Dear Chairman Representative Pollert and Legislative Management:

The Onsite Wastewater Recycling Technical Committee (OWRTC), formed in North Dakota Century Code 23-35-02.3, has met regularly since December 3, 2021 in order to fulfill requirements in aforementioned NDCC. Bi-monthly meetings have been held to establish the following:

1. Create a statewide technical guide for onsite wastewater recycling treatment technologies and sewage distribution technologies.
2. Recommend standards and procedures for issuing an installer license.
3. Recommend continuing education requirements for installer license renewal.
4. Recommend reasonable fees for issues or renewing an installer license.

The OWRTC has enclosed an electronic version of the OWRTC Final Guide, the marked-up original code draft, and copies of all our meeting minutes as completion of the above tasks. In addition, committee members have prepared meeting expense reports to demonstrate their time involved, which are also enclosed.

The original code draft used for the creation of the technical guide is the code that a number of health units adopted in approximately
2017 and are currently utilizing in North Dakota. This code was created by the North Dakota Onsite Wastewater Technical Review Board that consisted of a representative from eight public health units that provide environmental health services in North Dakota, a representative of the ND Department of Environmental Quality, three onsite sewage treatment system installers, and a member of the North Dakota State University Extension system.

It is this committee's recommendation that the enclosed final guide become the onsite wastewater recycling treatment guide referenced in NDCC 23-35-02.2. The OWRTC additionally recommends that the North Dakota Onsite Wastewater Board, referenced in the enclosed document, be created and given authority to oversee the technical guide and license, collect fees, and recommend continuing education requirements for onsite wastewater installers.

The committee further recommends that the Private Sewage Disposal Systems section (62-03.1-03) of the North Dakota Plumbing Code move from the North Dakota Plumbing Board to the North Dakota Onsite Wastewater Board, and that the legislature appropriate $200,000 in start-up funding for the next biennium for the newly-created Board.

Respectfully submitted by the members of the Onsite Wastewater Recycling Technical Committee,

Committee Chair Tom Schimelfenig
Onsite Wastewater Installer
Schimelfenig Excavating, Bowdon, N.D.

Vice Chair Lisa Otto-Westman, REHS/RS
LPHU Representative
First District Health Unit, Minot, N.D.

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North Dakota Rules and Regulations for

On-site Wastewater Treatment Systems

Adopted by Resolution on the ___ day of ___, 20__ by the _____.

Table of Contents

Resolution Regulatory Requirements for Licensing of Installers, Permits for Installation, Inspection, Construction Requirements, Use and Maintenance of On-Site Wastewater Treatment Systems

Section I Purpose

The purpose of this Resolution is to protect the health, safety, and welfare of the public and environment in North Dakota through the establishment of minimum requirements for the regulation of on-site wastewater treatment systems with the intent to protect ground water quality and prevent or eliminate the development of public nuisances. The improper design, location, installation, use and maintenance of on-site wastewater treatment systems can adversely affect the public health, safety, general welfare, and environment by discharge of inadequately treated wastewater to surface and ground waters. This Resolution is intended to protect the county's citizens by protecting its health, safety and general welfare and natural resources.

Section II Authority

This Resolution is adopted in accordance with the authority granted in North Dakota Century Code Chapter 23-35.

Section III Scope and Jurisdiction

This Resolution regulates the siting, design, installation, alteration, operation, maintenance, monitoring and management of all on-site wastewater treatment systems within the applicable jurisdiction. This Resolution shall apply in _____. Where a municipality has passed an ordinance to regulate and enforce in an equivalent or more restrictive manner, such requirements established hereunder shall not apply.

Section IV Standards

The requirements and standards adopted by this Resolution are intended to be the standards for the siting, design, installation, alteration, operation, maintenance, monitoring and management of all onsite wastewater treatment systems. Nothing contained herein shall be construed to prevent the regulatory authority from requiring compliance with greater requirements than those contained herein where such requirements are necessary to maintain safe and sanitary conditions.

Section V Definitions

As used in this Resolution, the following words and terms, unless the context clearly requires otherwise, shall have the following meanings:

"Alternative System" means an on-site wastewater treatment system requiring supplemental treatment or a system designed to address unfavorable site conditions such as high groundwater, impervious soil formations, unacceptable percolation rates, and disposal field size limitations. These may include devices not presented in these regulations. wastewater

"Regulatory Authority" means North Dakota district health units, county, or city health departments, or their designees.

“At-grade System” means a pressurized soil treatment and dispersal system where wastewater effluent is dosed to an absorption bed that is constructed directly on original soil at the ground surface and covered by loamy soil materials.

"Baffle" is a device installed in a septic tank for proper operation of the tank and to provide maximum retention of solids, and includes vented sanitary tees and submerged pipes in addition to those devices that are normally called baffles.

"Bedroom" is any room within a dwelling that may be reasonably used as a sleeping room and includes, but is not limited to unfinished areas that have potential to become a bedroom(s).

"Capacity" is the liquid volume of a septic tank using inside dimensions below the outlet.

“Centralized System” is an on-site wastewater treatment system serving 4 or more dwellings or buildings.

"Cesspool" (Seepage Pit) is an underground pit into which raw wastewater and/or other untreated liquid waste is discharged and from which the liquid seeps into the surrounding soil.

"Clean Sand" Means commercially processed, washed sand or naturally occurring sand which will pass the jar test. See Appendix A Procedures for Soil Determination and Material Acceptability.

"Distribution Pipes" are perforated pipes that distribute wastewater effluent within a medium including drain field rock, chambers, and gravelless pipe.

"Dosing Device" is a commercially manufactured wastewater effluent pump, grinder pump, or siphon.

"Drain field Rock" is clean, commercially produced, washed, rock, crushed igneous rock or similar insoluble, durable, and decay-resistant material. The size shall range from ¾ inch minimum diameter to 2 ½ inches effective diameter, The jar test can be used as a method for testing drain field rock. See Appendix A Procedures for Soil Determination and Material Acceptability.

"Dwelling" is any building or place used or intended to be used by human occupants as a single-family or multiple-family unit.

"Floodway" is the bed of a wetland or lake, the channel of a watercourse, and those portions of the adjoining floodplain that are reasonably required to carry the regional flood discharge.

"Holding Tank" is a water-tight tank, with a minimum capacity of 1,000 gallons, meeting the minimum requirements set forth in Appendix B Design Standards, used for the storage of wastewater until it can be transported to a point of approved disposal.

"Impermeable" with regard to soils, is a soil horizon or layer having a vertical permeability less than 1 inch in 24 hours and shall be considered impermeable.

“Limiting Factor” means any factor that adversely affects the soils ability to effectively treat wastewater effluent. This encompasses actual soil saturation, redoximorphic features, or active fluctuating seasonal soil water table, bedrock, layers/conditions of low permeability or any physically identifiable condition that limits installation of a septic system.

"Malfunctioning or Failing System" is any situation in which the system fails to treat the wastewater or exposes it to potential human contact. Failures may involve any component or components of a new or existing system which ~~is improperly designed, installed,~~ is clogged or no longer functions properly or as intended. Examples of failures include, but are not limited to wastewater backing up into a building; wastewater surfacing, being pumped to the surface or discharged into a waterway; wastewater discharged into any abandoned well, crevice, sink hole, or other natural or manmade opening in the ground including cesspools and dry wells.

“Mound System" means a soil treatment and dispersal system designed and installed such that all of the infiltrative surface is installed above grade, using clean sand between the bottom of the infiltrative surface and the original ground elevation utilizing pressure distribution and capped with suitable material to stabilize the surface and encourage vegetative growth.

"On-site Wastewater Treatment System" (OWTS) is a wastewater treatment system or part thereof, serving a dwelling or building, or group thereof, which utilizes soil treatment and

disposal.

"Parallel Distribution" is the distribution of wastewater tank effluent by gravity which loads all sections of an on-site wastewater treatment system equally at the same time.

"Percolation Rate" is the timed rate of drop of water infiltrating into a test hole. The percolation rate can be determined by the percolation test. See Appendix A Procedures for Soil Determination Material Acceptability.

"Permeability" the rate with which gases or liquids penetrate or pass through a bulk mass of soil or layer of soil.

"Plastic Limit" is soil moisture content below which the soil may be manipulated for purposes of installing a soil treatment system and above which manipulation will cause compaction or smearing. If a fragment of soil can easily be rolled into a wire 1/8 inch diameter, the moisture content is above the limit and the soil cannot be used. The standard method of determining the plastic limit is specified by the American Association of State Highway Officials (AASHO) Designation: #T 90-61.

