty tank must be structurally sound and capable of withstanding loads created by 6 feet of burial over the top of the tank. Tanks must be installed in accordance with manufacturer's recommendations. The total depth of the tank installation shall not exceed the manufacturer's specifications unless the tank(s) have been properly engineered and constructed for the additional load.
- B) The walls and floor of concrete tanks must be at least 3 inches thick if adequately reinforced with steel and at least 6 inches thick if not reinforced. Concrete for septic tanks must have a water/cement ratio less than 0.45, a 28-day compressive strength of at least 4,000 psi, and must be made with sulfate-resistant cement (tricalcium aluminate content of less than 8 percent).
- C) Concrete covers must be at least 3 inches thick and adequately reinforced. Access lids must be at least 2 inches thick.
- D) A sealing material shall be placed around the sewer pipe where it enters and exits the septic tank to form a watertight connection.

E) Inlets

- 1) The inlet into the tank must be at least 4 inches in diameter and enter the tank 3 inches above the liquid level.
- 2) The sewers entering and exiting the septic tank shall terminate a minimum of four (4) inches from the baffles.
- 3) The inlet of the septic tank and each compartment must be submerged by means of a vented tee or baffle. Tees and baffles must extend below the liquid level to a depth where at least 10 percent of the tank's liquid volume is above the bottom of the tee or baffle.
- 4) Tees or baffles must extend above the liquid level a minimum of 7 inches.
- 5) Baffle tees must extend horizontally into the tank to the nearest edge of the riser access to facilitate baffle maintenance.

F) Outlets

- 1) Outlets must include an effluent filter approved by the reviewing authority and comply with Section 14.3 (G) below. On combination septic/dosing tanks, the septic tank outlet is considered to be in the wall dividing the septic compartment(s) and the dosing compartment.
- 2) For dosed systems, a pump basket screen that meets the specifications of effluent filters may be used in place of the effluent filter screen.
- 3) The outlet of the tank must be at least 4 inches in diameter.
- 4) Each compartment of the septic tank must be vented.
- 4) Effluent filter inlets must be located below the liquid level at a depth where 30 to 40 percent of the tank's liquid volume is above the intake of the filter.

G) Effluent Filters

- 1) Effluent filters must be used in all systems prior to secondary treatment devices. The effective opening in the effluent filter must be no larger than 1/8-inch.
- 2) The minimum filter must provide a minimum clean water flow rate of 4.2 gallons per minute when tested in a setup that places the filter in its operation position and the clean water head is at the center of a 4-inch sewer line at the septic tank inlet.
- 3) Effluent filters must prevent solid particles larger than a nominal 1/8-inch diameter sphere from passing through.
- 4) All septic tank effluent must pass through the effluent filter. No by-pass capability may be designed into the effluent filter. A high-water alarm should be installed to signal that the filter has clogged and needs maintenance.
- 5) The effluent filter must be secured so that inadvertent movement does not take place during operation or maintenance. The filter handle must extend to the ground surface to facilitate maintenance without the use of special tools.
- 6) Openings developed by penetration, saw cut, or equivalent must be process controlled and all mold flash and penetration burrs removed.
- 7) The effluent filter material must be designed such that the filtering medium maintains structural integrity throughout the life of the device. The filter medium must not tear or otherwise distort so as to make the filter inoperable during normal operation. The entire filter must be constructed of proven corrosion resistant material for use in wastewater applications.
- 8) The effluent filter manufacturer must provide documentation that shows at least three years successful field-testing and operation or that the filter meets the design standard for effluent filters in ANSI/NSF Standard 46. The documentation must show the effluent filter has continuously lowered the Total Suspended Solids (TSS) by a minimum of 30 percent and that under normal use the filter is capable of obtaining a minimum of 3 years between maintenance intervals.

- 9) The effluent filter manufacturer must provide installation and maintenance instructions with each filter. The installer must follow the manufacturer's instructions when installing the filter and must use the manufacturer's recommendations for sizing and application. The installer shall leave the installation and maintenance instructions with the owner of the system.
  - 10) The effluent filter manufacturer must certify to the reviewing authority that the filter meets the requirements of this standard.
- H) A septic tank must provide an air space above the liquid level, which will be equal to or greater than 20 percent of its liquid capacity. Dose tanks do not need to meet the 20 percent air space requirement. Each compartment of the septic tank must be vented back to the inlet pipe.
- I) Inspection ports measuring at least 8 inches in diameter must be provided above each inlet and outlet and marked with rebar. An access at least 1.75 square feet in size must be provided into each compartment. Each access must be extended to within 12 inches of the finished ground surface. An access of the effluent filter of a size large enough to maintain the filter must be provided and must be extended to the finished ground surface.
- J) The nominal length of the septic tank must be at least twice the width (or diameter) of the tank.
- K) Dose tanks are excluded from these length, width, and depth requirements.
- L) Sizing of septic tanks
- 1) Residential.
    - a) Minimum capacities are:

**Table 14-1  
Minimum Liquid Capacity Requirements**

Number of Bedrooms	Capacity in Gallons
1 to 3	1,000
4 to 5	1,500
6 to 7	2,000
More than 7	An additional 250 gallons per bedroom

- b) For capacities greater than 1,000 gallons, the tank shall have 2 compartments excluding a pump chamber. 2 compartment septic tanks are also recommended at the 1,000-gallon capacity.
  - c) Each dwelling unit shall be served by its own septic tank, appropriately sized for the number of bedrooms within the unit or by (a) shared septic tank(s) with total capacity at least equal to the capacities that would be required for the separate units.
- 2) Non-residential.
- a) For situations where bedrooms are not used to size the septic tank, the tank must have the capacity of 1.5 times the daily design flow.
  - b) For a septic tank less than or equal to 5,000-gallon liquid capacity, depths greater than 78 inches must not be used in computing tank capacity.
  - c) Septic tank volume may be sized using nationally recognized plumbing codes, provided that there is adequate volume to store at least 3.5 times the estimated daily wastewater flow, and the sizing is approved by the EHD.
  - d) For the septic tank greater than 5,000-gallon liquid capacity, the maximum liquid depth is determined by dividing the liquid length by a factor of 2.5.
- M) Grease traps
- 1) Establishments such as restaurants that produce grease exceeding the limits of residential strength wastewater must be provided with grease traps and meet the requirements of Section 13.4.
  - 2) EHD may approve the use of other treatment devices or processes in place of a grease trap if sufficient documentation is provided that such a device or process produces an effluent that meets or exceeds the parameters of residential strength wastewater.

- 3) Post-construction monitoring of the system effluent may be required to document treatment effectiveness at the establishment being served.

#### 14.4 Construction

- A) EHD may require monolithic tanks in areas of high ground water or floodplain concerns.
- B) Any septic or pump tanks that must be located within the 100-year floodplain must be installed with a riser that extends at least two feet above the 100-year flood elevation at the site.
- C) All tanks must be watertight. Tanks used for commercial facilities, multiple-user systems or public systems must be tested in place for watertightness. Watertightness testing for a concrete tank may be conducted using a water test or vacuum test. Watertightness testing for a fiberglass tank may be conducted using a water test, a vacuum test, or a pressure test.
  - 1) Water testing must be conducted by sealing the outlets, filling the septic tank to its operational level, and allowing the tank to stand for at least 8 hours. If there is a measurable loss (2 inches or more), refill the tank and let stand for another 8 hours. If there is again a measurable loss, the tank must be rejected.
  - 2) Vacuum testing must be conducted by sealing all inlets, outlets, and accesses, then introducing a vacuum of 4 inches of mercury. If the vacuum drops in the first 5 minutes, it must be brought back to 4 inches of mercury. If the septic tank fails to hold the vacuum at 4 inches of mercury for 5 minutes, the tank must be rejected.
  - 3) For pressure testing a fiberglass tank, all inlets, outlets, and access ports must be sealed and adequately secured. The tank must be charged with 5 psig (3 psig for a 12-foot diameter tank). Allow tank pressure to stabilize. Disconnect the air supply. If there is any noticeable pressure drop in 1 hour, the tank must be rejected or repaired. Repeat the test after repair. Release air carefully through an appropriate valve mechanism.

#### 14.5 Maintenance

Owners of WWTS should obtain septic tanks maintenance recommendations, which are available at EHD. Those who own systems with siphons, pumps, or controls should carefully adhere to manufacturer's recommendations for operation and maintenance.

### **SECTION 15 DISTRIBUTION METHOD AND SYSTEM DESIGN**

- 15.0 Dosing or pressure distribution to an absorption system more equally distributes the effluent throughout the system. Dosed systems have been shown to lengthen the "life" of an absorption system and are encouraged for all systems. Dosed systems have also been shown to increase the biological treatment of effluent in the absorption system. For this reason, EHD may require the use of pressure distribution where marginal site conditions exist.
- 15.1 Pressure distribution should be utilized whenever practical and must be utilized when the design sewage flow requires more than 1,000 square feet of absorption area. The effective length of the trench cannot exceed the length of the pipe by more than one-half the orifice spacing.
- 15.2 When pressure distribution is utilized, the use of thirty-six (36) inch-wide dispersal trenches may be credited for the square footage requirements of the absorption area.
- 15.3 The limitations and design requirements of the particular absorption system proposed to be dosed shall apply.
- 15.4 Dosing may be accomplished by either pumps or siphons. For dosed systems not utilizing pressure distribution, the volume of each dose must be at least equal to 75 percent of the internal volume (325 gallons for 500 lineal feet) of the distribution lines being dosed. (Diameter of pipe in inches squared multiplied by 0.041 equals gallons per foot of run).
- 15.5 The volume of each dose is dependent on the soil type in which the absorption field will be installed. The dose volume shall be calculated using the equation  $DV = GPD \div DPD$  where DV is the dose volume in gallons, GPD is the estimated volume of wastewater produced per day in gallons, and DPD is the number of doses per day.
- 15.6 The dose volume of a pressure-distribution system must be equal to the drained volume of the discharge pipe and manifold, plus a volume that should be 10 times but must not be less than five times the distribution pipe volume. Where the system is designed to operate on a timer, more frequent, smaller doses may be used. The minimum

dose volume must still be equal to the drained volume of the discharge pipe and manifold, plus a volume equal to at least two times the distribution pipe volume. Where timers are used, additional controls are necessary to prevent pump operation at low-water level. The size of the dosing pumps and siphons must be selected to provide a minimum pressure of 1 psi (2.3 feet of head) at the end of each distribution line. For orifices smaller than 3/16-inch, the minimum pressure must be 2.16 psi (5 feet of head) at the end of each distribution line.

- 15.7 The pressure-distribution pipe must be PVC. The pipe must have a single row of orifices 1/8-inch diameter or larger in a straight line. Design must include orifices to allow for drainage of the pipe and to allow air to be expelled from the pipe. Maximum orifice spacing must be 5 feet.
- 15.8 The duration of each discharge may not exceed 15 minutes to promote uniform distribution.
- 15.9 Uniform distribution must be demonstrated for all pressure-distribution systems. No greater than 10 percent variation in distribution of dose across the entire drainfield or sand filter/sand mound or hydraulic zone of drainfield or sand filter/sand mound must be verified.
- 15.10 Cleanouts must be provided at the end of every lateral. The cleanouts must be within 6 inches of finished grade and should be made with either a long-sweep elbow or two 45-degree bends. A PE may specify the use of capped ends that are replaced after flushing if, in his opinion, this is a more feasible option than long sweep cleanouts. A metal location marker and plastic valve cover must be provided for each cleanout.
- 15.11 Dosing tanks
  - A) The reserve storage volume of the dosing tank must be at least equivalent to 25 percent of the design flow. EHD recommends systems be designed with a larger reserve storage volume. The reserve storage volume is computed from the high-level alarm. The tank must also include adequate liquid capacity for pump submergence and the dose volume. The required volume of the dosing tank must not be considered as any portion of the required volume of the septic tank. The dosing tank must be separated from the septic tank by an air gap to eliminate the possibility of siphoning from the septic tank. Dosing tanks must be provided with access ports sufficiently large enough to maintain the tank and pumps. Pumps, valves, and other apparatus requiring maintenance must be accessible from the surface without entering the tank or be located in a dry tank adjacent to the wet chamber.
  - B) Dosing tanks must meet the material requirements for septic tanks and must be watertight. Dosing tanks utilizing pumps must meet the requirements of Section 14.5.B.
  - C) Pumps must be sized and selected by a qualified individual. Static head, friction loss, flow rate and discharge pipe size must be taken into account.
  - D) The pump motor should be built with ball bearings and thermal overload protection.
  - E) The pump should be controlled by a control panel and a minimum of three floats.
  - F) The control panel should have at a minimum:
    - 1) a circuit breaker for the pump(s),
    - 2) circuit breaker or fuse for the control circuit,
    - 3) a magnetic motor contactor rated for the pump horse power,
    - 4) circuits for high water alarm, pump on and pump off,
    - 5) an audible and visual alarm indication,
    - 6) a Nema 4X enclosure.
  - G) The floats must control:
    - 1) the “off” level,
    - 2) the “on” level, and
    - 3) the “high water alarm” level.
  - H) Audio and visual high-water alarms must be provided for all dosing chambers that utilize pumps.
  - I) All wiring inside the dose chamber shall be protected from corrosive sewer gases.

- J) Dosed systems using a siphon should have a dose counter installed to check for continued function of the siphon.
  - K) Pump cycle counters and run-time counters are recommended in general and may be required in commercial, multiple-user and public systems.
- 15.12 Pressure distribution systems must be field-tested at the time of installation to verify uniform distribution, which is typically done by a test showing approximately equal squirt height.

**SECTION 16  
INDIVIDUAL WASTEWATER TREATMENT SYSTEMS**

16.0 General Considerations:

- A) The minimum requirements are compiled from Butte-Silver Bow County Regulations for Wastewater Treatment Systems and Circular DEQ 4. This section contains explanations, clarifications and instructions to assist installers, SE and PE in the design and installation of individual WWTS. If discrepancies exist between Circular DEQ 4 and these regulations, BSBCCHD rules and regulations would apply.
  - 1) The WWTS shall consist of a sewer line from a point two (2) feet outside the foundation wall to the primary treatment device (septic tank) and a sewer line from the primary treatment device (septic tank) to the secondary treatment system (absorption system). Some systems may require the use of dosing chambers and/or other treatment devices between the septic tank and the absorption field.
  - 4) The type of WWTS required is dependent upon the conditions found on the proposed site as well as the quantity and/or strength of the anticipated wastewater flows.
  - 3) The WWTS shall be designed to accept domestic wastes including gray water. Water from roof drains, ground water, surface runoff, sump pumps, etc., shall not be discharged into a WWTS and should be purposely diverted away.
  - 4) WWTS shall not violate the requirements of Section 1.
  - 5) Utilities shall not be laid in the excavations of WWTS.
  - 6) EHD may require suppliers of drain rock, sand, and/or other materials used in WWTS constructed in Butte-Silver Bow County to obtain PE certification of these materials to insure compliance with state and local regulations.
  - 7) Replacement areas proposed for new development submittals must meet all requirements of these regulations for a given system type. Replacements systems as described in Section 16.12 of this regulation (absorption beds, holding tanks, seepage pits etc.) may not be proposed for primary and/or replacements areas for new development submittals except as specifically allowed by Section 16.12.
- B) General Location Requirements.
  - 1) Location of WWTS shall be based on size and shape of the lot, soil types, slope of the land, depth to ground water, depth to bedrock or other limiting layer, proximity to existing and future water supplies, proximity to existing WWTS, proximity to surface water and floodplain, and replacement area.
  - 2) An area that can be used as a replacement area for the original absorption trench system must be designated. Interim use of the area must be compatible with future absorption system use. The replacement area must be separate from the primary area and must not be interlaced within the primary area. If interlaced, minimum separation must be 14 feet between primary lines.
  - 3) No component of any WWTS shall be located under driveways, parking areas, or other areas subjected to vehicular traffic except those portions of the system designed to accommodate the above conditions.
  - 4) Absorption systems and replacement areas should not be located in areas subject to livestock impacts.
  - 5) Absorption systems and replacement areas should not be located in areas subject to invasive, water-seeking roots from trees and shrubs.
  - 6) Absorption systems shall not be constructed in soils rated as having severe or very severe limitations for absorption systems by the Natural Resources and Conservation Service (NRCS) unless that limitation can be overcome through design or is not present as shown by site evaluation.

