

**SEWAGE HANDLING AND DISPOSAL REGULATIONS**  
**(Emergency Regulations for Gravelless Material and Drip Dispersal)**

**12 VAC 5-610-10 et seq.**

**March 14, 2014**

**12VAC5-610-10. [Repealed]**

**12VAC5-610-20. Purpose of regulations.**

This chapter has been promulgated by the State Board of Health to:

1. Assure that all sewage is handled and disposed of in a safe and sanitary manner;
2. Guide the State Health Commissioner in his determination of whether a permit for handling or disposing of sewage should be issued or denied; and
3. Guide the owner in the requirements necessary to secure a permit for handling and disposing of sewage.

**12VAC5-610-30. Relationship to other regulations.**

A. This chapter addresses the handling and disposal of those portions of sewage flows not regulated by a Virginia Pollutant Discharge Elimination System (VPDES) Permit or a Virginia Pollutant Abatement (VPA) Permit issued in accordance with 9VAC25-31 or 9VAC25-32, respectively.

B. Reclamation and reuse of sewage may be subject to permitting by the Department of Environmental Quality under 9VAC25-740.

**12VAC5-610-40. Administration of regulations.**

This chapter is administered by the following:

1. State Board of Health. The State Board of Health, hereinafter referred to as the board, has the responsibility to promulgate, amend, and repeal regulations necessary to ensure the safe and sanitary handling and disposal of sewage.

2. State Health Commissioner. The State Health Commissioner, hereinafter referred to as the commissioner, is the chief executive officer of the State Department of Health. The commissioner has the authority to act, within the scope of regulations promulgated by the board, for the board when it is not in session. The commissioner may delegate his powers under this chapter with the exception of his power to issue orders under § 32.1-26 of the Code of Virginia and 12VAC5-610-170 B. The commissioner has final authority to adjudicate contested decisions

of subordinate delegated powers under this section prior to appeal of such decisions to the circuit court.

3. State Department of Health. The State Department of Health, hereinafter referred to as the department, is designated as the primary agent of the commissioner for the purpose of administering this chapter.

4. District or local health departments. The district or local health departments are responsible for implementing and enforcing the operational activities as required by this chapter.

**12VAC5-610-50. Sewage Handling and Disposal Advisory Committee.**

The commissioner shall appoint a Sewage Handling and Disposal Advisory Committee consisting of 16 appointed members and five ex officio members. The commissioner shall appoint to the Sewage Handling and Disposal Advisory Committee one individual each from the following: a member of the Virginia Society of Professional Engineers; a member of the Consulting Engineers Council of Virginia; a member of the Virginia Association of Professional Soil Scientists; a member of the Home Builders Association of Virginia; a member of the Virginia Association of Counties; a member of the Virginia Municipal League; a member of the Virginia Association of Realtors; a member of the Virginia Section, American Institute of Professional Geologists; a member of the Virginia Well Drillers Association; a member of the Virginia Water Environment Association; a faculty member of a Virginia state university or college whose principal field of teaching is soil science; a member of the Virginia Environmental Health Association; a member of the Virginia Wastewater Association; a member of the Virginia Coalition of Environmental Associations and two citizens at large. Ex officio members shall consist of the Director, Division of Wastewater Engineering; an environmental engineer from Chesapeake Bay Local Assistance Department; a person with nonpoint source experience from the Department of Conservation and Recreation; Director, Bureau of Applied Technology, Department of Environmental Quality; and the Director, Division of Onsite Sewage; and Water Services; or their designees. The chairman shall be designated by the commissioner.

Appointed members shall serve at the discretion of the commissioner with terms being two years in duration. The Sewage Handling and Disposal Advisory Committee shall make recommendations to the commissioner regarding sewage handling and disposal policies, procedures and programs of the department. The committee shall meet at least annually. The committee shall establish its rules of order.

**12VAC5-610-60. The State Health Department Sewage Handling and Disposal Appeals Review Board.**

There is established within the Department of Health under § 32.1-166.1 the Sewage Handling and Disposal Appeals Review Board, hereinafter referred to as the Appeals Review Board.

**12VAC5-610-70. Grandfather clause.**

A. Any owner of a grandfathered lot may submit an application for a construction permit according to the procedure in 12VAC5-610-250. The local health department may perform a site and soil evaluation in accordance with Part III (12VAC5-610-450 et seq.) of this chapter and a permit shall be issued for a system which complies to the greatest extent possible with this chapter provided that the site and soil conditions would not preclude the successful operation of the system. Whenever the site and soil conditions on a grandfathered lot do not substantially comply with the requirements in Part IV (12VAC5-610-591 et seq.) of this chapter for a septic tank effluent system, secondary treatment will be required in the system design. In no case may the separation distance between the subsurface absorption system and a drinking water supply be less than the separation distance established in the regulations in effect at the time the grandfathered lot was approved (subdivision approval) or when the first permit was issued for the grandfathered lot.

B. Certification letters may not be issued in lieu of permits under the grandfather clause.

C. All permits issued under the grandfather clause which do not substantially comply with the provisions of this chapter shall be considered conditional permits in accordance with 12VAC5-610-250 J. A statement approved by the division shall be recorded and indexed in the grantor index of the land records of the circuit court having jurisdiction over the site of the sewage treatment and disposal system. The statement shall indicate that the permit is issued under the grandfather clause and that the site and soil conditions do not substantially comply with the current regulations and may contain such other information as the division deems appropriate to serve notice to future owners of the unique nature of grandfathered lots.

D. Within 18 months of July 1, 2000, any owner of a lot for which a certification letter or subdivision approval was issued after November 1, 1982, may submit an application for a construction permit according to the procedures in 12VAC5-610-250. Such application shall be subject to the permitting requirements of the regulations under which the certification letter or subdivision approval was issued.

**12VAC5-610-75. Permits valid on the effective date of this chapter.**

Sewage disposal system construction permits which are valid on July 1, 2000, shall be automatically renewed on a one-time basis. Each permit thus renewed shall have an expiration date 18 months from the expiration date shown on the face of the permit. Such permits may be converted to certification letters only if they substantially comply with the current provisions of this chapter.

**12VAC5-610-80. Sewerage systems and/or treatment works required.**

A. The discharge of untreated sewage onto the land or into the waters of the Commonwealth is prohibited.

B. No owner, person, or occupant shall discharge treated or untreated sewage onto the land, into the soil or into the waters of the Commonwealth without a valid permit from the commissioner or, as appropriate, a certificate issued by the Department of Environmental Quality in accordance with Title 62.1 of the Code of Virginia.

C. All buildings, residences, and structures designed for human occupancy, employment or habitation and other places where humans congregate shall be served by an approved sewerage system and/or treatment works. An approved sewerage system or treatment works is a system for which a certificate to operate has been issued jointly by the department and the Department of Environmental Quality or a system which has been issued a separate permit by the commissioner.

**12VAC5-610-90. [Repealed]**

**12VAC5-610-100. Right of entry.**

The commissioner or his designee shall have the right to enter any property to assure compliance with this chapter in accordance with the provisions of § 32.1-25 of the Code of Virginia.

Article 2  
Definitions

**12VAC5-610-110. [Repealed]**

**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.

"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.

"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).

"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.

Part II  
Procedural Regulations  
Article 1  
Procedures

**12VAC5-610-130. Compliance with Virginia Administrative Process Act.**

The provisions of the Virginia Administrative Process Act of the Code of Virginia shall govern the promulgation and administration of this chapter and shall be applicable to the appeal of any case decision based upon this chapter.

**12VAC5-610-140 to 12VAC5-610-150. [Repealed]**

**12VAC5-610-160. Emergency order or rule.**

If an emergency exists the commissioner may issue an emergency order or rule as is necessary for preservation of public health, safety, and welfare. The emergency order or rule shall state the reasons and precise factual basis upon which the emergency rule or order is issued. The emergency order or rule shall state the time period for which it is effective.

**12VAC5-610-170. Enforcement of regulations.**

All sewage handling and disposal facilities shall be constructed and operated in compliance with the requirements as set forth in this chapter. The commissioner may enforce this chapter through any means lawfully available.

A. Notice. Subject to the exceptions indicated below whenever the commissioner or the district or local health department has reason to believe a violation of any of these regulations has occurred or is occurring, the alleged violator shall be notified. Such notice shall be made in writing, shall be delivered personally or sent by certified mail, shall cite the regulation or regulations that are allegedly being violated, shall state the facts which form the basis for believing the violation has occurred or is occurring, shall include a request for a specific action by the recipient by a specified time and shall state the penalties associated with such violations (See § 32.1-27 of the Code of Virginia). When the commissioner deems it necessary he may initiate criminal prosecution or seek civil relief through mandamus or injunctive relief prior to giving notice.

B. Orders. Pursuant to the authority granted in § 32.1-26 of the Code of Virginia the commissioner may issue orders to require any owner to comply with the provisions of this chapter. The order shall be signed by the commissioner and may require:

1. The immediate cessation or correction, or both, of the violation;

2. The acquisition or use of additional land, equipment, supplies or personnel to assure that the violation does not recur;

3. The submission of a plan to prevent future violations to the commissioner for review and approval;

4. The submission of an application for a variance; and

5. Any other corrective action deemed necessary for proper compliance with the regulations.

C. Hearing before the issuance of an order. Before the issuance of an order described in subsection B of this section, a hearing must be held with at least 30 days notice to the affected owner of the time, place and purpose thereof, for the purpose of adjudicating the alleged violation or violations of this chapter. The procedure at the hearing shall be in accordance with 12VAC5-610-200 B and with §§ 9-6.14:11 and 9-6.14:12 of the Code of Virginia.

D. Order; when effective. All orders shall become effective not less than 15 days after mailing a copy thereof by certified mail to the last known address of the owner violating this chapter. Violation of an order is a misdemeanor. (See § 32.1-27 of the Code of Virginia.)

E. Compliance with effective orders. The commissioner may enforce all orders. Should any owner fail to comply with any order, the commissioner may:

1. Apply to an appropriate court for an injunction or other legal process to prevent or stop any practice in violation of the order;

2. Seek mandamus against any owner that is a municipal corporation;

3. Request the Attorney General to bring an action for civil penalty;

4. Request the Commonwealth's Attorney to bring a criminal action.

F. Not exclusive means of enforcement. Nothing contained in this section shall be interpreted to require the commissioner to issue an order prior to seeking enforcement of any regulations or statute through an injunction, mandamus or criminal prosecution.

G. Suspension of regulations during disasters. If in the case of a man-made or natural disaster, the commissioner finds that certain regulations cannot be complied with and that the public health is better served by not fully complying with this chapter, he may authorize the suspension of the application of the regulations for specifically affected localities and institute a provisional regulatory plan until the disaster is abated.

**12VAC5-610-180. [Repealed]**

**12VAC5-610-190. Variances.**

The commissioner may grant a variance to this chapter; however, minor deviations to the criteria contained in Part IV (12VAC5-610-591 et seq.) or Part V (12VAC5-610-660 et seq.) of this chapter may be granted in accordance with 12VAC5-610-280 C. The commissioner shall follow the appropriate procedures set forth in this section in granting a variance.

A. Definition of a variance. A variance is a conditional waiver of a specific regulation which is granted to a specific owner relating to a specific situation or facility and may be for a specified time period.

B. Requirements for a variance. The commissioner may grant a variance if a thorough investigation reveals that the hardship imposed (may be economic) by this chapter outweighs the benefits that may be received by the public and that the granting of such variance does not subject the public to unreasonable health risks.

C. Application for a variance. Any owner who seeks a variance shall apply in writing for a variance. The application shall be sent to the appropriate district and local health department for review and forwarding to the commissioner. The application shall include:

1. A citation to the regulation from which a variance is requested;
2. The nature and duration of the variance requested;
3. Any relevant analytical results including results of relevant tests conducted pursuant to the requirements of this chapter;
4. The hardship imposed by the specific requirement of this chapter;
5. A statement of reasons why the public health and welfare would be better served if the variance were granted;
6. Suggested conditions that might be imposed on the granting of a variance that would limit the detrimental impact on the public health and welfare;
7. Other information, if any, believed pertinent by the applicant; and
8. Such other information as the local health department and the commissioner may require.

D. Evaluation of a variance application.

1. The commissioner shall act on any variance request submitted pursuant to subsection C of this section within 60 calendar days of receipt of the request.

2. In the commissioner's evaluation of a variance application, the commissioner shall consider the following factors:

- a. The effect that such a variance would have on the operation of the sewage handling or disposal facility;
- b. The cost and other economic considerations imposed by this requirement;
- c. The effect that such a variance would have on protection of the public health;
- d. Any relevant analytical results including results of relevant tests conducted pursuant to the requirements of this chapter;
- e. The hardship imposed by enforcing the specific requirement of this chapter;
- f. The applicant's statement of reasons why the public health and welfare would be better served if the variance were granted;
- g. The suggested conditions that might be imposed on the granting of a variance that would limit the detrimental impact on the public health and welfare;
- h. Other information, if any, believed pertinent by the applicant;
- i. Such other information as the local health department and the commissioner may require; and
- j. Such other factors as the commissioner may deem appropriate.

E. Disposition of a variance request.

1. The commissioner may reject any applicant for a variance by sending a rejection notice to the applicant. The rejection notice shall be in writing and shall state reasons for the rejection. The applicant may petition for a hearing within 30 calendar days to challenge the rejection pursuant to 12VAC5-610-200.

2. If the commissioner proposes to grant a variance request submitted pursuant to subsection C of this section, the applicant shall be notified in writing of this decision. Such notice shall identify the variance, sewage handling or disposal facility covered, and shall specify the period of time for which the variance will be effective and any conditions imposed pursuant to issuing the variance. The effective date of a variance shall be 15 calendar days following its issuance.

3. No owner may challenge the terms set forth in the variance after 30 calendar days have elapsed from the date of issuance.

F. Posting of variances. All variances granted to any sewage handling or disposal facility are nontransferable. Each variance shall be attached to the permit to which it is granted. Each variance is revoked when the permit to which it is attached is revoked.

**12VAC5-610-200. Hearing types.**

Hearings before the board, commissioner or the commissioner's designees shall include any of the following forms depending on the nature of the controversy and the interests of the parties involved.

A. Informal hearings. An informal hearing is a meeting with the district or local health department with the district or local health director presiding and held in conformance with § 9-6.14:11 of the Code of Virginia. The district or local health department shall consider all evidence presented at the meeting which is relevant to the issue in controversy. Presentation of evidence, however, is entirely voluntary. The district or local health department shall have no subpoena power. No verbatim record need be taken at the informal hearing. The local or district health director shall review the facts presented and based on those facts render a decision. A written copy of the decision and the basis for the decision shall be sent to the appellant within 15 work days of the hearing unless the parties mutually agree to a later date in order to allow the department to evaluate additional evidence. If the decision is adverse to the interests of the appellant, an aggrieved appellant may request an adjudicatory hearing pursuant to 12VAC5-610-200 B.

B. Adjudicatory hearing for appeals of denials of sewage system construction permits. The adjudicatory hearing is a formal, public adjudicatory proceeding before the commissioner, the Sewage Handling and Disposal Appeal Review Board or a designated hearing officer, and held in conformance with § 9-6.14:12 of the Code of Virginia. An adjudicatory hearing includes the following features:

1. Notice. Notice which states the time and place and the issues involved in the prospective hearing shall be sent to the owner or the person who is the subject of the hearing. Notice shall be sent by certified mail at least 15 calendar days before the hearing is to take place.

2. Record. A verbatim record of the hearing shall be made by a court reporter. A copy of the transcript of the hearing, if transcribed, will be provided within a reasonable time to any person upon written request and payment of the cost.

3. Evidence. All interested parties shall attend the hearing and submit oral and documentary evidence and rebuttal proofs, expert or otherwise, that is material and relevant to the issues in

controversy. The admissibility of evidence shall be determined in accordance with § 9-6.14:12 of the Code of Virginia.

4. Counsel. All parties may be accompanied by and represented by counsel and are entitled to conduct such cross-examination as may elicit a full and fair disclosure of the facts.

5. Subpoena. Pursuant to § 9-6.14:13 of the Code of Virginia, the commissioner, Sewage Handling and Disposal Appeal Board, or hearing officer may issue subpoenas on behalf of themselves for the attendance of witnesses and the production of books, papers, maps or other materials. Failure to appear or to testify or to produce materials without adequate excuse may be reported by the commissioner to the appropriate circuit court for enforcement.

6. Judgement and final order. The commissioner may designate a hearing officer or subordinate to conduct the hearing as provided in § 9-6.14:12 of the Code of Virginia, and to make written recommended findings of fact and conclusions of law to be submitted for review and final decision by the commissioner. The final decision of the commissioner shall be reduced to writing and will contain the explicit findings of fact upon which his decision is based. A certified copy of the decision shall be delivered to the affected owner. Notice of a decision will be served upon the parties and become a part of the record. Service may be by personal service or certified mail, return receipt requested.

**12VAC5-610-210. Request for hearing.**

The commissioner or any person or owner injured by alleged violation of this chapter may request a hearing of one of the types listed by sending the request in writing to the district or local health department. The request for hearing shall cite the reason or reasons for the hearing request and shall cite the section or sections of this chapter involved.

**12VAC5-610-220. Hearing as a matter of right.**

Any person or owner whose rights, duties, or privileges have been, or may be affected by any decision of the board or its subordinates in the administration of this chapter shall have a right to both informal and adjudicatory hearings. The commissioner may require participation in an informal hearing before granting the request for a full adjudicatory hearing.

Exception. No person other than an owner shall have the right to an adjudicatory hearing to challenge the issuance of either a construction permit or operation permit unless the person can demonstrate at an informal hearing that the minimum standards contained in these regulations have not been applied and that he will be injured in some manner by the issuance of the permit.

### **12VAC5-610-230. Appeal.**

A. Any appeal from a denial of a construction permit for a sewage disposal system must be made in writing and received by the department within 30 days of the date of receipt of notice of the denial.

B. Any request for hearing on the denial of an application for a variance pursuant to 12VAC5-610-170 E 1 must be made in writing and received within 30 days of receipt of the denial notice.

C. Any request for a variance must be made in writing and received by the department prior to the denial of the sewage disposal system permit, or within 30 days after such denial.

D. In the event a person applies for a variance within the 30-day period provided by subsection C of this section, the date for appealing the denial of the permit, pursuant to subsection B of this section, shall commence from the date on which the department acts on the request for a variance.

E. Pursuant to the Administrative Process Act (§ 9-6.14:1 et seq. of the Code of Virginia), an aggrieved owner may appeal a final decision of the commissioner or Appeal Review Board to an appropriate circuit court.

### **12VAC5-610-240. Permits; general.**

No person or owner shall construct, operate, expand or modify a sewage disposal or handling system without a written permit from the commissioner.

A. Sewage disposal permits. No person or owner shall cause or allow the construction, expansion or modification of a sewage disposal system without the written construction permit from the commissioner which authorizes the construction or modifications. Furthermore, no person or owner shall cause or permit any sewage disposal system constructed after the effective date of this chapter to be operated without a written operation permit issued by the commissioner which authorizes the operation of the sewage disposal system, and/or nonpublic drinking water system (see 12VAC5-610-340). Conditions may be imposed on the issuance of any permit and no sewage disposal system shall be constructed, modified or operated in violation of these conditions.

B. Sewage handling permits. Any person who removes or contracts to remove and transport by vehicle the contents of any septic tank, sewage treatment plant, privy, holding tank, portable toilet, or any sewage septage or sewage sludges from any other device shall be deemed an owner and shall have a written sewage handling permit issued by the commissioner.

Exception. No such permit is required for the handling of sewage from (1) a holding tank on a vehicle or vessel by the owner of such vehicle or vessel or (2) the removal of screenings, sludges, grit, etc. from a sewage treatment plant by the owner or employees of such sewage treatment facilities.

**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.

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.

**12VAC5-610-255. Certification letters.**

A. An applicant for a sewage disposal system who does not intend to build within 18 months of application shall apply for a certification letter. The process shall be the same as for a system application made in accordance with 12VAC5-610-250. The fees charged for a certification letter shall be the same as prescribed in § 32.1-164 C of the Code of Virginia.

B. Certification letters indicate that a site is suitable for an onsite sewage treatment and disposal system and do not need to indicate the type of system for which the site is suitable.

C. Certification letters do not expire and shall convey with the land in the event the property is sold between the time the certification letter is issued and a construction permit is requested.

D. Certification letters may be converted to a construction permit by making application to the local health department in accordance with 12VAC5-610-250 and paying any required fees.

Note, however, no additional fee shall be charged when a certification letter is converted to a construction permit within 18 months of the date the letter was issued.

E. Formal plans and specifications are not required in order to obtain a certification letter unless said plans and specifications are necessary to determine the appropriateness of a site for a sewage disposal system. Depending upon the type and complexity of the system to be permitted, formal plans and specifications may be required.

F. Certification letters shall be issued only for conventionally approved systems. Certification letters shall not be issued for experimental or provisionally approved systems because there is no assurance that said system will successfully complete the required testing and demonstration and, hence, may not be available when the property owner wishes to convert the letter to a construction permit. Further, no certification letter shall be issued for a conditional permit pursuant to 12VAC5-610-250 J.

**12VAC5-610-260. Requirements for the submission of formal plans, specifications and other data.**

A. In accordance with the provisions of Title 54.1 of the Code of Virginia, all formal drawings, specifications, reports, and other documents submitted for approval shall be prepared by or under the supervision of a licensed professional engineer. The front cover of each set of drawings, of each copy of data and each copy of the specifications submitted shall bear the original imprint of the seal and signature of the licensed professional engineer by or under whom prepared. In addition each drawing submitted shall bear an imprint or a legible facsimile of such seal.

B. If revisions to the formal plans, specifications or documents are necessitated, a letter will be sent to the engineer outlining the revisions and requesting submission of the revised documents within 30 calendar days.

**12VAC5-610-270. Approval of formal plans.**

Final, complete and detailed plans and specifications submitted in accordance with the provisions of 12VAC5-610-250 and 12VAC5-610-260 will be reviewed by the district or local health department as appropriate as soon as practicable upon receipt. Such plans will be approved if they demonstrate compliance with the criteria set forth in Part V (12VAC5-610-660 et seq.) of this chapter, and if the sewage disposal system will be able to function properly. A set of approved plans will be returned to the owner.