"Professional Engineer" shall mean an individual who by reason of special knowledge or use of the mathematical, physical, and engineering sciences and the principles and methods of engineering analysis and design, acquired by engineering education and engineering experience, is qualified to practice engineering, and who has been registered and licensed by the State Board of Registration for Professional Engineers and Land Surveyors.

"Redoximorphic Features" (Active Mottling) reflects alternating reduction and oxidation conditions due to water table fluctuations.

"Registered Professional Soil Classifier" shall mean a person who by reason of their special knowledge of the physical, chemical, and biological sciences applicable to soils as natural bodies and of the methods and principles of soil classification as required by soils education and soil classification experience in the formation, morphology, description, and mapping of soils is qualified to practice soil classifying and who has been duly registered by the State Board of Registration for Professional Soil Classifiers, as per North Dakota Century Code, Chapter 43-36.

"Seepage Bed" means an absorption facility consisting of an area from which the entire earth contents have been removed and replaced with a network of effluent distribution material, filter aggregate and covered with suitable backfill material.

"Serial Distribution" is the distribution of wastewater tank effluent by gravity that progressively loads one section of an on-site wastewater treatment system to a predetermined level before overflowing to the succeeding section.

"Septic Tank" is a watertight tank, with minimum capacity of 1,000 gallons, meeting the minimum requirements laid out in Appendix B Design Standards. That shall receive the discharge of wastewater from a building sewer or preceding tanks, stores liquid for a detention period that provides separation of solids from liquid and digestion of organic matter, and allows the wastewater effluent to discharge to a succeeding tank, treatment device or soil treatment area.

"Septic System Servicer" is any person or business, permitted by the North Dakota Department of Health Division of Water Quality, who engages in the business of servicing septic systems, cesspools, privies, chemical toilets, holding tanks, and similar devices that receive wastewater, and who deposits such materials at some location approved by the North Dakota Department of Health.

"Setback" is a separation distance measured horizontally, unless otherwise noted.

"Wastewater" means waste produced by toilets, sinks, bathing, laundry or culinary operations or the floor drains associated with these sources, and includes household cleaners, medication and other constituents in the wastewater restricted to amounts normally used for domestic purposes.

"Wastewater Effluent" is that liquid which flows from a septic tank under normal

operation. "Site" is the proposed on-site wastewater treatment system area.

"Slope" is the ratio of vertical rise or fall to horizontal distance.

"Soil Boring" is any type of excavating capable of revealing in detail characteristics of soils penetrated.

"Soil Texture Classification" is where soil particle sizes or textures are specified in these regulations; they refer to the Guide for USDA Textural Classification.

"Soil Treatment Area" is an area where wastewater effluent is dispersed in to the soil for treatment and absorption and filtration and includes, but is not limited to trenches, seepage beds, at-grade systems and mound systems.

"Soil Type" is the lowest unit in the natural system of soil classification; a subdivision of a soil series and consisting of or describing soils that are alike in all characteristics including the texture of the A Horizon.

"Standard System" an on-site wastewater treatment system employing a septic tank and the

soil treatment system commonly known as seepage bed, trenches, at grade, or mound systems.

"Surface Water Body" is any significant accumulation of water, which includes lakes, rivers, streams, reservoirs, bogs, ponds and wetlands.

"Supply Line" are pipes used to distribute wastewater effluent to distribution boxes, drop boxes, and valve boxes.

"Trench" means a soil treatment and dispersal system, the absorption width of which is 18-36 inches and having a minimum sidewall absorption height of six inches of natural soil.

Section VI Licensing of On-site Wastewater Treatment System Installers

1. No person, firm, or corporation shall engage in the business of installing or constructing OSTSs without first obtaining a license from the regulatoryregulatoryregulatoryNorth Dakota Onsite Wastewater Board (NDOWB).
2. Licensure Requirements
    a. Submission of license fee. The fee for the license shall be set by the regulatoryNDOWB.Attend approved OSTS training before being licensed and every 3 years thereafter.
    b. Issuance of license will follow the tiered system below:
        i. Apprentice: Entry level – Must submit application to the ND OWB, which will allow them to work under a Level 1, 2 or 3 license holder. Cost $25/year.

        ii. Level 1: Must submit application to NDOWB. Licensee must provide work history from previous year to advance to Level 1. Soil classes approved by NDOWB must be completed prior to receiving a Level 1 license. Level 1 license will allow licensee to install septic tanks and conventional trench systems only. Cost $225/year.

        iii. Level 2: Must submit application to NDOWB. Licensee must show proof of 16 accumulative hours of onsite wastewater education; 8 hours of which must be in-person training. Education requirements may be waived if amount of time in Level is signed and guaranteed by a Level 3 licensee. Level 2 license holders may install multiple tanks, mounds, at-grades, beds and pressurized systems with pumps. Cost $225/year.

        iv. Level 3: Master level – Must submit application to NDOWB. Must provide proof of 24 accumulative hours of onsite wastewater education; 8 hours of which must be in-person training. Level 3 license holders may install commercial, industrial and systems that accept more than 2,500 gallons per day (gpd). Cost is $225/year.

c. All currently licensed installers will be licensed to a level 2 license. All contractors wanting to increase license to Level 3, must show proof of onsite education of a minimum of 8 hours within one year of license approval.
d. All unlicensed installers from out of state will be licensed to a level 2 license upon a letter of good standing from local health unit and show proof of North Dakota onsite septic installations. To increase to a level 3 license, they must show proof of onsite education of a minimum of 8 hours within one year of license approval.

3. All new construction and/or alterations/modifications to existing systems shall be done by a licensed OSTS installer or the property owner. Mound systems, at-grade systems, and commercial sites shall only be installed by a licensed OSTS installer.

4. Property owners are not required to be licensed to install systems on their property, but they shall attend an approved training or appropriate alternatives as defined by the NDOWB. It is the property owners' responsibility to procure appropriate equipment to install the system and any additional requirements as set forth by the regulatory authority.

5. Installation, construction, alteration, or repair of an OSTS by licensee in violation of the provisions of these regulations or any refusal to comply herewith on the part of the licensee shall be cause for revocation of, suspension or refusal to renew a license. Before any license issued under the provision of this section may be revoked the licensee shall be provided an opportunity to request a hearing to show cause why such license should not be revoked. Notice of the time, place, and purpose of such hearing shall be given in writing.

Section VII Permit for Installation of On-site Wastewater Treatment Systems

1. No person, firm, or corporation shall install, alter, repair, or extend any individual OSTS without first obtaining a permit from the regulatory authority.
2. The permit shall be issued by the regulatory authority within the jurisdictional limits where the work is being done. The fee for the permit shall be set by the regulatory authority. The application/permit shall be signed by the property owner.

3. Application for permits shall be made upon forms furnished by the regulatory authority. A permit to construct is valid for a period of 12 months from date of issuance. If construction is not started on the building or wastewater system within

12 months of the date of approval of the application, it will be necessary to resubmit a current application along with all necessary information for the system to insure that the lot, building plan, or location have not changed and that the proposed wastewater system continues to meet the requirements set forth herein.

4. The regulatory authority shall refuse to grant a permit for the construction of an individual wastewater treatment system where a public sewer system is available within 200 feet of the property line, unless the municipality denies hookup in a written document.

5. For any OSTS serving 25 or more individuals or with wastewater flows of 2,500 gallons per day (whichever is greater), plans and specifications shall be prepared by a North Dakota registered professional engineer and submitted to the North Dakota Department of Environmental Quality, Division of Municipal Facilities, for review and approval. Construction of such systems may not commence until approval is granted by the Division.

6. All Systems using a Class V Underground Waste Disposal (i.e. drainfield) serving 20 or more persons must complete a Shallow Disposal System Form and submit to the North Dakota Department of Environmental Quality, Division of Water Quality.

Section VIII Inspection of Newly Constructed On-site Wastewater Treatment Systems

1. The regulatory authority or its designee may perform inspections on all newly constructed OSTS. No part of the soil treatment area system shall be covered until it has been inspected, unless prior approval has been granted. It shall be the duty of the owner or occupant of the property to give the environmental health practitioner (EHP) free access to the property at reasonable times for the purpose of making an inspection.

