Project 6961 - Fast-Track

Department Of Health

Fast Track 12VAC5-610 - Update of the Sewage Handling and Disposal Regs to incorporate design elements of GMP 147

12VAC5-610-120. Definitions.

The following words and terms when used in this chapter shall have the following meanings, unless the context clearly indicates otherwise:

"Agent" means a legally authorized representative of the owner.

"Alluvial soil" means a soil developing from recently deposited alluvium and exhibiting essentially no horizon development or modification of the recently deposited materials.

"Alluvium" means mineral materials, either weathered or unweathered, that are transported by flowing water and deposited or redeposited in a flood-plain or marine terrace.

"Aquifer" means water-bearing portion of a geologic formation that transmits water.

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

"Certification letter" means a letter issued by the commissioner, in lieu of a construction permit, which identifies a specific site and recognizes the appropriateness of the site for an onsite wastewater disposal system.

"Colluvial soil" means a soil developing from recently deposited colluvium and exhibiting essentially no horizon development or modification of the recently deposited materials.

"Colluvium" means an accumulation of soil material, or a mixture of stone fragments and soil material, deposited at the base of slopes or in depressional areas, primarily by gravity.

"Commissioner" means the State Health Commissioner or his subordinate who has been delegated powers in accordance with subdivision 2 of 12VAC5-610-40.

"Cr horizon" means weathered or soft bedrock and is used to indicate root restrictive layers or bedrock or saprolite.

"Dilution area" means the land immediately adjacent to and down gradient, in the direction of ground water flow, from a mass sewage disposal system, which is provided for the purpose of diluting nitrogen, or other nutrients occurring in wastewater, with ambient ground water, in order to assure compliance with nutrient standards contained in this chapter.

"District health department" means a consolidation of local health departments as authorized in § 32.1-31 C of the Code of Virginia.

"Division" means the Division of Onsite Sewage and Water Services, Office of Environmental Health Services, State Health Department or its administrative successor.

"Existing construction" (with failing sewage disposal systems) means an existing structure where the sewage disposal system serving the structure has failed or is currently in violation of state law or regulations and requires correction.

"General approval" means approval granted to systems which are proven and tested in accordance with Article 2 (12VAC5-610-441 et seq.) of Part II of this chapter.

"Grandfathered lot" means:

1. Any lot upon which no permit has been issued and which is in a subdivision approved by the department prior to July 1, 2000, in accordance with a local subdivision ordinance. Individual lots may or may not have been evaluated; or

2. Any lot, parcel, or portion thereof with a previously issued permit or a specific written approval (not including a certification letter) from the department.

"Gray color" means a chroma-2 or less on the Munsell Color Chart.

"Impervious strata" means soil or soil materials with an estimated or measured percolation rate in excess of 120 minutes per inch.

"Infiltrative surface" means the designated interface where effluent moves from distribution piping, media, and fill to natural soil.

"Local health department" means a branch of the State Health Department established in each city and county in accordance with § 32.1-30 of the Code of Virginia.

"Mass sewage disposal system" means a sewage disposal system or systems which will discharge effluent to a single absorption area or multiple absorption areas with or without combined flows, such that the loading rate applied to any acre, as determined by the department, exceeds 1,200 gallons per day.

"Mineral soil" means a soil consisting predominantly of, and having its properties determined predominantly by, mineral matter. A mineral soil usually contains less than 20% organic matter, but it may contain an organic surface layer up to 12 inches thick.

"New construction" means construction of a building for which a building permit is required.

"Office" means the Office of Environmental Health Services, State Health Department.

"Owner" means the Commonwealth or any of its political subdivisions, including sanitary districts, sanitation district commissions and authorities, any individual, any group of individuals acting individually or as a group, or any public or private institution, corporation, company, partnership, firm or association which owns or proposes to own a sewerage system or treatment works.

"Person" means an individual, corporation, partnership, association or any other legal entity.

"Previously issued permit" means any permit issued prior to July 1, 2000, and in accordance with the regulations in effect at the time the permit was issued. There is no distinction between an expired permit and one that has been continually renewed.

"Pump and haul" means any unusual circumstance wherein sewage is permitted to be transported by vehicle to a point of disposal. The term "pump and haul" includes all facilities and appurtenances necessary to collect and store the sewage for handling by a contractor having a valid sewage handling permit.

"Rock" or "bedrock" means continuous, coherent, lithologic material that has relative hardness depending on the degree of weathering. Bedrock has characteristics such as strike, dip, jointing, and lithological compositions. Structure and water movement are rock controlled. Bedrock grinds with an auger, and mechanical penetration is more difficult or prevented as the material gets harder.

"Saprolite" means material weathered from igneous or metamorphic rock, without soil structure, and with remnant structure and fabric of the parent rock which is soft in place and can be penetrated easily with an auger.

"Secondary effluent" means effluent treated to reduce five-day biochemical oxygen demand to 30 mg/l or less, total suspended solids to 30 mg/l or less, and fats, oils, and grease to less than 5 mg/l.

"Septic tank effluent" means effluent characterized by a five-day biochemical oxygen demand between 120 and 200 mg/l; total suspended solids between 70 and 150 mg/l; fats, oils,

and grease of 30 mg/l or less; and having no other toxic, hazardous, or constituents not routinely found in residential wastewater flows.

"Septage" means the mat of grease and scum on the surface of septic tanks, the accumulated sludge at the bottom of tanks and the sewage present at the time of pumping.

"Sewage" means water-carried and nonwater-carried human excrement, kitchen, laundry, shower, bath or lavatory wastes separately or together with such underground, surface, storm or other water and liquid industrial wastes as may be present from residences, buildings, vehicles, industrial establishments or other places.

"Sewage disposal system" means a sewerage system or treatment works designed not to result in a point source discharge.

"Sewage handler" means any person who removes or contracts to remove and transports by vehicle the contents of any septic tank, sewage treatment plant, privy, holding tank, portable toilet or any sewage, septage or sewage sludges which have been processed to meet acceptable treatment standards as defined in this chapter or the Sewage Regulations (12VAC5-580-10 et seq.).

"Sewage handling" means the vehicular conveyance of sewage (See "Transportation" in § 32.1-163 of the Code of Virginia).

"Sewerage system" means pipe lines or conduits, pumping stations and force mains and all other construction, devices and appliances appurtenant thereto, used for the collection and conveyance of sewage to a treatment works or point of ultimate disposal.

"Shrink-swell soils" means soils with horizons that contain montmorillonite and other clays that excessively shrink upon drying and swell upon wetting.

"Sink hole" means a depression in the topography without a surface outlet for drainage from the low point. Sink holes are common in areas containing limestone and generally result from the collapse of solution cavities.

"Soil" means the weathered mineral and organic fraction of the earth's regolith, which is less than or equal to 2.0 mm in size as observed in place. Soil comprises sands, silts or clays or combinations of these textured components and may contain larger aggregate materials such as gravel, cobbles, stones or channers or precipitates from aqueous solution. Soil includes the A, O, B, C, and E horizons.

"Soil horizon" means a layer of soil or soil material approximately parallel to the land surface and different from adjacent genetically related layers in physical, chemical, and biological properties or characteristics such as color, structure, texture, consistency, kinds and numbers of organisms present, degree of acidity or alkalinity, etc.

"Subdivision" means multiple building lots derived from a parcel or parcels of land.

"Subsurface soil absorption" means a process which utilizes the soil to treat and dispose of effluent from a treatment works. (Also see "Subsurface drainfield" in § 32.1-163 of the Code of Virginia).