**12VAC5-610-280. Issuance of the construction permit.**

A. A construction permit shall be issued by the commissioner after approval of the application submitted under 12VAC5-610-250 A and D and fulfilling the requirement contained in 12VAC5-610-700 E 2, if applicable.

B. A construction permit shall be issued by the commissioner after approval of the application and plans and specifications submitted under 12VAC5-610-250 B and C. Such approvals shall include the requirement contained in 12VAC5-610-700 E 2, if applicable, and applicable requirements of the Department of Environmental Quality in accordance with § 32.1-164.3 of the Code of Virginia.

C. Exception.

1. If compliance with the criteria contained in Part IV (12VAC5-610-591 et seq.) or Part V (12VAC5-610-660 et seq.) of this chapter imposes economic or other conditions that are not justified by the health considerations upon which the criteria are based, a construction permit may be issued for the disposal system design which substantially complies with the criteria set forth in Part IV or V of this chapter.

2. When issuing a construction permit for repair of an existing failing sewage disposal system for an occupied structure with indoor plumbing, the criteria contained in Parts IV and V of this chapter shall be complied with to the greatest extent possible. However, it is not necessary to substantially comply with all of the requirements in those parts of this chapter with the exception of the set back distances for shellfish waters or drinking water wells, unless the system is already closer in which case the corrected system shall not be closer than the existing system. Furthermore, when it can be documented that compliance with those parts creates an economic hardship, the district health director or the district environmental health manager may waive the requirements for pretreating the effluent. All corrections must be of such a nature that they can reasonably be expected to reduce the risk to public health caused by the malfunctioning systems.

**12VAC5-610-290. Denial of a construction permit.**

A. If it is determined that the proposed design is inadequate or that soil, geological or other conditions are such to preclude safe and proper operation of a proposed sewage disposal system or that the installation of the system would create an actual or potential health hazard or nuisance, the permit shall be denied and the owner shall be notified in writing of the basis for the denial. The notification shall also state that the owner has the right to appeal the denial.

B. Construction permits may be denied for new construction to be served by a public water supply system which has reached its permitted capacity.

**12VAC5-610-300. Voidance, revalidation, and revocation of construction permits with and without conditions.**

A. Null and void. All sewage disposal construction permits are null and void when (i) conditions such as house location, sewage system location, sewerage system location, well location, topography, drainage ways, or other site conditions are changed from those shown on the application; (ii) conditions are changed from those shown on the construction permit; or (iii) more than 18 months elapse from the date the permit was issued. Reapplication for the purposes of having an expired permit reissued shall be the responsibility of the owner, and such reapplication shall be handled as an initial application and comply fully with 12VAC5-610-250.

B. Revalidation. Except as provided in 12VAC5-610-70, construction permits shall be revalidated if more than 18 months have elapsed since issuance of the construction permit and construction has not commenced. The district or local health department shall revalidate the permit if the permit had been previously issued in accordance with this chapter and the site conditions are the same as shown on the application and construction permit. Exception. This subsection is inapplicable to a Type III septage disposal facility.

C. Revocation. The commissioner may revoke a construction permit or inspection statement for any of the following reasons:

1. Failure to comply with the conditions of the permit;
2. Violation of any of this chapter for which no variance has been issued;
3. Facts become known which reveal that a potential health hazard would be created or that the ground water resources may be adversely affected by allowing the proposed sewage disposal system to be installed or completed.

**12VAC5-610-310. Revisions of approved plans.**

Any deviation from approved plans and specifications affecting capacity, hydraulic conditions, operating units or the functioning of the sewage disposal system must be approved by the bureau before such changes are made. Revised plans and specifications shall be submitted in time to permit the review and approval of such plans and specifications before any construction work which will be affected by the changes is begun.

**12VAC5-610-320. Inspection and correction.**

No part of any installation shall be covered with earth or used until inspected, corrections made if necessary, and approved, by the district or local health department or unless expressly authorized by the district or local health department. Any part of an installation which has been covered prior to approval shall be uncovered upon the direction of the district or local health department. This section shall not apply to any sewage disposal system installation that is pursuant to a design certified by a licensed professional engineer or onsite soil evaluator.

Exception. This section is inapplicable to a Type III septage disposal facility.

**12VAC5-610-330. Inspections of private evaluations and designs and reports required upon completion of construction.**

A. Upon completion of the construction or modifications of a sewage disposal system permitted pursuant to a design certified by a licensed professional engineer or onsite soil evaluator, the certifying licensed professional engineer or onsite soil evaluator shall inspect the sewage disposal system installation in a timely manner and submit to the district or local health department a signed inspection report stating that the installation was completed substantially in accordance with the approved evaluation and design revised only in accordance with the provisions of 12VAC5-610-310. This inspection report shall be based upon inspections of the sewage disposal system during and after construction or modifications that are adequate to assure the accuracy of the report. The department may, but is not required to, inspect the installation of such sewage disposal system. In the event that the certifying licensed professional engineer or onsite soil evaluator does not inspect the installation in a timely manner or declines to certify that the installation was completed substantially in accordance with the approved evaluation and design, the owner may petition the district or local health department to inspect the installation and render a final case decision approving or disapproving the installation. The district or local health department shall not be required to convene an informal fact-finding proceeding in accordance with § [2.2-4019](#) of the Code of Virginia or 12VAC5-610-200 prior to rendering such decision.

B. Statement from the sewage disposal system contractor. Upon completion of the construction or modification of a sewage disposal system, the owner shall submit to the district or local health department a statement signed by the contractor that the construction work was completed in accordance with the construction permit, and when appropriate the plans and specifications approved for the project and substantially in accordance with Part V (12VAC5-610-660 et seq.) of this chapter.

**12VAC5-610-340. Issuance of the operation permit.**

Upon satisfactory completion of the requirements of 12VAC5-610-320 and 12VAC5-610-330 the commissioner shall issue an operation permit. The issuance of an operation permit does not denote or imply any guarantee by the department that the sewage disposal system will function for any specified period of time. It shall be the responsibility of the owner or any subsequent owner to maintain, repair or replace any sewage disposal system that ceases to operate as defined in the operation permit and in 12VAC5-610-350.

**12VAC5-610-350. Failure of a sewage disposal system.**

For the purpose of requiring correction of a malfunctioning sewage disposal system the presence of raw or partially treated sewage on the ground's surface or in adjacent ditches or waterways or exposure to insects, animals or humans is prima facie evidence of such system failure and is deemed a violation of these regulations. Pollution of the groundwater or backup of sewage into plumbing fixtures may also indicate system failure.

**12VAC5-610-360. Review of subdivision plats for individual sewage disposal systems when required by local ordinance.**

A. The intent of this section is to assure that adequate information is supplied to the district or local health department to determine if any or all proposed lots contain a suitable area and reserve area for onsite sewage disposal systems prior to recordation of the subdivision plat. This section shall not be construed to restrict the department in rendering preliminary opinions in accordance with local ordinances prior to recordation. The information requested herein is supplemental to the information which may be required by local subdivision ordinances.

B. A subdivision plat or a subsection of a subdivision plat submitted to the district or local health department for review of onsite sewage disposal systems shall show at a minimum the location of the proposed onsite sewage disposal systems and the reserve absorption areas if required by Part V (12VAC5-610-660 et seq.) of this chapter, 12VAC5-610-710 for the onsite sewage disposal systems and the location of the water supply system on each lot, if applicable. Each plat or subsection of a subdivision plat shall be accompanied by specific soil information for each lot (absorption area and reserve area) in accordance with Article 1 (12VAC5-610-450 et seq.) of Part III of this chapter. If not provided by the local subdivision ordinance, the district or local health department may require the plat to show streets, utilities, storm drainage, water supplies, easements, lot lines and original topographic contour lines by detail survey or other information as required. For suggested contour interval and scale see APPENDIX L.

C. No department employee shall sign or indicate approval for onsite sewage disposal systems on a subdivision plat or subsection of a subdivision plat for recordation until a sewage disposal site(s), including reserve area when required in accordance with 12VAC5-610-710, has been identified, approved or disapproved and recorded on each lot of the subdivision plat on file with the district or local health department. The plat on file with the district or local health department shall be reconciled with the plat to be recorded. The recorded plat shall reference the plat on file with the department. The signature of a department employee on a recorded subdivision plat or subsection of a subdivision plat does not imply or connote that any lot(s) identified as approved shall be issued a sewage disposal construction permit unless all conditions and circumstances, such as but not limited to landscaping, contained in the original approval exist at the time of application for a sewage disposal construction permit.

D. Before building construction begins on a lot within the subdivision, a valid individual sewage disposal construction permit shall be issued for that lot in accordance with 12VAC5-610-280.

**12VAC5-610-370. [Repealed]**

**12VAC5-610-380. Procedures for obtaining a sewage handling permit.**

A. Sewage handling permits are issued by the commissioner. (See 12VAC5-610-240 B.) Applications for such permits shall be directed to the district or local health department. The procedure for obtaining sewage handling permits includes the following:

1. Application;
2. Conference;
3. Scheduling of equipment for initial inspection; and
4. Approval of disposal site or sites.

B. Application. An application for a sewage handling permit shall be made to the local or district health department on a form provided by the department.

C. Conference. A conference will be held with the district or local department for the purpose of discussing the methods and equipment utilized in the handling of sewage.

D. Initial equipment inspection. The owner shall make arrangements with the district or local health department at a suitable time for inspecting the sewage handling equipment.

E. Approval of disposal site or sites.

1. An approved sewerage system or treatment works is a system for which a certificate to operate has been issued jointly by the department and the Department of Environmental Quality

or a system which has been issued a separate permit by the commissioner. When the applicant is not the owner of the approved sewerage system or treatment works, the applicant shall append a statement from the owner of the approved sewerage system or treatment works to the application stating that the applicant may discharge septage and/or sewage. The statement shall include the quantity per day and point of discharge as indicated on the application to the approved sewerage system or treatment works.

2. If the disposal site is not an approved sewerage system or treatment works, each disposal site shall be considered a special facility (see 12VAC5-610-590 B) and shall be inspected and approved or disapproved on a case-by-case basis by the district or local health department and the bureau in accordance with 12VAC5-610-250 C.

**12VAC5-610-390. Issuance of sewage handling permit.**

The commissioner shall issue a sewage handling permit upon satisfactory completion of the procedures outlined in 12VAC5-610-380 and compliance with the criteria contained in Article 2 (12VAC5-610-560 et seq.) of Part III and Articles 8 (12VAC5-610-1020 et seq.) and 9 (12VAC5-610-1080 et seq.) of Part V of this chapter.

**12VAC5-610-400. Revocation of sewage handling permits.**

A. Each permit shall be for a time period not to exceed 12 months.

B. Each permit may be revoked when conditions are changed from those shown in the application.

C. Each permit may be revoked when there is a potential or real health hazard associated with the sewage handling operation.

**12VAC5-610-410. Special permits for pump and haul of sewage.**

A special permit for a definite time period issued by the commissioner is required for pump and haul. (See Part III, Article 2 of this chapter.)

Exception.

1. No such special permit is required for pump and haul associated with pumpout facilities at marinas or other places where boats are moored which are authorized by the Rules and Regulations Governing Sewerage and Sanitary Facilities at Marinas and Other Places Where Boats are Moored.

2. Where pump and haul is a maintenance requirement of an approved sewage disposal system such as pumping septage from a septic tank or periodic pumping of a holding privy, no such separate special permit is required.

**12VAC5-610-420. Procedure for obtaining a pump and haul permit.**

A. An owner who seeks a pump and haul permit shall follow the following steps:

1. Application;
2. Conference;
3. Plans, specifications, and other data as may be required;
4. Securing a contract with a sewage handling contractor having a valid sewage handling permit;
5. Submission of a detailed construction schedule for completion of the permanent receiving facilities; and
6. Bonding.

B. Application. An application shall be made through the district or local health department on a form provided by the department.

C. Conference. A conference is necessary with the district or local health department for the purpose of discussing the reasons for pump and haul and the methods and equipment to be utilized in the pump and haul operation.

D. Plans and specifications. Plans and specifications in sufficient detail shall be provided, when required, to show the sewage collection and holding facilities. See 12VAC5-610-250 C and E for further details relating to plans and specifications.

E. Contract with a sewage handling contractor. The owner shall secure and maintain a contract with a sewage handling contractor having a valid sewage handling permit. The contract shall be for a period of time sufficient to complete the construction necessary to alleviate the need for pump and haul.

The contract shall contain at a minimum, the following conditions:

1. Duration of contract;
2. Pumping schedule;
3. Availability of equipment;
4. Emergency response capability;
5. Disposal site, including limitations, utilized by the contractor; and
6. The contractor shall maintain and submit records on a monthly basis to the owner and the department. The records shall indicate the date, time and volume of each load, the disposal site or sites utilized and overflows or spillage.

F. Submission of detailed construction schedules. A detailed construction schedule shall show at a minimum, initial construction date and date of completion. Progress reports shall be submitted monthly.

G. Bonding. The commissioner may require any owner holding or applying for a permit issued pursuant to this section to post a bond with surety approved by the commissioner for the purpose of insuring continuation of the pump and haul operation for the specified time period contained in the pump and haul permit. Such bond shall be forfeited if the owner ceases to continue the pump and haul operation before the need for pump and haul has been alleviated. The forfeited bond shall be expended as necessary to restore and maintain the pump and haul operation for the permitted time period. Forfeiture of the bond shall not relieve the permit holder of any other legal obligations set forth in this chapter. No bond shall be required of a government entity holding a permit in accordance with 12VAC5-610-550.

**12VAC5-610-430. Issuance of a construction permit for storage facilities associated with the pump and haul of sewage.**

A construction permit shall be issued by the commissioner after completion of the requirements contained in 12VAC5-610-420 and, Article 7 (12VAC5-610-990 et seq.) of Part V of this chapter.

**12VAC5-610-440. Issuance of the special pump and haul permit.**

After concurrence of the local political subdivision and upon satisfactory completion of the requirements set forth in 12VAC5-610-420, 12VAC5-610-430, Article 4 (12VAC5-610-598 et seq.) of Part IV and Article 7 (12VAC5-610-990 et seq.) of Part V of this chapter, and if the commissioner determines that issuance of the pump and haul permit is in the best interest of public health, a permit shall be issued.

## Article 2

### Systems with Experimental or Provisional Approval

#### **12VAC5-610-441. Special permits for experimental methods, process and equipment.**

A. New construction. Sewage treatment and disposal methods, processes, and equipment which (i) are not covered by criteria in Part V (12VAC5-610-660 et seq.) of this chapter and (ii) in principle and/or application are new or unconventional are subject to a special permitting procedure in lieu of that set forth in 12VAC5-610-250. All applications for such processes, methods, and equipment shall be made to the division through the district or local health department.

1. Submission of data on experimental methods, processes, and equipment. The policy of the division is to encourage the development of any new methods, processes, and equipment which appear to have application for the treatment and disposal of sewage; however, new developments shall have been thoroughly tested in a full scale or representative pilot system utilizing this process and equipment. Results of this testing must be submitted to the division. The testing required on new developments will generally follow the following guidelines:

- a. All procedures used in validating the process shall be conducted under the supervision of a faculty member in an appropriate program of an accredited college or university, a licensed professional engineer experienced in the field of sanitary engineering, or by a testing firm acceptable to the division.
- b. The tests shall be performed under maximum design conditions and over extended periods of time in the geographical area of the proposed installation.
- c. The data shall be from a continuous operation of a full scale or pilot installation treating or conveying the type of sewage to be handled.
- d. Flow measuring equipment shall be provided and total flow shall be recorded daily.
- e. The minimum sampling and analysis program will be established by the division in accordance with the process under investigation.
- f. All analyses will be made in accordance with Standard Methods for the Examination of Water and Wastewater, 1992 (American Public Health Association), or analytical methods approved by the division.
- g. The sampling shall establish the impact of the experimental sewage treatment and disposal methods, processes, or equipment on ground water and public health.

h. The application shall identify and suggest operation and maintenance guidelines for the process or components of the process.

2. Detailed plans must be submitted showing how, in case of noncompliance, the method, equipment or process will be converted to or replaced with a proven system. In order to assure that funds are available to convert or replace the experimental method, equipment or process with a proven system, bonding or other assurances shall be provided. A proven system shall be a Type I, II, or III system, a point source discharge system or connection to an existing approved sewerage system or treatment works. The application for the experimental system shall be accompanied by one of the following: (i) a Virginia Pollution Discharge Elimination System (VPDES) permit, or (ii) a General Permit Registration Statement issued by the Department of Environmental Quality and a construction permit for an alternative discharging sewage treatment system issued by the commissioner, or (iii) certification from the owner of the existing sewage system or treatment works that connection is available, or (iv) a valid construction permit for a Type I, II, or III system.

3. Issuance of a construction permit. After review of the plans and testing data by the division and approval of a proven system (see subdivision 2 of this subsection), the commissioner shall issue a construction permit in accordance with the procedures in 12VAC5-610-250 if reasonably satisfied that the method, process, or equipment will provide satisfactory sewage disposal.

4. Issuance of an experimental operation permit. Upon completion of construction or modification, a permit to operate for a definite period of time will be issued for the operation of the experimentally approved methods, processes and equipment. The number of experimental systems of similar design characteristics to be installed for an evaluation period shall be determined by the division and where soil dependent systems are utilized, the number shall be limited to not more than four for each physiographic province (see Appendix K). There shall be no limit on the number of experimental systems allowed to be installed when an approved back-up system is constructed in accordance with subdivision 2 of this subsection and plumbing is provided to the back-up system. In this instance, a flow diversion valve shall be installed to divert wastewater flow between the two systems as necessary. The experimental permit to operate the experimental system shall require that the evaluation period be a minimum of 18 months and no longer than 36 months, under design conditions, and the holder of the experimental operation permit shall submit reports on operation during the evaluation period as required by the division.

5. Issuance of an operation permit. The commissioner shall issue an operation permit upon expiration of the experimental permit if, on the basis of testing during that period, the division finds that the experimental method, processes or equipment provides satisfactory sewage disposal. If these conditions are not met, then the commissioner shall issue an order which will require the owner to alter the sewage disposal system in a manner that will enable the conditions to be met.

B. Existing construction. Sewage treatment and disposal methods, processes and equipment (i) are not covered by the criteria in Part V (12VAC5-610-660 et seq.) of this chapter and (ii) in principle and/or application are new or unconventional may be utilized where a conventional sewage disposal system serving an occupied dwelling has failed and it is not possible to provide an alternate sewage disposal system having a discharge to state waters. The procedures for obtaining a permit for such systems shall generally follow those set forth in subsection A of this section with the following exceptions:

1. The detailed plans required need not show how in case of nonacceptance the sewage disposal system will be converted to or replaced with a proven process nor are bonds or assurances required;

2. More than four permits for soil dependent experimental systems of similar design characteristics may be issued per physiographic province; and

3. If the disposal system fails to work satisfactorily on a year-round basis, further correction to the system may be required.

C. Issuance of design and construction criteria. When sewage treatment and disposal methods, processes or equipment have demonstrated satisfactory performance and operational competence to the satisfaction of the commissioner, by completing the experimental process or by similar rigorous testing in other states or countries, provisional system approval shall be granted and design and construction criteria shall be developed in accordance with this article. If the wastewater to be treated is substantially different in flow or characteristics from one which was used during testing, the commissioner shall require the issuance of an experimental operating permit and further testing conducted until operational competence is demonstrated. The criteria shall include, at a minimum, the siting criteria, design and construction standards, performance, monitoring and service requirements of the methods, processes and equipment.

**12VAC5-610-442. Provisionally approved systems; overview.**

A. Sewage treatment and disposal systems, methods, processes, technology and equipment that are not covered by criteria in Part V (12VAC5-610-660 et seq.) of this chapter

and have not received general approval for use under the provisions of this chapter may be eligible for provisional approval. Depending upon the complexity of the system, method, process, technology or equipment, provisional approval may be granted requiring individual applications for either a Type II or Type III system, as described in 12VAC5-610-250. After the evaluation period described in 12VAC5-610-500, a provisionally approved system may be given general approval and be incorporated into this chapter.

B. The purpose of the provisional approval process is to use, evaluate, and develop criteria for the use of new and innovative technology. The evaluation process allows the department a realistic amount of time, under varied field conditions, to develop and refine siting, construction, operation and maintenance criteria applicable to conditions and uses occurring in Virginia. During this evaluation period, residents of the Commonwealth have the benefit of the systems and the department can review, evaluate, revise and refine all aspects of criteria related to the system.

**12VAC5-610-443. Applying for provisional approval.**

A. Applications for provisional approval shall be made in writing to the division and shall request provisional approval for a specific system, technology, method or process. The application shall comply with 12VAC5-610-250 regarding the submission of detailed plans and specifications.

B. The application shall include the following:

1. A description of the system's operation including the accepted scientific and engineering principles upon which the system technology, method or process is based.

2. A description of the site criteria required for successful operation of the system.

3. Design criteria for sizing the system to meet all relevant site conditions and waste flow characteristics.

4. Construction procedures for successfully installing a system.

5. Operation criteria and maintenance requirements for the successful use of the system over the life expectancy of the system.

6. Proposed performance standards that the system is expected to meet to determine the success or failure of the system.

7. Documentation giving factual evidence of the principles upon which the system is based demonstrating the capacity for satisfactory performance and operational competency for treating and disposing of effluent. Such evidence must include sufficient basic and applied research to

demonstrate that experimental status should be waived. Provisional approval of a product is principally intended to provide a method of full-scale system demonstration; however, limited applied research may be required when in the exclusive opinion of the department, the information obtained from applied research is necessary to the evaluation and decision-making process. Systems, technologies, methods, or processes which have not demonstrated sufficient basic and applied research to support the principles or theory of operation shall be considered experimental.