2. If, upon inspection, it is discovered that any part of the system is not constructed in accordance with the minimum standards provided in these regulations, the applicant and or the OSTS installer shall be responsible for the correction or elimination of all defects, and no system shall be placed in service until all defects have been corrected or eliminated.

Section IX General Provisions

1. The owner, building contractor, plumbing contractor, and OSTS installer are individually responsible for compliance with these regulations and any other regulations that may be pertinent to their occupation.

2. No property shall be improved in excess of its capacity to properly absorb wastewater effluent in the quantities and by the means provided herein.

3. The minimum lot size in which a new OSTS can be installed shall be 1 acre.

4. May allow NSF/ANSI 40 and 245 certified products to be used in design of ND onsite systems.

5. Water carried from bathrooms, kitchens, laundry fixtures, and other household plumbing shall pass through a septic tank prior to its discharge into the soil. Where underground disposal for treatment is not feasible, consideration will be given to special methods of collection and disposal.

6. Floor drains in shops shall not be connected to an OSTS. Building footing water, sump pumps, draintile, pool water, treated hot tub water, or pool filter backwash shall not enter the OSTS system.

7. Surface and storm waters shall not be discharged into any soil treatment area.

8. All wastewater shall be disposed of by a valid method of collection, treatment, and disposal. Wastewater shall not be disposed of in any manner that may create a nuisance or that may create a malfunctioning or failing system.

9. Cesspools shall not be installed and/or utilized and are considered a public nuisance. When a cesspool is abandoned, the pit shall be filled with soil, sand, or gravel. This requirement is binding on all systems.

10. When a septic tank is abandoned, it shall be pumped by a septic system servicer, the tank shall then be crushed and backfilled with soil, sand, or gravel or filled with a flowable fill and capped. Upon a finding of exceptional need, a septic tank may be ordered to be removed and disposed of in compliance with all applicable state and local rules and regulations.

11. No OSTS shall be installed during wet conditions or other conditions by which the soil would become smeared during construction. No OSTS shall be installed when the ground is frozen. The ground is considered frozen when the frost penetrates the top 6 inches of soil.

12. No OSTS or parts, thereof, shall be located on any parcel of land other than the parcel of
land where the dwelling or building serviced by the OSTS is located, except if there is a permanent easement recorded or a centralized treatment system.

13. No provision set forth herein shall be deemed to require a change in any portion of an existing OSTS or any other work regulated by these regulations in or on an existing building or lot when such work was installed and is maintained in accordance with the rules or regulations in effect prior to the effective date of these regulations, except, when it is determined by the regulatory authority to be a malfunctioning system. A malfunction in one portion of the system does not qualify as a failure of the entire system and thus does not automatically require rebuilding of the entire system.

Section X Site Conditions

1. All proposed sites for an OSTS soil treatment area shall include at minimum the following information:
   a. Depth of the seasonal high water table and bedrock or other limiting conditions.
   b. Soil conditions - properties and permeability
   c. Slope
   d. The existence of lowlands, depressions, rock outcrops
   e. Surface water drainage patterns
   f. All setbacks, as required in these regulations, shall be described or drawn out.

2. Flood prone areas
   a. No part of a system shall be installed in the floodway.
   b. The soil absorption area shall be located on the highest feasible area of the lot and shall have location preferences over all other improvements except the water supply well.
   c. The tank shall be protected against flotation under high water table conditions. This shall be achieved by weight of tank, earth anchors, or

shallow bury depths.

d. If a pumping station is used to move wastewater effluent from the septic tank to the soil treatment area, provisions shall be made to prevent the pump from operating when inundated with flood waters.

e. The building sewer shall be designed to prevent back flow of liquid into the building when the system is inundated. wastewater

f. Whenever the water level has reached a stage above the top of the septic tank, the tank shall be pumped to remove all solids and liquids after the flood has receded before the use of the system is resumed.

Section XI Construction Requirements

1. Every OSTS installed, and every alteration, extension, and/or repair to any system made after the effective date of this Resolution shall conform to the standards herein.

2. The proposed area or an OSTS shall be protected from disturbance, compaction or other damage by an effective method.

3. Approval of a system by the regulatory authority does not constitute a guarantee that the system will provide trouble-free service.

4. Proper installation, maintenance, and use, will decrease the possibility of a premature failure.

Section XII Other Systems

Where unusual conditions exist, special systems of treatment and disposal other than those specifically mentioned in these regulations may be provided if:

1. A design providing reasonable assurance of performance of such system is provided to the regulatory authority or

2. The engineering design, with the professional engineers stamp affixed, of such system is first approved by the regulatory authority and

3. There is no discharge to the ground surface or to surface waters and

4. Treatment and disposal of wastes is in such a manner so as to protect the public

health and general welfare and

5. Such systems shall comply with all applicable requirements of this Resolution except as otherwise affected by variance and with all local codes and ordinances.

Section XIII Unsuitable Soils

If the application for an OSTS permit has been denied because of the soil conditions being identified as unsuitable for an OSTS, a professional engineer may present plans for consideration by the regulatory authority for a specialized wastewater treatment system that overcomes the limitations of the lot and existing soil conditions.

Section XIV Administration

1. The regulatory authority or its designee shall administrate and enforce the provisions of these regulations.
2. At the request of the licensure board, each health unit is to rovide a list of regulators and proof that they have met the educational equivalent of Level 3 onsite licensure for the ND Onsite Wastewater Board.

3. The regulatory authority shall prepare a written decision, including findings of facts, supporting any decision it makes with respect to a denied application for a permit.

Section XV Variance

1. Upon application, the regulatory authority may grant a variance from the requirements of this Resolution when, in its opinion, undue hardship may result from strict compliance and that strict application would be unreasonable, impractical, or not feasible.

2. No variance shall be issued unless the regulatory authority finds:

a. that there are special circumstances or conditions affecting the property such that the strict application of the provisions of this Resolution would deprive the applicant of the reasonable use of the land;
b. that the variances necessary for the preservation and enjoyment of a substantial property right of the petitioner provided, however, any such variance includes conditions for prevention, control, or abatement of pollution consistent with the general purposes of this Resolution and applicable local, state, or federal laws;
c. that the granting of the variance will not be detrimental to the public health or welfare or injurious to other property in the area in which said property is situated; or
d. that the need for such variance is not the result of any act, omission or decision of the applicant.

3. The regulatory authority shall prepare a written decision, including findings of facts, supporting any decision it makes with respect to an application for a variance.

Section XVI Appeals

1. Any person directly affected by any order or determination of the regulatory authority may within 30 days of such action petition the local Board of Health for a hearing. Such appeal shall be in writing and shall specify in detail the grounds for the appeal. The appeal shall be filed with the local Board of Health.

2. Within 30 days of filing, the local Board of Health shall fix a date for a hearing.

3. Notice in writing shall be given to the petitioner at least 5 days prior to the hearing.

4. Within 30 days after the hearing, the local Board of Health shall take action and shall mail, by registered mail, a copy of its order to the petitioner.

5. If the petitioner is aggrieved by the determination of the local Board of Health, the petitioner may pursue an appeal with the North Dakota Onsite Wastewater Board following the above process defined for the local Board of Health.

6. If the petitioner is aggrieved by the determination of the North Dakota Onsite Wastewater Board, the petitioner may pursue an appeal in accordance with

N.D.C.C. Section 28-34-01.

Section XVII Suspension and Revocation

Any license or permit issued by the regulatory authority pursuant to these regulations shall be subject to action taken by the regulatory authority to suspend or revoke any such license or permit upon a finding of noncompliance with these regulations, a material misrepresentation in any application or materials presented in support of any license or permit; any willful noncompliance with these regulations; nonpayment of any fees or costs imposed pursuant to these regulations.

Section XVIII Cease and Desist Orders

Cease and desist orders may be issued when the regulatory authority, or its designee, has probable cause to believe that an activity regulated by this Resolution or any other official act is being or has been conducted without a permit or in violation of a permit or in violation of applicable law. When work has been stopped by a cease and desist order, the work shall not resume until the reason for the work stoppage has been completely satisfied, any fees paid, and the cease and desist order lifted.

Section XIX Regulation Enforcement

1. Malfunctioning on-site systems are a risk to the general health and welfare of this state and are hereby declared to be a nuisance.