"Total suspended solids" or "TSS" means a measure of the mass of all suspended solids in a sample typically measured in milligrams per liter (mg/l).

"Treatment level 2 effluent" or "TL-2 effluent" means secondary effluent as defined in 12VAC5-610-120 that has been treated to produce BOD_5 and TSS concentrations equal to or less than 30 mg/l each.

"Treatment level 3 effluent" or "TL-3 effluent" means effluent that has been treated to produce BOD_5 and TSS concentrations equal to or less than 10 mg/l each.

"Treatment unit" or "treatment system" means a method, technique, equipment, or process other than a septic tank or septic tanks used to treat sewage to produce effluent of a specified quality before the effluent is dispersed to a soil treatment area.

"Treatment works" means any device or system used in the storage, treatment, disposal or reclamation of sewage or combinations of sewage and industrial wastes, including but not limited to pumping, power and other equipment and appurtenances, septic tanks and any works, including land, that are or will be (i) an integral part of the treatment process or (ii) used for ultimate disposal of residues or effluent resulting from such treatment.

"Working volume" means the volume in a pump tank between the pump off level and the high water alarm level.

Part II

Procedural Regulations

Article 1

Procedures

12VAC5-610-250. Procedures for obtaining a construction permit for a sewage disposal system.

Construction permits are issued by the commissioner but all requests for a sewage disposal construction permit shall be directed initially to the district or local health department. For construction permits with design flows less than 1,000 gallons per day that are exempt from the license requirements for professional engineers under § 54.1-402.A.11, the requirement for formal plans and specifications is waived.

A. Type I. A Type I sewage disposal system is an individual sewage disposal system incorporating a septic tank and subsurface soil absorption (septic tank-subsurface drainfield) serving a single residence. The submission of an application is all that is normally necessary to initiate procedure for obtaining a permit under this subsection. If after a site investigation, it is determined that pumping, enhanced flow distribution (see 12VAC5-610-930 A) or low pressure distribution (see 12VAC5-610-940) is necessary, the system shall be considered a Type II system.

B. Type II. A Type II sewage disposal system is a sewage disposal system incorporating a septic tank and subsurface soil absorption system which serves a commercial or other establishment, more than a single family dwelling unit, or where pumping, enhanced flow distribution (see 12VAC5-610-930 A) or low pressure distribution (see 12VAC5-610-940) is necessary. The procedure for obtaining a permit includes the following steps:

1. The submission of an application;

2. A preliminary conference as necessary; and

3. The submission of informal plans, specifications, design criteria, and other data, as may be required by the district or local health department. Depending on the size and complexity of the system, the submission of formal plans and specifications may be required.

C. Type III. A Type III sewage disposal system includes sewage disposal systems other than a septic tank subsurface soil absorption system, and subsurface soil absorption systems, regardless of design, with design flows greater than 1,000 gpd. The procedure for obtaining a permit under this subsection includes the following steps:

1. The submission of an application;

2. A preliminary conference; and

3. The submission of formal plans, specifications and design criteria. Other supporting data may be required on a case-by-case basis.

When high strength wastes are proposed for subsurface disposal, the treatment methodology shall comply with the requirements found in 12VAC5-580-10 et seq. of the Sewage Regulations.

D. Type IV-Privies. The submission of an application is all that is normally necessary to initiate the procedure for obtaining a permit under this section.

E. Application. All applications for any type sewage disposal system shall be made on an application form provided by the district or local health department and approved by the department.

F. Preliminary conference. A preliminary conference with the district or local health department is held for Type II and Type III systems. When a Type III system for septage disposal is planned, the conference shall be with the department. At such conference the owner and/or his agent shall be prepared to set forth the sewage disposal problems and the proposed solution in such a manner to support his conclusions and recommendations.

G. Formal plans.

1. All formal plans for sewage disposal systems shall bear a suitable title showing the name of the owner and shall show the scale in feet, a graphical scale, the north point, date, and the name of the licensed professional engineer by or under whom prepared. The cover sheet and each plan sheet shall bear the same general title identifying the overall sewage disposal project and each shall be numbered. Appropriate subtitles should be included on the individual sheets.

The plans shall be clear and legible. They shall be drawn to a scale which will permit all necessary information to be plainly shown. The size of the plans should be no larger than 30 inches by 48 inches. Data used should be indicated. Location, when made, shall be shown on the plans. Logs of test borings shall be given either on plans or in the specifications.

Detailed plans shall consist of plan views, elevations, sections, and supplementary views which together with the specifications and general layouts provide the working information for the contract and construction of the work, including dimensions and relative elevations of structures, the location and outline form of equipment, the location and size of piping, water levels, ground elevations, and erosion control abatement facilities.

2. Geographical and other features. Topography, elevations (contour lines), existing or proposed streets and all bodies of water, ditches, buildings, springs, cisterns and wells within 100 feet horizontally of the proposed sewage disposal system site and/or well, a water mounding analysis showing the impact of the proposed sewage system on ground water and all property lines shall be clearly shown.

3. General layout. The general layout shall show the following:

a. Test borings, ground water elevation (if observed), and soil profiles;

b. Size and location of sewage disposal systems;

c. Schematic flow diagram showing the flow through the various disposal system units;

d. Piping; and

e. Hydraulic profile showing the flow of sewage.

4. Detailed plans. Detailed plans shall show the following:

a. Location, dimensions and elevations of existing or proposed system facilities;

b. Pertinent data concerning the rated capacity of pumps, blowers, motors and other mechanical devices. All or part of such data may be included in the specifications by suitable reference on the plans;

c. Average and maximum hydraulic flow in profile; and

d. Adequate description of any features not otherwise covered by the specifications.

H. Formal specifications. Complete technical specifications for the construction of the sewage disposal system and all appurtenances shall accompany the plans. The specifications accompanying construction drawings shall include, but not be limited to, all construction information not shown on the drawings, which is necessary to inform the builder in detail of the design requirements as to the quality of material workmanship and fabrication of the project, type, size, strength, operating characteristics, and rating of equipment; allowable infiltration, machinery, valves, piping, and jointing of pipe, electrical apparatus, wiring and meters; operating tools and construction materials; special filter materials such as stone, sand, gravel or slag; miscellaneous appurtenances; chemicals when used; instructions for testing materials and equipment as necessary to meet design standards and operating test for the complete works and component units.

I. Special requirements for certain sewage disposal systems. A construction permit for a single sewage disposal system proposed to serve a dwelling unit with multiple living units, multiple dwelling units or multiple lots with dwelling units shall be issued only to a single owner. The owner shall provide legal documentation to assure operation and the maintenance of the system for the expected life of the living units or dwellings.

J. Construction permit with conditions.

1. Definition: "Conditional construction permit" means a permit authorizing the installation of a septic tank subsurface soil absorption system which does not fully conform to the criteria in Part V (12VAC5-610-660 et seq.) of this chapter pertaining to septic tank size, subsurface soil absorption system size and certain ground water table conditions as indicated by soil evaluation, but which, under the conditions to which the permit is subject, can be reasonably expected to function without danger to public health.

2. The purpose of this section is to allow for the issuance of conditional construction permits. Procedures for obtaining a conditional construction permit are the same as those contained in subsections A, B, C and D of this section.