- 7) Absorption systems shall not be located in swales or depressions where runoff may flow or accumulate.
- 8) Absorption systems shall not be constructed in fill except as delineated in Chapter 4, Circular DEQ 4 and Section 16.12 of this regulation.
- 9) Minimum separation distances for location of the various component parts of the WWTS are shown in Table 16.1:

**Table 16-1  
Minimum Separation Distances In Feet**

	<b>Sealed components (a) &amp; other components (b)</b>	<b>Secondary Treatment (absorption system)</b>
Public or Multi-user (c) Wells and Springs	100	100
Other wells (c)	50	100
Suction Lines	50	100
100-year Floodplain	- (a) 100 (b)	100 (d)
Surface Water (e)	50	100
Cisterns	25	50
Roadcuts, Cliffs and Banks	10 (i)	25
Downgradient Slopes in excess of 25%	10 (i)	25
Property Lines & easements (f)	10	10
Subsoil Drains	10	10
Water Lines	10	10
Secondary Treatment	10	--
Foundation Walls	10	10
High Ground Water / Limiting Layer	--	4 (g,h)

- a) Sealed components include sewer lines, sewer mains, septic tanks, grease traps and dosing tanks/chambers.
- b) Other components include intermittent and recirculating sand filters, package plants and evapotranspiration systems.
- c) No well or its zone of influence may be located within any mixing zone of an existing or proposed absorption/dispersal system.
- d) This requirement may be waived if the property owner/authorized agent submit evidence that the average yearly highwater mark is 50 feet from the septic tank and 100 feet from the absorption system and the absorption system will be 4 feet above the 100-year flood elevation.
- e) This distance shall be measured horizontally to the average yearly highwater mark.
- f) If a variance is sought from this requirement, written permission must be obtained from the adjoining landowner(s). The 10-foot setback is recommended from an easement line and/or right-of way line (no system component may be located within an easement or right-of-way without the holder's written permission).
- g) The distance separating high ground water, bedrock, or limiting layer from the absorption system shall be measured vertically from the bottom of the absorption system trench or bed to the upper horizontal boundary of the high ground water, bedrock, or limiting layer.
- h) Sewer lines and sewer mains may be located in roadways and on steep slopes if lines and mains are safeguarded against damage.

C) Sizing of drainfields

- 1) A drainfield proposed to serve a residential development must be sized according to the minimum per bedroom square footage as indicated in Table 16-2.



- 2) Where bedrooms are not used for sizing, the application rate will be used. Application rates can be determined by using Table 16-2. Comparison of the soil profile report, percolation rate, and USDA soils report will be used to select the applicable square footage for a drainfield. The loading rate (gpd/ft<sup>2</sup>) is the maximum application rate for each soil type listed in Table 16-2.
- 3) Square feet is based on a 2-foot wide trench, considered a standard trench, and rounded to the nearest 5 feet in length.

**Table 16-2**

**Drain field Sizing Per Soil Type**

<b>Texture</b>	<b>Square feet for three bedroom (ft<sup>2</sup>)</b>	<b>Estimated Perc rate (min/in)</b>	<b>Application rate (gpd/ft<sup>2</sup>)</b>
Gravelly sand or very coarse sands	375	< 3	0.8
Loamy sand, coarse sand	375	3 - < 6	0.8
Medium sand, sandy loam	500	6 - <10	0.6
Fine sandy loam, loam, silt loam	600	10 - <16	0.5
Very fine sand, sandy clay loam	750	16 - <31	0.4
Clay loam, silty clay loam	1000	31 - <51	0.3
Sandy clay, clay, or silty clay	1500	51 - <121	0.2
Clays, silts, silty clays (soil is reported throughout the soil profile)	2000	121- <240	0.15
Clays, silts, salty clays	Additional information required	≥ 240	AIR

**TABLE 16-2b (Nonresidential Facilities)**

<b>Texture</b>	<b>Square feet for 100 gpd (ft<sup>2</sup>)</b>	<b>Estimated Perc rate (min/in)</b>	<b>Application rate (gpd/ft<sup>2</sup>)</b>
Gravelly sand or very coarse sands	125	< 3	0.8
Loamy sand, coarse sand	125	3 - < 6	0.8
Medium sand, sandy loam	167	6 - <10	0.6
Fine sandy loam, loam, silt loams	200	10 - <16	0.5
Very fine sand, sandy clay loam	250	16 - <31	0.4
Clay loam, silty clay loam	333	31 - <51	0.3
Sandy clay, clay or silty clay	500	51 - < 240	0.2
Clays, silts, salty clays	667	≥ 240	0.15
Clays, silts, salty clays	Additional information required	≥ 240	AIR

- (a) If the soil for 3 feet below the infiltrative surface contains more than 15 percent gravel or there is less than 6 feet separation between the bottom of the trench and a limiting layer, the trench must be sand-lined and pressured-dosed or other treatment provided as approved by the reviewing authority.
- (b) Pressure distribution will be required if more than 500 lineal feet (or 1,000 square feet) of distribution line is needed.
- (c) Comparison of soils profile report, percolation rate, and USDA soils report will be used to select applicable square footage.
- (d) Square footage is increased because the trench sidewall is not available in EVTA bed systems.
- (e) Systems in soils with initial percolation rates greater than 240 minutes per inch must be sized in accordance with application rates determined using the Double-/Ring Infiltrometer procedure outlined in ASTM D5093-02. Only ETA or ET systems design may be used.

**D) System Types**

- 1) These regulations describe many different types of wastewater treatment and dispersal systems for use in subsurface effluent discharge. These systems include standard absorption trenches, deep absorption

trenches, at-grade absorption trenches, sand-lined absorption trenches, gravelless absorption trenches, elevated sand mounds, intermittent sand filters, recirculating trickling filters, and evapotranspiration absorption systems. Systems providing advanced treatment or greater separation to a limiting layer may be used where standard absorption trenches are acceptable. Many of these systems also have specific application to solving particular problems.

- 2) Recirculating sand filters, evapotranspiration systems, aerobic sewage treatment units, chemical nutrient reduction systems are disallowed for use with individual or multiple-user applications without an approved variance or waiver from the reviewing authority (Appendix F). These systems are not discussed in this regulation. In cases where a variance or waiver has been granted, Circular DEQ 4 will be used as the regulation for design and review. Systems in this category require system design and system certification and as-built by a PE.
- 3) Other treatment systems not listed in this regulation may receive a local variance for use as experimental systems (Section 16.11).
- 4) The list below is a partial list intended to assist in problem-solving for a particular set of site conditions. These systems are:
  - a) Deep absorption trenches are used to break through an impervious soil layer and allow effluent to infiltrate a deeper and more permeable soil. The bottom of the trench must not be more than 5 feet below natural ground surface.
  - b) At-grade absorption trenches are used to achieve the minimum separation distance between the bottom of the trench and a limiting layer and may be used as long as the 4-foot separation can be maintained. These systems may be used only for residential strength wastewater and for flows not exceeding 500 gallons per day.
  - c) Sand-lined absorption trenches are used where the percolation rate is faster than 3 minutes/inch.
  - d) Gravelless absorption trenches are used in lieu of standard absorption trenches within the limitations provided in this regulation.
  - e) Elevated sand mounds are used to provide advanced treatment of septic tank effluent and/or to achieve the minimum separation distance between the bottom of the drain rock and a limiting layer.
  - f) Intermittent sand filters are used to provide advanced treatment of septic tank effluent and are typically used on small systems.
  - g) Recirculating trickling filters are used to provide advanced treatment of septic tank effluent.
  - h) Evapotranspiration-absorption systems are used where slow percolation rates or soil conditions would preclude the use of a standard absorption trench.
- 5) Dispersal areas may be designed as alternating absorption fields. This is accomplished by dividing the dispersal area into two separate fields to allow alternating use. The "resting" of the fields allows the clogging mat to biodegrade and can extend the life of the absorption system. This type of system is useful in soils with slow percolation rates. Dosing or pressure distribution will be required for alternating absorption field designs.
- 6) Monitoring requirements may be imposed on any system to establish the treatment efficiency and response to varying wastewater flows, strengths, and climatic conditions.
- 7) EHD will consider the complexity and maintenance required of a system, the stability of the processes, and the monitoring data in determining the adequacy, level of maintenance, and monitoring frequency.

#### 16.1 **Standard Absorption Trenches**

A) Absorption trenches must meet the location criteria in Table 16-1 of this regulation.

B) Design

- 1) The minimum area in any absorption trench system must be based upon the flow as determined in Section 12 and sized by the percolation rate or the soil type, whichever results in a larger drainfield, in accordance with Table 16-2.

- 2) Gravity and dosed absorption trenches must be separated by at least 5 feet between trench walls. Absorption trenches utilizing pressure distribution must be separated by at least 4 feet between trench walls (7 feet on center minimum regardless of distribution method used).
  - 3) Gravity and dosed absorption trenches must be at least 18 inches wide. Systems utilizing pressure distribution may have absorption trenches 36 inches wide. For the purposes of sizing, gravity and dosed trenches must not be considered more than 24 inches wide.
  - 4) The bottom of the absorption trenches must be at least 12 inches and no more than 36 inches below the natural ground surface. There must be a minimum of 12 inches of soil or fill material above the drain rock. When the trench is less than 24 inches below ground, a cap above the natural ground surface is required. The cap must be tapered from the edge of the outermost trench wall with a 3 horizontal to 1 vertical or flatter slope. The cap must be sloped to provide positive drainage away from the center of the drainfield.
  - 5) Gravity and dosed absorption trenches may not exceed 100 feet in length from where effluent is first applied to the soil.
  - 6) Gravity absorption field distribution lines must be 4 inches in diameter.
  - 7) Pressure distribution is required for any system > 1,000 square feet of absorption area and/or a design flow  $\geq$  2500 gpd.
- C) Gravity and dosed absorption field distribution lines and trenches must be level. Pressure distribution lines in a sand filter or drainfield must be level, unless a hydraulic analysis indicates uniform distribution of effluent will occur with a sloped line.
- D) The material used to cover the top of the drain rock must be synthetic drainage fabric or several (two to four) layers of untreated building paper. A 5-inch layer of straw may be substituted when these materials are unavailable. Nonporous plastic or treated building paper may not be used.
- E) If distribution boxes are used they must:
- 1) Be bedded to prevent settling.
  - 2) Use some flow control or baffling device such as a splash plate or 90° elbow inside the box to ensure equal distribution of effluent.
  - 3) Be connected to the distribution pipes by a minimum of five (5) feet of schedule 35 PVC pipe.
  - 4) Be water tested for equal distribution.
  - 5) Have absorption trenches of equal length.
  - 6) If constructed using concrete, the concrete must meet the same requirements as concrete for septic tanks in Section 14.3. Minimum wall, floor, and lid thickness for concrete distribution boxes must be 2 inches. Reinforcement is not required for concrete distribution boxes.
- F) Construction
- 1) Pipes from septic tanks must have solid walls and minimum downward slopes of 1/8 inch per foot.
  - 2) A manifold must be installed between the septic tank and the absorption trenches. The manifold must be of watertight construction. Distribution boxes may be used in gravity systems in lieu of manifolds. Both manifolds and distribution boxes must be set level and arranged so that effluent is evenly distributed to each distribution pipe. Special provisions must be made to minimize movement of distribution boxes due to settlement or frost heave. Access for inspection of the distribution box must be provided either through a riser or the distribution box must be marked with iron or a suitable, durable marker.
  - 3) Each outlet of a distribution box must serve an equal amount of drainfield.
  - 4) The pipe connecting a manifold or distribution box to a distribution pipe must be solid wall with tight joints and properly bedded throughout its length.
  - 5) When a manifold is used, there must be an equal number of distribution pipes spaced evenly on both sides of the junction of the inlet pipe to the manifold.
  - 6) Laterals from a common manifold or distribution box must be equal in length.

- 7) When the trenches have been excavated, the sides and bottom must be raked to scarify any smeared soil surfaces. Construction equipment not needed to construct the system should be kept off the area to be utilized for the absorption trench system to prevent undesirable compaction of the soils. Construction must not be initiated when the soil moisture content is high.

Note: If a sample of soil within the working depth can be easily rolled into the shape of a wire or cast, the soil moisture content is too high for construction purposes.

- 8) At least 6 inches of drain rock must be placed in the bottom of the trench.
- 9) The distribution pipe must be covered with at least 2 inches of drain rock and must be level.
- 10) The ends of the distribution pipes must be capped. When they are at equal elevations, they should be connected.

## 16.2 **Deep Absorption Trenches**

- A) Deep Absorption Trenches may only be used for individual systems and are not allowed for multiple-user or public systems.
- B) Deep absorption trenches may be used to break through a less permeable soil layer and allow effluent to infiltrate a deeper and more permeable soil. The bottom of the trench must not be more than 5 feet below natural ground surface.
- C) The site evaluation must include soil profile descriptions of at least two soil observation pits excavated to a minimum depth of 4 feet below the proposed trench bottom. All separation distances must be maintained per 17.36.3 or 17.36.9, ARM. Monitoring to establish depth to seasonally high ground water may be required where the reviewing authority has reason to believe that ground water is within 6 feet of the bottom of the absorption trench.
- D) Deep absorption trenches must be constructed at least 1 foot into suitable soil.
- E) Distribution pipe for a deep absorption trench must be installed at the same depth requirements as for the standard absorption trench. The deep trench must be dug 1 foot into the acceptable soil and backfilled with medium sand (with no more than 3 percent finer than the No. 100 sieve) or other approved material to the level of a standard absorption trench. The system must be sized based on the lesser application rate for the soil infiltrative surface or the backfill sand.

## 16.3 **At-Grade Absorption Trenches**

- A) At-grade systems may be used only for residential strength wastewater and where the design flow does not exceed 500 gallons per day. At-grade systems must not be installed on land with a slope greater than 6 percent or where the percolation rate is slower than 40 minutes per inch.
- B) Effective area
  - 1) The effective area is that area which is available to accept effluent. The effective length of the absorption area is the actual length of the trench, which cannot exceed the length of the pipe by more than one-half the orifice spacing. The effective width is the actual width of the washed rock below the distribution pipe, not to exceed 3 feet for each pipe.
  - 2) The effective area must be 1.5 times the area required for a standard drainfield, as described in Table 16-2. This information is determined by the soils profile information or possibly the percolation test.
- C) Pressure distribution is required for at-grade systems.
- D) Construction
  - 1) The ground surface where the system is to be placed must be plowed or scarified. The absorption "trench" is constructed by placing drain rock on the scarified ground, with a minimum width of 24 inches at the bottom of the distribution pipe. A minimum of 6 inches of drain rock must be placed under the distribution pipe and a minimum of 2 inches of drain rock must be placed over the distribution pipe. Leaching chambers may be used in place of distribution pipe and drain rock in accordance with Section 16.5.
  - 2) An appropriate geotextile fabric must be placed over the drain rock and covered with approximately 1 foot of soil.