2. Whenever brought to the attention of the regulatory authority that any unsanitary conditions exist in any on-site system or that any construction or work regulated by these regulations is dangerous, unsafe, unsanitary, a nuisance, risk to life, health, property, or otherwise is in violation of these regulations, it is the responsibility of the regulatory authority to investigate. The regulatory authority may order any person using or maintaining any such condition to repair, alter, change, remove, or demolish the problem area for the proper protection of life, health, and/or property. Every such order shall be in writing, addressed to the person using or maintaining any such conditions and shall specify a reasonable date or timeline for compliance with such order.

3. The property owner or designee shall notify the regulatory authority when a property that requires or has an OSTS is planned on being developed.

4. For a new property that has not been built on previously, feasibility for a new OSTS design and installation shall be determined.

5. When inspecting a property with an existing OSTS, the status and compliance of the existing system shall be determined by the regulatory authority, based on information provided by the property owner and visual inspection.

Section XX Penalties

Any person who violates these regulations or any rule or regulation adopted by the regulatory authority, or who violates any determination or order of the regulatory authority under these regulations, is guilty of a class B misdemeanor for each violation. Each continuing day of a violation is considered a separate offense.

Section XXI Fees

The regulatory authority is hereby authorized to establish and impose reasonable fees for inspections, plan reviews, site evaluations, filing of variance requests and filing of appeals.

Section XXII Severability

If any section, subsection, sentence, clause, phrase or portion of these regulations is for any reason held to be invalid or unconstitutional by the decision of any court of competent jurisdiction, such decision shall not affect the validity of the remaining portions of this Resolution.

Section XXIII Appendices

Appendix A – Procedures for Soil Determination and Material Acceptability
Appendix B – Design Standards
Appendix C –Estimated Wastewater Flow from Other Establishments *For Reference Only*

Section XX.IV Effective Date

This Resolution is hereby adopted by _____ on the _____ day of _____, 20__ and shall be effective on the _____ day of _____, 20__.

_____

Chair

Attest:

_____

Appendix A Procedures for Soil Determination and Material Acceptability

A **Soil Borings** - where soil borings are required, they shall be made as follows:

1. Each boring or excavation shall be made to a sufficient depth to provide the required design information.
2. A soil texture description shall be recorded by depth and notations made where texture changes occur.
3. Measurements shall be made to determine the depth to the limiting factor. This includes the highest notable water table by recording the first occurrence of redoximorphic features observed in the boring or excavation.

B **Percolation Tests** - where percolation tests are required they shall be made as follows:

1. Test hole dimensions and locations:
   Each test hole shall be 6 to 8 inches in diameter, have vertical sides, and be bored or dug to the depth of the bottom of the proposed individual wastewater treatment system.
2. Preparation of the test hole:
   The bottom and sides of the hole shall be carefully scratched to remove any smearing and to provide a natural soil surface into which water may penetrate. Remove all loose material from the bottom of the hole. Add 2 inches of clean rock or sand in a mesh bag to protect the bottom.
3. Soil Saturation and swelling:
   The hole shall be carefully filled with clear water to a minimum depth of 12 inches over the soil at the bottom of the test hole and maintained for no less than 4 hours and preferably overnight.
   The soil shall then be allowed to swell for at least 16 hours, but no more than 30 hours. In sandy soils, the saturation and swelling procedure shall not be required and the test may proceed if filling of the hole has seeped away in less than 10 minutes.
4. Percolation rate measurement:
   a. In sandy soils, adjust the water depth to 8 inches over the soil at the bottom of the test hole. From a fixed reference point, the drop in water level shall be measured in inches to the nearest 1/8 inch at approximately 10 minute intervals. A measurement can also be made by determining the time it takes for the water level to drop 1 inch from an 8 inch reference point. If 8 inches of water seeps away in less than 10 minutes, a shorter interval between measurements shall be used, but in no case shall the water depth exceed 8 inches. The test shall continue until 3 consecutive percolation rate measurements vary by a range of no more than 10%.
   b. In other soils, adjust the water depth to 8 inches over the soil at the bottom of the test hole. From a fixed reference point, the drop in water level shall be

measured in inches to the nearest 1/8 inch at approximately 30 minute intervals, refilling between measurements to maintain an 8 inch starting head. The test shall continue

until 3 consecutive percolation rate measurements vary by a range of no more than 10%. The percolation rate can also be made by observing the time it takes the water level to drop 1 inch from an 8 inch reference point if a constant water depth of at least 8 inches has been maintained for at least 4 hours prior to the measurement.

5. Calculating the percolation rate:
    a. Divide the time interval by drop in water level to obtain the percolation rate in minutes-per-inch.
    b. Percolation rates determined for each test hole shall be averaged to determine the final soil treatment system design.
6. For reporting the percolation rate, worksheets showing all calculations and measurements shall be submitted.
7. A percolation test shall not be run where frost exits below the depth of the proposed soil treatment system.

C Jar Test – Clean Sand

1. Place 2 inches of sand in the bottom of a quart size glass jar and then fill the jar 3/4th full of water.
2. Cover the jar and shake the contents vigorously.
3. Allow the jar to stand for 30 minutes and observe whether there is a layer of silt or clay on top of the sand.
4. If the layer of these fine particles is more than 1/8 of an inch thick, the sand is not suitable for use in mound construction, because too many fine particles tend to cause the soil to compact during constructions and future operation. Also, long-term acceptance rate of this soil will be slower than the long-term acceptance rate of clean sand, which is used for sizing the absorption bed area.

D Jar Test –Drain field Rock

1. Fill a quart sized glass jar nearly full with rock and then fill with water.
2. Cover the jar and shake the contents vigorously.
3. Allow the jar to stand for 30 minutes and observe whether a film forms on the surface or if fines collect on the bottom of the jar.
4. There should be less than 1/16-inch of fines in the bottom of the jar. If the measured fines layer is 1/16-inch or greater, a sieve analysis needs to be run (#200 sieve wash) to determine if the rock is acceptable or not.

Appendix B Design Standards

A Septic Tanks

General

1. All tanks shall be concrete, plastic or fiberglass, regardless of material or method of construction, the tank shall be watertight.
2. So designed and constructed as to withstand all lateral earth pressures under saturated soil conditions with the tank empty.
3. So designed and constructed as to withstand the pressure, at the depth of the septic tank, of saturated earth cover above the tank top.
4. Not subject to excessive corrosion or decay.
5. Tanks shall be installed in accordance with manufacturer requirements. Tanks susceptible to freezing shall be insulated.

Design – all tanks shall conform to the following criteria:

1. The liquid depth of any septic tank or compartment thereof shall not be less than 30 inches. A liquid depth greater than 6 ½ feet shall not be considered in determining tank capacity.
2. No tank or compartment thereof shall have an inside horizontal dimension less than 24 inches.
3. Inlet and outlet connections of the tank shall be submerged by means of baffles or sanitary tees.
4. The space in the tank between the liquid surface and the top of the inlet and outlet baffles shall not be less than 6 inches or 100 gallons, whichever is greater.
5. Inlet and outlet baffles shall be constructed of acid resistant concrete, acid resistant fiberglass, or plastic. Baffles shall be resistant to excessive corrosion or decay. Inlet baffles shall not restrict the movement of solids.
6. Sanitary tees shall be affixed to the inlet or outlet pipes with a permanent water-proof adhesive. Baffles shall be integrally cast with the tank, affixed with a permanent water- proof adhesive or affixed with stainless steel connectors, top and bottom.
7. The inlet baffle, or sanitary tee, shall extend at least 6 inches, but not more than 20% of the total liquid depth below the liquid surface and at least 1 inch above the crown of the inlet sewer.