8. Documentation of at least 50 comparable systems of identical design and capacity having been installed in Virginia or elsewhere. Only systems installed under similar soil and site conditions (if applicable) to the site and soil conditions for which approval is sought in Virginia shall be considered. Additionally, the wastewater flows, strength and other characteristics shall be documented and be similar in both the demonstration systems and the proposed use in the provisional application.

9. Data indicating that the 50 systems identified in subdivision 8 of this subsection have provided both treatment and disposal no worse than a conventional septic tank-drainfield system over a period of time not less than three years.

10. Test results and certifications must be conducted by an accredited college or university, the National Sanitation Foundation, entities accredited by the American National Standards Institute, or other testing groups that may be acceptable to the division as being impartial and competent in testing or evaluating wastewater treatment and disposal methods.

C. An application submitted according to this section and containing the information required by subsections A and B of this section shall be considered a completed application.

**12VAC5-610-444. Evaluation process for provisional system applications.**

A. Preliminary evaluation. Upon receiving an application, the division shall review it for completeness. The division shall request additional information from the applicant if the application does not contain all of the requested information. Once the application is complete, the division shall prepare a summary and a preliminary evaluation of the proposal.

B. Division evaluation and recommendation. The division shall evaluate all completed applications and make a recommendation to the commissioner concerning the application. The recommendation, if favorable, shall include proposed criteria for installing, operating and maintaining the system. The division shall consider the following information which shall be provided by the manufacturer or other interested party:

1. Whether the demonstrations and test results required by 12VAC5-610-443 B will provide sufficient scientific evidence to support the proposed theory of operation and that the application of the theory is appropriate for proposed uses without posing an undue risk to public health and ground water.

2. The impact of the system on ground water and public health.

3. The operation of the system in other states. The division may solicit evaluations and comments from health officials in other states or countries where the system, method, process, equipment or technology has been used.

4. A review of the appropriate manufacturer's or the distributor's records relating to system maintenance and user complaints. Failure to maintain accurate and up-to-date records of maintenance actions and customer complaints may delay or prevent completing a review.

5. A review of any sample results which may be collected from or around any of the systems.

6. The practicability of preventative maintenance and the frequency of the required maintenance.

7. Other information as deemed appropriate by the division which relates to evaluating the effect of the system, method or process on ground water or public health.

C. Decision by commissioner. In making a decision, the commissioner shall review the recommendations of the division and the comments and recommendations made by the advisory committee. The commissioner may elect to approve or deny the application, or approve the application with conditions or with requirements for additional testing. The commissioner's provisional approval shall set forth the criteria for filing an application (i.e., Type II or Type III system), installing, operating, maintaining and testing the provisionally approved system. The commissioner's approval shall indicate that the provisional approval may be modified as set forth in 12VAC5-610-447 C.

D. During the first year of provisional system approval, a maximum of 100 permits may be issued for a provisionally approved system. When 50 or more systems have been installed, operated, reviewed by the division and found to be demonstrating satisfactory performance and operational competency, the division may allow additional permits to be issued, up to 1,000 systems during the first five years. No single increment of additional permits may exceed 500 additional systems and a satisfactory review must be made by the division prior to any additional release of permits. Further, at least 12 months must elapse between permit releases

to assure adequate time passes for potential problems to develop and be discovered by the division.

**12VAC5-610-445. Appeals.**

A. Denial of provisional status. Pursuant to the Administrative Process Act (§ 9-6.14:1 et seq. of the Code of Virginia), any aggrieved applicant seeking provisional approval for a specific type of system may appeal the final case decision of the commissioner by requesting an adjudicatory hearing.

B. Denial of an applicant for use of a provisionally approved system. Aggrieved applicants who have been denied use of a system having provisional approval may request a hearing in accordance with 12VAC5-610-210.

**12VAC5-610-446. Permits for constructing and operating provisionally approved systems.**

A. Construction permit application. Homeowners can apply for a construction permit to install a provisionally approved system in the same manner provided for in 12VAC5-610-250 for Type II or Type III systems depending upon the nature of the provisional approval granted by the commissioner. Appeals from the denial of a permit application for a provisionally approved system shall conform to the requirements of 12VAC5-610-210.

B. Operation permit status. Homeowners installing a provisionally approved system in accordance with the construction permit issued by the commissioner and provisional siting, design and construction criteria for that system shall be issued an operation permit. Such operation permit shall be valid until the system ceases to operate in a safe and sanitary manner, as determined by the department. The validity of any individual operation permit issued for a system having provisional approval shall not be dependent upon ultimate approval or denial of that specific type of provisionally approved system for general approval under this chapter.

C. Recordation. All permits for provisionally approved systems shall be recorded with the clerk of the circuit court in the jurisdiction where the system is permitted, in accordance with 12VAC5-610-250 J 6.

D. Repair area. A 100% repair area, meeting or exceeding the requirements of this chapter, or an approved discharge permit shall be identified prior to permitting a site for a provisional system. The repair area shall be reserved for the exclusive use of the repair system. A 100% repair area meeting the requirements of the provisional approval shall be considered adequate toward meeting this repair area provision.

E. Maintenance. Whenever deemed appropriate by the commissioner, the department shall require operation and maintenance procedures and schedules appropriate for the method proposed.

**12VAC5-610-447. Evaluation period for provisionally approved systems.**

A. Evaluation criteria. Prior to receiving general approval and being incorporated into this chapter, systems with provisional approval shall be evaluated for not less than five years. The division should conduct an annual review of systems with provisional approval. The review, at a minimum, should be based on the following information submitted by the manufacturer; however, nothing shall prevent the department from verifying, augmenting or otherwise collecting additional information on the performance and operation of the system.

1. A field review of a sample of the systems installed. The sample shall include a representation of systems of newer and older installations and systems installed under different site and system limitations. System limitations will frequently be unique to each system and therefore the criteria used to select systems of different manufacturers will vary according to the nature and design of the system. The division shall determine the sample size to be evaluated and the criteria for sample selection.

2. Interviews with a sample of system owners to determine customer satisfaction and customer opinions. This sample may or may not be the same as the sample of systems reviewed under subdivision 1 of this subsection.

3. A review of the manufacturer's or the distributor's records relating to system maintenance and customer complaints. Failure to maintain accurate and up-to-date records of maintenance actions and customer complaints may delay or prevent completing a product review.

4. A review of any sample results which may be collected from or around any of the systems.

5. Other information as deemed appropriate by the division which relates to evaluating the effect of the system, method or process on ground water or public health.

B. Tracking of site locations. The manufacturer shall submit to the department records on the numbers, locations and operation of all provisionally approved systems on a quarterly basis not later than the 15th day of the month following the quarter.

C. Revisions to provisional approval. During the period of provisional approval, the department may revise any aspect of the site, soil and design requirements for that system based on experience gained during the use of the systems. The department shall work with the applicant to revise the approval by agreement, but shall not be prohibited from doing so without

the consent of the applicant if warranted by health or environmental concerns. The revised provisional approval shall apply to any systems for which an application is filed after the revision is made.

**12VAC5-610-448. General approval of provisionally approved systems.**

A. After the evaluation period specified in 12VAC5-610-447 is completed, site selection design and construction criteria shall be developed when the commissioner is satisfied that the sewage treatment and disposal system, method, process or equipment has demonstrated operational competency and satisfactory performance equal to or better than that of a gravity flow septic tank drainfield absorption system. Initially these criteria shall be implemented by policy and shall grant the status of general approval to the system or process and shall not limit the number of systems allowed. Subsequently, at the discretion of the department, criteria for the approved system shall be incorporated into this chapter in accordance with the Virginia Administrative Process Act (§ 9-6.14:1 et seq. of the Code of Virginia). The criteria shall include, at a minimum, the site conditions necessary for permitting a system, design considerations, installation criteria, performance, monitoring and service requirements of the methods, processes and equipment.

B. After the evaluation period specified in 12VAC5-610-447 is completed, site selection and design and construction criteria required in Part V (12VAC5-610-660 et seq.) of this chapter shall not be developed if the commissioner concludes that the sewage treatment and disposal system, method, process or equipment has not demonstrated satisfactory performance and operational competency equal to or better than that of a gravity flow septic tank-drainfield absorption system. The provisional system approval may be extended or rescinded for any system failing to show equivalency with a gravity flow septic tank-drainfield absorption system. After the provisional approval for a system has been rescinded, any future applications for systems utilizing the same design shall be denied. However, this provision shall not be used to prevent systems of similar design which have been modified in a manner which can reasonably be expected to overcome the previously identified deficiencies to be considered under the experimental requirements of this chapter.

## Article 3

### Mass Sewage Disposal Systems [Withdrawn]

#### Part III

#### General Criteria and Methods for Conducting Site Evaluations

#### Article 1

#### Evaluation Criteria for Subsurface Soil Absorption Systems

##### **12VAC5-610-450. General.**

Soil evaluation for a subsurface soil absorption system shall follow a systematic approach including consideration of physiographic province, topography, available area, degree of slope, and soil profile (thickness of each horizon, color, permeability, and texture). The evaluation is intended to document sufficient information to conclude whether or not the site can accommodate an onsite sewage treatment and dispersal system listed in Part IV (12VAC5-610-591 et seq.) of this chapter. The topography, available area, seasonal water table, drinking water supplies, bodies of water, shellfish growing areas, soil horizon, depth, rate of absorption, or combination of any of the above shall be considered in such evaluation. A percolation test may be required as a prerequisite to the issuance of a permit. When the district or local health department questions the estimated percolation rate, the district or local health department may require a percolation test. Percolation tests shall be analyzed as only one of many criteria in determining soil suitability for absorption of treated sewage.

##### **12VAC5-610-460. Site and structure identification.**

A site plan (sketch) showing dimensions of property, proposed and/or existing structure or structures, driveways, underground and overhead utilities on the property and adjacent sewage disposal systems, bodies of water, drainage ways, agricultural drain tile, wells, cisterns, and springs for a minimum of 200 feet radius of the center of the proposed building or drainfield is necessary in order to evaluate the suitability of a subsurface soil absorption system for that site. In addition, for new construction, the boundary of the lot and building site shall be staked. As a minimum, prior to issuance of the construction permit the perimeter of the soil absorption area site or sites shall be shown on a copy of a surveyed plat of the property. When a parcel of land consisting of a single lot is involved on which an onsite sewage disposal system is proposed to be located and is not directly influenced by the off site location of any sewage disposal system, well, body of water, etc., the requirement for the surveyed plat may be waived by the district or local health department.

**12VAC5-610-470. Physical features.**

A. Physical features including soil features, slope, depth of rock, the location of rock outcrops, drainage ways, marshes, swamps, sink holes, flood plains, artificial drainage systems, and various structures and topographic features found in Tables 4.1 through 4.4 shall be fully and accurately documented in writing as part of the site and soil evaluation.

B. Drainage way. A drainage way is a concave portion of the landscape in which surface water or rain water run-off gathers intermittently to flow to a lower elevation.

C. Fill material. Fill material means soil transported and deposited by man as well as soil recently transported and deposited by natural erosion forces. Recent natural soil transportation and deposit is evidenced by one or more of the following.

1. No or indistinct soil horizons;
2. Depositional stratification;
3. Presence of a buried organic layer; and
4. Position in the landscape.

D. Minimum depth to seasonal water table. As used herein, "seasonal water table" means that portion of the soil profile where a color change has occurred in the soil as a result of saturated soil conditions or where soil concretions have formed. Typical colors are gray mottlings, solid gray or black. The depth in the soil at which these conditions first occur is termed "seasonal water table."

E. Artificial drainage. Where soils are artificially drained, soil coloration may no longer be an accurate indicator of the position of the seasonal water table. Three types of artificial drainage systems which are generally considered are as follows:

1. A water table depressor system of buried conduits, i.e., agricultural drainage tile;
2. A lateral ground water movement interceptor is a buried conduit for the purpose of intercepting lateral ground water movement, i.e., a French drain; and
3. Open ditches with the bottom elevation of the ditch below the seasonal water table.

**12VAC5-610-480. Soil profiles and patterns.**

A. General. The purpose of determining the soil profiles and patterns is to identify the soil characteristics that affect installation of a subsurface soil absorption system.

B. Soil profile. A soil profile is a vertical section of the soil throughout all its horizons.

C. Profile holes.

1. Acceptable equipment.

a. Auger. An auger is defined as a mechanical device which is used to remove a soil sample for evaluation. Devices utilizing the Archimedes screw principle are prohibited because they blend and mask the true soil characteristics.

b. Other equipment. Other equipment may be used in addition to an auger to expose the soil profile as long as it does not mask or blend the true soil characteristics.

2. General location of profile holes. Profile holes to determine design requirements shall be located in the area that is unrestricted by the criteria contained in Part IV (12VAC5-610-591 et seq.) of this chapter and Table 4.2. Additional profile holes outside the unrestricted area may be required to make a complete evaluation of the site.

3. Depth of profile hole. The minimum depth of the profile hole shall be five feet unless prevented or made unnecessary by some physical feature of the soil such as gray coloration, rock or when a potential horizon is found at a lesser depth. Where a potential soil horizon is considered for use, the soil evaluation shall be extended below the potential horizon to assure that there is no interference with seasonal water table, rock or impervious strata (See Tables 4.3 and 4.4 of this chapter).

4. Number and location of profile holes. A minimum of five holes is necessary to determine the design requirements of an area for the placement of absorption trenches. Where there is uniform topography and the profile holes exhibit a uniform profile, a minimum of three holes is necessary. The size of the area investigated shall be based on the soil texture group encountered. As a minimum, holes shall be placed to be representative of the area under consideration for placement of the absorption trenches.

If more than one area is required in which to install the absorption trenches, each area shall be evaluated as described above. If any proposed absorption trench site is found unacceptable due to soil conditions, the site shall have been evaluated with a minimum of three holes which characterize the soil problem or problems and support the reasons for rejection. The actual area and number of holes to be investigated may be more than described above and shall be determined on a case-by-case basis.

5. In situations where a large area is to be evaluated, where the soil is highly variable, where the profile must be exposed below five feet or where the soil is "tight" (dense or compact) and/or rocky, the district or local health department may require that the owner have the soil profile in selected areas exposed by the digging of trenches, auger holes or pits. The actual area and number of holes to be investigated shall be determined on a case-by-case basis.

D. Soil profile documentation. Soil profiles shall be determined and a record made in writing of each boring. Additional documentation may be required by the district or local health department.

**12VAC5-610-490. Characteristics of soils that determine suitability.**

A. Color. Color is a key indication of the suitability of a soil.

1. Red and yellow mottlings may indicate slow internal drainage and may indicate a seasonal water table.

2. Gray and/or gray mottlings indicate seasonal water tables for at least three weeks duration.

3. Black appearance may be due to organic matter which has accumulated due to poor soil drainage.

B. Texture. The term texture refers to the relative proportion of various size groups of individual soil grains in a mass of soil. Specifically it refers to the proportion of sand, silt, and clay.

1. Soil Classification. For the purpose of this chapter soils have been categorized into four groups based on texture as follows:

a. Texture Group I—sand and loamy sand;

b. Texture Group II—sandy loam, loam, and sandy clay loam. Texture Group II soils are subdivided into Texture Group IIa and IIb soils. Texture Group IIa soils consist of sandy loam soils with percolation rates less than 31 minutes per inch and no structure development. The remainder of soils within this texture group are Texture Group IIb soils;

c. Texture Group III—silt loam, clay loam, silty clay loam; and

d. Texture Group IV—sand clay, silty clay and clay.

2. The soil texture shall be estimated by field testing. The field test that shall be applied is contained in APPENDIX F and is entitled "Field Guide to Soil Texture Classes." Laboratory estimation of texture by sieve and sedimentation analysis may be substituted for the field test at the owner's request and expense. Samples shall be collected by the laboratory under supervision of the district or local health department.

C. Permeability. The term permeability pertains to the characteristics of the soil that enable water or air to move through its pores. The permeability of a soil profile may be limited by the presence of one nearly impermeable horizon, even though the others are permeable.

1. Estimated rates. The soil classifications contained in subdivision B 1 of this section have been assigned the following estimated rates in minutes per inch for the purpose of design. These rates may be modified when experience has shown that because of soil structure the texture group has a demonstrated rate different from that assigned.

- a. Texture Group I—up to 16;
- b. Texture Group IIa—17 to 30;
- c. Texture Group IIb—31 to 45;
- d. Texture Group III—46 to 90; and
- e. Texture Group IV—equal to or greater than 91.

2. Percolation tests. When the estimated percolation rates are in question, percolation tests may be performed, however, the district or local health department may require percolation tests to determine "measured" percolation rates.

- a. Requirements. Percolation tests are to be performed under the supervision of the district or local health department. Test holes shall be located at points and depths selected and/or approved by the district or local health department. A minimum of three holes representative of the absorption area are required. When the results of the individual test holes have a spread of more than 30 minutes/inch, five holes with at least one hole in the center of the proposed absorption area are required. Records of all percolation tests performed shall be attached to the application (See APPENDIX G).
- b. Procedure. All percolation tests shall be performed in accordance with the procedure contained in APPENDIX G.
- c. Records. Data on swelling, saturation and measurement of the percolation rate shall be recorded on forms by the district or local health department; examples of these forms are contained in APPENDIX G.
- d. Interpretation of percolation test results. The absorption area shall be based on the average percolation rate measured in the test holes. The average percolation rate shall be computed by determining the percolation rate (minutes/inch) for each hole and averaging those values. When the percolation rate for an individual hole is in excess of 240 minutes/inch, the area represented may be retested one time and the most favorable rate used to calculate the percolation rate.

D. Soil restrictions. A soil restriction is a feature in the soil that impedes the percolation of water. Restrictions generally consist of a layer of soil horizon within a soil that is firmly compacted or is very rich in clay. Soils containing restrictions may require verification of the percolation rate by percolation tests. Examples of restrictions are listed below.

1. Pans. The term pans include hard pans, fragipans, clay pans, plowpans, traffic pans, iron pans, and plinthic horizons.

2. Stoniness. The term stoniness pertains to the relative proportions of stones present in a soil. Stoniness reduces the soil volume for absorption, and therefore, may require a larger subsurface soil absorption field than would be indicated by soil texture.

E. Soil concretions. Soil concretions as hard grains, pellets, or nodules from concentrations of compounds in the soil that cement the soil grains together. Concretions are indicative of slow percolation rates, restrictions, and/or seasonal water tables.

F. Shrink-swell soils. Shrink-swell soils may exhibit satisfactory percolation rates when dry and therefore must be thoroughly wetted before a percolation test is performed.

**12VAC5-610-500. Availability of suitable soils.**

Sufficient suitable soils shall be available to install the subsurface soil absorption system and reserve area. Design criteria for subsurface soil absorption systems are contained in Article 5 (12VAC5-610-900 et seq.) of Part V of this chapter and reserve area requirements are contained in 12VAC5-610-710.

**12VAC5-610-510 to 12VAC5-610-550. [Repealed]**

## Article 2

### Sewage Handling and Septage Management

#### **12VAC5-610-560. Sewage handling; general.**

A. In accordance with 12VAC5-610-240 B, a sewage handler shall have a written sewage handling permit issued by the commissioner.

B. It is the obligation of every sewage handler to assure that the sewage, sludge or septage handled are transported and disposed of in a safe and sanitary manner in conformance with this chapter. Treatment and management of sewage and sewage sludge are regulated by the Sewage Regulations (12VAC5-580-10 et seq.).

C. All sewage handling equipment in contact with sewage shall be washed in such a manner and location that the wastewater from washing it is conveyed to an approved sewerage system or treatment works.

D. Disposal of sewage sludges or septage into bodies of water or streams is prohibited.

#### **12VAC5-610-570. [Repealed]**

#### **12VAC5-610-580. Septage management; general.**

Ultimate management of septage generally falls into one of two categories, landfilling or land spreading. Landfilling requires that the septage be stabilized and dewatered to increase solids content nearly fivefold to avoid leaching problems. Land spreading of both stabilized and unstabilized septage is permissible under controlled conditions for agricultural purposes. The preferred methods for septage disposal are disposal in an approved sewage treatment plant or stabilization and subsequent disposal by land application or landfilling in accordance with the Biosolids Use Regulations (12VAC5-585-10 et seq.).

#### **12VAC5-610-590. Acceptable disposal sites.**

A. Sewerage system or treatment works. Any sewerage system or treatment works for which a certificate to operate has been issued jointly by the department and State Water Control Board or a system which has been issued a separate permit by the commissioner is considered an approved disposal site for vehicular transported sewage sludge or septage provided permission is obtained from the owner of the sewerage system or treatment works and the department and the State Water Control Board, as applicable, determine that the disposal of the sewage sludge or septage will not overload the facility.

B. Special facility. A special facility is a treatment works especially designed and constructed for the stabilization or disposal of septage including land as well as physical works. All special

facilities are Type III sewage disposal systems (see 12VAC5-610-250 C). Industrial waste sludges and sludges containing chemical concentrations in violation of state hazardous waste regulations and applicable federal regulations shall not be placed in a special facility.

Exception: Special facilities related to lime stabilization or direct injection may not require formal plans and specifications to be submitted.

C. Processes which may be utilized in special facilities designed for stabilization of septage.

1. The following processes are described with associated criteria in the Commonwealth of Virginia Sewerage Regulations, State Department of Health, State Water Control Board, February 1977 (Sewerage Regulations, 12VAC5-580-10 et seq.):

- a. Aerobic digestion;
- b. Anaerobic digestion;
- c. Chemical oxidation; and
- d. Incineration.

2. The following processes are described in Article 9 of this chapter:

- a. Anaerobic lagooning; and
- b. Lime stabilization.

3. Other processes may be considered on a case-by-case basis if supported by operating and test data satisfactory to the department.

D. Land as a special facility for ultimate disposal of septage.

1. Landfilling. Prior to landfilling, septage must be stabilized and dewatered. All landfilling operations utilizing septage must be in conformance with the regulations of the Commonwealth of Virginia Department of Waste Management governing disposal of solid waste.