- 3) The fill over the distribution pipe must extend on all sides at least 5 feet beyond the edge of the aggregate below the distribution pipe.
- 4) Construction equipment which would cause undesirable compaction of the soils must not be moved across the plowed surface or the effluent dispersal area. Construction and/or plowing must not be initiated when the soil moisture content is high.

Note: If a sample of soil within the working depth can be easily rolled into the shape of a wire or cast, the soil moisture content is too high for construction purposes.

#### 16.4 **Sand-Lined Absorption Trenches**

- A) Trenches must provide a minimum of 12 inches of fine to medium sand or loamy sand below the constructed drainfield. Leaching chambers may be used in place of distribution pipe and drain rock in accordance with Section 16.5. For standard gravel and pipe construction, sand must not be allowed to enter into the washed gravel zone during construction.

#### 16.5 **Gravelless Absorption Trenches**

- A) Gravelless systems include infiltration. Absorption trenches for these systems must meet the same requirements as a standard absorption trench, except where specifically modified in this section.
- B) Leaching chambers
  - 1) Leaching chambers are chambers with an open bottom structurally designed to carry the earth loading.
  - 2) Leaching chambers must consist of high-density polyolefin or other approved material.
  - 3) The maximum trench width for the chamber is 36 inches. If the trench width exceeds 24 inches, pressure distribution will be required.
  - 4) The total bottom area of the chamber will be used to calculate the infiltration area. The application rate indicated in Table 16-2 may be increased by a factor of 1.4 when chambers are used. The size of the primary and replacement drainfields must be large enough to accommodate a standard drainfield, even though this full area will not be used as part of the primary system.
  - 5) Chambers may be used in lieu of pipe and drain rock for standard absorption trenches, deep absorption trenches, at-grade absorption trenches, sand-lined absorption trenches, intermittent sand filters, recirculating sand filters, evapotranspiration systems, and evapotranspiration absorption systems.
  - 6) For permits and/or Certificate of Subdivision Plat Approval Statements already issued, the application rate increase may not be applied without prior amended approval from MDEQ and/or EHD.

#### 16.6 **Elevated Sand Mounds**

- A) Location
  - 1) Separation distances must be measured from the outside mound where the topsoil fill meets the natural ground surface.
  - 2) Elevated sand mounds must be constructed only upon undisturbed, naturally occurring soils.
  - 3) Elevated sand mounds may not be installed on land with a slope greater than 12 percent for soils with a percolation rate faster than 30 minutes per inch nor installed on land with a slope greater than 6 percent on soils with a percolation rate between 30 and 120 minutes per inch. Where trenches are used, the trenches must be installed with the long dimension parallel to the land contour.
- B) Design
  - 1) *The Wisconsin Mound Soil Absorption System Siting, Design, and Construction Manual, January 1990*, is recommended as a procedural guideline in the design of elevated sand mounds. The requirements of this regulation may be different from those in this reference document, and the requirements of this regulation will govern in those cases.
  - 2) There must be a minimum total depth of 21 inches of sand fill above the natural soil surface and 12 inches of sand fill between the bottom of the trench or bed and the natural soil surface. The in-place fill material must meet one of the following specifications:
    - a) ASTM C-33 for fine aggregate, with a maximum of 3 percent passing the No. 100 sieve, or

- e) Fit within the following particle size distribution:

**Table 16-3  
Filter Media Specifications For Elevated Sand Mound**

Sieve	Particle Size (mm)	Percent Passing
3/8 in	9.50	100
No. 4	4.75	95 to 100
No. 8	2.36	80 to 100
No. 16	1.18	45 to 85
No. 30	0.60	20 to 60
No. 50	0.30	10 to 30
No. 100	0.15	0 to 3

- c) Have an effective diameter (D10) of 0.15 mm to 0.30 mm with a Uniformity Coefficient (D60/D10) of 4 to 6, with a maximum of 3 percent passing the No. 100 sieve,
- d) Sand must be washed free of silts and clays.
- 3) Drain rock must meet the requirements of a standard drainfield, must be washed, and must range in size from ¾ to 2-1/2 inches. A PE may specify a specific size of drain rock if evidence is provided demonstrating the specific size will function equal to the washed rock that ranges in size from ¾ to 2-1/2 inches. Drain rock must be at least 9 inches deep and must be covered with filter fabric.
  - 4) The minimum spacing between trenches must be 4 feet, and the trench width must be 3 feet. Where beds are used, the distribution pipes must be installed parallel to the land contour, with spacing between pipes of at least 3 feet and no more than 5 feet.
  - 5) The required bottom area of the trench or trenches or gravel area for beds must be based upon flows as determined in Section 16.1, with an application rate of 1.0 gallons/day/square foot. A maximum flow per orifice should not create a saturated flow for the depth of the sand fill.
  - 6) The length of the mound must be at least three times the width of the mound.
  - 7) For soils with percolation rates between 61 and 120 minutes per inch with slopes of 1 to 2 percent, the land area 25 feet on all sides of the elevated sand mound must not be disturbed. A mound system that is constructed on slopes of 3 to 12 percent the effluent dispersal area is considered 50 feet on the down slope side, and the soil in this area may not be removed or disturbed except as specified. For soils with percolation rates faster than 61 minutes per inch, the land area 25 feet down slope of the elevated sand mound may not be removed or disturbed except as specified.
  - 8) The area of sand fill must be sufficient to extend 2 feet beyond the edges of the required absorption area before the sides are shaped to a 3 horizontal to 1 vertical or lesser slope. On sloping sites, the down slope setback must be based on the soil profile information or percolation rate (see Section 16.6, B, 7).
  - 9) The soil cap at the ends of the absorption area must be a minimum of 12 inches and must provide for positive drainage. These depths include 4 to 6 inches of topsoil.

C) Construction

- 1) The ground surface where a mound is to be placed must be plowed or scarified, or the sand mound may be keyed into the natural ground 4 inches to 8 inches by removing a portion of the topsoil. When mounds are keyed in, the removed soil must be replaced with the same sand as required for the rest of the mound, and this sand will not count as part of the required 21 inches of sand in the mound as described in Section 16.6, B, 2.
- 2) Construction equipment that would cause undesirable compaction of the soils must not be moved across the plowed surface or the effluent dispersal area. However, after placement of a minimum of 6 inches of sand fill over the plowed area, construction equipment may be driven over the protected surface to

expedite construction. Construction and/or plowing must not be initiated when the soil moisture content is high.

Note: If a sample of soil within the working depth can be easily rolled into the shape of a wire or cast, the soil moisture content is too high for construction purposes.

- 3) Above-ground vegetation must be closely cut and removed from the ground surface throughout the area to be utilized for the placement of the fill material. The fill that is the portion of the 3 to 1 side slope may have trees left in place if, in the opinion of the PE, the trees will enhance the nutrient uptake of the mound. Prior to plowing or scarifying, the dosing-pump discharge line from the pump chamber to the point of connection with the distribution-piping header must be installed. The area must then be plowed, scarified, or keyed in to a depth of 4 to 8 inches, parallel to the land contour, with the plow throwing the soil up slope to provide a proper interface between the fill and natural soils. Tree stumps should be cut flush with the surface of the ground, and roots should not be pulled.
  - 4) The area surrounding the elevated sand mound must be graded to provide for diversion of surface runoff waters.
  - 5) Construction should be initiated immediately after preparation of the soil interface by placing all of the sand fill needed for the mound (to the top of the trench) to a minimum depth of 21 inches above the plowed surface. This depth will permit excavation of trenches to accommodate the 9 inches of drain rock necessary for the distribution piping. After hand leveling of the absorption area, the drain rock should be placed into the trench and hand leveled. An observation port into the gravel is recommended but not required. Filter fabric must be placed over the drain rock to separate the drain rock from the soil cover. After installation of the distribution system, the entire mound should be covered with 6 inches of a finer textured soil material, such as sand loam to loam. A 4 to 6 inch layer of topsoil should then be added. The entire mound should be sloped to drain, either by providing a crown at the center or a uniform slope across the mound, with a minimum slope of 1 percent in either case. The entire mound must be seeded, sodded, or otherwise provided with shallow-rooted vegetative cover to ensure stability of the installation.
  - 6) The installation of the mound system must be inspected by the designer, who must certify that the system has been installed according to the approved design. As-built plans may be required by the reviewing authority prior to final approval of the system.
- D) Pressure distribution is required for the elevated sand mound system.
- E) Gravelless chambers constructed in accordance with the requirements of Section 16.5 may be used in lieu of a standard absorption trench. No change in application rate will be allowed for chambers in this application.

#### 16.7 **Intermittent Sand Filter**

- A) The design criteria must include, but not necessarily be limited to, the type of usage, primary treatment, filter media, filtration rate, and dosage rate. The wastewater strength must not exceed residential strength wastewater. Sand filters must discharge to a subsurface absorption system. The drainfield used for final dispersal may be downsized by 50 percent, as determined by Section 16.1, for soils with percolation rates between 3 and 60 minutes per inch. The drainfield used for final dispersal may be downsized by 25 percent, as determined by Section 17.1, for soils with percolation rates between 60 and 120 minutes per inch. (Soil profile information and perc. test both may be required under these circumstances.)
- B) Design
- 1) The minimum area in any subsurface sand filter must be based upon a flow as determined in Section 13.
  - 2) The application rate for intermittent sand filters may not exceed 1.2 gal/day/ft<sup>2</sup>.
  - 3) A minimum of one collection line must be provided. The upper end of the collection line must be provided with a 90-degree elbow turned up, a pipe to the surface of the filter, and a removable cap. The collection line may be flat. The bottom of the filter may be flat or sloped to the collection line(s).
  - 4) Distribution lines must be level and must be horizontally spaced a maximum of 3 feet apart, center to center. Orifices must be placed such that there is at least one orifice for each 4 square feet of sand surface area. All intermittent sand filter dosing must be controlled by a programmable timer. The minimum depth of filter media must be 24 inches. A watertight, 30-mil PVC liner (or equivalent) must be used to line the sand filter.

- 5) There must be a minimum of 2 inches of sand fill between the soil surface and/or any projecting rocks and the liner.
  - 6) Drain rock must be placed in the bottom of the filter to provide a minimum depth of 8 inches in all places and to provide a minimum of 4 inches of material over the top of the collection lines. The drain rock must be covered with a 3-inch thick layer of 1/4-inch to 1-inch washed gravel. Drain rock must meet the requirements for a standard drainfield. The drain rock at the bottom may be replaced with 1/8-inch to 3/8-inch washed gravel, except for 6 inches around the collection pipe.
  - 7) A layer of 1/4-inch to 1-inch washed gravel must be placed over the sand media, with at least 3 inches placed over the distribution lines and 3 inches placed under the distribution lines.
  - 8) The filter must be covered with 6 inches (at the edges) to 8 inches (at the center) of a suitable medium, such as sandy loam or loamy sand, to provide drainage and aeration. The material must be seeded, sodded, or otherwise provided with shallow-rooted vegetative cover to ensure stability of the installation.
  - 9) Monitoring pipes to detect filter clogging must be installed. A means for sampling effluent quality must be provided.
- C) Uniform pressure distribution must be provided for all sand filters in accordance with Section 16.
- D) The dose volume must not exceed 0.25 gallons per dose per orifice. The dose frequency must not exceed 1 dose per hour per zone. The dose tank must include a minimum surge volume of one-half the daily flow. The surge volume is the liquid storage capacity between the "timer-on" float and the "timer-override" float. The "timer-override" float and the "high-water alarm" float may be combined. Note that the surge volume defined here is not the same as the reserve storage volume defined in Section 16.
- E) Materials
- 1) The filter media must be washed and free of clay or silt and meet the following criteria in place.

**Table 16-4**  
**Filter Media Specifications For Intermittent Sand Filter**

Sieve	Particle Size (mm)	Percent Passing
3/8 in	9.50	100
No. 4	4.75	95 to 100
No. 8	2.36	80 to 100
No. 16	1.18	45 to 85
No. 30	0.60	15 to 60
No. 50	0.30	3 to 10
No. 100	0.15	0 to 2

- 2) Gravel measuring 1/8-inch to 3/8-inch in diameter must be washed and must meet the following gradation.

**Table 16-5**  
**Gravel Specifications For Intermittent Sand Filter**

Sieve	Particle Size (mm)	Percent Passing
1/2 inch	12.5	100
3/8 inch	9.50	95 to 100
No. 4	4.75	0 to 30
No.8	2.36	0 to 15
No. 100	0.15	0 to 2

- 3) The material used to cover the top of the sand filter must be separated from the filter by a synthetic drainage fabric.



## 16.8 Recirculating Trickling Filters

- A) These systems utilize aerobic, attached-growth treatment processes to biologically oxidize organic material and convert ammonia to nitrate (nitrification). A trickling filter consists of a bed of highly permeable medium to which a biofilm adheres. Wastewater is applied to the top of the bed and trickles through the media. Microorganisms in the biofilm degrade organic material and may also nitrify the wastewater. An under-drain system collects the treated wastewater and any sloughed solids and transports it to a settling tank from which it is recirculated back through the trickling filter.
- B) The design criteria must include, but not necessarily be limited to, primary treatment, filter size, filter media, organic loading, hydraulic loading, dosing rate, and recirculation rate. A discussion of the treatment by the trickling filter must be provided. A detailed set of plans and specifications and an operation and maintenance manual are required.
- 1) Recirculating trickling filter systems must have a means of primary and secondary settling. Additional components such as pump chambers, pumps, controls, recirculation valves, etc. may be used as required.
  - 2) Filter medium must be rock, slag, or plastic, must be resistant to spalling or flaking, and must be relatively insoluble in wastewater. The type, size, depth, volume, and clogging potential of the medium used must be based on published criteria and proven through monitoring and testing.
  - 3) The vessel containing the media must be watertight and corrosion resistant.
  - 4) Effluent must be distributed uniformly across the design surface area of the filter.
  - 5) Inlet openings into the under drains must have an unsubmerged, gross combined area equal to at least 15 percent of the surface area of the filter. Piping must be sloped to drain.
  - 6) The means of aerating the recirculation trickling filter must be described. If the means of aeration does not require any mechanical equipment, the system may be considered a passive nutrient reduction system if nutrient reduction is proven through monitoring and testing. If the means of aeration requires mechanical equipment, the system may be considered a nonpassive nutrient reduction system if nutrient reduction is proven through monitoring and testing.
  - 7) The method of recirculation and recirculation rate must be discussed and justified.
  - 8) All recirculating trickling systems must operate in a manner such that if a component of the system fails and treatment diminishes or ceases, untreated effluent will not be discharged to the absorption drainfield. Systems must be equipped with adequate alarms.
  - 9) If the recirculation trickling filter system is intended to remove nitrogen, a complete description of the nitrification and denitrification processes must be provided in detail, including the unit where it occurs, carbon source, feed rates, loading rates, pumps, controls, and other mechanisms necessary.
  - 10) If the recirculating trickling filter system is intended to remove nitrogen, monitoring data must be submitted from at least three existing systems operating in similar climates and treating wastewater with characteristics similar to that to be treated. Monitoring must include at least six cumulative years of data, with one system being in operation at least three years. Minimum data submitted must include information on time to reach steady state conditions, required maintenance and operation, average daily flow, and influent and effluent total nitrogen (TKN + nitrate + nitrite) concentration. The monitoring frequency must be sufficient to establish the treatment efficiency and response to varying wastewater flows, strengths, and climatic conditions.
  - 11) EHD will consider the complexity and maintenance required of the system, the stability of the processes, and the monitoring data in determining the adequacy, level of maintenance, and monitoring frequency of the system.
  - 12) A standard absorption trench, sized in accordance with Section 16.1, will be required.