8. The outlet baffle, or tee, and the baffles between compartments shall extend below the liquid surface, a distance equal to 40% of the liquid depth, except that the penetration of indicated baffles or sanitary tees for horizontal cylindrical tanks shall be 35% of the total liquid depth. They also shall extend above the liquid surface. In no case shall they extend less than 6 inches above the liquid surface.
9. The inlet invert shall not be less than 2 inches above the outlet invert.
10. The inlet and outlet shall be located opposite each other along with the axis of maximum dimension. The horizontal distance between the nearest points of the inlet and outlet devices shall be at least 4 feet.
11. If site conditions warrant, the approving authority may allow the inlet and outlet to be located on walls that are not opposite each other along the axis of maximum dimension. However, the horizontal distance between the nearest points of the inlet and outlet shall be at least 4 feet. However, the requirements of #10 above shall be met.
12. Sanitary tees shall be at least 4 inches in diameter. Inlet baffles shall be no less than 6 inches or no more than 12 inches measured from the end of the inlet pipe to the nearest point on the baffle. Outlet baffles shall be 6 inches measured from beginning of the outlet pipe to nearest point on the baffle.
13. Access to the septic tank shall be as follows:
    a. There shall be 1 or more manholes, with a minimum diameter of 18 inches (least dimension) and located within 6 feet of all walls of the tank. All manhole covers shall be at a minimum brought 6 inches above the finished grade.
    b. Covers shall be safely secured by being locked, bolted or screwed, having a weight of at least 95 pounds, or other methods as approved by the regulatory authority to prevent unauthorized entry.
    c. There shall be a 4 inch minimum inspection pipe for each baffled wall. The manhole cover can serve as the inspection cover. All inspection pipes shall be at minimum brought 6 inches above the finished grade.
14. Compartmentation of single tanks
    a. Septic tanks larger than 3,000 gallons and fabricated as a single unit shall be divided into 2 or more compartments.
    b. When a septic tank is divided into 2 compartments, not less than 1/2 nor more than 2/3 of the total volume shall be in the first compartment.
    c. When a septic tank is divided into 3 or more compartments, ½ of the total volume shall be in the first compartment and the other half equally divided in the other compartments.
    d. Connections between compartments shall be baffled so as to obtain effective retention of scum and sludge.

e. Adequate venting shall be provided between compartments by baffles or by an

opening of at least 50 square inches near the top of the compartment walls.

f. Adequate access to each compartment shall be provided by 1 or more manholes. Manholes shall meet the provisions of these regulations.

15. Multiple tanks
    a. Where more than 1 tank is used to obtain the required liquid volume, the tanks shall be connected in series.
    b. Each tank shall comply with all other provisions of these regulations.
    c. No more than 4 tanks in series can be used to obtain the required liquid volume.
    d. The first tank shall be no smaller than any subsequent tanks in series.
16. Outlet pipe from septic tank
    a. The outlet pipe from the septic tank shall not be cast iron.
    b. The outlet pipe extending from the septic tank shall be of sound and durable construction, not subject to corrosion or decay.
    c. The outlet pipe extending from the septic tank to the undisturbed soil beyond the tank shall meet the strength requirements of the American Society for Testing and Materials (ASTM), schedule 40 plastic pipe and shall be supported in a manner that there is no deflection during the backfilling and subsequent settling of the soil between the edge of the septic tank and the edge of the excavation.
    d. The soil around the pipe extending from the septic tank shall be compacted to original density for a distance of 3 feet beyond the edge of the tank excavation.
17. Capacity
    a. Dwelling - the liquid capacity of a septic tank serving a dwelling shall be based on the number of bedrooms contemplated in the dwelling served and shall be at least as large as the capacities given below in Table I:

Table I Tank Sizing for Dwellings

Number of Bedrooms	Tank Liquid Capacities (Gallons)
1 to 3	1,000
4 to 5	1,500
6 to 7	2,000
8 to 9	2,500

*For 10 or more bedrooms, the septic tank shall be sized as an “other” establishment.

    b. Other establishments. The liquid capacity of the septic tank serving a building other than a dwelling shall be determined by multiplying the

design flow, see Appendix D -Estimated Wastewater Flow for Other Establishments *For Reference Only*, by:

i. 3 if wastewater is delivered by gravity to the tank

ii. 4 if the wastewater is delivered by pressure to the tank

c. If a garbage disposal is installed in a dwelling or other establishment at any time, the septic tank capacity shall be at least 50% greater than that required in items a and b and either multiple compartments or multiple tanks shall be provided.

d. For other establishments and for dwellings utilizing a pressurized soil treatment area, an effluent filter shall be installed on the outlet of the last tank, closest to the pump chamber or soil treatment area.

e. Pump chamber capacity cannot be included in the sizing for septic tank liquid capacity.

18. Location
    a. The septic tank shall be placed so that it is accessible for the removal of liquids and accumulated solids.
    b. The septic tank shall be placed on firm and settled soil capable of bearing the weight of the tank and its contents.
    c. Setbacks see Table IV in Section C -Soil Treatment Area –Design and Construction.
19. The owner of any septic tank or their agent shall regularly inspect the tank. Whenever the top of the sludge layer is less than 12 inches below the bottom of the outlet baffle or whenever the bottom of the scum layer is less than 3 inches above the bottom of the outlet baffle the owner shall arrange for servicing by a septic system servicer.

B Distribution and Dosing of

Wastewater Effluent Supply Pipe

1. The supply pipe extending from the building to septic tank(s) to the undisturbed soil beyond the tank
   excavation shall meet the strength requirements of American Society for Testing and Materials (ASTM), Schedule 40 Pipe, contained in the Standard Specifications for Poly Vinyl Chloride (PVC) Plastic Pipe Schedules 40, 80 and 120, ASTM D1785.
2. Supply pipe shall
    a. Be made from materials resistant to breakdown from wastewater and soil;
    b. Be watertight, including all joints;
    c. Be durable throughout the design life;
    d. Not deflect, buckle, crush or longitudinally bend; by ensuring the soil is sufficiently compacted underneath the pipe and/or laying on undisturbed soil.
    e. Be resistant to pressures, fatigue, and strain for the application
    f. Be installed according to ASTM Standard Practice for Underground Installation of Thermoplastic Pipe for Sewer and Other Gravity-Flow

Applications ASTM D2321;

g. Be designed, installed, and protected to minimize the danger of freezing in the pipe;

h. Not be closer than 6 inches from final grade. Pipes susceptible to freezing shall be insulated and meet setback requirements, see Section C -Soil Treatment Area - Design and Construction.

3. Minimum slope for gravity supply pipes is 1%. Pipe restraints shall be used for slopes greater than 20% or where fluid velocities in the pipe exceed 15 feet per second.
4. For pressure supply pipes, a minimum slope of 1% for drainback or other frost protection shall be employed.

Gravity Distribution

1. Serial distribution shall be used to distribute wastewater effluent to individual trenches in a soil treatment area. If the necessary elevation differences between trenches for serial distribution cannot be achieved by natural topography or by varying excavating depths, parallel distribution shall be used.
2. If drop boxes are used for serial distribution, the following shall apply:
    a. Boxes shall be watertight and be constructed of durable materials not subject to excessive corrosion or decay
    b. The invert of the inlet supply pipe shall be at least 1 inch higher than the invert of the outlet supply pipe to the next drop box.
    c. The invert of the outlet supply pipe to the next drop box shall be no greater than 2 inches higher than the crown of the distribution pipe serving the trench in which the box is located.
    d. When wastewater effluent is delivered to the drop box by pump, the pump discharge shall be directed against a wall or side of the box on which there is no outlet or directed against a deflection wall or other energy dissipater. The discharge rate into the drop box shall not result in surfacing of wastewater from the drop box. The supply pipe shall drain after the pump shuts off.
    e. The drop box shall be covered by a minimum of 6 inches of soil. If the top of the box is deeper than 6 inches, access shall be provided above, at, or within 6 inches of finished grade.
    f. The drop box shall be placed on firm and settled soil.
3. Distribution boxes shall meet the following:
    a. Shall be watertight and be constructed of durable materials not subject to excessive corrosion or decay
    b. The distribution box shall be covered by a minimum of 6 inches of soil. If the top of the box is deeper than 6 inches, access shall be provided above, at, or within 6 inches of finished grade.

c. The invert and all outlets shall be set and maintained at the same elevation.
d. The inlet invert shall be either
    i. 1 inch above the outlet invert

ii. Sloped such that an equivalent elevation above the outlet invert is obtained within the last 8 feet of the inlet pipe.

e. Each trench line shall be connected separately to the distribution box and shall not be subdivided. Distribution boxes shall not be connected to one another if each box has distribution pipes.

f. When wastewater effluent is delivered by pump, a baffle wall must be installed in the distribution box or the pump discharge must be directed against a wall, baffle, side of the box on which there is not outlet, or directed against a deflection wall, battle or other the pump discharge shall be directed against a deflection wall, baffle, or other energy dissipater. The baffle shall be secured to the box and extend at least 1 inch above the crown of the inlet pipe. The discharge rate into the drop box shall not result in surfacing of wastewater from the box. Pressure shall not build up in the box during pump discharge.