3. Conditional construction permits may be issued for any one or more of the following use conditions when satisfactory substantiation is provided by the applicant:

a. Reduced water flow based on permanent water saving plumbing devices;

b. Limitations on the number of persons occupying the dwelling or using the facility served by the proposed septic tank system;

c. Intermittent or seasonal use of the dwelling or facility served by the septic tank system; and

d. Temporary use of the septic tank system for a specified time period not to exceed one year. Such permits may be renewable when the commissioner determines there is a good cause for renewal.

4. Criteria.

a. The septic tank and/or drainfield size may be reduced based on the use conditions contained in subdivision 3 a, b, c, or d of this subsection.

b. In areas with seasonal fluctuating water table(s), where the seasonally high water table would cause failure if the system were to be used continuously, septic tank systems may be installed when the period of use of the septic tank system coincides

with the period when the ground water table, as indicated by free water, is at its lowest level. Acceptable separation distances to free standing ground water are the same as those found in Tables 4.3 and 4.4 of this chapter.

c. Because of the increased risk of failure, a conditional permit shall not be issued, in an area with a seasonally fluctuating water table if the proposed absorption area is within 200 feet of a shellfish growing area, recreational waters or a public water supply impoundment.

5. The district or local health department shall affix to the conditional construction permit a clear and concise statement relating the conditions and circumstances which formed the basis for issuing the conditional permit as well as the owner's obligations under the permit.

6. The holder of any conditional construction permit shall have the permit recorded and indexed in the grantor index under the holder's name in the land records of the clerk of the circuit court having jurisdiction over the site of the septic tank system. District or local health departments shall be provided with certification that the conditional septic tank system permit has been recorded in the land records of the circuit court. The conditional permit shall become effective one day after the district or local health department receives notification of recordation. The district or local health department shall advise the local building official that conditional septic tank system permits are not valid without certification that the permits have been properly recorded as required and shall forthwith notify the local building official when the conditional permit becomes effective. Final approval of the construction of the septic tank subsurface soil absorption system shall not be given until or unless the system is constructed in accordance with the conditions of the permit. The operation permit will be issued in accordance with 12VAC5-610-340.

7. As per § 32.1-164.1 of the Code of Virginia, the holder of the permit and any subsequent holders of the permit shall be bound by the conditions stated in the permit unless the holder or subsequent holder obtains an additional permit for modification or alteration of the septic tank system to meet any new use conditions.

12VAC5-610-880. Pumping.

A. Force mains. General.

1. Velocity. At pumping capacity, a minimum self-scouring velocity of two feet per second shall be maintained. A velocity of eight feet per second should not be exceeded.

2. Air relief valve. Air relief valves shall be placed at high points in the force main, as necessary, to relieve air locking.

3. Bedding. All force mains shall be bedded to supply uniform support along their length.

4. Protection against freezing. Force mains shall be placed deep enough to prevent freezing.

5. Location. Force mains shall not pass closer than 50 feet to any drinking water source unless pressure tested in place at pump shut-off head. Under no circumstances shall a force main come within 10 feet of a nonpublic drinking water source.

6. Materials of construction. All pipe used for force mains shall be of the pressure type with pressure type joints.

7. Anchors. Force mains shall be sufficiently anchored within the pump station and throughout the line length. The number of bends shall be as few as possible. Thrust blocks, restrained joints and/or tie rods shall be provided where restraint is needed.

8. Backfilling and tamping. Force main trenches shall be backfilled and tamped as soon as possible after the installation of the force main has been approved. Material for backfilling shall be free of large stones and debris.

B. Pumping station and pumps. General.

1. Sizing. Pumping station wet wells shall provide at least one quarter (1/4) day storage above the high level alarm set point. Actual volume between high and low level limits is determined on a case-by-case basis depending on the objective of pumping: (i) when low pressure dosing is utilized see 12VAC5-610-940 A for sizing requirements; (ii) when pumping to a gravity distribution box the wet well shall be sized to provide a working volume between 1/4 the daily flow and the daily flow; (iii) when pumping for the purpose of enhancing flow distribution (see 12VAC5-610-930 A) the working volume of the wet ~~wall~~ well shall be 0.6 of the volume of the percolation piping.

2. Materials. Materials for construction of pumping stations are the same as for septic tanks (see 12VAC5-610-810). All materials and equipment utilized in pumping stations shall be unaffected by the corrosive action of sewage.

3. Access. An access manhole terminating above the ground surface shall be provided. The manhole shall have a minimum width dimension of 24 inches and shall be provided with a shoe box type cover adequately secured.

4. Construction. Pumping stations constructed of precast or poured in place concrete shall conform with the construction requirements contained in 12VAC5-610-815 E. When precast concrete pipe is utilized for a pumping station, the pipe shall be placed on and bonded to a concrete pad at least six inches thick and having a width at least one foot greater than the diameter of the pipe. All pumping stations shall be watertight. All conduits entering or leaving the pumping stations shall be provided with a water stop. The influent pipe shall enter the pumping station at an elevation at least one inch higher than the maximum water level in the wet well (total usable volume).

5. Installation. Placement of pumping stations shall conform to the requirements for placement of septic tanks contained in 12VAC5-610-815 F.

6. Pumps. All pumps utilized shall be of the open face centrifugal, vertical turbine, or suction lift type designed to pump sewage. Pumps utilized for the sole purpose of pumping effluent to a higher elevation shall have a capacity approximately 2.5 times the average daily flow in gallons per minute but not less than five gallons per minute at the system head. Pumps utilized for the purpose of enhancing flow distribution (See 12VAC5-610-930 A) shall have a minimum capacity of 36 gallons per minute at system head per 1200 linear feet of percolation piping. Pumps discharging to a low pressure distribution system shall be sized in accordance with 12VAC5-610-940 A. Dual alternating pumps are required on systems 1800 linear feet or greater in accordance with 12VAC5-610-930 B. Pumps shall be so placed that under normal start conditions it shall be subjected to a positive suction head. When multiple pumps are used, each pump shall have its own separate suction line. Suitable shutoff valves shall be provided on the discharge line and suction line (if provided) for normal pump isolation. A check valve shall be placed in the discharge line between the pump and shutoff valve. When the pump discharge is at a lower elevation than the high liquid level in the pump station, an antisiphon device shall be provided on the pump discharge. Pumps shall be piped so that they can be removed for servicing without having to dewater the wet well.

7. Controls. Each pumping station shall be provided with controls for automatically starting and stopping the pumps ~~based on water level~~. When float type controls are utilized, they shall be placed so as to be unaffected by the flow entering the wet well. Provisions shall be made for automatically alternating the pumps. The electrical motor control center and master disconnect switch shall be placed in a secure location above grade and remote from the pump station. Each motor control center shall be provided with a manual override switch. The control panel shall be located to allow for working access, taking into consideration the finished ground surface elevation.

8. Alarms. A high water alarm with remote sensing and electrical circuitry separate from the motor control center circuitry shall be provided. The alarm shall be audiovisual and shall alarm in an area where it may be easily monitored. When multiple pumps are utilized, an additional audiovisual alarm shall be provided to alarm when a pump motor fails to start on demand.

9. Ventilation. Positive ventilation shall be provided at pumping stations when personnel are required to enter the station for routine maintenance.

a. Wet wells. Ventilation may be either continuous or intermittent. Ventilation, if continuous, shall provide at least 12 complete air changes per hour; if intermittent, at least 30 complete air changes per hour. Such ventilation shall be accomplished by mechanical means.

b. Dry wells. Ventilation may be either continuous or intermittent. Ventilation, if continuous, shall provide at least six complete air changes per hour; if intermittent, at least 30 complete air changes per hour. Such ventilation shall be accomplished by mechanical means.