## 16.9 Evapotranspiration-Absorption Systems

- A) Evapotranspiration absorption (ETA) systems must meet all minimum separation distances prescribed for standard drainfields, as stated in 17.36.3 or 17.36.9, ARM. Distances must be measured from the edge of the system. ETA systems must not be installed on land with a slope greater than 6 percent.

- B) The material in the ETA system must be at least 24-inches deep and must be washed coarse sand or drain rock. Testing must be provided to document the void ratio used.
- 1) The minimum area of the ETA system must be based on an application rate determined from the percolation test. The application rate referenced in Section 16.2 can be used, or the application rate can be determined using the equation  $Q = 0.8 \cdot 3 / (T^{0.5})$ , where Q is the application rate in gallons per day per square foot, T is the percolation rate in minutes per inch, and  $(T^{0.5})$  is the square root of T. However, the application rate must not exceed the application rate for a standard drainfield.
  - 2) ETA systems must utilize pressure distribution design. The beds must be installed with the long dimension parallel to the land contour, and the length must be at least 3 times the width. The minimum spacing between distribution pipes must be 6 feet.
  - 3) The volume of the ETA system must be based upon 90 percent of the pan evaporation, minus precipitation for the wettest year in a 10-year period and actual percolation data from the site. In the wettest year in a 10-year period, the design must show that total water lost through evaporation and absorption equals or exceeds the total water gained through precipitation and effluent discharge. Due to lack of pan evaporation data, published information on pan evaporation, or data from a similar climatic location, may be used. Typically, storage capacity must be built into the system to accommodate months with low evaporation. The design must include a water balance for a one-year period. Transpiration may be included in the water balance where it can be adequately demonstrated.
  - 4) A minimum cap of 6 inches of loamy topsoil must be provided over the entire ETA system. The cap must be sloped a minimum of 1 percent to provide drainage.
- C) Construction
- 1) Excavation may proceed only when the moisture content is below the soil's plastic limit. If a sample of soil taken at the depth of the proposed bottom of the system forms a wire, instead of crumbling, when one attempts to roll it between the hands, the soil is too wet to excavate.
  - 2) A backhoe or excavator is usually used to excavate the system. Front-end loaders or bulldozer blades must not be used, because the scraping action of the bucket or blade can smear the soil severely, and the wheel or tracks will compact the exposed infiltrative surface.
  - 3) Excavation equipment must not be driven on the bottom of the system. If trenches are used, the equipment can straddle the excavation. If a bed is used, the bed should be divided into segments so that the machinery can always operate from undisturbed soil.
  - 4) The bottom of the bed must be level throughout to ensure more uniform distribution of effluent.
  - 5) The bottom and sidewalls of the excavation must be left with a rough open surface. Any smeared and compacted surfaces should be scarified.
  - 6) Work should be scheduled only when the infiltrative surface can be covered in one day, because wind-blown silt or raindrop impact can clog the soil.
  - 7) Once the infiltrative surface is properly prepared, the backfilling operations must be done carefully to avoid compaction (damage) of the soil.
  - 8) The porous media should be laid in by a backhoe or front-end loader, rather than dumped in by a truck. This should be done from the sides of the system rather than driving out onto the exposed bottom.
  - 9) The distribution pipes must have drain rock extending to the bottom of the system and be covered with a minimum of 2 inches of drain rock.
  - 10) The drain rock must be covered completely with synthetic drainage fabric to prevent the soil cover from entering the media.
  - 11) A 4-inch diameter, standing check pipe with both ends capped (only the bottom cap should be glued) must be installed. Several 1/8-inch to 1/4-inch diameter holes should be drilled in the bottom of the pipe and covered with filter cloth. Check pipe should be anchored in fill material to prevent the pipe from being pulled out of the bed.
  - 12) A berm surrounding the bed must be constructed to ensure that surface drainage does not enter the bed. The berm must be 6 to 12 inches above the natural grade of the site.

13) The backfill material must be relatively porous, such as loamy sand or sandy loam. It should be mounded above natural grade to allow for settling and to direct runoff away from the system.

D) Pressure distribution is required for the ETA system.

#### 16.10 **Restricted Systems**

A) These systems are disallowed for use with individual or multiple-user applications without an approved variance from the reviewing authority (Appendix F). In cases where a variance or waiver has been granted, Circular DEQ 4 will be used as the regulation for design and review. Systems in this category require system design and system certification and as-built by a PE.

- 1) Recirculating Sand Filters
- 2) Evapotranspiration Systems
- 3) Aerobic Sewage Treatment Units
- 4) Chemical Nutrient-Reduction Systems

#### 16.11 **Experimental Systems**

A) Treatment systems not listed in this regulation may receive a local variance for use as experimental systems. Experimental systems must only be considered under the following conditions:

- 1) The property owner/authorized agent must provide adequate information to the reviewing authority that ensures the system will effectively treat the wastewater in a manner that will prevent ground water contamination and will meet all of the requirements of 17.36.902, ARM, at all times. Failure to meet the requirements of 17.36.902, ARM, or any waiver conditions must invalidate the approval and be grounds to order cessation of use of the system and buildings that the system serves.
- 2) The property owner/authorized agent must include a complete description of a scientific evaluation process to be carried out by a scientific, educational, governmental, or engineering organization.
- 3) The property owner must arrange for any funding necessary to provide adequate design, installation, monitoring, and maintenance.
- 4) The system must be designed by a PE.

B) The reviewing authority may place any requirements or restrictions it deems necessary on an experimental system. All requirements for standard systems must apply to experimental systems except those specifically exempted by the waiver. An approval to construct an experimental system is not transferable from person to person. The property owner/authorized agent must provide for inspections to be made by persons acceptable to the reviewing authority. Monitoring and inspection results must be submitted annually to the reviewing authority for up to five years. The reviewing authority may require that a redundant system (i.e., a system that meets the requirements of another section of this regulation) be installed in parallel with the experimental system.

C) Any person who sells a property containing an experimental system must disclose all permit, monitoring, and maintenance requirements to the buyer.

D) Experimental systems may be reclassified by the reviewing authority after sufficient evidence has been collected to show that the system functions satisfactorily over time.

E) Maintenance and operation

- 1) Continuous maintenance and operation must be provided for the life of the system by a management entity acceptable to EHD. The type of entity required and the degree of management will be commensurate with the complexity of the system and the site conditions.
- 2) The management entity must be responsible for monitoring the operation of the system.
  - a) Frequent inspections (as determined by the reviewing authority) of the mechanical equipment must be provided during the first 90-day start-up period.
  - b) The routine inspection schedule must be quarterly at a minimum.
  - c) Records, both of maintenance and performance, must be kept and submitted annually to EHD.

- d) All manufacturers of experimental systems must provide a maintenance and operation manual, which must be followed. The manual must contain detailed instructions on proper operation and maintenance procedures, including safety, a replacement parts list, public health considerations, limitations of the unit, detection of a malfunction, and expectations from a well functioning unit.
- e) Notification to the service provider and EHD must be made within two business days if, for some reason, a unit fails to function properly.

F) Advance treatment

- 1) If the experimental system is intended to attain a higher level of treatment than a septic tank, monitoring data must be submitted from at least three existing systems operation in similar climates and treating wastewater similar in characteristics to that to be treated. Monitoring must include at least six cumulative years of data, with one system being in operation at least three years. Minimum data submitted must include information on time to reach steady-state conditions, required maintenance and operation, average daily flow, and influent and effluent values for each parameter. Sample analysis is to be done by an independent laboratory.
- 2) The monitoring frequency must be sufficient to establish the treatment efficiency and response to varying wastewater flows, strengths, and climatic conditions.
- 3) EHD will consider the complexity and maintenance required of the system, the stability of the processes, and the monitoring data in determining the adequacy, level of maintenance, and monitoring frequency of the system.

16.12 **Replacement Systems**

A) **General.**

- 1) Applications for replacement systems must follow the same requirements as outlined in Section 3 with the following exceptions for failed or failing systems:
  - a) Only one (1) soil pit and one (1) perc test are required in the proposed drainfield area.
  - b) No additional replacement area must be stipulated. However, EHD recommends that while site work is being done another replacement area be identified.
  - c) Nondegradation analysis may not be required if no expansion is proposed or the proposed replacement drainfield area is not a significant distance from the failing drainfield.
- 2) Any repair or replacement, of any portion of or all of an existing system will require that the entire system meet these regulations for location, design and construction of a WWTS.
- 3) The systems addressed in this section are only allowed as replacement systems in accordance with 17.36.901, ARM, and Circular DEQ 4.
- 4) The “systems” discussed in this section may not be used for new development submittals except as specifically allowed by this section.
- 5) Site modifications, including artificial drainage, cut “systems” and fill “systems”, may only be used for replacement of failing systems. However, cut “systems” and fill “systems” may be proposed for replacement (not primary) areas at the time of proposed new development, provided the site preparation is completed prior to approval.
- 6) For the purposes of this section, a replacement system is a WWTS proposed to replace a failed, failing, or contaminating system. Systems proposed to be replaced that are not failed, failing, or contaminating are considered alterations (i.e. construction activities and/or site modifications that prompt moving the WWTS).
- 7) Replacement systems shall be designed and constructed to allow the best treatment practical. Absorption fields will be considered first for all situations.
- 8) If there is insufficient room for an absorption field, an absorption bed shall be given consideration before a seepage pit.
- 9) A vertical separation of forty-eight (48) inches from the bottom of the absorption system and high ground water, bedrock, or other limiting layer is required.

- 10) If the sewer from the building is at a depth which mandates an absorption system depth of greater than thirty-six (36) inches, EHD may allow a maximum trench depth of sixty (60) inches provided mandatory ground water, bedrock or other limiting layer separations are maintained.
- 11) If a proposed replacement system cannot meet all the requirements of this regulation the property owner may request a variance (Section 6 and Appendix F).

**B) Septic Tanks and Pump Chambers**

- 1) A permit may be issued for the replacement or addition of a septic and/or pump tank only, provided the existing system has a valid, approved BSBCCCHD permit for a drainfield or bed dispersal area.
- 2) Any system that does not have a valid, approved BSBCCCHD WWTS permit must be shown to be, or brought to, current state and local standards through the permitting process as outlined in these regulations.
- 3) Any septic and/or pump tank being abandoned must be pumped out by a licensed septic tank pumper. The tank may then be removed and disposed of at an approved facility OR filled with sand, gravel or soil and buried in place OR crushed and buried in place.

**C) Absorption Beds** - Absorption beds are used primarily on lots with limited area. Beds differ from trenches in that they are wider than twenty-four (24) inches and have more than one distribution line.

- 1) Limitations.
  - a) Absorption beds will only be considered when a secondary treatment system utilizing absorption trenches is not feasible due to limited area. EHD shall make this determination.
  - b) Absorption beds shall not be installed if any of the following conditions exist:
    - i) Soils having a percolation rate greater than sixty (60) min./inch, or
    - ii) When slopes are greater than 8%, or
    - iii) When high ground water, bedrock or any other limiting layer is within sixty-six (66) inches of the ground surface.
- 2) Design - Absorption beds shall be designed similarly to standard absorption trenches with the following changes:
  - a) Design of the bed shall be determined on a case-by-case basis. The bed should be designed to have the greatest amount of sidewall practical.
  - b) Pressure distribution lines shall be spaced at intervals no greater than three (3) feet.
  - c) The distribution lines shall be laid level.
  - d) No machinery shall be driven on the excavation of the bed.
- 3) All bed designs must utilize pressure distribution.

**D) Fill System**

Fill systems may be used only for replacement of existing failed systems and may not be used for new subsurface wastewater treatment systems. The reviewing authority must initially approve the fill location with the site modification completed prior to final system approval. Fill areas for replacement absorption systems must be physically completed prior to approval by the reviewing authority.

- 1) Location
  - a) The entire area necessary for the replacement absorption system must be filled prior to final approval of the system.
  - b) Fill systems may not be installed on soils with percolation rate slower than 60 mpi. Side slopes on the fill may not exceed 25 percent (4:1)
- 2) Fill Restrictions

- a) A minimum of 4 feet of natural soil from the bottom of the infiltrative surface of the subsurface system to a limiting layer must be maintained. Fill cannot be used to overcome minimum vertical or horizontal separation distances.
- 3) Fill Material
- a) Soils used for fill may not be finer than sandy loam with a maximum of 20 percent passing the No. 100 sieve.
- 4) Design
- a) System configuration dimensions and orientation must be submitted in a design report. The design report and drawings must be approved by approved by the BSBCCHD prior to the placement of fill material.
  - b) Three percolations tests evenly spaced across the completed fill must be performed at the depth of the proposed infiltrative surfaces as a basis for design application rate.
  - c) The absorption system must be sized o the basis of the percolation rate for either the soil beneath the fill material or the percolation rate of the fill material, whichever is slower.
- 5) Construction
- a) All vegetative cover must be removed from the area to be filled.
  - b) Fill material must not be put in place when the fill or the original soil surface is frozen.
  - c) Fill material must be placed in lifts and compacted as specified in the design report so that stable soil structure conditions are achieved.
  - d) Absorption systems must be set back at least 25 feet from the lower edge of the filled area on slopes of 6 percent or greater. For slopes less than 6 percent, absorption systems must be set back at least 10 feet on all sides prior to starting the side slope.
  - e) The fill area must be seeded with a suitable grass to aid in stabilization.
- E) Artificially Drained Site.**
- 1) Prior to construction of any site drainage system such as field drain, under drain, or vertical drain, an evaluation of the site must be performed, including soil profile descriptions; slope; depth to bedrock or impervious layer; estimation of depth to seasonally high ground water; topography; distance to wells, seeps, streams, ponds, or other open water; and any other pertinent considerations.
  - 2) Design
    - a) The drainage method chosen (curtain drain, vertical drain, or under drain) and the reason for this choice must be detailed. Drawings showing dimensions of the drain system and materials to be utilized must be provided.
    - b) The drainage system must be constructed according to the specific design approved by the reviewing authority.
  - 3) The type of WWTS to be approved must depend upon the depth to seasonally high ground water. A minimum of 4 feet from the bottom of the trench over the entire area of the proposed drainfield and replacement area to the seasonally high ground water must have been achieved by the site drainage system. An adequate horizontal separation distance must be maintained between the drain and the absorption system in order to reduce the potential for effluent to enter the drain.
  - 4) The reviewing authority may require monitoring of the depth to seasonally high ground water after installation of the drainage system.
- F) Cut "System"**
- 1) Absorption trenches for these systems must meet the same requirements as a standard absorption trench.
  - 2) Design
    - a) Cut areas for the replacement drainfield must be physically completed prior to approval. Two test holes must be excavated in the cut area to a depth of 10 feet below the depth of the cut, and detailed

soil profile descriptions must be provided. Percolation tests must also be performed after the cut has been completed. If a limiting layer is encountered at 7 to 10 feet, a description of how this limitation will be overcome must be provided.