4. Nonpressurized distribution pipes shall comply with the following:
   a. Shall be at least 4 inches in diameter and constructed of sound and durable material not subject to corrosion or decay or to loss of strength under continuously wet conditions.
   b. Shall have at least 1 row of holes of no less than 1/2 inch in diameter spaced no more than 36 inches apart.
   c. Shall be laid level orientated away from the distribution device.
   d. Shall have a load bearing capacity of not less than 1,000 pounds per lineal foot.
   e. The distribution pipes in beds shall be uniformly spaced no more than 5 feet apart and not more than 30 inches from the side walls of the bed.

Pressure Distribution

1. Pressure distribution pipes and associated fittings shall be properly joined together and withstand a pressure of at least 40 pounds per square inch.
2. The distribution network shall be designed so there is less than 10% variance in flow for all perforations.

Perforations shall be no smaller than 1/8 inch diameter and no larger than 1/4 inch diameter. The number of perforations, perforation spacing and pipe size for pressure distribution shall be in accordance with Table II. The friction loss in any individual perforated lateral shall not exceed 20% of the average pressure head on the perforation

Table II Maximum Number of Perforation per Lateral

¼ inch holes	Pipe diameter in inches				
	1	1.25	1.5	2	3
Perforation spacing in feet	Number of perforations per lateral				
2	10	13	18	30	60
2.5	8	12	16	28	54
3	8	12	16	25	52
3/16 inch holes	Pipe diameter in inches				
	1	1.25	1.5	2	3
Perforation spacing in feet	Number of perforations per lateral				
2	12	18	26	46	87
2.5	12	17	24	40	80
3	12	16	22	37	75
1/8 inch holes	Pipe diameter in inches				
	1	1.25	1.5	2	3
Perforation spacing in feet	Number of perforations per lateral				
2	21	33	44	74	149
2.5	20	30	41	69	135
3	20	29	38	64	128

3. Perforations holes shall be drilled straight into the pipe and not at an angle. Pressurized distribution laterals shall be installed level. Perforation holes shall be free of burrs. The pipes shall drain after the pump turns off.
4. The pressure distribution pipes in beds shall be uniformly spaced no more than 36 inches apart and not more than 24 inches from the outside edge of the bed or mound.
5. Pressure distribution pipes shall be connected to a header or manifold pipe that is of a diameter of such that the friction loss in the header or manifold will be no greater than 5% of the average head at the perforations. The header or manifold pipe shall be connected to the supply pipe from the pump.

6. Perforated pressure distribution pipes shall not be installed closer than 12 inches from the edge of the absorption bed and shall terminate no closer than 12 inches from the ends of the absorption bed.
7. Pressure distribution pipes cleanouts shall be provided to check the system for proper operation and cleaning of plugged perforations. Cleanouts shall be accessible from final

grade.

Dosing of Wastewater Effluent

1. The pump controls and pump discharge line shall be installed to allow access for servicing or replacement without entering the dosing chamber.
2. The dosing chamber shall be water tight and constructed of concrete, plastic or fiberglass.
    a. There shall be 1 or more manholes, with a minimum diameter of 18 inches (least dimension) preferably located directly above the dosing device. Manhole covers shall be brought 6 inches above the finished grade.
    b. Covers shall be safely secured by being locked, bolted or screwed, having a weight of at least 95 pounds, or other methods as approved by the regulatory authority to prevent unauthorized entry.
    c. The size of the wastewater effluent dose shall be determined by design of the soil treatment unit but in no case shall the dosing chamber be sized to provide a dose of less than 75 gallons.
    d. It shall be the responsibility of the property owner to contact a qualified electrician for proper installation of any electrical component used for dosing.
    e. A mechanical warning system shall be installed to warn of pump failure.
3. Pumps for gravity distribution
    a. The pump shall discharge at least 10 gallons per minute but no more than 45 gallons per minute
    b. The pump shall be constructed and fitted with sound, durable and corrosion- resistant materials.
    c. The pump shall have sufficient dynamic head for both the elevation difference and friction loss.
4. Pumps for pressure distribution
    a. The pump shall be constructed and fitted with sound, durable and corrosion- resistant materials.
    b. The pump discharge capacity shall be based on perforation discharges for a minimum average head of
        i. For dwellings: 1 foot for 3/16 inch to ¼ inch perforations and 2 feet for 1/8 inch perforations
        ii. For other establishments: 2 feet for 3/16 inch to ¼ inch perforations and 5 feet for 1/8 inch perforations

    Perforation discharge is determined by the following formula:
    $Q=19.56cd^2h^{1/2}$

Where q= discharge in gallons per minute
C= 0.60 = coefficient of discharge
D = perforation diameter in inches
H = head in feet

c. The pump discharge head shall be at least 5 feet greater than the head required to overcome pipe friction losses and the elevation difference between the pump and the distribution device.
d. The quantity of wastewater effluent delivered for each pump cycle shall be no greater than 25% of the design flow and at least 4 times the volume of the distribution pipes plus the volume of the supply pipe.

5. Pumps shall be installed in accordance with manufacturer requirements.

C Soil Treatment Area

General - Final treatment and disposal of all wastewater effluent shall be approved by the regulatory authority.

1. The soil and limiting factors shall determine the type of soil treatment area. See Appendix A for soil boring and percolation test procedures.
2. Soils shall be analyzed and reported by a registered professional soil classifier or entity approved by the regulatory authority.
3. The soil sizing factor shall be determined by the soil between the bottom of the soil treatment area and the limiting factor, using the most restrictive layer as the soil sizing factor.
4. The vertical separation between the bottom of the soil treatment area and the limiting factor shall be at least 24 inches.
5. In course sand, (see Guide for USDA Textural Classification), a minimum of 36 inches of vertical separation shall be required.
6. Excessive overland surface flow shall be diverted from the soil treatment area.

Sizing

1. After considering the soil conditions, the required size of the soil treatment area shall be determined by number of bedrooms for dwellings, the sum of the areas required for each individual unit for multiple residential units, and by the daily wastewater flow for other establishments.
2. For a multifaceted building the gallons per day of each service, number of bedrooms etc. shall be cumulative to determine the gallons per day.
3. Estimates of wastewater flow for dwellings are given below in Table III:

Table III Dwelling Wastewater Flow

Number of Bedrooms	Wastewater Flow (gallons per day)
2	300
3	450
4	600
5	750
6	900
7	1050
8	1200
9	1350

4. For other establishments, see Appendix D as reference.
5. The minimum soil treatment area required for any dwelling shall provide treatment for at least 2 bedrooms, 300 gallons per day.

Design and Construction

Setbacks are given below in Table IV:

Table IV Minimum Setback Distances

Feature	Wastewater tanks, holding tank (feet)	Soil treatment area and distribution device (feet)
Well < 100 feet deep	100	100
Well > 100 feet deep	50	50
Any other water supply well or buried water suction pipe	50	50
Buried pipe distributing water under pressure	10	10
Surface Water bodies –from ordinary high water mark	100	100
Buildings	10	20
Property lines	10	10

Trench

1. The sizing of the soil treatment area shall be determined in accordance with Table V:

TABLE V Soil Sizing Factors

Percolation Rate (minutes-per-inch)	Soil Texture	Soil Sizing Factor (feet²/gallon per day)	Area per Bedroom (feet²)
<0.1*	Coarse sand		
0.1 – 5	Medium sand Loamy sand	0.83	125
0.1 – 5	Fine sand	1.67	250
6 – 15	Sandy loam	1.27	190
16 – 30	Loam	1.67	250
31 – 45	Silt loam, silt	2.00	300
46 – 60	Clay loam sandy clay or silty clay	2.20	330
61 - 120**	Clay, sandy or silty clay	4.20	630
>120***			
*Soil is unsuitable for standard system if percolation rate is less than 0.1 minutes-per-inch		** Consider at-grade or mound for soils with this percolation range	***Soil is unsuitable for standard system if percolation rate is slower than 120 minutes-per-inch

2. On slopes in excess of 12%, the soil profile shall be carefully evaluated in the location of the proposed soil treatment system and down slope to identify the presence of layers with different permeability that may cause side hill seepage. In no case shall a trench be located within 15 feet of such a layer surfacing on the down slope.
3. Trenches shall not be less than 18 inches nor more than 36 inches wide. Any trench wider than 36 inches shall be considered a bed. See Section C -Soil Treatment Area -Seepage Bed.
4. Trenches should have a minimum spacing of 6 feet on center.
5. The bottom of the trench excavation shall be level and along the contour. Sidewalls shall be as vertical as practical and not intentionally sloped.
6. The bottom and sides of the soil treatment system to the top of the filter material shall be excavated in such a manner as to leave the soil in a natural, un-smeared, and uncompacted condition. Excavation shall be made only when the soil moisture content is at least or less than the plastic limit.