C. Conveyance pumps and pump stations that move TL-2 effluent or TL-3 effluent to a soil dispersal system shall comply with the following.

1. 12VAC5-610-880.A. shall apply except that the minimum velocity in the force main may be reduced to 1 foot per second.

2. Pump station wet wells shall provide at least one quarter (1/4) day storage above the high level alarm set point. Alternatively, storage may be provided in a treatment tank such as a recirculation tank, but the maximum water level must be one inch below the invert of the pipe from the septic tank.

3. 12-VAC5-610-880.B 2, 3, 4, 5, 7, 8 and 9 shall apply.

4. All pumps utilized shall be of the open face centrifugal, vertical turbine, or suction lift type designed to pump sewage.

a. Pumps utilized for the purpose of enhancing flow distribution (See 12VAC5-610-930 A) shall have a minimum capacity of 36 gallons per minute at system head per 1200 linear feet of percolation piping.

b. Pumps discharging to a low pressure distribution system shall be sized in accordance with 12VAC5-610-940.

c. Dual alternating pumps are required on systems 1800 linear feet or greater in accordance with 12VAC5-610-930 B.

d. Submersible pumps shall be so placed that under normal start conditions the pump shall be subjected to a positive suction head.

e. When multiple pumps are used, each pump shall have its own separate suction line. Suitable shutoff valves shall be provided on the discharge line and suction line (if provided) for normal pump isolation. A check valve shall be placed in the discharge line between the pump and shutoff valve. When the pump discharge is at a lower elevation than the high liquid level in the pump station, an anti-siphon device shall be provided on the pump discharge. Pumps shall be piped so that they can be removed for servicing without having to dewater the wet well.

D. Pumps Integral to Treatment Systems. Pumps integral to treatment systems are pumps that move wastewater within the treatment unit and are required to achieve the desired effluent quality. 12VAC5-610-880.A, B, and C do not apply to these integral pumps.

12VAC5-610-930. Gravity distribution.

Gravity distribution is the conveyance of effluent from a distribution box through the percolation lines at less than full flow conditions. Flow to the initial distribution box may be initiated by pump, siphon or gravity.

A. Enhanced flow distribution. Enhanced flow distribution is the initiation of the effluent flow to the distribution box by pump or siphon for the purpose of assuring more uniform flow splitting to the percolation lines. Enhanced flow distribution shall be provided on systems where the flow is split more than 12 times or the system contains more than 1200 linear feet of percolation lines. For the purpose of this chapter, enhanced flow distribution is considered to produce unsaturated soil conditions.

B. System size. Distribution systems containing 1800 or more linear feet of percolation piping shall be split into multiple systems containing a maximum of 1200 linear feet of percolation piping per system.

C. Distribution boxes. The distribution box is a device for splitting flow equally by gravity to points in the system. Improperly installed distribution boxes are a cause for absorption field malfunction.

1. Materials. The preferred material for use in constructing distribution boxes is concrete (3000 psi). Other materials may be considered on a case-by-case basis. All materials must be resistant to both chemical and electrolytic corrosion and must have sufficient structural strength to contain sewage and resist lateral compressive and bearing loads.

2. Design. Each distribution box shall be designed to split the influent flow equally among the multiple effluent ports. All effluent ports shall be at the same elevation and be of the same diameter. The elevation of the effluent ports shall be at a lower elevation than the influent port. The placement of the influent ports shall be such as to prevent short circuiting unless baffling is provided to prevent short circuiting. The minimum inside width of a gravity flow distribution box shall be equal to or greater than 12 inches. The inside bottom shall be at least four inches below the invert of the effluent ports and at least five inches below the invert of the influent port. A minimum of eight inches freeboard above the invert of the effluent piping shall be provided. The distribution box shall be fitted with a watertight, removable lid for access.

3. Installation. The hole for placement of the distribution box shall be excavated to undisturbed soil. The distribution box shall be placed in the excavation and stabilized. The preferred method of stabilizing the distribution box is to bond the distribution box to a four inch poured in place Portland cement concrete pad with dimensions six inches greater than the length and width dimensions of the distribution box. The box shall be permanently leveled and checked by water testing. Conduits passing through the walls of a distribution box shall be provided with a water stop.

D. Lead or header lines. Header or lead lines are watertight, semirigid or rigid lines that convey effluent from a distribution box to another box or to the percolation piping.

1. Size. The lead or header lines shall have an internal diameter of four inches.

2. Slope. Minimum slope shall be two inches per 100 feet.

3. Materials. The lead or header lines shall have a minimum crush strength of 1500 pounds per foot and may be constructed of cast iron, plastic, vitrified clay or other material resistant to the corrosive action of sewage.

4. Appurtenances.

a. Joints. Lead or header lines shall have joints of the compressions type with the exception of plastic lead or header lines which may be welded sleeve, chemically fused or clamped (noncorrosive) flexible sleeve.

b. Adapters. Joining of lead or header lines of different size or material shall be accomplished by use of a manufactured adapter specifically designed for the purpose.

c. Valves. Valves shall be constructed of materials resistant to the corrosive action of sewage. Valves placed below ground level shall be provided with a valve box and a suitable valve stem so that it may be operated from the ground surface.

5. Construction.

a. Bedding. All lead or header lines shall be bedded to supply uniform support and maintain grade and alignment along the length of the lead or header lines. Special care shall be taken when using semirigid pipe.

b. Backfilling and tamping. Lead and header lines shall be backfilled and tamped as soon as possible after the installation of the lead or header lines has been approved. Material for backfilling shall be free of large stones and debris.

6. Termination. Header or lead lines shall extend for a minimum distance of two feet into the absorption trenches.

E. Gravity percolation lines. Gravity percolation lines are perforated or open joint pipes that are utilized to distribute the effluent along the length of the absorption trenches.

1. Size. All gravity percolation lines shall have an internal diameter of four inches.

2. Slope. The slope of the lines shall be uniform and shall not be less than two inches or more than four inches per 100 feet.

3. Design. Effluent shall be split by the distribution system so that all gravity percolation lines installed shall receive an equal volume of the total design effluent load per square foot of trench, i.e., the fraction of the flow received by each percolation line divided by the length of the gravity percolation lines shall be equal for all gravity percolation lines in a system.

4. Length. No individual gravity percolation line shall exceed 100 feet in length.

5. Materials.

a. Clay. Clay tile shall be extra-strength and meet current ASTM standards for clay tile.

b. Perforated plastic drainage tubing. Perforated plastic drainage tubing shall meet ASTM standards. At not greater than 10 feet intervals the pipe shall be plainly marked, embossed or engraved thereby showing the manufacturer's name or hallmark and showing that the product meets a bearing load of 1,000 lb. per foot. In addition, a painted or other clearly marked line or spot shall be marked at not greater than 10 feet intervals to denote the top of the pipe.

The tubing shall have three holes, 1/2 to 3/4 inch in diameter evenly spaced and placed within an arc of 130 degrees, the center hole being directly opposite the top marking.

Spacing of each set of three holes shall be at four inch intervals along the tube. If there is any break in the continuity of the tubing, an appropriate connection shall be used to join the tubing.

6. Installation.

a. Crushed stone or gravel. Clean gravel or crushed stone having a size range from 1/2 inch to 1-1/2 inches shall be utilized to bed the gravity percolation lines.