- b) A complete lot layout must be submitted showing the cut areas, the uphill and downhill slope, and slope across the cut area. Slope across the drainfield site must be a uniform slope.
  - c) Cut systems will only be considered on slopes that do not exceed 25 percent and where downhill slope below the cut area is not greater than 25 percent.
- 3) The designer shall submit a letter of verification indicating that the site meets minimum requirements of applicable rules after the cut has been completed.
- G) **Holding Tank** - Holding tanks are not a means of wastewater treatment and disposal. Instead, they function as a storage device for wastewater. When full, the contents of the tank must be pumped out by a septic system pumper licensed with MDEQ.
- 1) Limitations.
    - a) All other means of utilizing a dispersal system must be exhausted (including off-site easements) before a holding tank may be considered for a seasonal residence or any other structure. The PE or SE must attest to this in the application.
    - b) Due to the high volume of wastewater produced at residences and the expense of continually pumping the tank, this system will not be considered for year-round residences.
    - c) The facility to be served is for seasonal use only unless a variance is granted by the BOH for structures that have low sewage flows.
    - d) Siting requirements shall be the same as those for septic tanks.
  - 2) Design.
    - a) Holding tanks must be monolithic. The lid must also be monolithic with an 18 inch minimum diameter sealed access port.
    - b) The holding tank must be stabilized against flotation, and waterproofed against infiltration or exfiltration.
    - c) Holding tanks must have a minimum 1,000 gallon effective capacity. EHD will determine capacity required on a case-by-case basis.
    - d) An audio and/or visual high-level alarm must be installed which signals when tank capacity has reached 75%, or they shall be fitted with an exterior measuring device.
  - 3) Use and maintenance of a holding tank will be considered a “sanitary restriction” on the property. The property owner(s) will be required to sign and have notarized a document of sanitary restriction, which must be filed with the property in the C & R. This document establishes that the property owner(s) agree to abide by the following conditions:
    - a) The property shall be maintained for seasonal use only unless a variance has been granted.
    - b) Test the holding tank for tightness immediately upon installation and on an annual basis thereafter. Means of testing shall be specified.
    - c) Provide a signed contract with a Licensed Septic Tank Pumper to have the holding tank pumped on a regular schedule or an “as-needed” basis as determined by EHD.
    - d) Submit proof of pumping and tightness testing to EHD on an annual basis, and,
    - e) Connect to a public system when collection mains become accessible (within 300 feet of the property) if permission is granted by the entity controlling the system.
    - f) Any other conditions and/or restrictions placed upon the property per the permit and/or variance approval.
    - g) Disclose all conditions of this document to a prospective buyer of the property. The buyer must agree to assume all of the conditions as stated on the document of sanitary restriction.

- H) **Sealed Pit Privies** - Sealed pit privies consist of an enclosed receptacle to receive non-water carried toilet wastes into a lined vault.
- 1) Limitations
    - a) Sealed pit privies shall be considered for facilities, which do not have a piped water supply.
    - b) New and/or replacement sealed pit privies will only be considered for local, state, and/or federal government agencies.
  - 2) Design - The vault used to hold the wastes shall be watertight. EHD will approve designs on a case by case basis.
  - 3) Operation - The vault must be pumped by a Licensed Septic Tank Pumper when full.
  - 4) Proof of pumping must be submitted to EHD on an annual basis.

**SECTION 17  
COMMERCIAL AND MULTIPLE-USER WASTEWATER TREATMENT SYSTEMS**

17.0 General

- A) In the interest of protecting public health and the quality of ground water in Butte-Silver Bow County, the BSBCHD attaches a high degree of scrutiny to WWTS that are designed as commercial, multiple-user and/or public systems. Recognizing the potential for greater design flows, changes in property ownership, facility usage and/or wastewater quantity or strength being discharged, the BSBCHD has adopted the following requirements for septic permit applications for WWTS serving these developments.
- B) At EHD's discretion, review of larger and/or more complicated systems may be forwarded to MDEQ or an engineering firm under contract. The costs incurred for this review will be the responsibility of the property owner. The property owner may request in writing a cost estimate prior to the review by an outside party. All fees must be submitted prior to the permit being issued.
- C) Appropriate application fees will be required

17.1 Commercial Wastewater Treatment Systems

- A) Application for commercial WWTS permits shall be made per Appendix D.
- B) Plans for commercial WWTS must be approved by EHD and must be designed, inspected and certified in accordance with these regulations.
- C) A detailed written plan describing the proposed commercial venture must be submitted with the wastewater treatment permit applications. EHD may require additional information.
- D) WWTS design flow estimates and wastewater strength considerations for commercial establishments shall be addressed per Section 13 of this regulation.
- E) EHD may require water meters, pump flow/run-time meters or other flow measuring devices to confirm wastewater production estimates. Such devices must be monitored on a regular basis and the results reported to EHD per any stipulations noted on the permit.
- F) Individual or shared commercial WWTS with design flows greater than 700 gallons per day are considered as multiple-user for purposes of design requirements.
- G) A WWTS serving a food establishment is typically considered a public system regardless of whether it serves more or less than 24 people per day for more than 60 days a year.
- H) When a permit application for a commercial system is submitted to the BSBCHD, a Commercial Addendum form (available at EHD) must be completed and signed by the owner of the property onto which the WWTS is to be placed. The completed form must be notarized and included with the application. The property owner's signature on the addendum will document permission for EHD to file this form with the parcel in the C & R before final approval will be given.
- I) If there is any doubt that the place of business served by this WWTS will expand to service 25 or more people or if the nature of the business changes to a food establishment consideration must be given to a public WWTS.



## 17.2 Multiple-User Wastewater Treatment Systems

- A) Application for multiple-user WWTS permits shall be made per Appendix D.
- B) Plans for multiple-user WWTS must be approved by EHD and must be designed, inspected and certified in accordance with these regulations.
- C) WWTS design flow estimates and wastewater strength considerations for commercial establishments shall be addressed per Section 13 of this regulation.
- D) EHD may require water meters, pump flow/run-time meters or other flow measuring devices to confirm wastewater production estimates. Such devices must be monitored on a regular basis and the results reported to EHD per any stipulations noted on the permit.

## SECTION 18 LOCAL SUBDIVISION REVIEW

### APPENDIX A TECHNICAL REFERENCES

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- A.1 Puget Sound Water Quality Authority. April 1996. *Guidance Handbook for On-site Sewage System Monitoring Programs in Washington State*. Olympia: Washington State Department of Health.
- A.2 Soil Survey Division Staff, United States Department of Agriculture. October 1993. *Soil Survey Manual*. Washington D.C.: United States Government Printing Office.
- A.3 State of Oregon Department of Environmental Quality. April 1995. *Oregon Administrative Rules for On-site Sewage Disposal*. Salem: State of Oregon.
- A.4 United States Environmental Protection Agency. October 1980. *Design Manual: Onsite Wastewater Treatment and Disposal Systems* EPA 625/1-80-012
- A.5 Washington State Department of Health. April 5, 1999. *Pressure Distribution: Recommended Standards and Guidance for Performance, Application, Design, and Operation and Maintenance*.

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- A.6 Bouwer, H. 1989. The Bouwer and Rice Slug Test – An Update. *Groundwater* Vol. 27, No. 3, pgs. 304-309.
- A.7 Bouwer, H. and Rice, R. C. 1976. A Slug Test for Determining Hydraulic Conductivity of Unconfined Aquifers with Completely or Partially Penetrating Wells. *Water Resources Research*. Vol. 12, pgs. 423-28.
- A.8 Bauman, B. J. and Schafer, W. H. 1984. Estimating Groundwater Quality Impacts from On-site Sewage Treatment Systems. *Proceedings of the 4<sup>th</sup> National Symposium on Individual and Small Community Sewage Systems*. New Orleans. pg. 285-294.
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- A.11 Freeze, D. A. and Cherry, J.A. 1979. *Groundwater*. Prentice Hall. 604pg.
- A.12 Hvorslev, M.J. 1951. Time Lag and Soil Permeability in Ground Water Observations. U.S. Army Corps of Engineers Waterway Experimentation Station, Bulletin 36.
- B.1 History of the Sanitation in Subdivisions Act (Plat Approval Statements).
  - A) On February 28, 1961, the 37th Montana Legislature determined that the health and safety of Montana citizens was being endangered by drainage from cesspools, septic tanks, privies, water closets, and other sources of polluting matter by liquid raising to the ground surface creating nuisances and seeping into drinking water supplies. Because of this concern, the first health department law regarding subdivisions was enacted. Under this law, a subdivision was considered as a division of land creating 5 or more parcels any of which is less than 5 acres, along an existing or proposed street, highway easement or right-of-way.

- B) On February 28, 1967, the definition of a subdivision was changed to mean a division of land creating 2 or more parcels, any of which is less than 5 acres, along an existing or proposed street, highway easement or right-of-way. In addition, all subdivision plats were subject to sanitary requirements but the Clerk & Recorder can record the plat without regard to sanitary requirements provided sanitary restrictions are attached to the plat. No building, the use of which by persons necessitates supplying water, sewage, or solid waste disposal, shall be built until such restriction has been removed or modified.
- C) On July 1, 1973, the Sanitation in Subdivisions Act was brought into law. This law required all sanitary restrictions placed on a subdivision be reviewed and removed by the Montana Department of Health before the plat could be filed, any lots could be sold or any dwelling was erected. The law included condominiums or areas providing space for camping trailers, house trailers or mobile homes. The definition of a subdivision was changed to mean a division of land into 2 or more parcels, whether contiguous or not, any of which is 10 acres or less, excluding roadways.
- D) Further redefinition of a subdivision occurred on May 1, 1975. A subdivision was then and is currently defined as a division of land which creates one (1) parcel of less than 20 acres which is exclusive of public road ways. See 61-1-205 and 61-1-206, MCA, for the definition of a public roadway.
- E) In 1977, the 45th Legislature passed a bill that allowed the Montana Department of Health (now MDEQ) to contract with local governments to perform reviews of minor subdivisions. A minor subdivision is a division of land created 1 to 5 parcels of less than 20 acres per parcel.
- F) SB 167 amends the Sanitation in Subdivision Act and became effective on April 20, 2001. This bill allows local health departments to review major subdivision lots with onsite individual/shared or multiple-user systems and provides a mechanism for local health departments to be notified of a subdivision site investigation prior to a subdivision application. SB 167 allows fees to be used for inspection and enforcement purposes.
- G) In summary, if a parcel falls into one of the following categories, the property is subject to the Sanitation in Subdivisions Act and must have the sanitary restrictions lifted prior to the construction of any dwelling that requires a water supply or creates wastewater.
  - 1) The property is part of a subdivision created after February 28, 1961 containing 5 or more parcels any of which is less than 5 acres.
  - 2) The property is part of a subdivision created after February 28, 1967 containing 2 or more parcels any of which is less than 5 acres.
  - 3) The property is part of a subdivision created after July 1, 1973 containing 2 or more parcels any of which is less than 10 acres.
  - 4) The property is part of a subdivision created after May 1, 1975 containing 1 or more parcels under 20 acres.

**APPENDIX C**  
**SCHEDULE OF FEES**

<b>C.0</b>	<b>Permit Fees</b>	
	A) New.....	\$100.00
	B) Replacement.....	\$100.00
	C) Upgrade/Expand.....	\$100.00
	D) Multiple User .....	\$200.00
	E) Commercial .....	\$200.00

- F) Experimental, Restricted or Any Pressure Dosed System .....\$150.00
- G) Installed By Owner Or Unlicensed Installer .....\$150.00
- H) System Installed Without Permit or Review By EHD .....\$250.00**

**C.1 Variance Fees**

- A) Replacement System.....\$150.00
- B) New Construction or Expansion .....\$150.00

**C.2 Re-inspection Fee .....\$50.00**

**C.3 Site Visit (Consultation Requested by Property Owner/Authorized Agent).....\$50.00**

**C.4 Registration of Competency (Installers Test)**

- A) Installer Exam.....\$75.00
- B) Registration Renewal (due every calendar year).....\$50.00

**C.5 Ground Water Monitoring**

- A) 1-3 Wells.....\$250.00

**APPENDIX D  
APPLICATION FOR PERMIT**

**D.0 Permit Application Form**

- A) All permit applications shall be made in writing and in permanent ink, on forms available from EHD. A permit application shall only be signed by the property owner or their authorized agent. The legal property owner is the owner of record as filed in the C & R's office at the time the application is submitted to EHD. The permit application form shall include the following information:
  - 1) Category for which the system is being applied: New Development, Upgrade/Expansion, Replacement, Individual/Shared, Multiple-User and Commercial (check all that apply).
  - 2) EQ # (when applicable).
  - 3) Name, mailing address and telephone number of the legal property owner.
  - 3) Name, mailing address and telephone number of the applicant (if other than the legal property owner).
  - 4) The authorized road address of the site/structure for which the permit is being applied. Authorized road addresses may be obtained from the Butte-Silver Bow Planning Department. (The office may be contacted at (406-497-6255).
  - 5) Name of subdivision as noted on the Plat Approval Statement (phase, block, lot) or Certificate of Survey (C.O.S.) number and lot/tract designation as applicable.
  - 6) Legal description (quarter-quarter / Section #, Township, Range).

- 7) Parcel size.
- 8) The number and type of structure(s) proposed to be connected to the system and;
  - a) Number of bedrooms to be served by the system for residences (an unfinished basement must be considered as an additional bedroom), and/or,
  - b) Estimated volume of wastewater produced (the submittal packet must include a description of how this estimate was determined for non-residences).
- 9) Verification that the RSR has been recorded in the C & R.
- 10) Type of Water Supply approved to serve the property.
- 11) Type of WWTS required by the RSR or proposed by the SE/PE
- 12) Number and type of structures allowed per RSR
- 13) Amount of drainfield required per RSR or recommended by the SE/PE.
- 14) Any other conditions per RSR or the SE/PE.
- 15) Signature of the legal property owner or their authorized agent.
- 16) Additional information as required on the application form at EHD's discretion.

#### D.1 Site Plan

- A) All applications must include three (3) copies of a site plan on paper no larger than 11 X 17 inches. Recommended scale is one inch equals twenty feet or one inch equals thirty feet. If drawing is not to scale, appropriate setback distances (Table 16.1) must be indicated. All site plans must include the following:
  - 1) Shape and size of the parcel, including all recorded property boundaries, easements and/or right-of-ways.
  - 2) Location of the proposed primary and replacement absorption systems.
  - 3) The locations of all wells and water supplies (per state approval and/or otherwise, proposed and existing) on the parcel and their distances to at least two (2) property lines. All wells (or well locations approved per state or local authority) must have a designated 100-foot radius zone of influence area shown.
  - 4) The location of any surface waters, drainage ways and floodplains on the property and within 100 feet of the property boundary.
  - 5) A statement verifying that there are no wells or surface water within 100 ft. of the proposed drainfield. For tank settings only, a statement verifying there are no wells or surface water within 50 feet of the proposed tank location (Public wellheads must be at least 100 feet from a septic and/or pump tank).
  - 6) Location of house site(s), driveways, outbuildings, etc. and proximity to septic tank and absorption systems.
  - 7) North point.
- B) For properties that required a site evaluation, the following additional information must be included on the site plan:
  - 1) Location and identification number of all soils test pits and percolation tests.
  - 2) Slope in the area of the absorption system and any slopes greater than or equal to 25% within 50 feet of the proposed drainfield areas.
- C) For those applications requiring nondegradation review (Section 3 and Appendix K), the following additional information must be included on the site plan:
  - 1) Mixing zones for each proposed onsite WWTS.
  - 2) Direction of ground water flow (hydraulic gradient).
  - 3) The approximate locations and identification of all wells used in the nondegradation review must either be shown on the site plan, or on an accompanying USGS topographic map or other similar map.
  - 4) The location of all state surface waters within ½ mile of the proposed development must be shown on the site plan, or on an accompanying USGS topographic map or other similar map.