2. Land spreading. For the purpose of this chapter land spreading is the controlled uniform application of either dewatered or undewatered septage to the land surface for ultimate disposal. Land spreading shall be accomplished in such a manner so as not to adversely affect future agricultural use of the land. All land spreading operations must take into consideration such factors as application rates, potential runoff of contaminants from the septage applied to soils, groundwater contamination, proximity to residences and people and other public health considerations. All land spreading operations require site specific management criteria and approval.

a. Stabilized septage may be disposed of by land spreading in accordance with the provisions of applicable portions of 12VAC5-580-720 of the Sewerage Regulations and any applicable federal regulations, except where stated in this chapter.

b. Unstabilized septage may be disposed of by land spreading in accordance with the provisions of subsection E, the Code of Virginia and any applicable federal regulations.

E. Land spreading of unstabilized septage. General. Land spreading of unstabilized septage via shallow injection plowing is permissible (see 12VAC5-610-560 D). Injection plowing is a technique which employs a device which injects septage into a cavity created below the ground surface with positive closure of the injection swath. Injection plowing shall be accomplished with a narrow shank injector at a depth between 6 and 12 inches. The injection device and any associated prime mover shall be equipped with high flotation tires so as not to damage the physical characteristics of the soil in relation to agricultural practices. All land spreading operations for unstabilized septage shall provide for:

1. Storage during periods when weather, soil conditions or cropping conditions do not allow for injection;

2. Sampling and monitoring of the septage before land spreading for quality control as may be requested;

3. Record keeping and reporting for quality control;

4. Controlled access to the public for 12 months;

5. No grazing for at least one month following the date of each injection by farm animals whose products are consumed by humans;

6. Compliance with applicable portions of 12VAC5-580-720 of the Sewerage Regulations except where stated in this chapter; and

7. Limiting the application rate so as not to exceed ½ acre-inches (13,600 gal./acre) at one time due to the low solids content and excessive hydraulic loading by septage.

F. Special facility operation.

1. Records and reports shall be kept in a manner satisfactory to the department. As a minimum, the records shall reflect the quantity of septage (gallons) discharged into the special facility daily, the quantity (gallons) removed daily for land application, the land application site, and for anaerobic lagoons, the date the last load was discharged into the anaerobic lagoon. Reports shall be submitted to the department on a quarterly basis (See APPENDIX H).

2. Sampling and analyses requirements for special facilities are as follows:

a. Anaerobic lagoon. In accordance with the provisions of 12VAC5-580-720 of the Sewerage Regulations.

b. Lime stabilization of domestic septage. The origin and the pH of each load must be determined and recorded by the hauler prior to land application. However, periodic sampling and analyses may be required by the department on a case-by-case basis (See paragraph F 1 of this section).

c. Shallow injection of unstabilized septage. Generally no sampling and analyses will be required by the department. The origin of each load must be determined and recorded by the hauler prior to injection. However, periodic sampling and analyses may be required by the department on a case by case basis.

3. An operations and maintenance manual shall be prepared for the septage stabilization facility and shall contain, as a minimum the following information:

a. Site security methods to prevent unauthorized entry.

b. Procedures to maintain the appropriate records.

c. Site management procedures including all-weather access road and ground maintenance.

d. Methods and equipment utilized for placing septage into and removing septage from, the lagoon facility, mixing facility or storage facility as applicable.

e. Plan for land application of septage and/or other disposal methods.

f. Methods for odor control which may include both physical methods such as lagoon depth control and the use of appropriate chemicals.

g. Methods and procedures for monitoring characteristics of the septage and groundwater quality.

4. The site and physical works shall be maintained in a condition free from tall grass and weed overgrowth and rodent harborage.

5. When an anaerobic lagoon is utilized for stabilization its contents shall not be removed for land application until a time period of at least 90 days has elapsed from the time the last load of septage has been discharged into the lagoon.

G. Special facility abandonment. In the event a septage stabilization facility ceases to operate, it shall be the responsibility of the owner to abandon the facility properly. The following steps are required.

1. The owner shall notify the department at least 30 days in advance that the facility is to be abandoned;

2. The contents of the facility shall be disposed of in an approved manner under the supervision of the department; and

3. The structure shall be dismantled and the site returned approximately to its natural contours.

## Part IV

### General Criteria for the Selection of a Wastewater Treatment and Disposal System Based on Site Conditions

#### Article 1

#### Site Limitations

##### **12VAC5-610-591. Overview.**

The intent of this part is to provide guidance on how to match various treatment and dispersal systems to site-specific conditions in order to construct a safe, proper, and adequate sewage system for the site under consideration. Article 1 (12VAC5-610-591 et seq.) identifies site conditions which limit or prohibit the use of onsite systems. Article 2 (12VAC5-610-594 et seq.) establishes criteria for the use of systems that rely on naturally occurring undisturbed soils to treat and disperse effluent, with or without pretreatment. Article 3 (12VAC5-610-597 et seq.) establishes criteria for the use of systems which rely on fill soils to accomplish treatment prior to dispersal.

##### **12VAC5-610-592. Setback distances.**

A. Septic tanks, other tanks, and header line setback distances. The minimum separation distances between septic tanks, pump chambers, aerobic pretreatment devices (including sand filters, biofilters, and aerobic treatment units), header lines, and similar devices as determined by the department, and various structures and topographic features are contained in Table 4.1 entitled Minimum Separation Distances for Pretreatment Units, Conveyance Lines, and Header Lines.

B. Manifolds. Manifolds 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 manifold come within 10 feet of a drinking water source.

C. Absorption area. The absorption area is the soil medium beginning at the interface between the soil and the gravel, sand, or other point of effluent application, which is utilized for dispersal of the effluent. The absorption area includes the infiltrative surface in the absorption trench, or the point of effluent application, and the soil between and around the effluent distribution system. Setback distance to various structures and topographic features and an absorption area are contained in Table 4.2.

### **12VAC5-610-593. Physical features.**

Physical features, landscape position and soil characteristics affect the ability of soil-based systems to treat and disperse effluent. In order to correctly select and place a sewage system in the environment such that public health and the environment are protected, it is necessary to understand and consider the local hydrologic conditions, the regional geology, and the nature of the soils occurring on the site being evaluated. At a minimum, the following features shall be considered:

1. Marshes and swamps. Placement of subsurface soil absorption systems on or in swamps and marshes is prohibited.

2. Seasonal water table. A vertical separation distance between the point of effluent application and a seasonal water table shall be maintained which reflects the quality of the effluent and the receiving environment. Minimum vertical separation distances may be found in Articles 2 (12VAC5-610-594 et seq.) and 3 (12VAC5-610-597 et seq.) of this part and Tables 4.3 and 4.4.

3. Slope. Subsurface soil absorption trench systems shall not be placed on slopes greater than 50% unless terraced. Criteria for other types of onsite systems are contained in Tables 4.3 and 4.4.

4. Drainage ways. Subsurface soil absorption systems shall not be placed at a position in a drainage way subject to intermittent flooding.

5. Fill material. Placement of subsurface soil absorption systems in fill materials is generally prohibited except in three specific situations. The Wisconsin Mound system is considered a fill system as is the sand-on-sand system. These systems are governed by criteria found in 12VAC5-610-960, 12VAC5-610-965, and Table 4.4. Fill material consisting of colluvial soil derived from sandstone (noncarbonaceous) in the mountainous area may be considered on a case-by-case basis for placement of subsurface soil absorption systems.

6. Sink holes. Placement of a subsurface soil absorption system at the low point of a sink hole is prohibited. For set back distance see Table 4.2.

7. Flood plains. Subsurface soil absorption systems shall not be placed in flood plains subject to annual or more frequent sustained (24 hours) flooding.

8. Alluvial and colluvial deposits. Placement of subsurface soil absorption areas in alluvial and colluvial deposits with shallow depths, extended periods of saturation, or possible flooding is prohibited.

9. Shrink-swell soils. When soils containing horizons with shrink-swell characteristics (see definitions in 12VAC5-610-120) have been identified, they shall be rejected for use for subsurface soil absorption systems.

10. Soil restrictions. Soil restrictions in themselves may form the basis for outright rejection of the site.

11. Free standing water. The presence of free standing water in a profile hole may be grounds for rejection of the site.

## Article 2

### Systems Using Naturally Occurring Undisturbed Soil

#### **12VAC5-610-594. In-ground systems.**

A. An in-ground system is a system which utilizes a natural, undisturbed soil horizon to treat and disperse effluent where the infiltrative surface is placed 18 inches or more beneath the original surface of the ground. In-ground systems include, but are not limited to, conventional septic tank drainfield systems, chamber systems, alternative aggregate systems, enhanced flow systems, and pressure dosed systems.

B. Septic tank effluent. Septic tank effluent may be utilized in an in-ground system when all of the site and soil criteria of this subsection are met. Also see Table 4.3.

1. Horizon. The soil horizon(s) for the 18 inches immediately below the installation depth shall not show the presence of any limiting factor. Limiting factors include bedrock, seasonal or permanent water table, pans, or other impervious strata.

2. Separation distances. Table 4.2 contains the minimum setback distances between an absorption field and various structures or topographic features.

3. Estimated or measured infiltration rates. The estimated or measured infiltration rate shall not exceed 120 minutes per inch within any part of the sidewall area of the trench or within 18 inches of the infiltrative interface where effluent encounters undisturbed soil.

C. Soil criteria when utilizing secondary effluent. Secondary effluent may be utilized in an in-ground system when all of the criteria of this subsection are met. Also see Table 4.3.

1. Horizon. The soil horizon(s) for the 12 inches immediately below the installation depth shall not show the presence of any limiting factor. Limiting factors include bedrock, seasonal or permanent water table, pans or other impervious strata.

2. Separation distances. Table 4.2 contains the minimum setback distances between an absorption field and various structures or topographic features.

3. Estimated or measured infiltration rates. The estimated or measured infiltration rate shall not exceed 120 minutes per inch within the sidewall area of the trench, if any, or within 12 inches of the infiltrative interface where effluent encounters undisturbed soil.

#### **12VAC5-610-596. Shallow-placed systems.**

A. Shallow-placed systems are systems which utilize a natural, undisturbed soil horizon to treat and disperse effluent where the infiltrative surface is placed at a depth of less than 18 inches from the original soil surface. Also see Table 4.3. Shallow-placed systems may use the

system designs similar to in-ground systems; however, when shallow-placed systems are installed at less than 12 inches from the ground surface, timed dosing shall be used to disperse the effluent.

B. Septic effluent prohibited. Septic tank effluent is prohibited for use in shallow-placed systems because of the increased likelihood for human and vector contact with effluent.

C. Soil criteria when utilizing secondary effluent. Secondary or better effluent may be utilized in an shallow-placed system when all of the criteria in this subsection are met. Also see Table 4.3.

1. Soil texture. In order to assure effluent dispersal under adverse conditions while maintaining adequate treatment capacity, shallow-placed systems installed shallower than 12 inches, which utilize absorption trenches, are limited to Texture Group I and II soils. Any soil texture group may be utilized for absorption trench systems installed between 12 and 18 inches.

2. Limiting features. A minimum of 12 inches of soil is required beneath the trench bottom or infiltrative surface before encountering soils with a seasonal or permanent water table. Additionally, to assure adequate hydraulic dispersal capacity, bedrock and impervious strata may not occur within 18 inches of the trench bottom.

3. Separation distances. Table 4.2 contains the minimum setback distances between an absorption field and various structures or topographic features.

## Article 3

### Systems Using Fill Material

#### **12VAC5-610-597. Fill systems.**

A. Fill systems are systems where the infiltrative surface and some portion of the treatment medium is comprised of fill material and not a naturally occurring undisturbed soil. Fill systems may be located in-ground, shallow-placed, or above ground. Fill systems addressed in these regulations are the Wisconsin Mound system, the noncarbonaceous mountain colluvium system, and the sand-on-sand system.

B. Elevated Sand Mounds. Septic tank effluent may be utilized with elevated sand mounds. Pretreatment shall be required when effluent strength exceeds residential strength wastewater and may be required where hydrologic conditions meet the minimum criteria contained in this chapter. For the purpose of siting an elevated sand mound, the criteria in Table 4.4 shall apply. For the purposes of establishing minimum setback distances between an elevated sand mound and various structures or topographic features, the mound shall be considered an absorption field and distances shown in Table 4.2 utilized.

C. Sand-on-sand systems. Sand-on-sand is a process of modifying a soil absorption system site using fill material which is similar in texture to the original, naturally occurring material. Filling is accomplished in accordance with 12VAC5-610-965.

1. Criteria for utilizing septic effluent. Septic tank effluent may be utilized with sand-on-sand systems. For the purpose of siting a sand-on-sand system, the criteria in Table 4.4 shall apply. Sand-on-sand systems may be utilized with septic tank effluent when the following criteria are met:

- a. Soil texture. In order to assure effluent dispersal under adverse conditions, while maintaining adequate treatment capacity, shallow-placed systems are limited to Texture Group I and IIa soils. The use of Texture Group IIb, III and IV soils for sand-on-sand systems is prohibited.
- b. Soil structure. Sand-on-sand is restricted to soils classified as entisols (i.e., a young soil with no horizon development) and which have a texture of sand, loamy sand, coarse sandy loam, or sandy loam texture.
- c. Depth of soil. A minimum of 18 inches of naturally occurring undisturbed soil, measured from the ground surface, is required before encountering soils with bedrock, or a seasonal or permanent water table. Additionally, to assure adequate

hydraulic dispersal capacity, no restrictive horizons may occur within 30 inches of the ground surface.

d. Separation distances. Table 4.2 contains the minimum setback distances between an absorption field and various structures or topographic features.

e. Estimated or measured infiltration rates. When siting a sand-on-sand system, the estimated or measured infiltration rate shall not exceed 30 minutes per inch within the sidewall area of the trench or within 18 inches of the infiltrative interface where effluent encounters undisturbed soil.

f. Slope. Sand-on-sand is prohibited where the slope of the original site exceeds 5%.

## 2. Criteria for utilizing secondary effluent.

a. Depth of soil. A minimum of 12 inches of soil, measured from the ground surface, is required before encountering bedrock, or a seasonal or permanent water table. Additionally, to assure adequate hydraulic dispersal capacity, no restrictive horizons may occur within 24 inches of the ground surface.

b. Separation distances. Table 4.2 contains the minimum setback distances between an absorption field and various structures or topographic features.

c. Estimated or measured infiltration rates. The estimated or measured infiltration rate shall not exceed 30 minutes per inch within the sidewall area of the trench, if any, or within 18 inches of the infiltrative interface where effluent encounters undisturbed soil.

D. Fill systems in mountain colluvium. The criteria for conventional, in-ground trench systems contained in Table 4.3 shall be complied with to the greatest extent possible. However, fill material consisting of colluvial soil derived from sandstone (noncarbonaceous) in the mountainous area may be considered on a case-by-case basis for placement of subsurface soil absorption systems.

Table 4.1.

Minimum Separation Distances for Pretreatment Units, Conveyance Lines, and Header Lines.

Structure or Topographic Features	Minimum Horizontal Distance
Property Lines	5
Building Foundations	10
Basements	20
Drinking Water Wells (all classes)	50
Cisterns Bottom Elevation Lower than Ground Surface in Area of Pretreatment Unit)	100
Shellfish Waters	70
Natural Lakes & Impounded Waters and Streams	50
Developed Springs (when the spring is down slope)	100
Drainage Ditches:	
Ditch Bottoms above Seasonal Water Table	10
Ditch Bottom below Seasonal Water Table and Ditch Normally Contains Water	50
Lateral Ground Water Movement Interceptor	50
Low Point of Sink Holes When Placed within the Bowl of the Sink Hole	100
Utility Lines	10

Table 4.2.  
Minimum Separation Distances.

Structure or Topographic Features	Soil Texture Group	Minimum Distance (Ft) from Bottom or Sidewall of Subsurface Soil Absorption System Trench	
		Vertical	Horizontal
Property Lines	I, II, III, IV	--	5
Building Foundations	I, II, III, IV	--	10
Basements	I, II, III, IV	--	20
Drinking Water Wells			
Class IIIA or IIIB	I, II, III, IV	--	50
Class IIIC or IV	I, II, III, IV	--	100
Cisterns (Bottom Elevation Lower than Ground Surface in Area of Subsurface Soil Absorption System)	I, II, III, IV	--	100
Shellfish Waters	I, II, III, IV	--	70
Natural Lakes & Impounded Waters	I, II, III, IV	--	50
Streams	I, II, III, IV	--	50 <sup>a</sup>
Developed Springs (when the spring is down slope)	I, II, III, IV	--	200 <sup>e</sup>
Rock and Rock Outcropping	I	2	2
Rock and Rock Outcropping	II, III, IV	1.5	1.5
Pans and Impervious Strata	I, II, III, IV	1.5	1.5
Drainage Ditches:			
Ditch Bottoms above Seasonal Water Table	I, II, III, IV	--	10
Ditch Bottom below Seasonal Water Table and Ditch Normally Contains Water	I	--	70 <sup>a</sup>
	II	--	70 <sup>a</sup>
	III	--	50 <sup>a</sup>
	IV	--	50 <sup>a</sup>

Water Table Depressor System	I	6 <sup>b</sup>	70
	II	3 <sup>b</sup>	70
	III	2 <sup>b</sup>	50
	IV	2	50
Lateral Ground Water	I	--	70 <sup>c</sup> 10 <sup>d</sup>
Movement Interceptor	II	--	70 <sup>c</sup> 10 <sup>d</sup>
	III	--	50 <sup>c</sup> 10 <sup>d</sup>
	IV	--	50 <sup>c</sup> 10 <sup>d</sup>
Low Point of Sink Holes When Placed within the Bowl of the Sink Hole	I, II, III, IV	--	100
Utility Lines	I, II, III, IV	--	10

<sup>a</sup>The set back distance may be reduced to 10 feet in Group III and IV soils and 20 feet in Group I and II soils if the subsurface soil absorption system is designed to produce unsaturated flow condition in the soil.

<sup>b</sup>Vertical Distance to the invert of the drain tile in the water table depressor system.

<sup>c</sup>Absorption trench up slope from interceptor.

<sup>d</sup>Absorption trench down slope from interceptor.

<sup>e</sup>Arc of 180 degree up slope of spring and 100 ft. down slope.

Table 4.3.

Summary of Separation Distances between Systems Using Naturally Occurring Undisturbed Soils and Limiting Site Factors.

Site Factor	In-Ground System <sup>1</sup>		Shallow-Placed System <sup>1</sup>	
	Septic Tank Effluent	Secondary Effluent	Septic Tank Effluent	Secondary Effluent
Bed Rock	18"	12"	n/a	18"
Restriction	18"	12"	n/a	18"
Shrink-Swell Soil	18"	12"	n/a	18"
Slope	50%	50%	n/a	50%
Perc Rate	5-120 mpi	5-120 mpi	n/a	5-45 mpi
Water Table	18"	12"	n/a	12"

<sup>1</sup>The separation distances for in-ground and shallow-placed systems are measured from the trench bottom or other infiltrative interface vertically down to listed site factor.

Table 4.4.

Summary of Separation Distances between Fill Systems and Limiting Site Factors.

Site Factor	Elevated Sand Mound		Sand-on-Sand System <sup>2</sup>		Noncarbonaceous Mountain Colluvium	
	Septic Tank Effluent	Secondary Effluent	Septic Tank Effluent	Secondary Effluent	Septic Tank Effluent	Secondary Effluent
Bed Rock	24" <sup>1</sup>	24" <sup>1</sup>	60"	60"	18"	12"
Restriction	24"	12"	30"	24"	18"	12"
Shrink-Swell Soil	24"	12"	40"	30"	18"	12"
Slope 25%	25%	25%	5%	5%	50%	50%
Perc Rate	5-120 mpi	5-120 mpi	5-30 mpi	5-30 mpi	5-120 mpi	5-120 mpi
Water Table	24"	10"	18"	12"	18"	12"

<sup>1</sup>24 inches refers to creviced bedrock. This distance may be reduced to 12 inches when noncreviced bedrock is encountered. See the Wisconsin Mound Soil Absorption System Siting, Design, and Construction Manual, January 1990.

<sup>2</sup>The separation distance for sand-on-sand systems is measured from the ground surface vertically down to the listed site factor.

## Article 4

### Pump and Haul of Sewage

#### **12VAC5-610-598. General.**

Pump and haul pertains to an unusual circumstance wherein sewage is permitted to be transported by vehicle to a point of disposal. 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.

#### **12VAC5-610-599. Permanent pumping and hauling.**

Pumping and hauling on a permanent basis is prohibited unless done under the auspices and supervision of a government entity as provided for in 12VAC5-610-599.3 (see subdivision 2 of 12VAC5-610-410 for exception). Pumping and hauling for over one year shall be considered as a permanent pumping and hauling operation.

#### **12VAC5-610-599.1. Emergency pumping and hauling.**

When serious malfunctioning of an existing sewage disposal system, sewerage system or treatment works occurs, pumping and hauling may be authorized for a definite time period until the malfunctioning system can be reconstructed or repaired.

#### **12VAC5-610-599.2. Temporary pumping and hauling.**

Temporary pumping and hauling may be permitted under the following conditions:

1. It must be demonstrated that the temporary pumping and hauling of sewage is not the usual practice in order to permit premature and unplanned real estate or commercial development in an area where sewerage facilities do not exist;
2. Construction of an approved sewerage system or treatment works is actively in progress with personnel and machinery at work in the particular area. Bonding, cash escrow or other assurances shall be required to guarantee completion of the sewerage system and/or treatment works;
3. The completion of the sewerage system or treatment works is assured and a completion date within the definition of temporary pumping and hauling has been set; and
4. Any and all delays from the anticipated completion date shall be reported immediately by the holder of the pump and haul permit to the district or local health department. Delays not resulting from circumstances beyond the control of the holder of the pump and haul permit shall be grounds for revocation of the pump and haul permit.