Minimum depth of gravel or crushed stone beneath the percolation lines shall be six inches. Clean course silica sand (does not effervesce in presence of dilute

hydrochloric acid) may be substituted for the first two inches (soil interface) of the required six inches of gravel beneath the percolation lines. The absorption trench shall be backfilled to a depth of two inches over the gravity percolation lines with the same gravel or crushed stone. Clean sand, gravel or crushed stone shall be free of fines, clay and organic materials.

b. Grade boards or stakes. Grade boards or stakes placed in the bottom or sidewalls of the absorption trench shall be utilized to maintain the grade on the gravel for placement of the gravity percolation lines. Grade stakes shall not be placed on centers greater than 10 feet.

c. Placement and alignment. Perforated gravity percolation piping shall be placed so that the center hole is in the horizontal plane and interfaces with the minimum six inches of graded gravel. When open joint piping is utilized the upper half of the top of the 1/4-inch open space shall be covered with tar paper or building paper to block the entrance of fines into the pipe during the backfilling operation. All gravity percolating piping shall be placed in the horizontal center of the absorption trench and shall maintain a straight alignment and uniform grade.

d. Backfilling. After the placement of the gravity percolation piping the absorption trench shall be backfilled evenly with crushed stone or gravel to a depth of two inches over the piping. Untreated building paper or other suitable material shall be placed at the interface of the gravel and soil to prevent migration of fines to the trench bottom. The remainder of the trench shall be backfilled with soil to the ground surface.

F. Gravelless material is a proprietary product specifically manufactured to disperse effluent within the absorption trench of an onsite sewage system without the use of gravel. Gravelless material may include chamber, bundled expanded polystyrene, and multi-pipe systems. The division shall maintain a list of all generally approved gravelless material. Gravelless material on the generally approved list may be used in accordance with Table 5.4 of 12VAC5-610-950.

1. Gravelless material that received general approval as of December 12, 2013, shall retain such status when used in accordance with the requirements of this chapter. After December 12, 2013, the division shall review and evaluate new applications for general approval pursuant to the requirements of this chapter.

a. Any manufacturer of gravelless material may submit an application for general approval to the division using a form provided by the division. A complete application shall include the manufacturer's contact information, product specifications, product approvals in other states or territories, installation manual, and other information deemed necessary by the division to determine compliance with this chapter.

b. The manufacturer of gravelless material shall identify in the application for general approval any recommendation that deviates from the requirements of this chapter. If the recommendation is approved by the division, then the manufacturer shall include the deviation in the gravelless material's installation manual.

2. Gravelless material shall have the following minimum characteristics for general approval:

a. The minimum exterior width shall be at least 90% of the total width of the absorption trench. The exterior width of a chamber system shall be measured at the edge or outer limit of the product's contact with the trench bottom unless the division determines a different measurement is required based on the gravelless material's design. The exterior width of bundled expanded polystyrene and multi-pipe systems shall be measured using the outside diameter of the bundled gravelless material unless the division determines a different measurement is required based on the

gravelless material's design. The division shall establish the exterior width of any gravelless material that is not considered a chamber, bundled expanded polystyrene, or multi-pipe system.

b. Gravelless material shall have a minimum height of eight inches to provide a continuous exchange of air through a permeable interface.

c. Gravelless material shall have a permeable interface that shall be located along the trench bottom and trench sidewalls within the absorption trench.

d. Gravelless material shall provide a minimum storage capacity of 1.3 gallons per square foot of trench bottom area.

e. Gravelless material shall pose no greater risk to surface water and groundwater quality than gravel in absorption trenches. Gravelless material shall be constructed to maintain structural integrity such that it does not decay or corrode when exposed to effluent.

f. Gravelless material shall have a minimum load rating of H-10 or H-20 from the American Association of State Highway and Transportation Officials or equivalent when installed in accordance with the manufacturer's specifications and minimum specified depth of cover in nontraffic or traffic areas, respectively.

3. For designs using gravelless material, the absorption trenches shall receive an equal volume of effluent per square foot of trench. Trench bottom area shall be equal to or greater than the minimum area requirements contained in Table 5.4 or Table 5.5 of 12VAC5-610-950. Trench sidewall shall not be included when determining minimum area requirements. When open-bottom gravelless material is utilized, it shall provide a splash plate at the inlet of the trench or other suitable method approved by the manufacturer to reduce effluent velocity.

4. Installation of gravelless material shall comply with this chapter and the approved installation manual unless the department grants a deviation pursuant to 12VAC5-610-660 or the division has granted a deviation identified in the installation manual.

5. Gravelless material shall contain a pressure percolation line along the entire length of the trench when low pressure distribution is utilized pursuant to 12VAC5-610-940 D.

6. When pumping effluent to overcome gravity, any open-bottom gravelless material shall provide a high-flow splash plate at the inlet of the trench or other suitable method approved by the manufacturer to reduce effluent velocity.

7. When enhanced flow distribution is used, open-bottom gravelless material shall contain a percolation pipe that extends a minimum of 10 feet from the trench's intersection with the header line. The percolation pipe shall be installed in accordance with the manufacturer's approved installation manual. The dosing volume shall be a minimum 39 gallons per 100 linear feet of absorption trench.

8. Gravelless material may be substituted for gravel in accordance with this chapter, provided that the certifying licensed professional engineer or onsite soil evaluator approves the substitution. The certifying licensed professional engineer or onsite soil evaluator shall document the substitution and related design changes on the inspection report submitted in accordance with 12VAC5-610-330. A new construction permit pursuant to 12VAC5-610-310 is not required for the substitution.

12VAC5-610-950. Absorption area design.

A. The absorption area is the undisturbed soil medium utilized for absorption of the effluent. The absorption area includes the infiltrative surface in the absorption trench and the soil between and around the trenches when trenches are used.

B. Suitability of soil horizon. The absorption trench bottom shall be placed in the soil horizon or horizons with an average estimated or measured percolation rate less than 120 minutes per inch. Soil horizons are to be identified in accordance with 12VAC5-610-480. The soil horizon must meet the following minimum conditions:

1. It shall have an estimated or measured percolation rate equal to or less than 120 minutes per inch;

2. The soil horizon or horizons shall be of sufficient thickness so that at least 12 inches of absorption trench sidewall is exposed to act as an infiltrative surface; and

3. If no single horizon meets the conditions in subdivision 2 of this subsection, a combination of adjacent horizons may be utilized to provide the required 12-inch sidewall infiltrative surface. However, no horizon utilized shall have an estimated or measured percolation rate greater than 120 minutes/inch.

C. Placement of absorption trenches below soil restrictions. Placement of the soil absorption trench bottom below soil restrictions as defined in 12VAC5-610-490 D, whether or not there is evidence of a perched water table as indicated by free standing water, ~~or gray mottlings or coloration~~ or redoximorphic features including concentrations, depletions, or stains, nodules, or concretions of iron and manganese, requires a special design based on the following criteria:

1. The soil horizon into which the absorption trench bottom is placed shall be a Texture Group I, II or III soil or have an estimated or measured percolation rate of less than 91 minutes per inch.

2. The soil horizon shall be a minimum of three feet thick and shall exhibit no characteristics that indicate wetness on restriction of water movement. The absorption trench bottom shall be placed so that at least two feet of the soil horizon separates the trench bottom from the water table or rock. At least one foot of the absorption trench side wall shall penetrate the soil horizon.