- 5) The location of all onsite or offsite wells (existing or approved per an RSR) that are within 200 feet of any proposed/existing mixing zones or drainfields.

D.2 Additional Information Required For Application Submittal

- A) A permit fee in accordance with Appendix C.
- B) For subdivision lots as described in Section 3, the application must include at least one copy of the state-approved subdivision plan, showing the approved well and drainfield locations, as applicable. This copy may be reproduced in triplicate and used as the working site plan as long as it is enlarged or otherwise marked to clearly indicate the parcel under review, and includes the required category 1 information.
- C) If the property does not have a Certificate of Subdivision Plat Approval, as described in Section 3, or is part of a subdivision with a Certificate of Subdivision Plat Approval that did not stipulate a per-bedroom drainfield sizing or application rate, EHD shall be provided with site evaluation information as outlined in Section 5, to determine the suitability of the site/property for a WWTS. Nondegradation analysis may also be required for lots subdivided prior to the adoption of the Sanitation in Subdivision Act (February 28, 1961).
- D) For those applications requiring nondegradation review (Section 3), the following additional information must be provided:
  - 1) Copies of well logs for all wells used in the non-significance determination, or
  - 2) A printout of well information from the Montana Bureau of Mines and Geology (MBMG) Ground Water Information Center (GWIC) that includes all the pertinent well construction, pump test, water level, location, ownership and lithologic data may be submitted instead of actual well log copies.
- E) To protect the property owner's interest, proof of compliance or the ability to comply with other agencies, districts, or other governmental entities bylaws, ordinances, zoning laws, rules or regulations, when deemed pertinent by EHS, may be required.
- F) Additional information may be requested at EHD discretion.

**APPENDIX E  
SITE EVALUATION**

E.0 The following is a summary of information that must be submitted to EHD when a site evaluation is required.

- A) A copy of the recorded survey on paper no larger than 11 X 17 inches, including filing information.
- B) Name of the SE or PE performing the site evaluation. If the site evaluation and/or design are done by a PE or an individual under a PE's supervision, the official PE's seal must appear on the site plan and on any design plans.
- C) Soil Profile: At least one soil test pit is required within 25 feet of each of the proposed drainfields (primary and replacement) for soil descriptions. The minimum depth of soil profile descriptions must be eight (8) feet unless a limiting layer is encountered at a shallower depth. The soil profile may be completed to a greater depth to demonstrate compliance with nondegradation rules for phosphorous breakthrough. If the locations exhibit a varied geology additional pits may be required. The following soil properties must be evaluated to the full depth of the holes (Appendix I)
  - 1) Thickness of layers or horizons;
  - 2) Texture, (USDA Soils Classification System) structure, and consistency of soil horizons;
  - 3) Color (preferably described by using the notation of the Munsell color scheme) and color variation (redoximorphic features);
  - 4) Depth of water, if observed;
  - 5) Estimated depth to seasonally high ground water and basis for the estimate;
    - a) Explain how this determination was made and why it is thought to be representative of the seasonal high ground water level. For a marginal site, monitoring wells shall be installed and monitored through the high ground water period (Appendix L).
    - b) Monitoring shall be performed by a person approved by EHD or if approved by the Director, by EHD for a pre-paid fee assessed in accordance with Appendix C of this regulation. Any site being

monitored by the SE or PE must be reported to EHD before monitoring has begun to allow for review.

- 6) Depth to and type of bedrock or other limiting layer (perc rate >60 min/inch), if observed;
  - a) Stoniness reported on a volume basis (i.e. the percentage of the soil volume occupied by particles greater than 2 mm in diameter);
  - b) Plasticity; and
  - c) Other prominent features such as root depth, presence of calcium etc.
- D) Percolation Tests: One “perc test” may be required within each of the proposed drainfield areas (primary and replacement) at the depth of the proposed drainfield trench excavation (Appendix J).
- E) Other Site Factors including land slope, flooding, surface water and amount of suitable area.
- F) Soil surveys. These are usually found at the local USDA Natural Resources Conservation Service (NRCS) office. Soil surveys offer good preliminary information about an area and can be used to identify potential problems; however, they cannot substitute for a field investigation. If available, the most recent version of appropriate section(s) of the soil survey must be provided, including Sanitary Facilities, Engineering Index, Physical Properties, Water Features, and Soil Features.
- G) For parcels requiring nondegradation review (Section 3 and Appendix K), the following additional information must be provided:
  - 1) Copies of well logs for all wells used in the non-significance determination, or
  - 2) A printout of well information from the Montana Bureau of Mines and Geology (MBMG) Ground Water Information Center (GWIC) that includes all the pertinent well construction, pump test, water level, location, ownership and lithologic data may be submitted instead of actual well log copies.
- H) EHD at its discretion may require additional information.

#### **APPENDIX F VARIANCE PROCEDURE**

- F.0 Purpose. A variance provides limited flexibility from strict compliance with BSBCCHD regulations.
- F.1 Applicability. When certain circumstances preclude compliance with requirements of BSBCCHD regulations, a person may apply to the Butte Silver Bow Board of Health for a variance from the applicable regulation.
- A) For each variance application, the property owner/authorized agent must clearly demonstrate that all alternatives not requiring a variance have been explored.
  - B) Variance requests related to the proposed use of an experimental system must provide for an acceptable alternative system should the experimental system prove to be inadequate in terms of treatment, dispersal or operation and maintenance.
- F.2 Scope of Variance.
- A) Variances are non-transferable and remain valid only for the specific sites and WWTS permits for which they are granted.
  - B) All other provisions of BSBCCHD regulations shall apply to variance recipients except those specifically exempted by the Board pursuant to the variance.
  - C) Variance requests will be processed and reviewed on a case-by-case basis.
- F.3 Standard for Granting Variance.
- A) The property owner/authorized agent must first prove:
    - 1) The system that would be allowed by the variance is unlikely to cause pollution of state waters in violation of 75-5-605, MCA; and
    - 2) The granting of the variance:

- a) Will protect the quality and potability of water for public water supplies and domestic uses, and will protect the quality of water for other beneficial uses, including those uses specified in 76-4-101, MCA; and
- b) Will not adversely affect public health, safety and welfare; and
- 3) The variance will not conflict with the requirements of 17.36.907(3), ARM.
- B) Next, the property owner/authorized agent must prove:
  - 1) Special circumstances exist where strict compliance with BSBCCHD regulations will result in unnecessary hardship that is:
    - a) Peculiar to the property owner's property or situation; and
    - b) Not caused by the property owner's action or inaction. (Examples of a property owner's action or inaction include, but are not limited to, new construction or the extensive remodeling of a structure in which the strength or amount of wastewater produced is increased); and
  - 2) The variance does not conflict with the purpose of BSBCCHD regulations.

F.4 Variance procedure.

- A) A complete variance application shall be submitted to EHS within 30 days after a permit is denied. If EHD does not receive a variance application within the prescribed time, then a variance shall not be granted.
- B) EHD shall determine if a variance application is complete.
- C) If EHD determines that an application is not complete, it shall notify the property owner/authorized agent of the deficiencies.
  - 1) A complete variance application shall include:
    - a) Property owner's name and address;
    - b) Specific provision or provisions of BSBCCHD regulation from which variance is requested;
    - c) Legal description or address where variance is requested;
    - d) Detailed and accurate description of the proposed project or circumstances under consideration including a statement that alternatives not requiring a variance have been explored;
    - e) Specific written explanation addressing each criteria under the Standard for Granting Variance (See F.3);
    - f) A list of the names and addresses of all adjacent property owners. Failure to provide a complete and accurate list may result in delay of the variance hearing;
    - g) Any further relevant information which EHD may require which is reasonably obtainable by the property owner/authorized agent.
- D) If EHD determines that an application is complete, the Board shall schedule a public hearing within 45 days.
- E) EHD shall serve notice of the hearing to the property owner at the address on the permit application by certified mail or by personal service at least 14 days before the hearing.
- F) EHD shall publish notice of hearing in accordance with Section 7-1-2121, MCA.
- G) Notice shall be sent by EHD to all adjacent property owners using the list of names and addresses supplied by the property owner/authorized agent by regular mail or personal service at least 14 days before the hearing.

F.5 Fees - The Board shall establish a fair and reasonable variance application fee in Appendix C. The application fee must be paid in full before a variance will be considered. If the variance application is withdrawn prior to the public notification process, the Health Officer may authorize a return of a portion of the variance fees. Variance application fees are non-refundable if public notification has taken place. The Board may approve changes in fees at regularly scheduled board meetings.

F.6 Restrictions on variance.

- A) Revisions or modifications made to BSBCCHD regulations shall not be grounds for a variance.
  - B) Expiration of variance - Unless otherwise specified in BSBCCHD regulations, the privilege to execute a variance expires two (2) years following approval by the Board.
  - C) No variance granted pursuant to this section shall be construed to prevent or limit the application of emergency provisions and procedures established in BSBCCHD regulations or relieve the property owner of responsibility of complying with other applicable local, state, or federal rules or standards.
- F.7 Variance Hearing Procedure.
- A) Variance hearings shall be conducted pursuant to the hearing procedures adopted by the BOH.
- F.8 Continuances.
- A) The Board may continue a hearing on its own initiative for a period not to exceed 45 days.
  - B) A hearing may be continued for longer than 45 days only if circumstances require a longer period and both the Board and the property owner/authorized agent agree to a specific period.
- F.9 Appeals.
- A) If a variance petition is denied, the property owner may, under Section 75-5-305, MCA, appeal to the Board of Environmental Review.
- F.10 Variance Revocation. A variance may be revoked by the Board if:
- A) Information is withheld, falsified or inaccurately supplied by the property owner or their authorized agent.
  - B) Conditions of the variance and/or permit approval are not satisfied.

**APPENDIX G**  
**AS-BUILT MINIMUM REQUIREMENTS**

- G.0 Within 30 days of the date a WWTS inspection was scheduled with EHD, the responsible installer, SE, or PE shall submit to EHD one original copy of a signed system certification form and one legible "as-built" drawing, done in permanent ink, on paper no larger than 11 X 17 inches. EHD reserves the right to require illegible and incomplete plans be revised and resubmitted to EHD within 30 days of notification.
- G.1 An as-built drawing must at a minimum include the following:
- A) Septic tank.
  - B) All plumbing stub outlets.
  - C) Sewer line between the building and septic tank.
  - D) Sewer line between septic tank and any distribution boxes, inspection boxes, pump tanks, and drainfield lines.
  - E) Distribution boxes, inspection boxes, and pump tanks.
  - F) All drainfield lines. The length of each individual drainfield line shown as well as the total number of lineal feet and/or square footage of drainfield lines.
  - G) The approved drainfield replacement area.
  - H) The location of any unusual construction features in the drainfield must be clearly indicated.
  - I) Well location(s) or a statement that the well was not yet installed at the time of installation.
  - J) Distances between any drainfield lines and the edges of foundations, property lines, lakes, streams, well, driveways, and water lines.
  - K) A minimum of two measurements from one or more fixed landmarks (i.e. building foundation(s) to the lid of any septic tank, pump tank, and distribution box, to enable future location of these components.
  - L) Location, size, shape and placement of all buildings or proposed buildings on the site showing their relations to the sewage dispersal system and to any easements.
  - M) North arrow orientation.
  - N) Location and name of the primary access road to the property (county road, state highway, etc.)



- O) "As-built" drawings must be clearly marked "**AS-BUILT**", noting the name of the person who drew it. If the system was designed by a PE, the "as-built" must include the PE's official seal.

G.2 Other:

- A) "As-builts" are not overlays of the original design, unless the "as-built" is clearly distinguishable from the original plan and is reproducible as such.
- B) If "as-built" drawing is to scale, recommended scale is one inch equals twenty feet or one inch equals thirty feet. Appropriate setback distances (Table 16.1) must be indicated.
- C) Additional information may be requested at EHD's discretion. See Appendix BSB A-K for an example as-built drawing.

**APPENDIX H  
SOILS AND SITE CHARACTERISTICS**

H.0 Soil Profiles

- A) At least one soil pit is required within 25 feet of each of the proposed drainfields (primary or replacement) for soil descriptions. The minimum depth of soil profile descriptions must be 8 feet unless a limiting layer is encountered at a shallower depth. The soil profile may be completed to a greater depth to demonstrate compliance with nondegradation rules for phosphorous breakthrough. If the locations exhibit a varied geology, additional pits may be required.

H.1 Definitions

- A) **Bedrock** • material that cannot readily (easily) be excavated by power equipment, or material that is jointed, fractured, or has cohesive structure that does not allow water to pass through or has insufficient quantities of fines within fractures or layers to allow for the adequate treatment of wastewater.
- B) **Escarpment** • any slope greater than 50 percent, which extends vertically 6 feet or more as measured from toe to top.
- C) **Limiting layer** • bedrock, an impervious layer or seasonally high ground water.
- D) **Mottling or redoximorphic features** • soil properties associated with wetness that results from the reduction and oxidation of iron and manganese compounds in the soil after saturation with water and desaturation, respectively.
- E) **Natural soil** • soil that has developed in place through natural processes, and where no fill material had been added.
- F) **Seasonally high ground water** • the minimum depth, at any season of the year, to the upper surface of the zone of saturation, measured from the ground surface, as measured in an unlined hole or perforated monitoring well during the time of year when the water table is the highest. The term includes the upper surface of a perched water table.
- G) **Slope** • the rate that a ground surface declines in feet per 100 feet. It is expressed as percent of grade.
- H) **Soil profile** • a description of the soil to a depth of 8 to 10 feet using the USDA soil classification system.
- G) **Soils texture** • the amount of sand, silt, or clay, measured separately in soil mixture.

H.2 Soil Texture

- A) Soil texture refers to the weight proportion of the separates for particles less than 2 mm, as determined from a laboratory particle-size distribution. Field estimates should be checked against laboratory determinations, and field criteria should be adjusted as necessary. Field criteria for estimating soil texture must be chosen to fit the soils of the area. Sand particles feel gritty and can be seen individually with the naked eye. Silt particles cannot be seen individually without magnification; they have a smooth feel to the fingers when dry or wet. In some places, clay soils are sticky; in others, they are not. Soils dominated by montmorillonite clays, for example, feel different than soils that contain similar amounts of micaceous or kaolinitic clay.
- B) Definitions of the soil texture classes according to distribution of size classes of mineral particles less than 2 mm in diameter are as follows:
  - 1) Sands: 85 percent or more sand and the percentage of silt plus 1.5 times the percentage of clay is 15 or less.