### **12VAC5-610-599.3. Permanent pump and haul.**

Permanent pumping and hauling of sewage may be permitted under the following conditions:

1. That the government entity enter into a contract with the department setting forth that the government entity will provide pump and haul services, either directly or through a private contractor holding a sewage handling permit, to the home(s), commercial establishment(s) or occupied structure(s) for the period the occupied structure is utilized or until connection can be made to an approved sewerage facility;

2. Upon completion of the contract between the department and the government entity, the commissioner shall issue a single pump and haul permit to the government entity. A separate construction permit shall be issued to the government entity for each sewage storage facility. The sewage storage facility(s) shall be designed and constructed in accordance with Article 7 (12VAC5-610-990 et seq.) of Part V of this chapter; and

3. When the government entity provides the sewage pump and haul services, it shall conform to the conditions contained in 12VAC5-610-380 and Article 8 (12VAC5-610-1020 et seq.) of Part V of this chapter.

## Article 5

### Installation of Residential Sewage Disposal Systems in Political Subdivisions Having Soil Drainage Management Contracts with the State Health Department

#### **12VAC5-610-600. General.**

It is the policy of the department to grant sewage disposal system permits for private residential systems utilizing subsurface soil absorption whenever such permits can be granted without endangering public health. Many soils are limited in their ability to accept sewage by high seasonal water tables. Some soils can accept sewage when an adequate local plan for soil drainage exists. When a political subdivision enters into a Soil Drainage Management Contract with the department and subsequently develops Soil Drainage Management Plan(s) in an area in which soils respond to artificial drainage and the plan is acceptable to the department, the department will consider the approval of subsurface soil absorption systems in soils that were previously unacceptable because of high seasonal water tables.

#### **12VAC5-610-610. Definitions.**

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

"Soil Drainage Management Contract (SDMC)" means a contract between the department and the political subdivision for the development, operation, maintenance, and enforcement of all soil drainage management plans within the political subdivision.

"Soil Drainage Management Plan (SDMP)" means a plan approved by the commissioner, pursuant to 12VAC5-610-630 below, meeting the criteria set forth in 12VAC5-610-640 below.

#### **12VAC5-610-620. Applicability.**

This article shall be applicable only in those political subdivisions which enter into Soil Drainage Management Contracts with the department.

#### **12VAC5-610-630. Procedures for entry into or withdrawal from a Soil Drainage Management Contract (SDMC).**

##### A. Entry.

1. Any political subdivision in the Commonwealth may at any time apply to the department through the district or local health department for entry into an SDMC with the department. The application shall contain the following minimum elements:

- a. A proposed contract between the department and the political subdivision; and

b. Drafts of all ordinances, required easements, or other legal documents which the political subdivision proposes to adopt as a portion of the SDMC including a local ordinance requiring the holder of a sewage disposal construction permit issued in conjunction with the SDMC to have the permit recorded in the land records of the circuit court having jurisdiction.

2. The department shall, within 60 days of the submission of an application for entry into an SDMC, evaluate the application and propose to the political subdivision any suggestions for modification to the SDMC.

3. The political subdivision may review the department's suggested modifications and resubmit a revised application within such time as the political subdivision elects.

4. The department shall accept or reject entry into an SDMC within 90 days of receipt of the final application from a political subdivision.

5. Upon rejection by the department of a final application for entry into an SDMC, the political subdivision may appeal the department's decision to the appropriate circuit court. The Virginia Administrative Process Act, § 9-6.14:1, et seq., shall apply to such an appeal.

**B. Withdrawal.**

1. If the department determines that a political subdivision is failing to abide by the terms set forth in its SDMC with the department, the department may withdraw from the contract.

2. The department shall, within 60 calendar days of its proposed withdrawal from an SDMC notify the political subdivision of the department's intent.

3. The political subdivision may apply to the department for a hearing upon the proposed withdrawal. Such hearing shall be held in accordance with the provisions governing case decisions contained within the Virginia Administrative Process Act.

4. Within 30 calendar days after such hearing, the department shall notify the political subdivision whether the department will withdraw from the SDMC.

5. A decision by the department to withdraw from an SDMC may be appealed to the appropriate circuit court pursuant to the provisions of the Virginia Administrative Process Act.

6. If withdrawal occurs, continued maintenance of all SDMP's shall be the responsibility of the political subdivision in areas where permits were issued in accordance with this chapter.

**12VAC5-610-640. Minimum standards for Soil Drainage Management Plans.**

A. Every SDMP offered in conjunction with a SDMC shall meet the following minimum standards for surface and groundwater management.

B. The SDMP shall provide for:

1. Positive surface grading in the area of a dwelling and subsurface soil absorption area at a minimum of 0.5%;
2. Drainage ditches for diverting surface water and for lowering the seasonal groundwater table which shall:
  - a. Completely surround the subsurface soil absorption system;
  - b. Have a minimum grade of 0.2%;
  - c. Be located 70 feet,  $\pm$ 10 feet from the drainfield; and
  - d. Have the invert of the ditch placed in a Group I, II or III soil at an elevation so that the normal water surface in the ditch is at least six inches below the invert of the trench of the subsurface soil absorption system;
3. A French drain on one side in lieu of an open drainage ditch on one of the four sides;
4. Diversion ditches or swales shall be:
  - a. Required where adjacent property is equal to or higher in elevation than the proposed site and the adjacent property may be expected to discharge water onto the proposed site;
  - b. Designed to meet such site specific individual requirements as the department determines to be necessary;
5. A receiving stormwater and groundwater drainage system which is adequate in capacity so that waters from a proposed site shall be conveyed to it in accordance with the political subdivision's criteria;
6. Diversion ditches, where required, or other ditches to transport stormwater and/or groundwater from a site to a receiving body in accordance with the political subdivision's criteria;
7. Ditches to remain open and not be piped and covered unless approved by appropriate local government official, such approval to be granted only with the concurrence of the department;
8. Only appurtenances to the subsurface soil absorption system shall be constructed within the confines of the perimeter ditches required in paragraph B 2 a, above, except where a French drain is provided on one side; and
9. Lots which shall be a minimum of three acres in size not including swamps or marshland.

**12VAC5-610-650. Department procedures relating to subsurface soil absorption system applications in SDMC counties and cities.**

A. All applications for subsurface soil absorption systems will be evaluated based on the criteria contained in this part. When the site is limited only by a high seasonal water table and/or surface runoff, the department shall require that a satisfactory SDMP be in place and functioning satisfactorily before issuance of a construction permit. Typed on the construction permit will be the following statement which shall be signed by the applicant:

I understand that this soil has severe limitations for the disposal of septic effluent. With the aforementioned drainage measures the health department expects reasonable serviceability, however, it may malfunction during extreme conditions.

I understand and acknowledge the above and agree to install and maintain the drainage measures.

Signed

Date

B. Soils to be considered shall demonstrate their ability to be artificially drained and shall fall generally into Texture Group I, II, or III.

C. The SDMP and site specific drainage system or systems shall be certified, supervised, maintained, and prepared by or under the direct supervision of a professional engineer licensed in Virginia who is a full-time employee of the political subdivision. In addition, the political subdivision shall have the manpower or other capability to maintain the applicable conditions of the SDMP. This certification shall become a part of the subsurface soil absorption system permit.

D. Proper easements shall be provided for drainage to assure access for proper maintenance.

E. Political subdivisions shall assure proper installation and maintenance of the stormwater and ground water drainage system or systems.

F. The department retains the right to reject any SDMP if in the opinion of the department the SDMP proposed will result in a nuisance or health hazard condition.

Part V  
Design and Construction Criteria  
Article 1  
General Requirements

**12VAC5-610-660. General.**

The criteria contained in this section shall apply to all onsite sewage disposal systems. Deviations from these criteria may be considered by the district or local health department on a case-by-case basis.

**12VAC5-610-670. Sewage flows.**

Subsurface soil absorption systems shall be designed on the basis of the sewage flows tabulated in Table 5.1.

Table 5.1.  
Sewage Flows.

Discharge Facility	Design Unit	Flow (gpd)	BOD (#/day)	S.S. (#/day)	Flow Duration (Hour)
Dwelling <sup>1</sup>	per person total	75	0.2	0.2	24
Food preparation		15			
Toilet facilities		20			
Bathing facilities		20			
Handwashing facilities		5			
Laundering		15			
Schools with shower and cafeteria	per person	16	0.04	0.04	8
Schools without showers and with or without cafeteria	per person	10	0.025	0.025	8
Boarding schools	per person	75	0.2	0.2	16
Motels at 65 gals/ person (rooms only)	per person	130	0.26	0.26	24
Trailer courts	per person	75	0.2	0.2	24
Restaurants	per seat	50	0.2	0.2	16
Interstate or through highway restaurants	per seat	100-180	0.7	0.7	16
Interstate rest areas	per person	5	0.01	0.01	24
Service stations	per vehicle served	10	0.01	0.01	16

Factories & office buildings	per person per 8-hr shift	15-35	0.03-0.07	0.03-0.07	operating period
Shopping centers	per 1,000 ft. of ultimate floor space	200-300	0.1	0.1	12
Hospitals	per bed	300	0.6	0.6	24
Nursing homes	per bed	200	0.3	0.3	24
Homes for the aged	per bed	100	0.2	0.2	24
Doctor's office in medical center	per 1,000 sq. ft.	500	0.1	0.1	12
Laundromats, 9 to 12# machines	per machine	500	0.3	0.03	16
Community colleges	per student and faculty	15	0.03	0.03	12
Swimming pools	per swimmer	10	0.001	0.001	12
Theaters, drive-in type	per car	5	0.01	0.01	4
Theaters, auditorium type	per seat	5	0.01	0.01	12
Picnic areas	per person	5	0.01	0.01	12
Camps, resort day and night with limited plumbing	per campsite	50	0.05	0.05	24
Luxury camps with flush toilets	per campsite	100	0.1	0.1	24
Dump station	per campsite	50	0.05	0.05	24

<sup>1</sup> For all dwelling units the design shall be based on two persons per bedroom.

### **12VAC5-610-680. Water saving plumbing devices.**

Water saving plumbing devices are encouraged to lengthen the life of the subsurface soil absorption system. However, only permanent water saving plumbing devices such as low flush toilets shall be considered in reducing the size of the absorption area. Devices such as inserts in showers are considered temporary.

### **12VAC5-610-690. Recycle and reuse systems.**

Recycle and reuse systems are methods, processes and equipment in which sewage is restored to a condition suitable for reuse. When recycle and reuse systems are utilized in conjunction with toilet wastes only, an approved method of sewage disposal shall be provided to properly dispose of sewage generated via handwashing and other related sanitation activities. All recycle and reuse systems shall provide for an approved method of sewage disposal to handle excess sewage generated within the system. These systems are considered experimental unless they have been previously deemed to be satisfactory in accordance with the provisions of 12VAC5-610-441 and/or as a minimum have been certified by the National Sanitation Foundation as meeting the current Standard 41 as determined by the bureau. Water recycle and reuse systems intended to produce water for other than toilet flush water are considered experimental and shall comply with the provisions of 12VAC5-610-441. All proposals for recycle and reuse systems shall be submitted to the bureau through the district or local health department.

### **12VAC5-610-700. Site preparation and alteration.**

A. Preservation of soil structure. The preservation of the original structure of the soil in the area selected for placement of the absorption trenches is essential to maintaining the percolative capacity of the soil.

1. Prohibition on construction. Subsurface soil absorption systems shall not be constructed in Texture Group III and IV soils during periods of wet weather when the soil is sufficiently wet at the depth of installation to exceed its plastic limit. For the purpose of this chapter, the plastic limit of a soil shall be considered to have been exceeded when the soil can be rolled between the palms of the hands to produce threads 1/8 inch in diameter without breaking apart and crumbling.

2. Soil compaction. Special caution shall be taken in allowing wheeled and tracked vehicles to traverse the area selected for placement of the absorption systems before, during and after construction of the trenches, especially during wet weather. Precaution is especially important

where Texture Group III and IV soils are involved. Alteration of soil structure by movement of vehicles may be grounds for rejection of the site and/or system or revocation of the permit.

3. Soil smearing. Excavating equipment utilized to construct the absorption system shall be so designed as not to compress or smear the sidewalks or bottom of the system. Excessive smearing of the usable absorption trench sidewalls or bottom during construction may result in irreversible damage to the soil infiltrative surface and may be grounds for rejection of the site and/or system.

B. Removal of vegetation. Vegetation such as maple, cottonwood, willows and other plant species with extremely hydrophilic (water loving) root systems shall be removed for a minimum of 10 feet from the actual absorption areas. Other trees should be removed from the absorption area.

C. Grading.

1. Pregrading. The proposed site for the subsurface soil absorption system shall not be graded until the district or local health department has completed the site evaluation contained in Article 1 (12VAC5-610-450 et seq.) of Part III of this chapter.

2. Interim grading. Interim grading means site grading during or immediately preceding the construction of the absorption system. Any such grading shall be done in accordance with the conditions contained in the construction permit. The district or local health department may require notification upon completion of the interim grading but before actual installation of the absorption system.

3. Final grading. Final grading of the absorption area site for diversion of surface water (e.g., crowning) for the purpose of eliminating surface water from flowing or ponding on the site, preparation for seeding, etc. shall be accomplished to avoid damaging the absorption area. Prior to grading, the distribution box, pretreatment unit and absorption area shall be clearly staked.

D. Drainage.

1. Surface water. The area surrounding the absorption area shall be graded to divert surface water from the absorption area site. The absorption area site shall also be graded to eliminate the ponding of water.

2. Roof drains, basement sump discharges (nonsewage), floor drains, footing drains, etc., are prohibited from being connected to the sewage disposal system and shall be directed away from the absorption area site in a manner to preclude water flow into, through or over the site.

Discharge of sewage into a basement sump collecting water from floor drains, storm water, etc., is prohibited.

3. Lateral ground water movement interceptors (LGMI, e.g., French drains) may be required to divert ground water movement away from the absorption area site. The LGMI shall be placed perpendicular to the general slope of the land and generally parallel to the absorption trenches. A tight drain from the LGMI shall be constructed to discharge into a natural or manmade drainage way.

E. Protection of subsurface soil absorption system.

1. No structures shall be placed over the subsurface soil absorption system. Driveways or parking lots shall not be constructed on the subsurface soil absorption system unless the invert of the lead or header lines or top of the gravel in the absorption trenches is deeper than 30 inches below the ground surface and the driveway or parking lot is paved with portland cement or bituminous concrete to prevent compaction of the trench bottom. Driveways and parking lots shall not be constructed over the distribution box unless adequate structural and access provisions are provided.

2. Where all or part of a subsurface soil absorption system is proposed to be installed on property other than the owners, an easement in perpetuity shall be recorded with the clerk of the court prior to issuance of a construction permit (see 12VAC5-610-280). The easement shall be of sufficient area to permit access, construction, required reserve area (see 12VAC5-610-710), and maintenance of the system.

3. Where the sewer line from the building to the pretreatment unit or the conveyance line is to be placed underneath a state road or in a Virginia Department of Transportation right-of-way, the requirement for a recorded easement in perpetuity can be waived for that portion of the system located underneath the road or in the right-of-way. In its place, the applicant shall obtain the appropriate permit or permits from the Department of Transportation to construct the sewer or conveyance line in its right-of-way. The construction permit for the sewage disposal system shall not be issued until the applicant provides the local health department with a copy of the permit issued by the Department of Transportation. Under no circumstances shall the pretreatment unit, the distribution box, or the soil absorption portion of the system be installed in the Department of Transportation right-of-way.

F. Preplacement and post-placement of utilities. Subsurface soil absorption systems shall not be placed in an underground utility easement. No buried public or private utility service (e.g.,

water lines, electrical lines, gas lines, etc.) shall traverse the subsurface soil absorption system area nor shall the buried service be closer than 10 feet to the system.

**12VAC5-610-710. Reserve absorption area sites.**

Separate reserve area or areas meeting the requirements of Part III, Article I of this chapter and equalling 50% of the required absorption area shall be provided where the estimated or measured percolation rate exceeds 45 minutes/inch.

## Article 2

### Building Sewers

#### **12VAC5-610-720. General.**

Sewers referred to in this section are watertight, smooth bore, rigid conduits which convey sewage from a building drain to a pretreatment unit and are not to be confused with public sewers addressed in the Sewerage Regulations. (See 12VAC5-580-10 et seq.)

#### **12VAC5-610-730. Minimum size.**

Sewers shall have a minimum internal diameter (ID) of three inches. Larger sewers may be required depending on projected flows.

#### **12VAC5-610-740. Slope.**

The minimum slope for three- and four-inch sewers is 1-1/4 inches per 10 feet, and for a six-inch sewer is 3/4 inch per 10 feet.

#### **12VAC5-610-750. Materials.**

All sewers shall be of cast iron (CI) pipe not less than service weight, schedule 40 plastic pipe, extra strength vitrified clay or other acceptable materials to be evaluated on a case-by-case basis. Bituminous fiber pipe is prohibited. Sewers passing under driveways shall be heavy duty CI or schedule 40 plastic pipe, or other acceptable material to be evaluated on a case-by-case basis.

#### **12VAC5-610-760. Sewer appurtenances.**

A. Joints. Sewer joints shall be of the compression type except that plastic pipe may be welded sleeve or chemically fused.

B. Adapters. Joining of pipes of different sizes and/or material shall be accomplished by use of a manufactured adapter specifically designed for that purpose.

C. Bends. The building sewer shall have a straight alignment where possible. When a straight alignment is not possible ells not exceeding 45 degrees shall be used.

D. Cleanouts. Cleanouts shall be brought to the ground surface and shall be provided every 50 feet to 60 feet along the length of the building sewer. Cleanouts shall be brought to the ground surface for access.

#### **12VAC5-610-770. Sewer construction.**

A. Location. Sewers passing within 50 feet of a nonpublic drinking water supply well or other nonpublic drinking water supply source shall have special construction and pipe materials to

provide adequate protection. Special construction constitutes water pipe meeting AWWA specifications, pressure tested (10 feet of water) in place without leakage prior to backfilling. However, under no circumstances shall a sewer come within 10 feet of a nonpublic drinking water supply source.

B. Above grade installation. Sewers constructed above grade shall be adequately supported and protected against freezing. When plastic pipe is used for above grade installation the pipe must be protected against ultraviolet radiation, i.e. shielded against sunlight.

C. Bedding. All sewers shall be bedded to supply uniform support along the length of the sewer.

D. Backfilling and tamping. Sewer trenches shall be backfilled with suitable material free of large stones and clumps of earth and tamped to prevent movement of the sewer as soon as possible after the installation of the sewer has been approved.

Article 3  
Pretreatment Systems

**12VAC5-610-780. General.**

As used in this article, "pretreatment" refers to treatment works designed to prepare sewage for disposal in a soil medium.

**12VAC5-610-790. Types.**

Three general types of pretreatment systems are described herein. They are as follows:

- A. Biological;
- B. Physical; and
- C. Chemical.

**12VAC5-610-800. Aerobic biological systems.**

Aerobic biological treatment systems will be considered on a case-by-case basis at the request of the owner. These systems shall meet the applicable criteria contained in 12VAC5-640-360 of the Alternative Discharging Sewage Treatment Regulations for Individual Single Family Dwellings or 12VAC5-580-770 of the Sewerage Regulations (12VAC5-580-10 et seq.) or criteria developed by a testing laboratory or agency approved by the division. Where an activated sludge process is used to produce a secondary effluent, provisions shall be made to protect the drainfield from bulking solids. Use of an aerobic pretreatment system shall not result in the reduction of the absorption area requirements contained in Article 5 (12VAC5-610 900 et seq.) of this chapter.

**12VAC5-610-810. Anaerobic biological systems.**

Septic tanks are the most commonly used pretreatment systems and under normal circumstances are the most inexpensive units that give acceptable results with a minimum of maintenance.

The preferred material for use in constructing septic tanks is concrete. Other materials may be considered on a case-by-case basis. All materials must be resistant to corrosion, both chemical and electrolytic, and must have sufficient structural strength to contain sewage and resist lateral compressive and bearing loads.

**12VAC5-610-815. Septic tank design.**

A. Tank capacity. The minimum hydraulic detention time shall be 48 hours based on daily design flow. In no case shall the septic tank capacity be less than 750 gallons. Table 5.2 contains the minimum required septic tank capacities for dwelling units.

Table 5.2.  
Septic Tank Capacities for Dwelling Units.

No. of Bedrooms	Approximate Tank Volume in Gallons
1	750
2	750
3	900
4	1200
5	1500

B. Tank dimensions. Septic tanks shall be rectangular in plan, cross-section and longitudinal view. The length to liquid depth to width ratio should be approximately equal or greater than 2 to 1 to 1 (2:1:1) and less than or equal to 3 to 1 to 1 (3:1:1). In no case shall the liquid depth be less than four feet or greater than eight feet. A minimum of one foot free board shall be provided. Inlet and outlet structures shall be placed on the longitudinal axis of the tank. Typical tank dimensions are found in Table 5.3.

Table 5.3.  
Typical Septic Tank Dimensions in Feet.

Approximate Gallons	Length	Width	Liquid Depth	Freeboard
750	7	3.5	4	1
900	8	4	4	1
1200	9	4.5	4	1
1500	9.5	5	4.7	1

C. Inlet-outlet structure.

1. General. The inlet and outlet structures shall function as a baffle. The invert of the inlet structure shall be greater than one inch but less than two inches higher than the invert of the outlet structure with the tank installed. The inlet structure shall extend six to

eight inches below and eight to 10 inches above the normal liquid level. The outlet structure shall extend below the normal liquid surface to a distance of 35 to 40% of the liquid depth and eight to 10 inches above the normal liquid level. The inlet and outlet structures shall have an open space not less than four inches by four inches in cross-section or four inches in diameter.

2. Materials. All materials used for inlet and outlet structures shall have long term resistance to chemical and electrolytic corrosion. When pipe tees are used as inlet and outlet structures, the material shall be compatible with the material used in the sewer.

D. Top access and watertightness. All septic tanks shall be watertight and shall be provided with a watertight top. As a minimum, access manholes shall be provided over the inlet and outlet structures and shall have a minimum open space of 18 inches by 18 inches. When the septic tank has in excess of 30 inches of soil cover, an access manhole shall be brought to within 18 inches of the ground surface and shall be provided with a tight fitting cover. In wet areas the manhole covers shall be watertight.

E. Construction of septic tanks. The contractor and/or manufacturer shall design and construct the septic tank to withstand the lateral and bearing loads to which the septic tank is expected to be subjected.