3. A lateral ground water movement interceptor (LGMI) shall be placed upslope of the absorption area. The LGMI shall be placed perpendicular to the general slope of the land. The invert of the LGMI shall extend into, but not through, the restriction and shall extend for a distance of 10 feet on ~~either side~~ both sides of the absorption area (See 12VAC5-610-700 D 3).

4. Pits shall be constructed to facilitate soil evaluations as necessary.

D. Sizing of absorption trench area for septic tank effluent.

1. Required area. The total absorption trench bottom area required shall be based on the average estimated or measured percolation rate for the soil horizon or horizons into which the absorption trench is to be placed. If more than one soil horizon is utilized to meet the sidewall infiltrative surface required in subsection B of this section, the absorption trench bottom area shall be based on the average estimated or measured percolation rate of the "slowest" horizon. The trench bottom area required in square feet per 100 gallons (Ft^2/100 Gals) of sewage applied for various soil percolation rates is tabulated in Table 5.4. The area requirements are based on the equation:

$\log y = 2.00 + 0.008 (x)$

where $y = Ft^2$/100 Gals

x = Percolation rate in minutes/inch

Notwithstanding the above, the minimum absorption area for single family residential dwellings shall be 400 square feet.

2. Area reduction. See Table 5.4 for area reduction when gravelless material or low pressure distribution is utilized. A reduction in area shall not be permitted when flow

diversion is utilized with low pressure distribution. When gravelless material is utilized, the design width of the trench shall be used to calculate minimum area requirements for absorption trenches.

E. Minimum cross section dimensions for absorption trenches.

1. Depth. The minimum trench sidewall depth as measured from the surface of the mineral soil shall be 12 inches when placed in a landscape with a slope less than 10%. The installation depth shall be measured on the downhill side of the absorption trench. When the installation depth is less than 18 inches, the depth shall be measured from the lowest elevation in the microtopography. All systems shall be provided with at least 12 inches of cover to prevent frost penetration and provide physical protection to the absorption trench; however, this requirement for additional cover shall not apply to systems installed on slopes of 30% or greater. Where additional soil cover must be provided to meet this minimum, it must be added prior to construction of the absorption field, and it must be crowned to provide positive drainage away from the absorption field. The minimum trench depth shall be increased by at least five inches for every 10% increase in slope. Sidewall depth is measured from the ground surface on the downhill side of the trench.

2. Width. All absorption trenches utilized with gravity distribution shall have a width of from 18 inches to 36 inches. All absorption trenches utilized with low pressure distribution shall have a width of eight inches to 24 inches.

F. Lateral separation of absorption trenches. The absorption trenches shall be separated by a center to center distance no less than three times the width of the trench for slopes up to 10%. However, where trench bottoms are two feet or more above rock, pans and impervious strata, the absorption trenches shall be separated by a center to center distance no less than three times the width of the trench for slopes up to 20%. The minimum horizontal separation distance shall be increased by one foot for every 10% increase in slope. In no case shall the center to center distance be less than 30 inches.

G. Slope of absorption trench bottoms.

1. Gravity distribution. The bottom of each absorption trench shall have a uniform slope not less than two inches or more than four inches per 100 feet.

2. Low pressure distribution. The bottom of each absorption trench shall be uniformly level to prevent ponding of effluent.

H. Placement of absorption trenches in the landscape.

1. The absorption trenches shall be placed on contour.

2. When the ground surface in the area over the absorption trenches is at a higher elevation than any plumbing fixture or fixtures, sewage from the plumbing fixture or fixtures shall be pumped.

I. Lateral ground water movement interceptors. Where subsurface, laterally moving water is expected to adversely affect an absorption system, a lateral ground water movement interceptor (LGMI) shall be placed upslope of the absorption area. The LGMI shall be placed perpendicular to the general slope of the land. The invert of the LGMI shall extend into, but not through, the restriction and shall extend for a distance of 10 feet on either side of the absorption area.

Table 5.4.
Area Requirements for Absorption Trenches Receiving Septic Tank Effluent.

Percolation Rate	Area Required (Ft^2/100 Gals)	Area Required (Ft^2/Bedroom)

(Minutes/Inch)	Gravity	Gravity Gravelless	Low Pressure Distribution	Gravity	Gravity Gravelless	Low Pressure Distribution
5	110	83	110	165	124	165
10	120	90	120	180	135	180
15	132	99	132	198	149	198
20	146	110	146	218	164	218
25	158	119	158	237	178	237
30	174	131	164	260	195	255
35	191	143	170	286	215	260
40	209	157	176	314	236	264
45	229	172	185	344	258	279
50	251	188	193	376	282	293
55	275	206	206	412	309	309
60	302	227	217	452	339	325
65	331	248	228	496	372	342
70	363	272	240	544	408	359
75	398	299	251	596	447	375
80	437	328	262	656	492	394
85	479	359	273	718	539	409
90	525	394	284	786	590	424
95	575	489	288	862	733	431
100	631	536	316	946	804	473
105	692	588	346	1038	882	519
110	759	645	379	1138	967	569
115	832	707	416	1248	1061	624
120	912	775	456	1368	1163	684

J. Controlled blasting. When rock or rock outcroppings are encountered during construction of absorption trenches the rock may be removed by blasting in a sequential manner from the top to remove the rock. Percolation piping and sewer lines shall be placed so that at least one foot of compacted clay soil lies beneath and on each side of the pipe where the pipe passes through the area blasted. The area blasted shall not be considered as part of the required absorption area.

K. Trenches receiving TL-2 effluent or TL-3 effluent are exempt from the increase in trench depth with slope and the soil cover requirements as found in 12VAC5-610-950.E. The following additional requirements shall apply.

1. Soil dispersal loading rates shall not exceed the values in Table 5.5.

2. The minimum vertical separation to a limiting feature shall be maintained under the entire infiltrative surface in accordance with 12VAC5-613-80.

3. The minimum soil cover, after settling, shall be 6 inches as measured from the finished ground surface to the uppermost limit of the dispersal media (or gravelless material) utilized in the absorption area. On sloping sites, cover shall be tied back into the existing slope to facilitate stabilization of the slope and maintenance of the site. The soil cover, with amendments as needed, shall be of a quality, character, and fertility suitable to establish a vegetative cover that is uniform and sufficiently mature to survive and inhibit erosion.

4. The minimum installation depth is equal to the sidewall of the dispersal system construction as described in 12VAC5-610-930.F (gravelless), 12VAC5-610-940, and 12VAC5-610-950.E.1. On sloping sites, the minimum installation depth is measured on the downhill side of the absorption trench.

5. When trenches are installed at less than 12 inches from the ground surface, timed dosing shall be used to disperse the effluent.

6. For slopes up to 15 percent slope, there are not any soil texture group limitations for shallow placed trenches receiving TL-2 effluent or TL-3 effluent. For slopes over 15 percent, trench systems installed in Texture Group III and IV soils shall have a 12 inch or greater installation depth.

7. Designs supported by Division approved manufacturer's design manuals may deviate from 12VAC5-610-950.K4 and K5.

8. Not withstanding the above, the minimum absorption area for a single family residential dwelling receiving TL-2 effluent or TL-3 effluent shall be 400 square feet.