- a) *Coarse sand*: 25 percent or more very coarse and coarse sand and less than 50 percent any other single grade of sand.
  - b) *Sand*: 25 percent or more very coarse, coarse, and medium sand (but less than 25 percent very coarse and coarse sand) and less than 50 percent either fine sand or very fine sand.
  - c) *Fine sand*: 50 percent or more fine sand; or less than 25 percent very coarse, coarse, and medium sand and less than 50 percent very fine sand.
  - d) *Very fine sand*: 50 percent or more very fine sand.
- 2) *Loamy sands*: At the upper limit, 85 to 90 percent sand and the percentage of silt plus 1.5 times the percentage of clay is 15 or more; at the lower limit, 70 to 85 percent sand and the percentage of silt, plus twice the percentage of clay, is 30 or less.
    - a) *Loamy coarse sand*: 25 percent or more very coarse and coarse sand and less than 50 percent any other single grade of sand.
    - b) *Loamy sand*: 25 percent or more very coarse, coarse, and medium sand (but less than 25 percent very coarse and coarse sand) and less than 50 percent either fine sand or very fine sand.
    - c) *Loamy fine sand*: 50 percent or more fine sand; or less than 50 percent very fine sand and less than 25 percent very coarse, coarse, and medium sand.
    - d) *Loamy very fine sand*: 50 percent or more very fine sand.
  - 3) *Sandy loams*: 20 percent or less clay and 52 percent or more sand and the percentage or silt plus twice the percentage of clay exceeds 30; or less than 7 percent clay, less than 50 percent silt, and between 43 and 52 percent sand.
    - a) *Coarse sandy loam*: 25 percent or more very coarse and coarse sand and less than 50 percent any other single grade of sand.
    - b) *Sandy loam*: 30 percent or more very coarse, coarse, and medium sand (but less than 25 percent very coarse and coarse sand) and less than 30 percent either fine sand or very fine sand.
    - c) *Fine sandy loam*: 30 percent or more fine sand and less than 30 percent; or between 15 to 30 percent very coarse, coarse, and medium sand; or more than 40 percent fine and very fine sand, at least half of which is fine sand, and less than 15 percent very coarse, coarse, and medium sand.
    - d) *Very fine sandy loam*: 30 percent or more very fine sand; or more than 40 percent fine and very fine sand, at least half of which is very fine sand, and less than 15 percent very coarse, coarse, and medium sand.
  - 4) *Loam*: 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand.
  - 5) *Silt loam*: 50 percent or more silt and 12 to 27 percent clay; or 50 to 80 percent silt and less than 12 percent clay.
  - 6) *Silt*: 80 percent or more silt and less than 12 percent clay.
  - 7) *Sandy clay loam*: 20 to 35 percent clay, less than 28 percent silt, and 45 percent or more sand.
  - 8) *Clay loam*: 27 to 40 percent clay and 20 to 45 percent sand.
  - 9) *Silty clay loam*: 27 to 40 percent clay and less than 20 percent sand.
  - 10) *Sandy clay*: 35 percent or more clay and 45 percent or more sand.
  - 11) *Silty clay*: 40 percent or more clay and 40 percent or more silt.
  - 12) *Clay*: 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.
- C) Necessarily these verbal definitions are somewhat complicated. The texture triangle is used to resolve problems related to word definitions. The eight distinctions in the sand and loamy sand groups provide refinement greater than can be consistently determined by field techniques. Only those distinctions that are significant to use and management and that can be consistently made in the field should be applied.

H.3 Particle size distribution (fine earth or less than 2 mm, “gravelly” indicates particles that are 2 mm or larger in size) is determined in the field mainly by feel. The content of rock fragments is determined by estimating the proportion of the soil volume that they occupy.

#### H.4 Soil

A) The United States Department of Agriculture uses the following size separates for the <2 mm mineral material:

- 1) Very coarse sand: 2.0 – 1.0 mm
- 2) Coarse sand: 1.0 – 0.5 mm
- 3) Medium sand: 0.5 – 0.25 mm
- 4) Fine sand: 0.25 – 0.10 mm
- 5) Very fine sand: 0.10 – 0.05 mm
- 6) Silt: 0.05 – 0.002 mm
- 7) Clay: <0.002 mm

B) The texture classes are sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay, and clay. Subclasses of sand are subdivided into coarse sand, sand, fine sand, and very fine sand. Subclasses of loamy sands and sandy loams that are based on sand size are named similarly.

#### H.5 Rock fragments

A) Rock fragments are unattached pieces of rock 2 mm in diameter or larger that are strongly cemented or more resistant to rupture. Rock fragments include all sizes that have horizontal dimensions less than the size of a pedon.

B) Rock fragments are described by size, shape, and, for some, the kind of rock. The classes are pebbles, cobbles, channers, flagstones, stones, and boulders. If a size or range of sizes predominates, the class is modified, as for example: “fine pebbles,” “cobbles 100 to 150 mm in diameters,” “channers 25 to 50 mm in length.”

C) Gravel is a collection of pebbles that have diameters ranging from 2 to 75 mm. The terms “pebble” and “cobble” are usually restricted to rounded or subrounded fragments; however, they can be used to describe angular fragments if they are not flat. Words like chert, limestone, and shale refer to a kind of rock, not a piece of rock. The upper size of gravel is 3 inches (75 mm). The 5-mm and 20-mm divisions for the separation of fine, medium, and coarse gravel coincide with the sizes of openings in the “number 4” screen (4.76 mm) and the “3/4 inch” screen (19.05 mm) used in engineering.

D) The 75-mm (3 inch) limit separates gravel from cobbles. The 250-mm (10 inch) limit separates cobbles from stones, and the 600-mm (24 inch) limit separates stones from boulders. The 150-mm (channers) and the 380-mm (flagstones) limits for thin, flat fragments follow conventions used for many years to provide class limits for plate-shaped and crudely spherical rock fragments that have about the same soil use implications as the 250-mm limit for spherical shapes.

#### H.6 Rock fragments in soil

A) The adjectival form of a class name of rock fragments (Table I-1) is used as a modifier of the textural class name: “gravelly loam,” “stony loam.” The following classes, based on volume percentages, are used:

- 1) *Less than 15 percent*: No adjectival or modifying terms are used in writing for contrast with soils having less than 15 percent pebbles, cobbles, or flagstones. The adjective “slightly” may be used, however, to recognize those soils used for special purposes.
- 2) *15 to 35 percent*: The adjectival term of the dominant kind of rock fragment is used as a modifier of the textural terms: “gravelly loam,” “channery loam,” “cobbly loam.”
- 3) *35 to 60 percent*: The adjectival term of the dominant kind of rock fragment is used with the word “very” as a modifier of the textural term: “very gravelly loam,” “very flaggy loam.”

- 4) *More than 60 percent:* If enough fine earth is present to determine the textural class (approximately 10 percent or more by volume), the adjectival term of the dominant kind of rock fragment is used with the word “extremely” as a modifier of the textural term: “extremely gravelly loam,” “extremely bouldery loam.” If there is too little fine earth to determine the textural class (less than about 10 percent by volume), the term “gravel,” “cobbles,” “stones,” or “boulders” is used as appropriate.
- B) The class limits apply to the volume of the layer occupied by all pieces of rock larger than 2 mm. The soil generally contains fragments smaller or larger than those identified in the term. For example, a stony loam usually contains pebbles, but “gravelly” is not mentioned in the name. The use of a term for larger pieces of rock, such as boulders does not imply that the pieces are entirely within a given soil layer. A boulder may extend through several layers.

**Table H-1**  
**Terms For Rock Fragments**

Shape and size	Noun	Adjective
<u>Spherical, cubelike, or equiaxial:</u>		
2-75 mm diameter	Pebbles	Gravelly
2-5 mm diameter	Fine	Fine gravelly
5-20 mm diameter	Medium	Medium gravelly
20-75 mm diameter	Coarse	Coarse gravelly
75-250 mm diameter	Cobbles	Cobbly
250-600 mm diameter	Stones	Stony
≥ 600 mm diameter	Boulders	Bouldery
<u>Flat:</u>		
2-150 mm long	Channers	Channery
150-380 mm long	Flagstones	Flaggy
380-600 mm long	Stones	Stones
≥ 600 mm long	Boulders	Bouldery

**Table H-2**  
**Classes Of Surface Stones And Boulders In Terms Of Cover And Spacing**

Class	Percentage of surface covered	Distance in meters between stones or boulders if the diameter is:			Name
		0.25m <sup>1</sup>	0.6m	1.2m	
1	0.01 – 0.1	≥8	≥20	≥37	Stony or bouldery
2	0.1 – 3.0	1 – 8	3 – 20	6 – 37	Very stony or very bouldery
3	3.0 – 15	0.5 – 1	1 – 3	2 - 6	Extremely stony or extremely bouldery
4	15 – 50	0.3 – 0.5	0.5 – 1	1 – 2	Rubbly
5	50 – 90	<0.3	<0.05 – 1	<1	Very rubbly

<sup>1</sup>0.38 m if flat

H.7 Soil structure

- A) Soil structure refers to units composed of primary particles. The cohesion within these units is greater than the adhesion among units. As a consequence, under stress, the soil mass tends to rupture along predetermined planes or zones. Three planes or zones, in turn, form the boundary. A structural unit that is the consequence of soil development is called a ped. The surfaces of peds persist through cycles of wetting and drying in place. Commonly, the surface of the ped and its interior differ as to composition or organization, or both, because of soil development.
- B) Some soils lack structure and are referred to as structureless. In structureless layers or horizons, no units are observable in place or after the soil has been gently disturbed, such as by tapping a space containing a slice of soil against a hard surface or by dropping a large fragment on the ground. When structureless soils are ruptured, soil fragments, single grains, or both, result. Structureless soil material may be either single grain or massive. Soil material of single grains lacks structure. In addition, it is loose. On rupture, more than 50 percent of the mass consists of discrete mineral particles.
- C) Some soils have simple structure, each unit being an entity without component smaller units. Others have compound structure, in which large units are composed of smaller units separated by persistent planes of weakness.
- D) In soils that have structure, the shape, size, and grade (distinctness) of the units are described. Field terminology for soil structure consists of separate sets of terms designating each of the three properties, which by combination form the names for structure.

H.8 Several basic shapes of structural units are recognized in soils.

- A) *Platy*: The units are flat and plate-like. They are generally oriented horizontally. A special form, lenticular platy structure, is recognized for plates that are thickest in the middle and thin toward the edges.
- B) *Prismatic*: The individual units are bounded by flat to rounded vertical faces. Units are distinctly longer vertically, and the faces are typically casts or molds of adjoining units. Vertices are angular or subrounded; the tops of prisms are somewhat indistinct and normally flat.
- C) *Columnar*: The units are similar to prisms and are bounded by flat or slightly rounded vertical faces. The tops of columns, in contrast to those prisms, are very distinct and normally rounded.
- D) *Blocky*: The units are block like or polyhedral. They are bounded by flat or slightly rounded surfaces that are casts of the faces of surrounding peds. Typically, blocky structural units are nearly equidimensional but grade to prisms and to plates. The structure is described as angular blocky if the faces intersect at relatively sharp angles; a subangular blocky if the faces are a mixture of rounded and plane faces and the corners are mostly rounded.
- E) *Granular*: The units are approximately spherical or polyhedral and are bounded by curved or very irregular faces that are not casts of adjoining peds.

H.9 Size

- A) Five classes are employed: very fine, fine, medium, coarse, and very coarse. The size limits differ according to the shape of the units. The size limit classes are given in Table I-3. The size limits refer to the smallest dimension of plates, prisms, and columns.

**Table H-3**  
**Size Classes Of Soil Structure**

Size Classes	Shape of Structure			
	Platy <sup>1</sup> mm	Prismatic & Columnar mm	Blocky mm	Granular mm
Very Fine	<1	<10	<5	<1
Fine	1 – 2	10 – 20	5 – 10	1 – 2
Medium	2 – 5	20 – 50	10 – 20	2 – 5
Coarse	5 – 10	50 – 100	20 – 50	5 – 10
Very Coarse	>10	>100	>50	>10

<sup>1</sup> In describing plates, “thin” is used instead of “fine” and “thick” instead of “coarse.”

## H.10 Grade

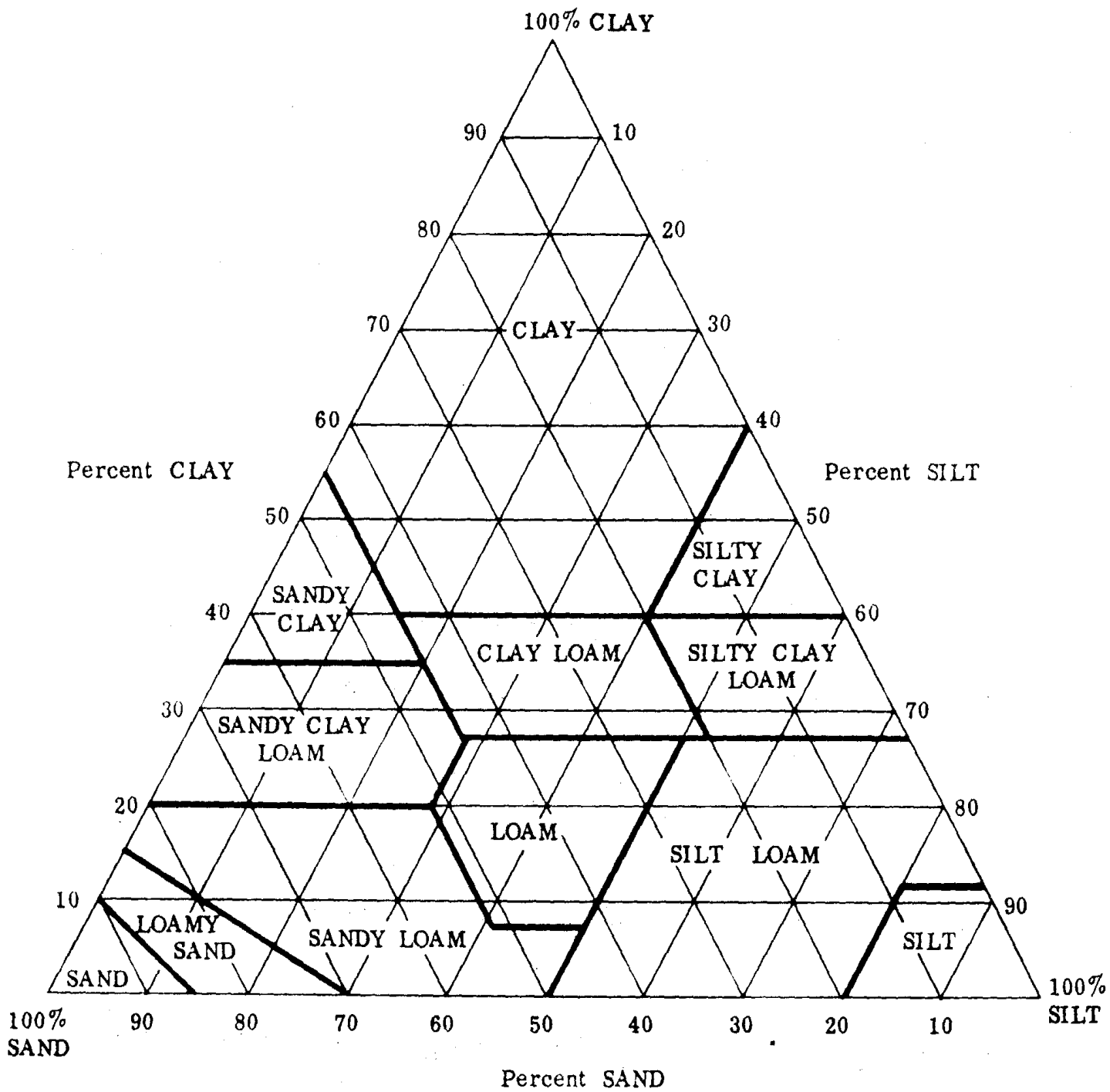
- A) Grade describes the distinctness of units. Criteria are the ease of separation into discrete units and the proportion of units that hold together when the soil is handled. Three classes are used:
- 1) *Weak*: The units are barely observable in place. When gently disturbed, the soil material parts into a mixture of whole and broken units and much material that exhibits no planes of weakness. Faces that indicate persistence through wet-dry-wet cycles are evident if the soil is handled carefully. Distinguishing structurelessness from weak structure is sometimes difficult. Weakly expressed structural units in virtually all soil materials have surfaces that differ in some way from the interiors.
  - 2) *Moderate*: The units are well formed and evident in undisturbed soil. When disturbed, the soil material parts into a mixture of mostly whole units, some broken units, and material that is not in units. Peds part from adjoining peds to reveal nearly entire faces that have properties distinct from those of fractured surfaces.
  - 3) *Strong*: The units are distinct in undisturbed soil. They separate cleanly when the soil is disturbed. When removed, the soil material separates mainly into whole units. Peds have distinctive surface properties.
- B) Three terms for soils structure are combined in order (1) grade, (2) size, (3) shape. “Strong fine granular structure” is used to describe a soil that separates almost entirely into discrete units that are loosely packed, roughly spherical, and mostly between 1 and 2 mm in diameter.