7. Trenches shall not be more than 110 feet in length, without approval from the regulatory authority.

8. Allow a 25% reduction in design when using chambers in a trench, if the chambers are a minimum of twelve inches (12”) tall and thirty-six inches (36”) wide or larger.
9. Trenches shall not have a depth greater than 4 feet.
10. When in slower draining loam to clay soil, excavation shall be by back hoe or other means that allow the equipment wheels or tracks to remain on the surface soil. Excavation equipment or other vehicles shall not be driven on the soil treatment area.
11. When installed in sand, the soil treatment area shall employ one of the following:
    a. Employ pressure distribution;
    b. Divide the total dispersal area into multiple units that employ serial distribution,
    c. Or other treatment method preapproved by the regulatory authority
12. Material Used
    a. Drain field rock trench system
        i. There shall be a layer of at least 6 inches but no more than 24 inches of filter materials on the bottom of the trenches.
        ii. The filter material shall completely encase the distribution pipes; see Section B -Distribution and Dosing of Wastewater Effluent, to a depth of at least 2 inches.
        iii. The filter material shall be covered with an unwoven geo-textile fabric or a similar, permeable material approved by the regulatory authority
    b. Other materials and devices may be used to distribute wastewater effluent over the soil treatment area and shall be installed in accordance with manufacturer requirements, upon approval by the regulatory authority.
13. The minimum depth of cover over the crown of distribution pipes shall be 12 inches of soil. The maximum depth of cover over the crown distribution pipes shall be no more than 36 inches. No more than 24 inches is preferred.
14. Each trench shall have an inspection pipe that is 4 inches in diameter. The inspection pipe shall be located at the end opposite where wastewater effluent enters the drain field and allow for monitoring of current water level. Perforations shall not be located above the fabric, if used. The inspection pipe shall extend to the bottom of the distribution medium, be secured and capped 6 inches above finished grade, or accessible below grade. If the first trench has an additional inspection

pipe it shall be at the entrance of the trench.

15. The trenches shall be backfilled and crowned above finished grade to allow for settling.
16. A grass cover shall be established over the soil treatment system.

Seepage Bed

In addition to applicable design and construction information found in Trench Design and Construction, beds shall meet the following requirements:

1. Beds shall have prior approval from the regulatory authority.
2. Gravity beds shall be sized with 50% more square feet than trenches.
3. Bed construction shall be limited to areas having natural slopes of less than 6%.
4. Maximum width for gravity bed is 12 feet, the maximum for pressurized bed is 25 feet.
5. Multiple beds shall be spaced at one-half the bed width.

Mound

1. Buildings utilizing a mound as soil treatment area that employs a garbage disposal shall have an effluent filter that is capable of removing food waste.
2. Mounds shall be constructed on original soil and meet the separation requirement between the bottom of the distribution medium and limiting factor.
3. There shall be at least 12 inches of original soil with a percolation rate faster than 120 minutes-per inch above the limiting factor. See vertical separation requirements in Section C Soil Treatment Area-General #4 and 5.
4. The sizing of the soil treatment area shall be determined in accordance with Table VI by using the percolation rate of the 12 inches of original soil immediately under the clean sand layer.

Table VI Absorption Width Sizing

Percolation rate of original soil (minutes-per-inch)	Soil Texture	Loading Rate (gallons per day/ square foot)	Absorption Ratio (square feet per gallon/day)
<5	Coarse sand Loamy sand Sand	1.20	1.00
0.1 – 5	Fine sand Loamy fine sand	0.6	2.0
6 – 15	Sandy loam	0.78	1.50
16 - 30	Loam	0.60	2.00
31 – 45	Silt loam, silt	0.50	2.40

46 – 60	Clay loam, silty or sandy clay loam	0.45	2.67
61 – 120	Silty or Sandy Clay or Clay	0.24	5
>120	Soil is unsuitable for standard system if percolation rate is slower than 120 minutes-per-inch		

5. Mounds shall not be located on natural slopes exceeding 12%.
6. On slopes of 3% or greater, and where the original soil is a clay, sandy clay or silty clay soil, mounds shall not be located where the ground surface contour lines that lie directly below the long axis of the distribution bed represent a swale or draw, unless contour lines have a radius of curvature greater than 100 feet. Mounds shall never be located in swales or draws where the radius of curvature of the contour lines is less than 50 feet.
7. The required absorption width of mounds constructed on ground sloping from 0 to 1% shall include the width of the distribution bed plus a distance measured between the outer

   edges of the upslope and the down- slope banks. The required absorption width for mounds constructed on ground sloping between 1% and 12% shall include the width under the drain field rock layer plus a portion of the width of the downslope bank.
8. The side slopes on the mound shall not be steeper than 4 to 1.
9. The supply pipe from the pump to the mound area shall be installed before soil surface preparation. The trench shall be carefully backfilled and compacted to prevent seepage of wastewater effluent.
10. All vegetation in excess of 4 inches in length and dead organic debris shall be removed from the surface of the total area selected for the mound, including the area under the banks. The total area shall be roughened by plowing to a depth of at least 8 inches or the sod layer broken and roughened by backhoe teeth. Furrows shall be thrown uphill and there shall be no dead furrow under the mound.
11. The soil shall be plowed or roughened when the moisture content of a fragment 8 inches below the surface is below the plastic limit. The soil under a mound including the area under the banks shall not be roughened by rototilling or pulverizing. In soils that are sandy in the top 8 inch depth, discing may be used for surface preparation as a substitute for plowing. Mound construction shall proceed immediately after surface preparation is completed.
12. A rubber-tired tractor may be used for plowing or discing but shall not be driven on the absorption area after the surface preparation is completed. A crawler or track type tractor shall be used for mound construction.
13. Materials Used

a. Drain field rock mound system
    i. The bottom area of the drain field rock layer shall be sized on the basis of
    0.83 square feet-gallon per day of water per day at a minimum.
    ii. A minimum of 12 inches of soil defined as clean sand shall be placed in contact with the bottom area of the drain field rock layer area is to be located and shall be uniformly tapered to cover the entire original soil absorption area.
    iii. The clean sand shall be placed by using a construction technique that minimizes compaction. If the clean sand is pushed into place, a crawler tractor with a blade or unloaded bucket shall be used to push the clean sand into place. At least 6 inches of clean sand shall be kept beneath the equipment to minimize compaction of the plowed layer. When placing clean sand with a backhoe that has rubber tires, the tractor shall not drive over the drain field rock or banks of the mound. The clean sand layer upon which the drain field rock is placed shall be level.
    iv. A depth of at least 9 inches of drain field rock shall be placed over the rock layer area below the distribution pipe.
    v. Distribution of wastewater effluent over the rock layer shall be by distribution pipe under pressure see Section B -Distribution and Dosing of Wastewater Effluent.
    vi. The drain field rock shall completely encase the top and sides of the distribution pipes to a depth of 2 inches. The top of the drain field rock shall be level in all directions.
    vii. The width of the drain field rock layer in a single mound shall not exceed 10 feet.
    viii. The drain field rock shall be covered with a permeable synthetic fabric.
    ix. Construction vehicles shall not be allowed on the drain field rock until back fill is placed.
    x. On slopes of 3% or greater, the long axis of the level drain field rock layer shall not diverge up or down the slope by more than 12 inches of elevation from the natural contour line. The depth of the clean sand layer along the upper edge of the level drain field rock layer shall not vary by more than 12 inches.
    xi. Soil suitable to grow vegetative cover shall be placed on the soil treatment area to a depth of 1 foot in the center of the mound and to a depth of 6 inches at the sides.
    xii. A maximum of two 10-foot wide rock layers may be installed side by side in a single mound if the original soil is sandy loam, loam, silt

loam, silt, clay loam, sandy clay or silty clay to a depth of at least 24 inches below the clean sand layer. The rock layers shall be separated by 4 feet of clean sand.

xiii. When 2 rock layers are installed side by side, the sandy loam fill shall be 18 inches deep at the center of the mound and 6 inches deep at the sides.

b. Other material and devices may be used to distribute wastewater effluent over the soil treatment area upon approval by the regulatory authority shall be installed in accordance with manufacturer requirements.