Table 5.5 Soil Absorption Area Loading Rates for Systems Receiving TL-2 or TL-3 Effluent

	TL-2 Effluent				TL-3 Effluent			
Percolation Rate (mpi)	Pressure Trench* Loading (gpd/ft^2)	Gravity Trench* Loading (gpd/ft^2)	Drip** Loading) (gpd/ft^2)	Pad/Mound Loading** (gpd/ft^2)	Pressure Trench* Loading (gpd/ft^2)	Gravity Trench* Loading (gpd/ft^2)	Drip** Loading (gpd/ft^2)	Pad/Mound Loading** (gpd/ft^2)
5	1.8	1.80	0.60	1.20	3.0	3.00	1.00	1.66
10	1.67	1.67	0.56	1.11	2.67	2.67	0.89	1.66
15	1.53	1.53	0.51	1.02	2.33	2.33	0.78	1.66
20	1.4	1.40	0.47	0.93	2.0	2.00	0.67	1.66
25	1.30	1.30	0.43	0.86	1.75	1.75	0.58	1.33
30	1.2	1.13	0.40	0.80	1.5	1.41	0.50	1.11

35	1.10	0.98	0.37	0.73	1.38	1.22	0.46	0.95
40	1.00	0.84	0.33	0.66	1.25	1.05	0.42	0.83
45	0.90	0.73	0.30	0.60	1.13	0.91	0.38	0.74
50	0.8	0.62	0.27	0.53	1.0	0.77	0.33	0.67
55	0.76	0.57	0.25	0.50	0.94	0.71	0.31	0.61
60	0.71	0.51	0.24	0.47	0.89	0.64	0.30	0.55
65	0.67	0.46	0.22	0.44	0.83	0.57	0.28	0.51
70	0.62	0.41	0.21	0.41	0.78	0.51	0.26	0.48
75	0.58	0.36	0.19	0.38	0.72	0.46	0.24	0.44
80	0.53	0.32	0.18	0.35	0.67	0.40	0.22	0.42
85	0.49	0.28	0.16	0.33	0.61	0.35	0.20	0.39
90	0.44	0.24	0.15	0.30	0.56	0.30	0.19	0.37
95	0.4	0.20	0.13	0.27	0.5	0.25	0.17	0.35
100	0.37	0.19	0.12	0.25	0.46	0.23	0.15	0.33
105	0.34	0.17	0.11	0.23	0.43	0.21	0.14	0.32
110	0.31	0.16	0.10	0.21	0.39	0.19	0.13	0.30
115	0.28	0.14	0.09	0.19	0.35	0.18	0.12	0.29
120	0.25	0.13	0.08	0.17	0.32	0.16	0.11	0.28

*Loading rates to trenches, whether gravity or pressure dosed, are based on the gallons per day of wastewater applied to the bottom of the trench.

**Loading rates to drip systems, pads, and mounds are based on the infiltrative surface area provided and are on an aerial basis.

12VAC5-610-955. Drip dispersal.

A. Drip dispersal applies wastewater in an even and controlled manner over an absorption area. Drip dispersal system components may include treatment components, a flow equalization pump tank, a filtration system, a flow measurement method, supply and return piping, small diameter pipe with emitters, air/vacuum release valves, redistribution control, and electromechanical components or controls.

B. Drip dispersal system tubing shall be color coded and certified by the manufacturer as designed and manufactured for the dispersal of wastewater. All drip dispersal system tubing shall be equipped with emitters approved for use with wastewater. For the application of septic tank effluent, the tubing must have self-cleaning emitters.

1. The minimum linear feet of tubing in the system shall be one-half of the minimum soil absorption area in square feet.

2. All tubing shall be placed on contour.

3. Except as provided by 12VAC5-613, drip systems dispersing septic tank effluent shall comply with the requirements of 12VAC5-610-594.

4. Drip systems dispersing secondary effluent or better require a minimum of six inches of cover over the tubing. Cover may be achieved by a combination of installation depth and Group II or Group III soil cover or other approved material over the drip field.

5. The discharge rate of any two emitters shall not vary by more than 10% in order to ensure that the effluent is uniformly distributed over the entire drip field or zone.

6. The emitters shall be evenly spaced along the length of the drip tubing at not less than six inches or more than 24 inches apart.

7. The system design shall protect the drip emitters and system from the effects of siphoning or backflow through the emitters.

C. Drip dispersal systems shall comply with the following minimum soil absorption area requirements:

1. For the dispersal of septic tank effluent, the minimum soil absorption area for a drip system shall be calculated by multiplying the trench bottom area required for a low pressure distribution system in Table 5.4 of 12VAC5-610-950 by three.

2. For the dispersal of ~~secondary or better effluent~~ TL-2 effluent or TL-3 effluent, the minimum soil absorption area shall be in accordance with Table 5.5 of 12VAC5-610-950. ~~calculated by multiplying the trench bottom area for pressure distribution systems in accordance with subdivision 10 of 12VAC5-613-80 by three.~~

3. Air/vacuum release valves shall be located at the high points of the supply and return manifolds to each zone.

D. All drip dispersal systems shall be equipped with devices or methods to restrict effluent from draining by gravity to portions of a zone or laterals lower in elevation. Variable distribution due to gravity drainage shall be 10% or less within a zone.

E. A minimum of six hours of emergency storage above the high water alarm in the pump chamber shall be provided. The equalization volume shall be equal to 18 hours of storage. The equalization volume shall be measured from the pump off level to the high water alarm level. An audio/visual alarm meeting the requirements of 12VAC5-610-880 B 8 shall be provided for the pump chamber.

F. Each drip dispersal zone shall be time-dosed over a 24-hour period. The dose volume and interval shall be set to provide unsaturated flow conditions. Demand dosing is prohibited. Minimum dose volume per zone shall be 3.5 times the liquid capacity of the drip laterals in the zone plus the liquid capacity of the supply and return manifold lines (which drain between doses) accounting for instantaneous loading and drain back.

1. At each dosing cycle, the system design shall only allow a full dose volume to be delivered.

2. For design flows greater than 1,000 gallons per day, a means to take each zone off line separately shall be provided. The system shall have the capability to bypass each zone that is taken out of service such that each subsequent dose is dispersed to the next available zone in sequence.

G. Filtration shall be provided to remove suspended solids and prevent clogging of emitters. The filtration design shall meet the drip tubing manufacturer's particle size requirements for protection of the emitters at a flow rate equal to or greater than the rate of forward flushing. Filter flush water shall be returned to the treatment system at a point where the residuals and

volume of the flush water do not negatively impact the effluent quality or exceed the hydraulic design capacity of the treatment system.

H. A means for measuring or estimating total flow dispersed to the soil absorption area and to verify field dosing and field flushing rates shall be provided.

I. The system shall provide forward field flushing to achieve scouring velocity as specified by the drip tubing manufacturer. Field flushing shall occur on a routine schedule to prevent excessive solids accumulation and clogging. Flush water shall be returned to the treatment system at a point where the residuals and volume of the flush water do not negatively impact the effluent quality or exceed the hydraulic design capacity of the treatment system.

J. Electrical components shall be Underwriters Laboratory (UL) listed for the intended purpose. The designer shall provide a description with a schematic diagram of the electrical and control functions in the operation and maintenance manual. The electrical control equipment shall be mounted within a National Electrical Manufacturers Association (NEMA) 4X rated enclosure with a rigid latching door. All switches shall be clearly identified, and all internal wiring shall be factory installed. All wiring shall be installed according to applicable electrical safety codes and the manufacturer's installation schematic.

K. All components in a drip dispersal system shall be rated to withstand contact with wastewater and recommended for this application by the manufacturer. All components shall be protected from freezing.

L. The designer of the drip dispersal system shall verify the dosing rates, the flushing rates, and other parameters critical to the proper operation of the system at the startup inspection. A summary of the startup inspection shall be included in the operation and maintenance manual and shall include, at a minimum, the dosing volume, the forward flow flushing rate, the pressure head of the system, and verification of proper cycling between zones.