F. Placement of septic tanks. The precast septic tank shall be bedded with at least six inches of sand or fine gravel where rock or other undesirable conditions are encountered. The tank shall be placed level. Where excavation is required, the hole shall be sufficiently large to permit placement of the tank. Backfilling the excavation for all septic tanks shall be done in layers with sufficient tamping to avoid settling. Backfill material shall be free of large stones and debris.

#### **12VAC5-610-817. Maintenance.**

A. In order to encourage proper maintenance and reduce the likelihood of solids being discharged to an absorption field, all septic tanks constructed after July 1, 2000, shall be designed to allow for routine inspection without being uncovered (i.e., have an inspection port as provided for in subsection B of this section) or have an effluent filter as provided for in subsection C of this section, or be designed for reduced maintenance as provided for in subsection D of this section.

B. Inspection port. An inspection port is a three-inch or larger port pipe or structure which allows access to the septic tank for the purpose of measuring sludge and scum accumulation. The inspection port shall terminate at or above grade and be designed to allow an inspection of

sludge buildup in the septic tank. The inspection port shall be constructed of schedule 40 PVC pipe, or its equivalent, and shall be fitted with a watertight threaded cap. The recommended location of the inspection port shall be in or near the manhole cover on the inlet side of the septic tank away from the inlet tee. Other locations may be approved by the district health department on a case-by-case basis.

C. Effluent filters. An effluent filter is a device which has one or more of the following purposes: (i) to manage solids to provide greater service life to a pump or other components of an onsite system; (ii) to manage the total suspended solids (TSS) passed to the absorption field, potentially enhancing absorption field life; or (iii) some other purpose recognized as beneficial by the department.

1. All effluent filters shall be designed to improve the quality of effluent leaving the tank in a manner which is consistent with their purpose.

2. Septic tank outlet filters shall be constructed from a material which resists the corrosive nature of the environment within a septic tank.

3. A tamper proof child resistant at-grade access port shall be provided to assure the filter can be readily maintained as necessary.

D. Reduced maintenance septic tanks. Septic tanks which are sized 30% larger than shown in Table 5.3 and which are baffled such that the first compartment is nominally the volume required in Table 5.3 shall be considered to be a reduced maintenance septic tank.

#### **12VAC5-610-820. Miscellaneous.**

A. Multiple septic tanks in series. The required volume for a septic tank may be satisfied by the utilization of two septic tanks in series; however, the first septic tank in series shall equal to 1/2 to 2/3 the required total volume.

B. Physical and/or chemical systems. Physical or chemical systems, or both, utilized as pretreatment for subsurface disposal of sewage shall meet the applicable criteria contained in 12VAC5-580-930 through 12VAC5-580-960 of the Sewerage Regulations.

C. Water stop. A water stop is a method for sealing the annular space around a conduit or pipe, or both, for the purpose of preventing infiltration or exfiltration, or both. Conduits or pipes passing through the walls of a pretreatment unit shall be provided with a water stop.

#### **12VAC5-610-830 to 12VAC5-610-840. [Repealed]**

## Article 4

### Conveyance Systems

#### **12VAC5-610-850. General.**

For the purpose of this chapter an "effluent conveyance system" is defined as the piping, mechanical equipment and appurtenances utilized to transport effluent from a pretreatment system to a point where the flow is split for distribution to a subsurface soil absorption system.

#### **12VAC5-610-860. Conveyance methods.**

Three basic methods utilized to convey effluent are:

1. Gravity;
2. Pumping; and
3. Dosing siphons.

#### **12VAC5-610-870. Gravity effluent mains.**

A. Size. Mains transporting effluent by gravity shall have a minimum internal diameter of three inches.

B. Slope. Gravity mains shall have a slope of not less than six inches per 100 feet.

C. Materials. Gravity mains spanning disturbed soil shall meet the material specifications contained in 12VAC5-610-750. The mains shall meet the specifications until placed two feet in undisturbed soil or until termination in a structure. The remaining gravity mains 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. All gravity mains shall be watertight, smooth bore, rigid conduits.

D. Appurtenances.

1. Joints. Gravity mains shall have joints of the compression type with the exception of plastic mains which may be welded sleeve or chemically fused.

2. Adapters. Joining of mains of different size and/or material shall be accomplished by use of a manufactured adapter specifically designed for that purpose.

3. 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.

E. Flow diversion devices. Flow diversion is a technique for increasing the useful life of an absorption area. Flow diversion provides for diversion of flow to two alternate equally sized

absorption areas whose sum meets the area requirements in 12VAC5-610-950 B with a rest period of approximately one year for recovery of each absorption area. These devices shall meet the material requirements contained in paragraph D 3 of this section.

F. Construction. Construction standards for gravity effluent mains are the same as those for house sewers and are found in 12VAC5-610-770.

#### **12VAC5-610-880. Pumping.**

##### A. Force mains.

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.

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 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 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.

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.

#### **12VAC5-610-890. Siphons.**

A. Use. Intermittent dosing siphons have two major uses:

1. Low pressure dosing of subsurface soil absorption systems (see 12VAC5-610-940); or
2. To provide more uniform distribution of effluent to large or multiple sectioned subsurface soil absorption systems which split the flow 12 or more times or contain 1200 linear feet or more of percolation piping (see 12VAC5-610-930 A and B).

B. Materials. Materials for construction of dosing siphon chambers are the same as for septic tanks (see 12VAC5-610-810).

C. Number and sizing. Dosing siphons discharging to subsurface soil absorption systems shall have an average discharge rate greater than 2.5 times the average daily influent flow in gallons per minute but not less than 70 gallons per minute per 1200 linear feet of percolation lines. Twin alternating siphons are required where the system to be dosed exceeds 1800 linear

feet in accordance with 12VAC5-610-930 B. The volume of the dosing chamber shall equal 0.6 the volume of the percolation piping for enhanced flow distribution. Actual dosing chamber volume is determined on a case-by-case basis where low pressure distribution is utilized (see 12VAC5-610-940 A).

D. Access. The siphon chamber shall terminate at or above the ground surface. The top of the chamber shall be removable to an extent to allow access for maintenance, repairs and removal of the siphon components.

E. Construction. Dosing chambers constructed of precast or poured in place concrete shall conform with the construction requirements contained in 12VAC5-610-815 E.

F. Force mains. Force mains used in conjunction with siphons shall meet the applicable criteria contained in 12VAC5-610-880 A.

## Article 5

### Subsurface Soil Absorption System

#### **12VAC5-610-900. General.**

Subsurface soil absorption systems are sewage disposal systems which utilize the soil to further treat and dispose of effluent from a treatment works in a manner that does not result in a point source discharge and does not create a nuisance, health hazard or ground or surface water pollution.

#### **12VAC5-610-910. Scope.**

For the purpose of this chapter, a "subsurface soil absorption system" shall refer to that part of a sewage disposal system beginning at the flow splitting device and extending through the absorption area or areas.

#### **12VAC5-610-920. Distribution methods.**

The term distribution methods refers to the piping, flow splitting devices, gravel, and other appurtenances beginning at the point of flow splitting and ending at the point of effluent application to the soil absorption area. Two basic methods are considered:

- A. Gravity; and
- B. Pressure.

#### **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 and/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 and/or stakes. Grade boards and/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 the 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 sewage.

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 minimum specified depth of compacted 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 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 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 required by this chapter, 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 identify the substitution 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.

**12VAC5-610-940. Low pressure distribution.**

Low pressure distribution is the conveyance of effluent through the pressure percolation lines at full flow conditions into the absorption area with the prime motive force being a pump or siphon. Low pressure systems are limited to a working pressure of from one to four feet of head at the distal end of the pressure percolation lines. For the purpose of this chapter low pressure distribution is considered to provide unsaturated soil conditions.

A. Dosing cycle. Systems shall be designed so that the effluent volume applied to the absorption area per dosing cycle is from seven to 10 times the volume of the distribution piping, however, the volume per dosing cycle should not result in a liquid depth in the absorption trench greater than two inches.

B. Manifold lines. Manifold lines are watertight lines that convey effluent from the initial point of flow splitting to the pressure percolation lines.

1. Size. The manifold line shall be sized to provide a minimum velocity of two feet per second and a maximum velocity of eight feet per second.

2. Materials. All pipe used for manifolds shall be of the pressure type with pressure type joints.

3. Bedding. All manifolds shall be bedded to supply uniform support along its length.

4. Backfilling and tamping. Manifold trenches shall be backfilled and tamped as soon as possible after the installation of the manifold has been approved. Material for backfilling shall be free of large stones and debris.

5. Valves. Valves for throttling and check valves to prevent backflow are required wherever necessary. Each valve shall be supplied with a valve box terminating at the surface.

C. Pressure percolation lines. Pressure percolation lines are perforated pipes utilized to distribute the flow evenly along the length of the absorption trench.

1. Size. Pressure percolation lines should normally have a 1-1/4 inch inside diameter.
2. Hole size. Normal hole size shall be 3/16 inch to 1/4 inch.
3. Hole placement. Center to center hole separation shall be between three and five feet.
4. Line length. Maximum line length from manifold should not exceed 50 feet.

5. Percent flow variation. Actual line size, hole size and hole separation shall be determined on a case-by-case basis based on a maximum flow variation of 10% along the length of the pressure percolation lines.

6. Materials and construction. The preferred material is plastic, either PVC or ABS, designed for pressure service. The lines shall have burr free and counter sunk holes (where possible) placed in a straight line along the longitudinal axis of the pipe. Joining of pipes shall be accomplished with manufactured pressure type joints.

7. Installation.

a. Crushed stone or gravel. Clean gravel or crushed stone having a size range from 1/2 inch to 3/4 inch shall be utilized to bed the pressure percolation lines. Minimum depth of gravel or crushed stone beneath the percolation lines shall be 8-1/2 inches. Clean course silica sand (does not effervesce in the presence of dilute hydrochloric acid) may be substituted for the first two inches (soil interface) of the required 8-1/2 inches of gravel beneath the pressure percolation lines. The absorption trench shall be backfilled to a depth of two inches over the pressure 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 and/or stakes. Grade boards and/or stakes placed in the bottom or sidewalls of the absorption trench shall be utilized to maintain the gravel level for placement of the pressure percolation lines. Grade stakes shall not be placed on centers greater than 10 feet.

c. Placement and alignment. Pressure percolation lines shall be placed so that the holes face vertically downward. All pressure percolation piping shall be placed at the same elevation, unless throttling valves are utilized, and shall be level. The piping shall be placed in the horizontal center of the trench and shall maintain a straight alignment. Normally the invert of the pressure percolation lines shall be placed 8-1/2

inches above the trench bottom. However, under no circumstance shall the invert of the pressure percolation lines be placed closer than 16-1/2 inches to the seasonal water table. When the invert of the pressure percolation lines must be placed at an elevation greater than 8-1/2 inches above the trench bottom, landscaping over the absorption area may be required to provide the two inches of gravel and six inches of fill over the pressure percolation lines required in subdivision 7 a of this subsection.

d. Backfilling. After the placement of the pressure percolation piping the absorption trench shall be backfilled evenly with crushed stone or gravel to a depth of two inches over the opening. 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.

8. Appurtenances. The distal (terminal) end of each pressure percolation lines shall be fitted with a vertical riser and threaded cap extending to the ground surface. Systems requiring throttling valves will be supplied with couplings and threaded riser extensions at least four feet long so that the flow may be adjusted in each line.

D. Gravelless material with general approval may be used for low pressure distribution in accordance with the manufacturer's approved installation manual, Table 5.4 of 12VAC5-610-950, and the applicable requirements of this chapter.

#### **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, 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 or 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 and/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 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.

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<sup>2</sup>/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  $y = \text{Ft}^2/100 \text{ Gals}$

$x = \text{Percolation rate in minutes/inch}$

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

2. Area reduction. See Table 5.4 of this section 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 width of the trench excavation 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.

Percolation Rate (Minutes/Inch)	Area Required (Ft <sup>2</sup> /100 Gals)			Area Required (Ft <sup>2</sup> /Bedroom)		
	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.

**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. 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.

4. 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.

5. 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.

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, the minimum soil absorption area shall be calculated by multiplying the trench bottom area for pressure distribution systems in accordance with subdivision 10 of 12VAC5-613-80 by three.

3. Landscape linear loading rates shall be considered for sloping absorption areas to the greatest extent possible. The landscape linear loading rate is the volume of effluent (gallons) applied per day per linear foot of the system along the natural contour (gallon per day/feet).

4. 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 conduct a startup inspection that verifies the dosing rates, the flushing rates, and other parameters critical to the proper operation of the system. 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.

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

C. Mound systems 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.

D. The manual referred to in subsection C 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. 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. 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. 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. When the depth to a restriction, shrink-swell soils or a water table is less than 24 inches, pretreatment sufficient to produce a secondary quality effluent may be used to reduce these distances as shown in Table 4.4.

**12VAC5-610-965. Sand-on-sand.**

A. Sand-on-sand is a process of modifying a soil absorption system site using fill material which is similar in texture to the original, naturally occurring material. Filling is accomplished in a manner which allows for adequate treatment and disposal of effluent, protection from frost and traffic damage, and does not promote the creation of restrictive horizons. Sand-on-sand systems are considered Type II systems and are used to overcome limitations encountered with certain high water table soils. A detailed description of the siting criteria used for sand-on-sand systems is found in 12VAC5-610-597.

B. Site preparation. All surface vegetation and organic matter, including but not limited to grass, shrubs, trees, leaf litter, branches, limbs, and tree stumps shall be removed. Special consideration shall be given to site preparation to avoid soil compaction and other damage which may create discontinuities and restrictive horizons when the fill material is placed on the site.

C. Fill material. Fill material may be added to such a site and used for residential onsite wastewater disposal for flows up to 1,000 G.P.D. on sites meeting the criteria established in 12VAC5-610-597 provided that:

1. The fill material used is the same texture as the underlying material;
2. The coarse fragment content of the fill material is neither greater than 10% by volume nor noncarbonaceous and inorganic material greater than two mm in size;
3. The fill material is placed in such a manner as to prevent the formation of any restrictive horizons;

4. The fill material covers an area 10 feet greater in all horizontal dimensions than the soil absorption system;

5. The sides of the filled area are sloped at not greater than 1:10 (rise:run);

6. The fill material provides at least six inches of cover over all portions of the system; and

7. The fill material is stabilized to prevent surface erosion.

D. Application rate. All sand-on-sand systems shall be designed on a 30 mpi loading rate and shall use a method of pressure distribution which achieves unsaturated flow conditions.

E. Fill depth. All sand-on-sand systems utilizing gravel trench designs shall have a minimum of 25 inches of fill over the original site.

F. System placement. The drainfield trenches shall be placed so that there is six inches of fill, or more, beneath the trench bottom and six inches of fill over the trenches.

G. The remaining design and construction criteria for sand-on-sand systems are the same as for the design and construction of a similar system in original undisturbed soils.

## Article 6

### Privies

#### **12VAC5-610-970. General.**

A privy is a nonwater carriage device for temporary storage or permanent disposal of human excreta. The privy shall not be used as the receptacle of any water carriage wastes.

#### **12VAC5-610-980. Types.**

A. Privies are divided into two categories, those that function as disposal facilities and those that function merely as holding facilities with ultimate disposal of the contents at another facility via pump and haul.

B. Disposal privies.

1. Pit privy.

a. Description. A pit privy consists of a lined earthen pit with a suitable rodent and insect proof structure and pit vent stack. The structure shall be provided with self-closing lid or lids on the seat riser. The pit privy is located exterior to a dwelling.

b. Location. Required separation distances from various structures and topographic features are the same as for subsurface soil absorption systems and may be found in Table 4.2. The bottom of the pit privy shall be at least two feet above the seasonal water table and any rock. Location of pit privies shall also comply with 12VAC5-610-593 1 through 6 and 10.

c. Utilization. The Uniform Statewide Building Code of Virginia normally prohibits the installation of pit privies at new homes. In case of hardship, unsuitable soil conditions or temporary recreational use, a privy can sometimes be constructed after obtaining the approval of the building official with the approval of the department. A sewage disposal system meeting the requirements of 12VAC5-610-250 A and B shall be provided to treat other sewage (wastewater) generated from activities such as laundering, bathing, handwashing, and cooking. Pit privies utilized at existing dwellings should be abandoned within one year of the availability of sanitary sewers. Proper abandonment consists of removing the structure and covering the pit with at least two feet of soil. Pit privies are an acceptable means of sewage disposal at isolated areas such as primitive camping areas, public boat launching areas, recreation areas, state parks and wilderness areas where pressurized water systems are not provided.

## 2. Incinerator toilets.

a. Description. Incinerator toilets are devices that utilize electrical energy or burning gas to incinerate human excreta deposited directly into them. They function both as toilet and disposal facility and produce an inert ash. Incinerator toilets are located in the interior of a dwelling.

b. Utilization. In addition to the conditions stated in subdivision 1 c of this subsection for pit privies, incinerator toilets shall not be utilized where they are subjected to frequent use and/or peak loading conditions.

c. Certification. All incinerator toilets must be certified by the National Sanitation Foundation as meeting the current Standard 41.

## 3. Composting toilets.

a. Description. Composting toilets are devices which incorporate an incline plane, baffles or other suitable devices onto which human excreta is deposited for the purpose of allowing aerobic decomposition of the excreta. The decomposing material is allowed to accumulate to form a humus type material. These units serve as both toilet and disposal devices. Composting toilets are located interior to a dwelling.

b. Utilization. In addition to the conditions stated in subdivision 1 c of this subsection for pit privies, all materials removed from a composting privy shall be buried. Compost material shall not be placed in vegetable gardens or on the ground surface.

c. Certification. All composting toilets must be certified by the National Sanitation Foundation as meeting the current Standard 41.

## C. Holding privies.

1. General. Due to the nature of these devices, i.e., they require routine pump and haul, special care shall be taken in selecting these devices for use. These devices are satisfactory for use at mass gatherings, transient worker populations, construction sites, recreation areas, etc.

### 2. Vault privy.

a. Description. A vault privy is similar to a pit privy except that, instead of an earthen pit, a water and corrosion proof containment vessel (vault) is provided. The vault shall be provided with access for periodic removal of the vault contents.

b. Location. Vault privies shall be located to prevent contamination of ground water or surface water. The elevation of the top of the vault or access port shall be placed

two feet above the annual flood elevation. Separation distances from structures and topographic features will be determined on a case-by-case basis.

c. Utilization. Vault privies are an acceptable method of holding human excreta where ground water, surface water or other conditions prohibit the installation of other approved sewerage facilities. The conditions contained in subdivision B 1 c of this section shall be met.

### 3. Portable privies.

a. Description. A portable privy is a type of vault privy that is generally manufactured as a single unit and is easily transported.

b. Location. Location of portable privies should be determined on a case-by-case basis under the supervision of the district or local health department.

c. Utilization. Portable privies are normally used in association with mass gatherings, construction sites, etc., where temporary facilities are required.

d. Numbers required.

(1) When portable privies are used at mass gatherings, one privy per 100 persons shall be provided as a minimum.

(2) When portable privies are used at construction sites or transient worker locations, one privy per 25 persons shall be provided as a minimum.

e. Pumping. The containment vessel of the portable privies shall be pumped as often as necessary to prevent overflow. It is recommended that they be pumped when  $2/3$  full.

## Article 7

### Storage Facilities Criteria for Pump and Haul of Sewage

#### **12VAC5-610-990. General.**

Storage facilities associated with pump and haul operations permitted under 12VAC5-610-420 shall meet the criteria contained herein.

#### **12VAC5-610-1000. Location.**

The storage facilities shall be accessible by an all weather road of suitable carrying capacity to handle a fully loaded tank truck. Sufficient all weather surface area with appropriate carrying capacity shall be provided for maneuvering the tank truck.

#### **12VAC5-610-1010. Design.**

A. Capacity. Temporary storage facilities shall have sufficient capacity to store the projected flow for 48 hours.

B. Materials. The materials utilized shall be resistant to the corrosive action of sewage and shall be capable of withstanding the internal and external loads placed upon it.

C. Watertightness. The storage facility shall be watertight.

D. Access. The storage facility shall be easily accessible for the removal of the sewage. An access manhole with minimum dimensions of 18 inches by 18 inches terminating at or above the ground surface shall be provided. The storage facility shall be a closed containment vessel and all access ports shall be provided with removable covers.

E. Venting. Adequate venting shall be provided in all storage facilities.

F. Level Alarm. All facilities shall be provided with an audiovisual alarm to be activated when the storage facility is 3/4 full. Audiovisual alarms shall alarm at two locations, one that is manned 24 hours per day and the other at the site of the storage facility where the storage facility receives sewage on a 24-hour basis. When sewage flow is intermittent only one alarm at the storage facility is required.

## Article 8

### Vehicle Specifications for Sewage Handling

#### **12VAC5-610-1020. General.**

All vehicles utilized to transport sewage shall be kept in a clean and sanitary condition.

#### **12VAC5-610-1030. Vehicle identification.**

The name and address of the owner shall be displayed on each side of the vehicle in letters at least four inches high. In addition, the sewage handling permit number shall be displayed immediately beneath the owners name and address and in plain sight.

#### **12VAC5-610-1040. Sewage containment vessel (tank).**

The tank in which the sewage is to be transported shall be fully enclosed and watertight. All inlets and outlets to the tank shall be secured and made watertight during transit. The tank shall be secured to the truck.

#### **12VAC5-610-1050. Pumps.**

When a pump is utilized to transfer sewage, the pump shall be watertight and properly valved and/or capped to prevent spillage during transport.

#### **12VAC5-610-1060. Valves.**

All valves shall be watertight.

#### **12VAC5-610-1070. Hoses.**

Suction and discharge hoses shall be watertight and provisions shall be made for carrying the hose in a manner to prevent leakage.

Article 9  
Special Facilities

**12VAC5-610-1080. Anaerobic lagooning of septage.**

A. General. An anaerobic lagoon for the purpose of this chapter is a nondischarging facility consisting of an open impervious structure, constructed of earth or other material specifically designed for receiving and stabilizing septage and other sewage sludges. Industrial waste sludges and sludges containing toxic material shall not be placed in these lagoons.