14. A clean out and vertical inspection pipe at least 4 inches in diameter shall be installed and secured at the distribution medium and sand interface. The inspection pipe shall allow for monitoring of current water level. Perforations shall not be located above the fabric, if used. The inspection pipe shall extend to the bottom of the distribution medium, be secured and capped 6 inches above finished grade, or accessible below grade.
15. A grass cover shall be established over the entire area of the mound.
16. Shrubs shall not be planted on the top of the mound. Shrubs may be placed at the foot and side of the mound.
17. Whenever mounds are located on slopes, a diversion shall be constructed immediately upslope from the mound to intercept and direct runoff.

At-grade System

1. Buildings utilizing an at-grade system as soil treatment area that employs a garbage disposal shall have an effluent filter that is capable of removing food waste.
2. At-grade systems shall not be installed in areas with slopes greater than 25%.
3. At-grade beds shall not exceed a width of 15 feet. The at-grade width for slopes 1% and greater does not include any width of media necessary to support the upslope side of the pipe.
4. The sizing of the soil treatment area shall be determined in accordance with Table VI by using the loading rate for the upper 12 inches of soil.
5. Materials Used
    a. Distribution of wastewater effluent over the drain field rock layer shall be by distribution pipe under pressure see Section B -Distribution and Dosing of Wastewater Effluent.
    b. At-grade systems located on 1% slope or greater require only one distribution pipe located on the upslope edge, with the bed width being measured from the distribution pipe to the downslope edge. Multiple distribution pipes may be allowed for use to provide even distribution if necessary, based upon site conditions.
    c. The upslope edge of an at-grade bed shall be installed along the natural contour.
    d. At-grade materials shall be placed by using construction techniques that minimize compaction.
    e. 12 inches of soil suitable to grow vegetative cover shall be installed over the distribution media. Cover shall extend at least 5 feet from the ends of the media bed and be sloped to divert surface water. Side slopes shall not be steeper than 4 to 1.
    f. Other material and devices may be used to distribute wastewater effluent over the soil treatment area upon approval by the regulatory authority shall be installed in accordance with manufacturer requirements.
6. A clean out and vertical inspection pipe at least 4 inches in diameter shall be installed and secured at the distribution medium and sand interface. The inspection pipe shall allow for monitoring of current water level. Perforations shall not be located above the fabric, if used. The inspection pipe shall extend to the bottom of the distribution medium, be secured and capped 6 inches above finished grade, or accessible below grade.
7. A grass cover shall be established over the entire area of the at-grade.

D Alternative Systems

Holding Tanks

1. A holding tank shall comply with the septic tank provisions of these regulations, see Section A -Septic Tanks.
2. Capacity:
    a. For a dwelling, the minimum size shall be 1,000 gallons or 400 gallons times the number of bedrooms, whichever is greater.
    b. For permanent buildings other than dwellings and temporary facilities, the capacity shall be based on measured flow rates or estimated flow rates. The tank capacity shall be at least 7 times the daily flow rate.
3. Holding tanks shall be located:
    a. In an area readily accessible to a pump truck under all weather conditions.
    b. Where accidental spillage during pumping will not create a nuisance.
4. Proof for disposal and treatment of the wastewater wastes shall be maintained by the owner with a septic system servicer.
5. Holding tanks shall be monitored to minimize the chance of accidental wastewater overflows. A mechanical warning system shall be installed which allows 25% reserve capacity after actuation. It shall be the responsibility of the property owner to contact a qualified electrician for proper installation of any electrical component.

Chemical Toilets

1. Chemical toilets shall consist of a toilet seat connected by a metal hopper to a metal tank containing chemicals, usually sodium hydroxide. All connections to the toilet seat and the tank shall be watertight. A rod shall extend above the floor of the room to operate the agitator in the chemical tank.
2. A supply of the chemical shall be available in a closed container for periodic additions to the toilet.

Privies

1. General specifications for the design and construction of a privy.
    a. A privy pit shall be constructed by providing a watertight structure in the pit. The watertight structure shall provide a minimum capacity of 1000 gallons.
    b. A privy building shall be placed over the structure.
    c. The floor of this building shall be of concrete with the privy seat of suitable material which is easily cleanable and serviceable.
    d. A vent located adjacent to the seat shall extend from the vault to a point above the roof of the building. The seat shall be provided with a cover.
2. All openings in the building shall be screened to prevent the entrance of flies. The building shall be so constructed as to prevent the entrance of vermin to the vault. The privy door shall be self-closing.

3. A contract for disposal and treatment of the wastewater wastes shall be maintained by the owner with a septic system servicer.

4. Privies shall be monitored to minimize the chance of accidental wastewater overflows. If a mechanical warning system is installed, it shall allow 25% reserve capacity after actuation. It shall be the responsibility of the installer to contact a qualified electrician for proper installation of any electrical component.
5. Removable cans: When removable cans are used in a privy, they shall be placed in watertight vaults and provisions made for removing the seat so the cans can be moved for disposal of the contents in a manner acceptable to the regulatory authority. The privy building shall comply with the above specifications for a pit privy building

Appendix D Estimated Wastewater Flow from Other Establishments

For Reference Only

TYPE OF OCCUPANCY	GALLONS PER DAY
Airports (per employee)	15
Airports (per passenger)	5
Auto washers – check equipment manufacturer	-
Bowling alleys – with snack bar only (per lane)	75
Campground – with central comfort station (per person)	35
Campground – with flush toilets – no showers (per person)	25
Camps (day) – no meals served (per person)	15
Camps (summer and seasonal camps) – (per person)	50
Churches – sanctuary (per seat)	5
Churches – with kitchen waste (per seat)	7
Dance halls – (per person)	5
Factories – no showers (per employee)	25
Factories – with showers (per employee)	35
Factories – with cafeteria (per employee)	5
Hospitals – (per bed)	250
Hospitals – kitchen waste only (per bed)	25
Hospitals – laundry waste only (per bed)	40
Hotels – no kitchen waste (per bed)	60
Institutions – resident (per person)	75
Nursing home – (per person)	125
Rest home – (per person)	125
Laundries – self-service with minimum 10 hours per day (per wash cycle)	50
Laundries – commercial check with manufacturer's specification	-
Motel (per bed space)	50
Motel – with kitchen (per bed space)	60
Offices – (per employee)	20
Parks – mobile homes (per space)	250
Parks (picnic) – with toilets only (per parking space)	20
Parks (recreational vehicles) – without water hook-up (per space)	75
Parks (recreational vehicles) – with water and sewer hook-up (per space)	100
Restaurants – cafeteria (per employee)	20
Restaurants – with toilet waste (per customer)	7
Restaurants – with kitchen waste (per meal)	6
Restaurants – with kitchen waste disposable service (per meal)	2
Restaurants – with garbage disposal (per meal)	1
Restaurants – with cocktail lounge (per customer)	2
Schools staff and office (per person)	20

Schools – elementary (per student)	15
Schools – intermediate and high (per student)	20
Schools – with gym and showers (per student)	5
TYPE OF OCCUPANCY	**GALLONS PER DAY**
Schools – with cafeteria (per student)	3
Schools (boarding) – total waste (per person)	100
Service station – with toilets for 1st bay	1000
Service station – with toilets for each additional bay	500
Stores – (per employee)	20
Stores – with public restrooms (per 10 square feet of floor space)	1
Swimming pools – public (per person)	10
Theaters – auditoriums (per seat)	5
Theaters – with drive-in (per space)	10

For SI units: 1 square foot = 0.0929 m^2 , 1 gallon per day = 3.785 L/day

Notes:

[1] Sewage disposal systems sized using the estimated waste/sewage flow rates shall be calculated as follows:

(a) Waste/sewage flow, up to 1500 gallons per day (5678 L/day)
Flow x 1.5 = septic tank size

(b) Waste/sewage flow, over 1500 gallons per day (5678 L/day)
Flow x 0.75 + 1125 = septic tank size

(c) Secondary system shall be sized for total flow per 24 hours.

[2] See Section H 201.1.

[3] Because of the many variables encountered, it is not possible to set absolute values for waste/sewage flow rates for all situations. The designer should evaluate each situation and, where figures in this table need modification; they should be made with the concurrence of the Authority Having Jurisdiction.