12VAC5-610-960. Elevated sand mound.

A. An elevated sand mound is a soil absorption system that incorporates low pressure distribution and sand filtration to produce treated sewage prior to absorption in the natural underlying soil. The elevated sand mound utilizes less gross soil area than most other soil absorption systems. Elevated sand mounds differ from pads in that elevated sand mounds are always an above ground system, may receive septic tank effluent, always require pressure distribution and the infiltrative surface follows the natural ground surface and contour of the site.

~~B. Mound systems are considered Type III systems (see 12VAC5-610-250 C).~~

~~C~~. B. Mound systems receiving septic tank effluent shall be designed and constructed in accordance with the Wisconsin Mound Soil Absorption System Siting, Design and Construction Manual prepared by the Small Scale Waste Management Project, School of Natural Resources, College of Agricultural and Life Sciences, University of Wisconsin-Madison dated January ~~1990~~ 2000 or its successor. Drip dispersal or low pressure distribution shall be used.

~~D~~. C. The manual referred to in subsection ~~C~~ B of this section shall be used for the designated construction of elevated sand mounds. The following criteria are required for all elevated sand mound systems in addition to the requirements found in the manual.

~~1. The construction permit shall require permanent water saving devices; however, there shall be no corresponding reduction in the basal area. The construction permit shall be recorded and indexed in the grantor index under the holder's name in the land records of the clerk of the circuit court having jurisdiction over the site of the sewage disposal system pursuant to 12VAC5-610-250 J.~~

~~2~~.1. The proposed mound site shall be fenced, roped or otherwise secured, and marked, to prevent damage by vehicular traffic. Activities on the mound site shall be severely limited in order to protect it to the greatest extent possible.

~~3. Formal plans and specifications, prepared by a licensed professional engineer in accordance with 12VAC5-610-250 G, shall be required and must be approved by the health department prior to any site-disturbing activities.~~

~~4.~~ 2. ~~The local health department shall be notified at least 48 hours before any work begins on the site, including delivery of materials.~~ The mound must be constructed during dry weather and soil conditions. ~~The contractor shall schedule a conference with the local health department to review the plans and specifications prior to beginning any phase of construction, including delivery of materials.~~

~~5.~~ 3. Wooded sites shall not be used unless it is shown by the applicant that the wooded site is the only site available, and if the applicant can demonstrate that the site can be properly prepared ~~(plowed)~~. If a wooded site is used, trees shall be removed by cutting them off at ground level, leaving the stumps in place. The cut trees shall be removed using methods that do not require driving equipment over the mound site and that do not result in the removal of any soil from the site. Larger basal areas may be required on wooded sites.

~~6~~. 4. When the depth to a restriction, shrink-swell soils or a water table is less than 24 inches, pretreatment sufficient to produce ~~a secondary~~ TL-2 effluent or TL-3 effluent may be used to reduce these distances ~~as shown in Table 4.4~~. in accordance with 12VAC5-613-80.

5. The minimum absorption area for single family residential dwellings shall be 400 square feet.

D. Elevated sand mounds receiving TL-2 effluent or TL-3 effluent shall adhere to the following additional design criteria.

1. The basal area (interface of fill sand and original soil surface) loading rate shall not exceed the values found in Table 5.5.

2. The minimum sand depth under the dispersal system is 6 inches.

3. The minimum soil cover, after settling, shall be 6 inches as measured from the finished ground surface to the uppermost limit of the dispersal media (or gravelless material) utilized in the absorption area. The finished sideslopes cannot exceed 1:4 (rise:run). The soil cover, with amendments as needed, shall be of a quality, character, and fertility suitable to establish a vegetative cover that is uniform and sufficiently mature to survive and inhibit erosion.

4. Vertical separation to limiting features as found in 12VAC5-613-80 shall be maintained under the entire infiltrative surface of the basal area.

5. Designs supported by Division approved manufacturer's design manuals may deviate from pressure dosing but require dosing to a gravity distribution system at a minimum.

12VAC5-610-966. Pads.

A. A pad is an absorption area wider than 3 feet but not longer than 100 feet with a level infiltrative surface where the bottom of the pad meets the original soil. The minimum standoff to a limiting feature in accordance with 12VAC5-613-80 is to be met under the entire infiltrative surface.

B. The minimum effluent quality dispersed to a pad is TL-2 effluent and pad bottom loading rates shall not exceed the values for pads noted in Table 5.5.

C. The longest dimension of the basal area of the pad, its length, shall be oriented parallel to the natural surface topographic contours. Minor deviations from surface contours are acceptable as long as the bottom of the pad is level (the entire bottom surface of the pad is at the same elevation, not to exceed 10% of the depth of the pad from the ground surface or plus or minus 2 inches, whichever is less), and intersects a similar soil horizon across its surface.

D. Pads and trenches may be used together in a single system when the respective pad or trench subsystems follow the respective design criteria found in this chapter and are separated by a minimum of 6 feet between the sidewall of the pad and the trench. When multiple pads are used on a site, the pads must be separated by the width of the pad as measured perpendicular to the natural surface topographic contour.

E. Pads shall be limited to sites with slopes of 10% or less (less than or equal to 10 feet of rise for every 100 feet of run).

F. Dosing. All pads must be dosed. Pad systems over 1,000 gallons per day must be pressure dosed. When pads are installed at less than 12 inches from the ground surface, timed dosing shall be used to disperse the effluent.

G. The minimum absorption area for single family residential dwellings shall be 400 square feet.

H. Pad Construction.

1. Gravel pads shall have a minimum installation depth of 12 inches, unless in Texture Group I or II soils where the installation depth can be reduced to 8 inches. On sloping sites, the minimum installation depth is measured on the downhill side of the pad infiltrative surface. The construction of the pad's gravity percolation line and gravel bedding shall follow 12VAC5-610-930E with the exception that the bottom of the pad is level and not sloping. Piping shall have a maximum center to center spacing of 9 feet.

2. Gravel pads utilizing low pressure distribution shall follow 12VAC5-610-940 for construction and dosing cycle (volume). Gravel pads using low pressure distribution shall have a minimum installation depth of 12 inches, unless in Texture Group I or II soils where the installation depth can be reduced to 8 inches. On sloping sites, the minimum installation depth is measured on the downhill side of the pad infiltrative surface. Piping shall have a maximum center to center spacing of 9 feet.

3. Pads utilizing gravelless material as found in 12VAC5-610-930F shall follow 12VAC5-630F and the manufacturer's instructions on minimum depth of installation, but in no case shall a pad be installed at less than 8 inches from the original soil surface. Gravelless material shall have a maximum center to center spacing of 9 feet. On sloping sites, the minimum installation depth is measured on the downhill side of the pad infiltrative surface.

4. Designs supported by a Division approved manufacturer's design manual may deviate from the maximum slope, depth of installation, separation distance between pads, and timed dosing when the dispersal area is constructed in accordance with the approved manual.

I. The minimum soil cover, after settling, shall be 6 inches as measured from the finished ground surface to the uppermost limit of the dispersal media (or gravelless material) utilized in the absorption area. If the cover is mounded above grade, the finished sideslope cannot exceed 1:4 (rise:run). The soil cover, with amendments as needed, shall be of a quality, character, and fertility suitable to establish a vegetative cover that is uniform and sufficiently mature to survive and inhibit erosion.