B. General site requirements.

1. Engineering, geologic, soil and hydrologic evaluation. Geologic information required by the district or local health department and the division shall include, but not be limited to, soil characteristics, percolation information, maximum ground water table, direction of ground water movement and permeability.

2. Location.

a. Minimum setback distances for topographic features are the same as those for subsurface soil absorption systems and are contained in Table 4.2.

b. Buffer zone. Buffer zone criteria are contained in Appendix I.

c. Flood protection. The anaerobic lagoon and operational components shall be located at an elevation which is not subject to the 100-year flood/wave action or shall otherwise be adequately protected against the 100-year flood/wave action damage. The anaerobic lagoon shall remain fully operational during the 25-year flood/wave action.

d. Surface runoff. Adequate provisions shall be made to divert storm water around the anaerobic lagoon and otherwise protect the lagoon's embankments.

3. Access. An all weather access road shall be provided.

4. Fencing. The facility site to include treatment units and appurtenances shall be fenced with a five foot fence (woven wire plus barbed wire); gates and locks to provide controlled entry into the facility. The fence shall be posted with signs identifying the facility, safety and health dangers and trespass penalties. The fence shall not be constructed closer than 10 feet to the outside edge of any treatment unit or appurtenance.

C. Design requirements (see Figure V-1 for typical sections).

1. Receiving facilities.

a. An impervious pad of sufficient strength to support a loaded tank truck and with drainage to the lagoon shall be provided at the point or points where the contents of the tank truck is offloaded into the lagoon or receiving facilities.

b. The receiving and inlet facilities shall be designed to transport the septage into the lagoon, to distribute the septage as evenly as possible throughout the lagoon and to minimize generation of odors and suspension of solids.

## 2. Treatment units.

### a. Anaerobic lagoons.

(1) Number and capacity. A minimum of two lagoons shall be provided. The combined total capacity of the lagoons shall provide eight months storage based on the average daily discharge into the lagoon.

(2) Operating depth. The normal operating depth shall be from three to five feet.

(3) Lagoon bottom. The lagoon bottom shall be level, constructed of impervious material ( $10^{686}$  sm/sec) and be a minimum of two feet above the seasonal water table or at the original ground surface.

(4) Lagoon embankments. Embankments and/or dike walls shall be impervious and structurally stable. They shall be designed to permit access of equipment by appropriate lining or internal barriers necessary for sludge removal in a nuisance free and safe manner, and to minimize risk, supervision, operation and maintenance. Earthen embankments shall be sloped (minimum 1:3) and seeded with proper cover, subject to soil characteristics, to minimize erosion.

(5) Freeboard. A minimum freeboard of two feet above the normal depth shall be provided.

(6) Shape. A uniform shape shall be provided, i.e., round, square, or rectangular with no narrow or elongated portions. The lagoon shall not contain islands, peninsulas or coves unless they are part of the inlet/outlet design.

b. Sludge dewatering. When sludge dewatering units are provided they shall be designed in accordance with 12VAC5-580-700, Sludge Dewatering, Virginia Sewerage Regulations.

3. Supernatant disposal. Normally the lagoon supernatant should be included in the sludge mixed liquor which is disposed of on the land. When a system is designed to provide for separate supplemental supernatant disposal it shall be by subsurface soil absorption system. The minimum subsurface soil absorption system field size shall be based on the anticipated average daily supernatant generation rate and shall meet all applicable criteria contained in Article 1 (12VAC5-610-450 et seq.) of Part III and Article 5 (12VAC5-610-900) of this part. The lagoon outlet shall be designed to minimize the solids content of the supernatant withdrawn for disposal in the subsurface soil absorption system and shall be provided with a means to control the rate and quantity of supernatant withdrawal.

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For Anaerobic lagooning of septage, see Virginia Administrative Code print product.

## **12VAC5-610-1090. Lime stabilization of septage.**

A. General. Lime stabilization of septage is a process consisting of the addition of hydrated lime in sufficient quantity usually 50 pounds per 1000 gallons, to raise the pH and hold it at 12 or higher for at least 30 minutes before dewatering or land spreading. The process normally requires mixing during the lime addition process as well as a mixing tank to facilitate the holding and mixing requirement.

### **B. Mixing equipment.**

1. Mixing may be accomplished by recirculation through the pump truck. Mixing through the pump truck is limited to operations where no more than one load at a time is processed. In this case a mixing tank is not required.

2. When a mixing tank is required a minimum capacity of 2000 gallons shall be provided. Mixing tank volume in excess of 2000 gallons may be required on a case-by-case basis. When separate mixing capability is necessary it may be accomplished by either mechanical mixing or air diffusion.

a. Mechanical mixers shall be capable of maintaining the bulk fluid velocity above 26 ft/minute and an impeller Reynolds number greater than 1000.

b. Diffused air requirements range from 150 to 250 CFM/1000 Ft of tank volume for coarse bubble diffusers. The diffusers shall be mounted such that a spiral roll is established in the mixing tank away from the point of lime addition.

C. pH. Suitable methods of measuring pH values in excess of 12 shall be provided and maintained to measure the pH of the septage-lime mixture.

D. Dewatering. Dewatering is required prior to landfilling lime stabilized septage and may be desirable before land spreading. Criteria for dewatering facilities may be found in 12VAC5-580-700 of the Sewerage Regulations. In addition all filtrate from the dewatering facilities must be:

1. Disposed of in a subsurface soil absorption system; or
2. Collected in an impervious container or earthen basin for ultimate disposal in an approved sewerage system or treatment works or by land spreading.

E. Storage facilities. Regardless of the equipment used to land spread the lime stabilized septage, there will be extended time periods, particularly during winter, when the septage cannot be land applied. Therefore, storage facilities shall be provided. The design and construction of the storage facilities shall adhere to the following criteria:

1. General site requirements. If the storage facilities are to be constructed of manufactured materials, i.e., steel or concrete, the site requirements shall conform to 12VAC5-610-1080 B 2. Where an earthen storage facility is to be provided site requirements shall conform with 12VAC5-610-1080 B 1 and 2.

### **2. Design requirements.**

a. Transfer facilities. When the storage facilities are located adjacent to the mixing facilities described in

subsection B of this section the piping shall be arranged in such a manner to eliminate spillage, reduce splashing and facilitate distribution of the septage through the storage unit.

b. Receiving facilities. When the storage facilities are remote from the mixing facilities and require vehicular transport of the lime stabilized septage the receiving facilities shall conform to 12VAC5-610-1080 C 1.

c. Capacity. The storage volume shall be based upon a mass balance which considers as a minimum monthly pumping rates (number of loads pumped per month), number, location and nature of land spreading sites including soil type, crop cover and topography and seasonal application to cropped or pastured land. In no case shall the storage capacity be less than 60 days.

d. Storage facilities. When the storage facility is of a manufactured material (steel, concrete, etc.) it shall be watertight and fitted with appropriate piping and appurtenances to facilitate removal of the stored material. When the storage facility is of earthen construction it shall adhere to the design requirements contained in 12VAC5-610-1080 C 2 a (2), (3), (4), (5), and (6) above. See Appendix P.

**12VAC5-610-1100. Storage facilities for unstabilized septage.**

Unstabilized septage storage facilities shall conform to 12VAC5-610-1090 E above as applicable.

Article 10

Sewage Dump Stations

**12VAC5-610-1110. General.**

A dump station is a facility for receiving sewage from a recreational vehicle. The dump station shall be connected to an approved sewerage system or treatment works.

**12VAC5-610-1120. Location.**

The relationship of a dump station to structures and topographic features shall be in accordance with Table 4.4 and 12VAC5-610-470 A, C, F, and G. Dump stations shall be at least 50 feet from any habitation or camp site.

**12VAC5-610-1130. Design.**

A dump station shall consist of the following features:

A. A four inch sewer pipe trapped below the frost line and connected to an approved sewerage system.

B. The sewer inlet shall be surrounded by a concrete pad sloped to drain to the sewer inlet. The pad shall have minimum dimensions of 60 inches by 36 inches by six inches thick. The sewer inlet shall be at least six inches below the lip of the pad and located not more than 1/4 the length from one end of the pad. The end of the pad where the sewer inlet is located shall be curbed with a four inch curb.

C. The sewer inlet shall be fitted with a fly tight cover.

D. A water supply properly protected against cross connection and backflow shall be provided to facilitate washdown of the pad area. The water outlet shall be posted with a sign stating "Notice: Unsafe Water Outlet. This water for washdown purposes only".

E. The sewer line shall meet the material and construction specifications contained in Part IV, Article 2 of this chapter.

## Article 11

### Nonpublic Drinking Water Supply Systems Utilized in Conjunction with Onsite Sewage Disposal Systems

#### **12VAC5-610-1140. General.**

A. Authority for this article is found in § 32.1-164 B 6 of the Code of Virginia. This article pertains only to new construction where a nonpublic water supply, other than a private well, is to be constructed and utilized in conjunction with an onsite sewage disposal system. Approval of the water supply is an integral part of the issuance of an operation permit for a sewage disposal system (see 12VAC5-610-340) and no separate permit is required. An approval of a water supply under this section connotes a water supply meeting the quantity, quality and construction standards of a satisfactory water supply at the time of approval.

#### B. Quantity.

1. The system shall be capable of supplying water in adequate quantity for its intended usage. Failure to provide adequate capacity may cause intermittent flows and negative pressures which may cause contamination of the system through cross connections or other system deficiencies.

2. The source shall have a capacity to produce 150 gallons per bedroom per day for residential use.

3. The minimum system capacity (source plus storage) should be capable of delivering a sustained flow of five gallons per minute per connection for 10 minutes for ordinary residential use.

#### C. Quality.

1. Water sources described in this section shall be considered satisfactory if the water sample or samples test negative for coliform organisms. Sources with positive coliform counts, but with less than 100 MPN/100ml shall be provided with a means for continuous disinfection (chlorination).

2. A sample tap shall be provided at or near the water entry point into the system so that samples may be taken directly from the source; this requirement may be met by utilizing the first tap on the line near where the plumbing enters the house (may be a hose bib), provided the tap precedes any water treatment devices.

3. The entire water system including the well shall be disinfected prior to use. After operating the well to remove any remaining disinfectant, a sample of the water from the well shall be collected by the district or local health department for bacteriological examination. The sample may be collected by the owner, or an agent designated by the owner, provided the sample is submitted to a private, certified (by Division of Consolidated Laboratory Services)

laboratory for analysis.

4. If tests indicate that the water is unsatisfactory and no other approval source is available, adequate approved methods of water treatment shall be applied. The district or local health department shall be consulted when treatment is necessary.

D. Approval. All water supplies covered by this chapter shall be approved by the district or local health department before being placed into service as a satisfactory water supply.

**12VAC5-610-1150. [Repealed]**

**12VAC5-610-1160. Springs.**

A. Sanitary survey. Only springs which are found acceptable following a sanitary survey (12VAC5-610-1150 B) will be considered for use as a source of potable water. The following shall be considered when making the sanitary survey:

1. The spring's source should be an aquifer which is not subject to pollution;
2. The spring should not be subject to flooding;
3. Consideration should be given to fencing an adequate area completely around the spring to prevent contamination by people and/or animals;
4. Consideration should be given to diverting surface water away from the spring; and
5. The distance from other sources of pollution shall be the same as for subsurface soil absorption systems contained in Table 4.4 and 12VAC5-610-810 A.

B. Construction of springs and/or reservoirs.

1. The spring shall be completely enclosed. The walls and cover shall be constructed of durable watertight material.

2. All springs and/or reservoirs shall be accessible for cleaning and maintenance. When access is through the top, the opening shall have a minimum dimension of 24 inches. The opening shall be fitted with a solid, watertight cover which overlaps the framed opening and extends vertically down around the frame at least two inches (shoe box).

3. The top of the cover frame shall be at least two 12 inches above the surrounding ground surface.

4. Overflows shall be screened to prevent entrance of undesirable materials (See 12VAC5-610-1170 C 9).

**12VAC5-610-1170. Cisterns.**

A. General. Cisterns shall be considered only when no other source of potable water is feasible.

B. Location and protection. The following precautions should be taken with regard to the location and protection of

cisterns:

1. The distance from other sources of pollution shall be the same as for subsurface soil absorption systems contained in Table 4.4 and 12VAC5-610-810 A; and

2. Cisterns shall be located in a manner that will not subject them to flooding.

C. Construction.

1. The cistern shall be constructed of watertight, durable, structurally sound material, with a smooth interior surface.

2. When the cistern is filled by rainfall provisions shall be made to bypass, divert or otherwise remove the water that falls at the beginning of a rain.

3. Cisterns shall be accessible for cleaning.

4. Where a manhole cover is used, it shall be watertight and the manhole shall be at least 24 inches in diameter.

5. Where another type of cover is used, it shall be a solid, watertight cover which overlaps the framed opening and extends vertically down around the frame at least two inches.

6. The top of the cover frame shall be at least 12 inches above the surrounding ground surface.

7. All openings into the cistern shall be screened in order to prevent the entrance of insects, rodents and other animals and pollutants.

8. When screens and filters are utilized for filtering roof runoff, they shall be accessible for regular cleaning.

9. Drain and overflow pipes shall not be connected directly to any sewer, soil pipe, house drain or other waste pipe. An air-gap shall be provided on all drains and overflow pipes. Drains and overflow pipes shall be suitably screened.

10. Asphaltic roofing material or painted roofs should not be utilized in conjunction with cisterns because of the potential leaching of toxic materials.

D. Potability. Cisterns cannot be relied upon to provide potable water without adequate treatment. Adequate treatment consists of removal of solids washed from the roof and continuous disinfection.

APPENDIX F.

## Field Guide To Soil Texture Classes

### Field Guide To Soil Texture Classes (USDA)

Introduction-The purpose of this test is to provide a standard procedure for estimating soil texture in the field. The texture is estimated by the "feel" of moist soil. The texture of a soil cannot be estimated by "feel" if it is either dry or wet.

### Definitions

## Particle Size Classes

**Sand-Sand** has a particle size ranging from 0.05 millimeters (mm) to 2.0 millimeters (mm) in diameter. Sand imparts a gritty feel to soil due to the shape of the individual particles.

**Silt-Silt** has a particle size ranging from 0.002 millimeters (mm) to 0.05 millimeters (mm) in diameter. When moist, silt has a floury feel and does not ribbon when pressed between the thumb and forefinger due to the shape of the individual particles. When placed between the teeth silt has a gritty feeling.

**Clay-Clay** has a particle size less than 0.002 millimeters (mm) in diameter. Clay exhibits colloidal properties, has a negative charge and is flat and platelike in shape. Moist clay is sticky and will ribbon readily when pressed between the thumb and forefinger. When placed between the teeth clay has a smooth slick feeling.

**Soil Texture-Soil texture** refers to the relative proportions of sand, silt and clay particles in a soil material that has a particle size less than two (2) millimeters (mm) in diameter. Soil texture is an indicator of infiltration capacity, permeability, degree of aeration and drainage as well as other physical characteristics of a soil material.

**Soil Texture Classes-The United States Department of Agriculture (USDA)** has identified twelve (12) soil texture classes as follows: sand, loamy sand, sandy loam, sandy clay loam, loam, silt loam, silt, silty clay loam, clay, clay loam, sandy clay and silty clay. Each texture class has a distinctive characteristic(s) which can be estimated in the field by trained personnel.

**Distinguishing Characteristics-The following characteristics** are based on moist soil.

**Sand-Sand** has a gritty feel, does not stain the fingers and does not form a ball when moist.

**Loamy Sand-Loamy sand** has a gritty feel, stains the fingers (silt and clay) and forms a weak ball but cannot be handled without breaking.

**Sandy Loam-Sandy loam** has a gritty feel, forms a ball that can be picked up with the fingers and handled with care without breaking.

**Loam-Loam** may have a slight gritty feel but does not show a finger print and forms only short ribbons of from 0.25 inch to 0.50 inch in length. Loam will form a ball that can be handled without breaking.

**Silt Loam-Silt loam** has a floury feel when moist and sticky when wet but will not ribbon and forms a ball that will tolerate some handling. Silt texture has not been found in any Virginia soils.

**Sandy Clay Loam-Sandy clay loam** has a gritty feel but contains enough clay to form a firm ball and may ribbon to form 0.75 inch to 1 inch long pieces.

**Silty Clay Loam-Silty clay loam** is sticky when moist and will ribbon from one (1) to two (2) inches. Rubbing silty clay loam with the thumb nail produces a moderate sheen. Silty clay loam produces a distinct finger print.

**Clay Loam-Clay loam** is sticky when moist. Clay loam forms a thin ribbon of one (1) to two (2) inches in length and produces a slight sheet when rubbed with the thumb nail. Clay loam produces a nondistinct finger print.

Sandy Clay-Sandy clay is plastic, gritty and stocky when moist and both forms a firm ball and produces a thin ribbon to over two (2) inches in length.

Silty Clay-Silty clay is both plastic and sticky when moist and lacks any gritty feeling. Silty clay forms a firm ball and readily ribbons to over two (2) inches in length.

Clay-Clay is both sticky and plastic when moist, produces a thin ribbon over two (2) inches in length, produces a high sheen when rubbed with the thumb nail and forms a strong ball resistant to breaking.

## APPENDIX G.

### 1. Percolation Test Procedure

### 2. Percolation Test Data Forms

#### Percolation Test Procedure

Definition-The percolation test is a field procedure conducted in the soil horizon(s) selected for installation of the proposed subsurface soil absorption system for the purpose of observing the rate that clean water will permeate the soil under saturated conditions. The test provides a method for approximating the actual movement of wastewater through the soil which will occur during operation of the subsurface soil absorption system.

#### Test Holes

1. Test holes shall be located at points and depths selected by and/or approved by the district or local health department.

2. The depth of the test hole shall be placed in the "slowest" portion of the horizon(s) selected for installation of the absorption trenches. (See § 4.03A).

3. The portion of the test hole penetrating the horizon(s) selected for placement of the absorption trenches shall be 7 (±) 2 inches in diameter. Minimum acceptable horizon thickness is twelve (12) inches. The diameter of the test hole above the selected horizon(s) may be as large as necessary to conduct the test and prepare the hole in the selected soil horizon(s).

4. Test holes shall, where possible, be constructed within four (4) to six (6) feet of an existing profile hole.

5. A portion of the material excavated from the test hole should be mounded around the test hole to prevent surface water runoff from entering the hole in the event of rainfall during the period preceding and continuing through the conduct of the test.

6. Where indicated the bottom and sidewalls of the hole shall be scarified with a sharp pointed instrument or knife to remove any smeared soil surfaces. Two inches of clean coarse sand or clean fine gravel (pea gravel) shall be added to the hole to protect the bottom infiltrative surface from scouring and sedimentation.

#### Presoaking

1. Swelling Procedure-When shrink-swell soils are suspected the soil surrounding the test hole shall be saturated for at least 24 hours by keeping at least 12 inches of water in the hole for the 24 hour period. An additional three days for swelling may be required during dry periods when cracking has occurred. After completion of the swelling procedure stated above the hole shall be left overnight before proceeding with the measurement procedure.

2. Saturation Procedure-All test holes not subject to the swelling procedure shall be kept saturated with at least 12 inches of water for a 4 hour period on the day preceding the measurement of the percolation rate. Residual water in the hole shall be left to provide overnight soaking.

Measurement of Percolation Rate-All measurements shall be made from a fixed reference point.

1. Test holes with 6 inches or less of water remaining after the overnight soaking period.

a. Carefully fill the hole with water to a depth of 6 inches over the sand/gravel.

b. Record water surface drop every 30 minutes for a 4 hour period.

c. After recording the water surface drop each 30 minutes estimate if, based on the last reading, the hole will go dry add sufficient water to maintain not more than one (1) inch water depth over the sand/gravel at the end of the test period.

d. The drop measured during the last 30 minute period shall be used to compute the percolation rate for the hole tested.

e. In soils where the first 6 inches of water seep away in less than 30 minutes after the overnight saturation period, add an additional 6 inches of water and the time interval between measurements shall be taken as 10 minutes and the test run to completion, i.e. hole goes dry. The drop that occurs during the final 10 minutes is used to calculate the percolation rate.

2. Test hole with more than 6 inches of water remaining after the overnight soaking period. The water depth over the gravel shall be recorded. More than 6 inches of water remaining in the hole after soaking procedure is prima-facie evidence of unsatisfactory for installation of a subsurface soil absorption system.

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For , see Virginia Administrative Code print product.

APPENDIX H.

#### Land Disposal Criteria

The following sections are reproduced from the Commonwealth of Virginia Sewerage Regulations, State Department of Health and State Water Control Board February 1977.

25.07 Sludge and Solids Disposal

#### 25.07.01 General

A plan shall be provided for the disposal of sludge and solids from each treatment facility as part of the final engineering documents (cf. Section 2.04.02). Before sludge is disposed of by land application, its short term and long term chemical effects on the land and groundwater must be evaluated. The evaluation program should consider the existing industrial waste surveys and general characteristics of the land to be used as well as other appropriate information. Adequate provisions for residue disposal, air pollution control, soil contamination prevention and groundwater/surface water contamination prevention shall be provided. Sludge shall not be applied to root crops or crops intended for human consumption in the raw form. Disposal of sludge shall be in such a manner as not to cause health hazards, destroy vegetation, create odor and/or vector problems, render the soil unsuitable for future land use or create other nuisances. Land areas proposed for sludge disposal should be remote from inhabited dwellings, water supplies and shellfish areas. Disposal of sludge to open dumps is prohibited. Designs incorporating the use of sludge as a soil conditioner should be forwarded to the Department of Agriculture and Commerce by the Department for appropriate review and comment.

#### 25.07.02 Land Acquisition or Control

When land application constitutes a primary means of sludge disposal for a facility and the facility does not possess sufficient alternate disposal means, the continued availability of the land shall be protected. Such land shall also be protected from improper concurrent uses during utilization periods. The means of such protection for land availability and from improper concurrent uses shall be determined by the Department, the Board and the owner at the preliminary engineering conference.