## H.11 Compound structure

Smaller structural units may be held together to form larger units. Grade, size, shape are given for both, and the relationship of one set to the other is indicated: “strong medium blocks within moderate coarse prisms,” or “moderate coarse prismatic structure parting to strong medium blocky.”

## H.12 Concentrations

- A) The features discussed here are identifiable bodies within the soil that were formed by pedogenesis. Some of these bodies are thin and sheetlike; some are nearly equidimensional; others have irregular shapes. They may contrast sharply with the surrounding material in strength, composition, or internal organization. Masses are noncemented concentrations of substances that commonly cannot be removed from the soil as a discrete unit. Most accumulations consist of calcium carbonate, fine crystals of gypsum or more soluble salts, or iron and manganese oxides. Except for very unusual conditions, masses have formed in place.
- B) Nodules and concretions are cemented bodies that can be removed from the soil intact. Composition ranges from material dominantly like that of the surrounding soil to nearly pure chemical substances entirely different from the surrounding material.
- C) Concretions are distinguished from nodules on the basis of internal organization. Concretions have crude internal symmetry organized around a point, a line, or a plane. Nodules lack evident, orderly internal organization.



#### H.13 Soil Color

- A) Elements of soil color descriptions are the color name, the Munsell notation, the water state, and the physical state: “brown (10YR 5/3), dry, crushed, and smoothed.”
- B) Physical state is recorded as broken, rubbed, crushed, or crushed and smoothed. The term “crushed” usually applies to dry samples and “rubbed” to moist samples. If unspecified, the surface is broken. The color of the soil is recorded for a surface broken through a ped, if a ped can be broken as a unit.
- C) The color value of most soil material becomes lower after moistening. Consequently, the water state of a sample is always given. The water state is either “moist” or “dry.” The dry state for color determinations is air-dry and should be made at the point where the color does not change with additional drying. Color in the moist state is determined on moderately moist or very moist soil material and should be made at the point where the color does not change with additional moistening. The soil should not be moistened to the extent that glistening takes place, as color determinations of wet soil may be in error because of the light reflection of water films.
- D) Munsell notation is obtained by comparison with a Munsell system color chart. The most commonly used chart includes only about one-fifth of the entire range of hues. It consists of about 250 different colored papers, or chips, systematically arranged on hue cards according to their Munsell notations.
- E) The Munsell color system uses three elements of color – hue, value, and chroma – to make up a color notation. The notation is recorded in the form: hue, value/chroma – for example, 5Y 6/3.
  - 1) *Hue* is a measure of the chromatic composition of light that reaches the eye. The Munsell system is based on five principal hues: red (R), yellow (Y), green (G), blue (B), and purple (P). Five intermediate hues representing midpoints between each pair of principle hues complete the 10 major hue names used to describe the notation. The intermediate hues are yellow-red (YR), green-yellow (GY), blue-green (BG), purple-blue (PB), and red-purple (RP).
  - 2) *Value* indicates the degree of lightness or darkness of a color in relation to a neutral gray scale. On a neutral gray (achromatic) scale, value extends from pure black (0/) to pure white (10/). The value notation is a measure of the amount of light that reaches the eye under standard lighting conditions.
  - 3) *Chroma* is the relative purity or strength of the spectral color. Chroma indicates the degree of saturation of neutral gray by the spectral color. The scales of chroma for soils extend from /0 to a chroma of /8 as the strongest expression of color used for soils.

#### H.14 Conditions for Measuring Color

- A) The quality and intensity of the light affect the amount and quality of the light reflected from the sample to the eye. The moisture content of the sample and the roughness of its surface affect the light reflected. The visual impression of color from the standard color chips is accurate only under standard conditions of light intensity and quality. Color determination may be inaccurate early in the morning or late in the evening. When the sun is low in the sky or the atmosphere is smoky, the light reaching the sample and the light reflected is redder. Even though the same kind of light reaches the color standard and the sample, the reading of sample color at these times is commonly one or more intervals of hue redder than at midday. Colors also appear different in the subdued light of a cloudy day than in bright sunlight. If artificial light is used, as for color determinations in an office, the light source used must be as near the white light of midday as possible. With practice, compensation can be made for the differences, unless the light is so subdued that the distinctions between color chips are not apparent. The intensity of incidental light is especially critical when matching soil to chips of low chroma and low value.
- B) Roughness of the reflecting surface affects the amount of reflected light, especially if the incidental light falls at an acute angle. The incidental light should be as nearly as possible at a right angle. For crushed samples, the surface is smoothed; the state is recorded as “dry, crushed, and smoothed.”

#### H.15 Recording guidelines

- A) Uncertainty. Under field conditions, measurements of color are reproducible by different individuals within 2.5 units of hue (one card) and 1 unit of value and chroma.
- B) Dominant color. The dominant color is the color that occupies the greatest volume of the layer. Dominant color (or colors) is always given first among those of a multicolored layer. It is judged on the basis of colors of a broken sample. For only two colors, the dominant color makes up more than 50 percent of the volume.



For three or more colors, the dominant color makes up more of the volume of the layer than any other color, although it may occupy less than 50 percent.

- C) Mottling. Mottling refers to repetitive color changes that cannot be associated with compositional properties of the soil. Redoximorphic features are a type of mottling that is associated with wetness. A color pattern that can be related to the proximity to a ped surface of other organizational or compositional feature is not mottling. Mottle description follows the dominant color. Mottles are described by quantity, contrast, color, and other attributes in that order.
- D) Quantity is indicated by three areal percentage classes of the observed surface: (The notations must clearly indicate to which colors the terms for quantity apply.)
  - 1) *Few*: less than 2 percent,
  - 2) *Common*: 2 to 20 percent, and
  - 3) *Many*: more than 20 percent.
- E) Size refers to dimensions as seen on a plane surface. If the length of a mottle is not more than two or three times the width, the dimension recorded is the greater of the two. If the mottle is long and narrow, as a band of color at the periphery of a ped, the dimension recorded is the smaller of the two and the shape and location are also described. Three size classes are used:
  - 1) *Fine*: smaller than 5 mm,
  - 2) *Medium*: 5 to 15 mm, and
  - 3) *Coarse*: larger than 15 mm.
- F) Contrast refers to the degree of visual distinction that is evident between associated colors: (Contrast is often not a simple comparison of one color with another but is a visual impression of the prominence of the one color against a background commonly involving several colors.)
  - 1) *Faint*: Evident only on close examination, faint mottles commonly have the same hue as the color to which they are compared and differ by no more than 1 unit of chroma or 2 units of value. Some faint mottles of similar but low chroma and value differ by 2.5 units (one card) of hue.
  - 2) *Distinct*: Readily seen but contrast only moderately with the color to which they are compared. Distinct mottles commonly have the same hue as the color at which they are compared but differ by 2 to 4 units of chroma or 3 to 4 units of value; or differ from the color to which they are compared by 2 units (one card) of hue but by no more than 1 unit of chroma or 2 units of value.
  - 3) *Prominent*: Contrast strongly with the color to which they are compared. Prominent mottles are commonly the most obvious color feature of the section described. Prominent mottles that have medium chroma and value commonly differ from the color to which they are compared by at least 5 units (two pages) of hue if chroma and value are the same; at least 4 units of value or chroma if the hue is the same; or at least 2 unit of chroma or 2 units of value if hue differs by 2.5 units (one card).

H.16 Other site factors include, but are not limited to the following:

- A) Type and percent of land slope across the proposed absorption system. The type (concave, convex, or plane), percent and direction of land slope must be reported, along with the method of determination.
- B) The potential for flooding or accumulation of surface water from storm events must be evaluated. EHS may require a written determination by the Gallatin County Floodplain Administrator.
- C) Amount of suitable area. Sufficient suitable soil must be available for the use intended for the primary and replacement absorption area while maintaining the required minimum horizontal setback distances from water supplies, surface waters, property lines, etc. For sites that do not have a defined use, an approved primary and replacement absorption area will be limited for a specific amount of sewage application based on the area described and the application rate allowed.

**APPENDIX I**  
**PERCOLATION TEST PROCEDURE**

- I.0 Percolation tests must be performed in accordance with the procedures outlined below. One perc test may be required in the area of the proposed drain field if the soil profile information is disputed by the EHD. Percolation tests must be conducted at the depth of proposed construction. For elevated sand mounds and at-grade systems, the depth of the percolation test hole must be 12 inches. Additional percolation tests may be required to determine the existence of a limiting layer.
- I.1 When more than one percolation test is conducted within the boundaries of a proposed drainfield, the percolation rate will be determined based on the arithmetic mean of the percolation test values. However, if any percolation test values exceed 120 minutes per inch, the drainfield location must be moved so that it does not include soils with percolation rates slower than 120 minutes per inch, unless an evapotranspiration or evapotranspiration absorption system is proposed. Additional percolation tests are required within the newly designated area.
- I.2 PERCOLATION TEST PROCEDURE #1
- A) Properly conducted percolation tests are helpful in determining drainfield site suitability and sizing the drainfield. Percolation tests must be conducted within the boundary of the proposed drainfield.
- B) Test Hole Preparation
- 1) Dig or bore holes 6 to 8 inches in diameter, with a maximum size of 10 inches, with vertical sides. Depth of holes must be equal to the depth of the proposed drainfield trenches, typically 24 inches below ground. If hole is larger than 6 to 8 inches, place a piece of 4-inch diameter, perforated pipe inside the hole, and fill the space between the pipe and the walls of the hole with drain rock.
  - 2) Roughen or scratch the bottoms and sides of the holes to provide natural unsmear surfaces. Remove loose material. Place about 2 inches of ½- to ¾-inch washed gravel in the bottom of holes to prevent scouring during water addition.
  - 3) Establish a reference point for measurements in or above each hole.
- C) Soaking
- 1) Fill holes with clear water to a level at least 12 inches above the gravel.
  - 2) If the first 12 inches of water seeps away in 60 minutes or less, add 12 inches of water a second time. If the second filling seeps away in 60 minutes or less, the percolation test should be run in accordance with the sandy soil test; proceed immediately with that test. As an alternative to proceeding with the test, if these conditions are met and documented, the percolation rate may be considered to be faster than 3 minutes per inch, and the test may be stopped.
  - 3) If either the first 12 inches or the second 12 inches does not seep away in 60 minutes, the percolation test must be run in accordance with the test for other soils. In these other soils, maintain at least 12 inches of water in the hole for at least 4 hours to presoak the hole. Do not remove water remaining after 4 hours. Permit soil to swell at least 12 hours, but no more than 24 hours, then proceed immediately with the test.
- D) Test
- 1) Sandy soils (percolation rate of 10 minutes per inch or faster)
    - a) Add water to provide a depth of 6 inches above gravel. Measure water level drop at least four times, in equally spaced intervals, in a 1 hour time period. Measure to nearest ¼ inch. Refill to 6-inch depth after each measurement. Do not exceed 6-inch depth of water. Use final water-level drop to calculate rate.
  - 2) Other soils (percolation rate slower than 10 minutes per inch).
    - a) Remove loose material on top of gravel.
    - b) Add water to provide a depth of 6 inches above ground. Measure water levels for a minimum of 1 hour. A minimum of four measurements must be taken. The test must continue until two successive readings yield percolation rates that do not vary by more than 15 percent, or until measurements have been taken for four hours. Do not exceed 6-inch depth of water. Use final water-level drop to calculate rate.

E) Records

- 1) Record the required information on the *MDEQ Percolation Test Form* and include as part of the application. Copies of this form are available from MDEQ or the BSBCCHD.
- 2) Record the following information on the form and include as part of the application:
  - a) Date(s) of test(s),
  - b) Location, diameter, and depth of each test hole,
  - c) Time of day that each soak period began and ended,
  - d) Time of day for beginning and end of each water-level drop interval,
  - e) Each water-level drop measurement,
  - f) Calculated percolation rate,
  - g) Name and signature of person performing test,
  - h) Name of owner or project name.

F) Rate Calculation

Percolation Rate = Time interval in minutes/Water-level drop in inches

**Chamber Sizing Calculations**

The following calculations are based on a 3 bedroom home with sandy clay loam, silty loam, clay loam soil type with a perc rate of 21-31 min/inch

3 Bedroom Flow 300 / gpd

Loading/Application Rate 0.4 gpd/ft<sup>2</sup>

Chamber Loading Rate = 0.4gpd/ft<sup>2</sup> x 1.4 = 0.56 gpd/ft<sup>2</sup>

**Example 1 >>>>>>>> 15" Chamber Sized @ 1.5ft/2ft:**

**300gpd / 0.56 = 536 ft<sup>2</sup> drain field**

**536 ft<sup>2</sup> / 1.5 ft<sup>2</sup>/ft = 358 linear feet of drain field**

**Example 2 >>>>>>>> 22" Chamber Sized @ 2.0 ft<sup>2</sup>/ft:**

**300 gpd / 0.56 = 536 ft<sup>2</sup> drain field**

**536 ft<sup>2</sup> / 2.0ft<sup>2</sup>/ft = 268 linear feet of drain field**

**Example 3 >>>>>>>> 34" Chamber Sized @3.0 ft<sup>2</sup>/ft: (These chambers must be pressure dosed)**

**300gpd / 0.56 = 536 ft<sup>2</sup> drain field**

**536 ft<sup>2</sup> / 3 ft<sup>2</sup>/ft = 179 linear feet of drain field**

**APPENDIX-J (A-K)**

**ILLUSTRATIONS**

- BSB-A As-Built**
- BSB-B At-Grade Drain Field Detail**
- BSB-C Deep Absorption Trench Detail**

<b>BSB-D</b>	<b>Gravelless Trench Detail</b>
<b>BSB-E</b>	<b>Level Drain Field Site</b>
<b>BSB-F</b>	<b>Sand Lined Absorption Trench</b>
<b>BSB-G</b>	<b>Septic and Dose Tank Detail</b>
<b>BSB-H</b>	<b>Septic Tank Design Minimums</b>
<b>BSB-I</b>	<b>Simple Site Plan Detail</b>
<b>BSB-J</b>	<b>Sloping Drain Field</b>
<b>BSB-K</b>	<b>Standard Trench Detail &amp; Gray Water Facts</b>