#### 25.07.03 Sludge Stabilization and Pathogen Reduction Prior to Land Application

Sludge shall be subjected to a treatment process which will stabilize many of the organic materials present in raw sludge. Anaerobic digestion, composting, aerobic digestion, heat treatment, processes or chemical treatment processes such as high lime or chlorine dosages are considered to produce stabilized sludges. For some projects, it may be necessary to achieve additional pathogen reduction beyond that attained by stabilization.

#### 25.07.04 Sludge Composition and Soil Evaluation

The following parameters for sludge and soil composition may be employed to determine the sludge classification and suitability of soils for sludge application. Determination of specific parameters to be run shall be made at the preliminary engineering conference and the results of the analyses shall be included as a portion of the sludge disposal plan required in accordance with Section 25.07.01.

Sludge

Soil

pH (pH units)

pH (pH units)

Cake or Slurry	Cation Exchange
Water (percent)	Capacity (meg/100gm)
Total solids (percent)	Components
Components	Clay Content (percent)
Organic Matter	Organic Matter (percent)
Total Kjeldahl Nitrogen	Total Nitrogen
Ammonia Nitrogen	Organic Nitrogen
Nitrates	Ammonia Nitrogen
Nitrites	Total Phosphorus
Chlorides	Available Phosphorus
Phosphates	Boron
Potassium	Exchangeable
Alkalinity as CaCO	Potassium
Boron	Sodium
Magnesium	Magnesium
Chlorinated Hydrocarbons	Iron
Copper	Copper
Nickel	Nickel
Chromium	Chromium
Zinc	Zinc
Manganese	Lead
Cadmium	Manganese
Mercury	Cadmium
Lead	Mercury
Micro-organisms	Drainage Characteristics
Total Coliforms (MPN/100 gms. sample)	Soil profile
Fecal Coliforms (MPH/100 gms. sample)	Soil Depth

\*unless otherwise noted, parameters shall be reported in mg/kg on a dry weight basis.

Appendix J contains forms which are recommended for use by the owner of the treatment facility in providing the results of background sludge and soil analyses. A one-quart soil sample shall be taken from the top four inches of soil and retained indefinitely.

After the sludge disposal plans required in accordance with Section 25.07.01 is approved by the Department and the Board, the Department and the Board waive the requirement for the sludge composition analyses and soil evaluation at any new application site for which either of the two following criteria apply:

- a. the sludge is applied as a single application not to be repeated for at least five years.
- b. the sludge application area is no larger than 10 acres.

This waiver in no way limits the powers of the Board and the Department in the control of any sludge application practice, regardless of frequency of application or size of the application area, for which groundwater contamination, surface runoff, soil toxicity, health hazards or nuisance conditions are considered to be a problem or a potential problem. Additionally, all other requirements contained in Section 25.07 including protection from improper concurrent uses, stabilization, sludge classification, application and disposal methods, soils, application rates, runoff control, sludge transport, etc. shall apply to all sludge application sites, regardless of size. As a further condition of this waiver provisions, the plant owner shall provide advance notification for concurrence to the appropriate Regional Offices of the Department and the Board of any new site(s) for which sludge application is intended. The notification for concurrence may be made by phone call to be confirmed in writing or by letter mailed in time to ensure receipt by the Department and Board prior to utilization of the new site(s). As a minimum, the notification for concurrence shall provide the location and size of the area, owner's name, proposed application rate, percentage of solids and any special or unusual conditions which may exist.

#### 25.07.05 Sludge classification

Prior to land application, sludge shall be evaluated in accordance with Section 25.07.03 and 25.07.04. The sludge shall be classified by its characteristics. For new projects, sludge characteristics may be approximated by data obtained from like treatment facilities receiving flow from similar waste contributors. Pilot studies for sludge characteristics may be required when deemed appropriate by the Department and the Board.

- a. Class A-Class A sludge shall be suitable for land application at the approved site in accordance with the approved application conditions indefinitely under proper management. Sludge which is classified as Class A shall be stabilized and shall not contain heavy metals or other undesirable components in quantities that (1) may be harmful to the production of crops, trees or other vegetation; (2) may result in crops or vegetation containing components which may be harmful to the health of animals or humans when consumed; (3) may render the soil unsuitable for future land use and (4) degrade existing groundwater quality. Appendix K presents standards for Class A sludge based on maximum allowable levels of certain heavy metals.

b. Class B-Class B sludge is sludge which is raw, partially stabilized, chemically or bacteriologically contaminated or contains undesirable components which makes it unfit for land application. This shall include unstabilized pumpage from septic tanks. Disposal of Class B sludge may be implemented by (1) conveyance to sewage treatment plant having approved sludge handling facilities, provided that detrimental effects to the plant shall not occur; (2) stabilization of sludge such that it shall meet the requirements of Section 25.07.05a, above; and (3) other methods which will be evaluated on a case by case basis. Raw or partially stabilized sludge shall be mixed with solid waste for disposal in solid waste landfills.

#### 25.07.06 Application and Disposal Methods

Spray application of Class A sludge to the land is acceptable when no transport of aerosols beyond the boundaries of the application area is predicted.

##### a. Liquid Sludge

Liquid sludge shall generally have a solids content of less than 12 percent. Liquid Class A sludges shall be applied to land by plowing, discing, or direct injection so that the sludges are immediately covered or by spraying or spreading on pasture that has been clipped short, permanent crop land or land that is producing trees or nursery stock. Only application sites especially selected for sludge application and approved by the Department and the Board may be used. Liquid sludges shall not be mixed with solid wastes for disposal in solid waste landfills.

##### b. Final Dewatered Sludge

Final dewatered sludge is sludge that is dewatered for the purpose of ultimate disposal and is defined as having a solids content usually ranging between 12 percent and 30 percent. Dewatered sludges including those dewatered through the use of centrifuges, vacuum filters and filter presses may be disposed with solid wastes if the ratio of sludge is high enough so as to prevent problems with compaction and extruding of sludges to the surface of the ground. These dewatered sludges may also be disposed in separate trenches at approved solid waste landfill sites or other approved sites. Dewatered Class A sludges may also be applied to the land by plowing or discing into the soil immediately after application or by spraying or spreading on pasture that has been clipped short, permanent crop land or land that is producing trees or nursery stock. Only application sites especially selected for sludge application and approved by the Department and the Board may be used.

##### c. Dried Sludge

Dried sludge is sludge that has a solids content greater than 30 percent. Dried Class A sludges from treatment processes may be disposed in solid waste landfills or atop the landfills to promote growth of vegetation, landfills selected for sludge disposal or plowing or discing into the ground or by spraying or spreading on pasture that has been clipped short, permanent crop land or land that is producing trees or nursery stock. Only application sites especially selected from sludge application and approved by the Department and the Board may be used.

#### d. Other Solids

Grit, rages and other debris or screenings from sewage treatment plants shall be stored in covered containers. These solids are classified as Class B, and subsequent disposal shall be by burial at solid waste landfill sites or other sites approved by the Department and the Board.

#### 25.07.07 Soil

Soils shall be well drained. A minimum soil depth of two feet is preferred.

#### 25.07.08 Application Rates

For land application systems, the engineer shall consider sludge composition, soil characteristics, climate, vegetation, cropping practices and other critical factors in determining application rates. Since sludge and site factors vary widely, application rates shall be determined for each specific site. Application rates shall be approved by the Department and the Board.

Nitrogenous substances are usually the limiting factor in determining annual application rates. Unless it can be satisfactorily demonstrated that the nitrogen uptake of crops to be harvested justifies a higher loading rate, the initial design application rate shall not exceed five tons of dry weight solids/acre/year. Guidelines for allowable application rates for specific crops are presented in Appendix K. Additionally, Appendix K presents guidelines on maximum loadings of cadmium, maximum cumulative levels for metals and acceptable soil pH levels. For any site receiving only a single application of sludge not to be repeated for at least five years, the maximum allowable loading rate for the on-time application shall be 15 tons of dry weight solids/acre. The above notwithstanding, at no time shall sludge be applied to a depth greater than 0.5 inches in any single application procedure.

No crops should be removed by harvesting or grazing less than 30 days after the last application of sludge. Pasture should be clipped immediately prior to sludge application.

#### 25.07.09 Groundwater Quality

Land application sites, landfills, sludge lagoons and sludge holding facilities shall be designed and operated so that the utilization of sludge does not result in groundwater quality changes. If the presently existing concentration of any parameter is high in the groundwater than the level allowed for a raw water supply source (reference: Commonwealth of Virginia Waterworks Regulations), then the sludge utilization or disposal technique shall not result in an increase in the concentration of that parameter.

#### 25.07.10 Holding Facilities

##### a. Emergency Holding

Raw sludges, septic tank sludges, sludges from upset digesters and sludges of similar nature may be stored in emergency holding facilities. Subsequent processing of the supernatant and sludge shall be provided in an approved manner. Such holding facilities should be located remote from human activity. The engineer shall provide a plan for

approval by the Department and the Board. The plan shall address sampling, odor control, vector control, potential soil and water pollution, and security.

b. Routine Holding

During periods when application of sludges to agricultural land is not possible due to climatic or other conditions, a holding facility shall be provided. The engineer shall provide a mass balance which determines the amount of sludge storage which is to be provided. The location and protection of the holding facility shall conform to the requirements stated in Section 25.07.01a, above. Holding shall be utilized to enhance runoff prevention.

25.07.11 Incineration

Incineration of sludges and screenings from treatment facilities is an approved method of solids reduction. Such facilities shall meet all requirements for air pollution control. The ash from such processes may be buried or spread on land selected for such purposes and approved by the Department and the Board.

25.07.12 Sludge Lagoons

a. Long Term Storage Lagoons

Long term storage lagooning of stabilized sludges is allowable if provisions are made for ultimate disposal of the sludge in accordance with the requirements of the section. Decant liquid from the lagoon shall be conveyed to a plant by an approved method for treatment in a manner that will not upset the plant's operational efficiency. Adequate provisions shall be made to prevent seepage from the lagoon. Fencing and warning signs shall be required.

b. Ultimate Disposal Lagoons

Lagooning of stabilized sludges as a means of ultimate disposal is allowable if stored in accordance with Section 25.07.12a above and covered with soil upon completion of use to a depth of two feet.

25.07.13 Transport of Sludge

The engineer shall furnish the final engineering documents (Section 2.03) the equipment and materials needed for sludge handling, including nonspill, water-tight vehicles for transport, routes, quantities of sludge and procedures to be used. Transport vehicles should be equipped with tow hooks, and transport routes through heavily populated areas should be avoided.

25.07.14 Land Reclamation

Land reclamation is an accepted practice usually utilizing high application rates of liquid sludge. Class A sludges are acceptable for land reclamation. The sludge utilization program shall be developed between the owner, the Department, the Board, the Division of Mined Land Reclamation (when appropriate) and other agencies as appropriate.

25.07.15 Other Methods

Other methods of sludge and solids disposal, such as preparation and use as a soil conditioner, will be considered on a case by case basis.

#### 25.07.16 Runoff Prevention

An area which has sludge applied by spraying or spreading shall be located a minimum distance of 50 feet from all surface water. Containment and controlled release of runoff from sludge application areas or effective erosion control methods should be practiced as necessary.

### APPENDIX I.

#### Buffer Zones

A. All anaerobic lagoons shall provide the minimum buffer zone as shown below unless they qualify for reduced requirements as provided in (B) below. Buffer zones are areas of controlled or limited use. Within buffer zones residential uses or high density, human activities or activities involving food preparation are prohibited. The extent of the buffer zone perimeter is measured from the perimeter of the lagoon.

Lagoon Size:	Buffer Zone Requirement:
40,000 per day and less	500 feet
Less than 500,00 gallons per day and greater than 40,000 gallons per day	750 feet

B. The Department shall consider reduction of up to one half of the above listed buffer zone requirements based on topography, prevailing wind directions, provision of covered units or the inclusion of an effective wind break in the overall anaerobic lagoon design.

1. The prevailing wind direction should be determined by on-site data. Local weather station records may be utilized if they are demonstrated to be applicable. Attention should be paid to both moderate and high speed winds since the high velocity winds often have a prevailing direction different from the prevailing direction of moderate winds.

2. A windbreak should be located on both sides of the anaerobic lagoon normal to a line projected through the plant and area which is to be protected as close to the plant as practical. An effective windbreak is comprised of manmade or natural barriers which extend from the ground surface to minimum height of 16 feet. A cultivated tree windbreak may be developed by planting at least four rows of fast growing evergreens (pine family preferred) planted on staggered 10 feet centers. Rows should be spaced no greater than 16 feet apart. The variety of tree used should be readily adaptable to the soil and climate at the plant site.

C. The required buffer zone shall be maintained by an adequate legal instrument throughout the life of the anaerobic lagoon.

APPENDIX J.

Sludge Dewatering

The following section is reproduced from the Commonwealth of Virginia Sewerage Regulations State Department of Health, State Water Control Board, February 1977

25.05 Sludge Dewatering

25.05.01 General

Drainage from beds and concentrate or filtrate from dewatering units shall be returned to the sewage treatment process at appropriate points preceding disinfection. These organic loads shall be considered in plant design, and alternatives for handling these loads may be considered similar to those for supernatant (See Section 25.01.06d).

25.05.02 Sludge Drying Beds

a. Area

The sludge drying bed area required for dewatering aerobic and anaerobic digested sludge shall not be less than the following:

Type of Treatment	Open Beds	Covered Beds
Primary	1.25	0.75
Trickling Filter	1.50	1.25
Activated Sludge	1.75	1.35
Chemical Precipitation	2.00	1.50
Aerated Plant with Aerobic Digesters	1.50	1.35

For other types of sludge treatment, the drying bed area will be evaluated on a case by case basis.

b. Percolation Type

1. Gravel

The lower course of gravel around the underdrains shall be proper graded and should be 12 inches in depth, extending at the underdrains. It is desirable to place this in two or more layers. The top layers of at least three inches shall consist of gravel 1/8 inch to 1/4 inch size.

2. Sand

The top course shall consist of at least 12 inches of sand with a uniformity coefficient of less than 4.0 and an effective grain size between 0.3 and 0.75 millimeters.

### 3. Underdrains

Underdrains shall be clay pipe, concrete drain tile or other underdrain material acceptable to the Department and the Board and shall be at least four inches in diameter and sloped not less than one percent to drain. Underdrains shall be spaced not more than 20 feet apart.

#### c. Impervious Types

Paved surface beds may be used if supporting data to justify such usage are provided.

#### d. Walls

Walls shall be watertight and extended 15 to 18 inches above and at least six inches below the surface.

#### e. Sludge Removal

Not less than two beds shall be provided and they shall be arranged to facilitate sludge removal. Concrete truck tracks should be provided for all percolation type sludge beds. Pairs of tracks for percolation type beds should be on 20-foot centers.

#### f. Sludge Influent

The sludge pipe to the beds shall terminate at least 12 inches above the surface and be arranged so that it will drain. Concrete splash plates shall be provided at sludge discharge points.

### 25.05.03 Rotary Vacuum Filtration

a. Where units will not operate on a continuous basis and the plant does not have digesters, aerated storage tanks should be provided for the sludge.

b. A maximum amount of flexibility consistent with reasonable economy should be designed into the system. Design flexibility should include, but not be limited to, the following:

1. sludge and chemical dilution facilities;
2. separate chemical conditioning tanks;
3. variable speed filter pan agitator drives; and
4. effective filter media cleaning facilities.

### 25.05.04 Centrifugation

a. Where units will not operate on a continuous basis and plant does not have digesters, aerated storage tanks should be provided for the sludge.

b. Successful application of centrifugation of municipal type sludges requires consideration of numerous factors. Therefore, proper scale-up data pertaining to the particular sludge to be dewatered shall be obtained and submitted to the Department and Board for approval.

c. Provisions for addition of coagulants to the sludge before or during introduction of the centrifuge shall be

considered.

#### 25.05.05 Pressure Filtration

- a. The addition of and mixing of coagulants before filtration shall be considered.
- b. Design data shall be collected from laboratory tests and be properly scaled-up to plant size.
- c. Adequate storage should be provided for single unit systems for down time and for multiunit systems on one or two shift cycles.

#### 25.05.06 Lagooning

- a. Lagooning for dewatering may be used where suitable land is available for this use.
- b. The soil shall be reasonably porous, or underdrains shall be provided. The maximum water table level shall be 18 inches below the bottom of the lagoon. The surrounding areas shall be grades to prevent surface water from entering the lagoon. The maximum depth shall be 24 inches or less. There shall be two or more lagoons. Any underdrainage fluids shall be returned to the treatment plant and be treated.
- c. Loading rates, buffer zones, odor control and groundwater protection will be addressed in the preliminary engineering conference.

APPENDIX K.

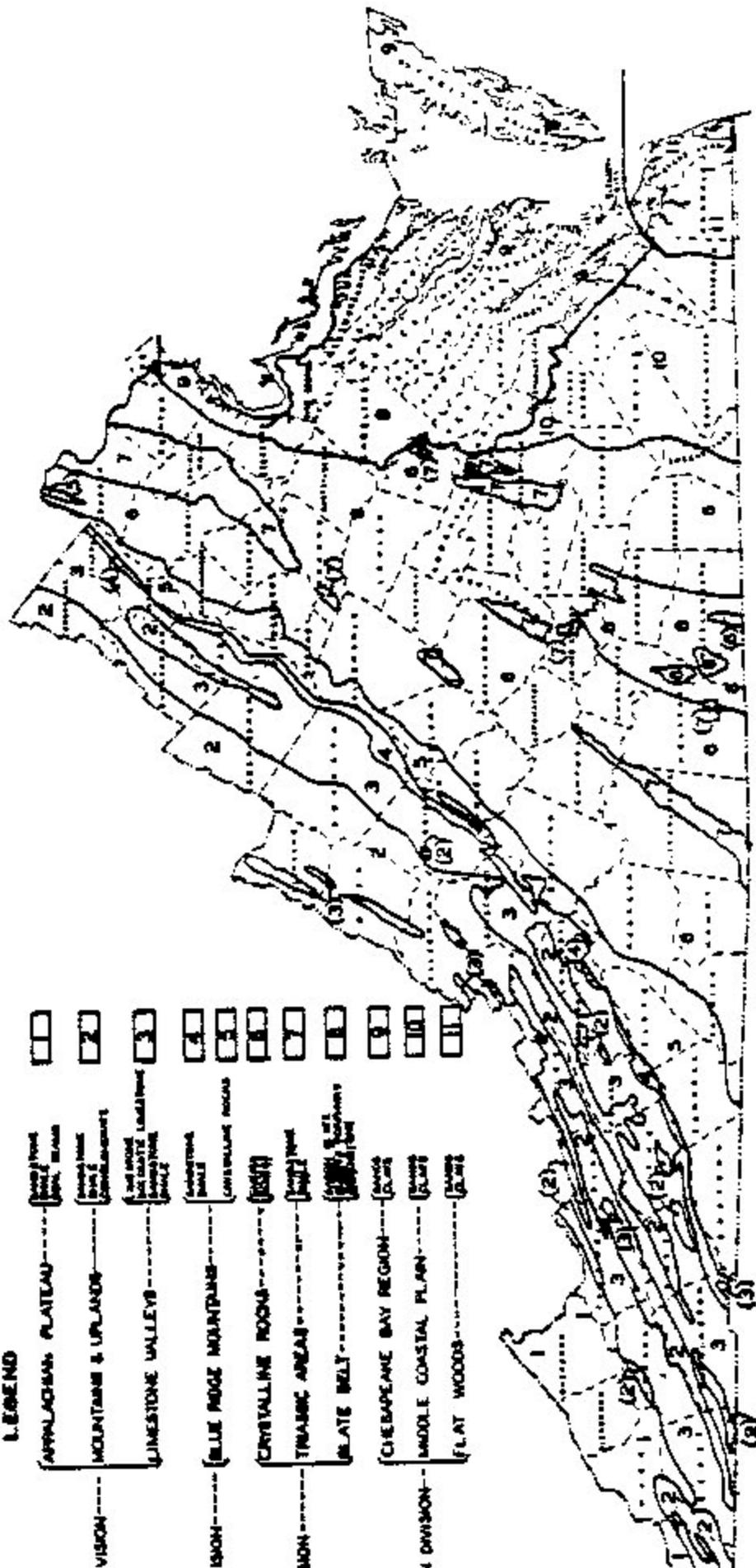
Map of Physiographic Provinces

# PHYSIOGRAPHIC AND SOIL PARENT MATERIAL

## MAP OF VIRGINIA

### LEGEND

APPALACHIAN PLATEAU	(1) (2) (3) (4) (5) (6) (7) (8) (9) (10) (11)
MOUNTAINS & UPLANDS	(1) (2) (3) (4) (5) (6) (7) (8) (9) (10) (11)
LIMESTONE VALLEYS	(1) (2) (3) (4) (5) (6) (7) (8) (9) (10) (11)
BLUE RIDGE MOUNTAINS	(1) (2) (3) (4) (5) (6) (7) (8) (9) (10) (11)
CRYSTALLINE ROCKS	(1) (2) (3) (4) (5) (6) (7) (8) (9) (10) (11)
TERRACED AREAS	(1) (2) (3) (4) (5) (6) (7) (8) (9) (10) (11)
GLATE BELT	(1) (2) (3) (4) (5) (6) (7) (8) (9) (10) (11)
CHESAPEAKE BAY REGION	(1) (2) (3) (4) (5) (6) (7) (8) (9) (10) (11)
MIDDLE COASTAL PLAIN	(1) (2) (3) (4) (5) (6) (7) (8) (9) (10) (11)
FLAT WOODS	(1) (2) (3) (4) (5) (6) (7) (8) (9) (10) (11)



APPENDIX L.

Suggested Scale and Contour Interval for Subdivision Plats

Lot Size (Acre)	Scale	Slope(%)	Contour Interval
0.5	1" = 20'	0-2	2
		6-10	5
		11-25	5
		26-50	10
0.5 - 3	1" = 50'	0-5	2
		6-10	5
		11-25	10
		26-50	20
3	1" = 100'	0-5	2
		6-10	5
		11-25	10
		26-50	20