

**SUBCHAPTER D: PLANNING, CONSTRUCTION, AND
INSTALLATION STANDARDS FOR OSSFS
§§285.30 - 285.39
Effective December 27, 2012**

§285.30. Site Evaluation.

(a) General Requirement. To document the soil and site conditions, a complete site evaluation shall be performed by either a site evaluator or a professional engineer on every tract of land where an OSSF will be installed. A report prepared by either the site evaluator or the professional engineer providing the site evaluation criteria in subsection (b) of this section shall be submitted with the planning materials.

(b) Site evaluation criteria. All aspects of the site evaluation shall be performed by either a site evaluator or a professional engineer according to this section. The information obtained during the site evaluation shall be used to determine the type and size of the OSSF.

(1) Soil analysis. The site evaluator or the professional engineer shall either drill two soil borings or excavate two backhoe pits at opposite ends of the proposed disposal area to determine the characteristics of the soil. In areas of high soil variability, the permitting authority may require additional borings or backhoe pits. The borings or backhoe pits shall either be excavated to a depth of two feet below the adopted excavation of the disposal area, or to a restrictive horizon, whichever is less. The location of all borings or backhoe pits shall be clearly indicated on the site drawing required in §285.5(a) of this title (relating to Submittal Requirements for Planning Materials).

(A) Soil texture analysis. A general texture analysis shall be performed to identify the classification of the soil. The different soils in each class are provided in §285.91(6) of this title (relating to Tables).

(i) Soil Class Ia. This class includes sandy textured soils that contain more than 30% gravel.

(ii) Soil Class Ib. This class includes sand and loamy sand soils that contain less than or equal to 30% gravel.

(iii) Soil Class II. This class includes sandy loam and loam soils.

(iv) Soil Class III. This class includes silt, silt loam, silty clay loam, clay loam, sandy clay loam, and sandy clay soils.

(v) Soil Class IV. This class includes silty clay and clay soils.

(B) Gravel analysis. Class II or Class III soils containing gravel shall be further evaluated by either a site evaluator or a professional engineer by using a sieve analysis to determine the percentage of gravel by volume and the size of the gravel as indicated in §285.91(5) of this title.

(C) Restrictive horizons analysis. The soils within the borings or backhoe pits shall be analyzed by either a site evaluator or a professional engineer to determine if a restrictive horizon exists. Clay subsoils, rock, and plugged laminar soils are considered restrictive horizons. Restrictive horizons are recognized by an abrupt change in texture from a sandy or loamy surface horizon to:

(i) a clayey subsoil which an auger will not penetrate; or

(ii) rock-like material which an auger will not penetrate.

(2) Groundwater evaluation. The soil profile shall be examined by either a site evaluator or a professional engineer to determine if there are indications of groundwater within 24 inches of the bottom of the excavation.

(A) If the designated representative and the site evaluator or the professional engineer disagree on the presence of groundwater, the designated representative shall verify groundwater information using the Natural Resources Conservation Service (NRCS) soil survey for that county, if it is available.

(B) If the designated representative or the site evaluator or the professional engineer disagree with the NRCS soil survey, or if an NRCS soil survey does not exist for that county, the owner has the option to retain a certified professional soil scientist to evaluate the presence of groundwater and present that information to the designated representative for a final decision.

(3) Surface drainage analysis.

(A) Topography. The slope of each tract of land where an OSSF will be installed, areas of poor drainage such as depressions, and areas of complex slope patterns where slopes are dissected by gullies and ravines shall be determined. All slope patterns shall be clearly indicated on the site drawing, as required in §285.5(a) of this title.

(B) Flood hazard. The 100-year floodplain for each tract of land where an OSSF will be installed shall be determined from either Federal Emergency Management Agency (FEMA) maps or from a flood study prepared by a professional

engineer when FEMA maps are not available. The 100-year flood boundaries shall be clearly indicated on the site drawing, as required in §285.5(a) of this title. The drawing(s) shall also indicate if the 100-year floodplain does not exist within the tract.

(4) Separation requirements. All features in the area where the OSSF is to be installed that could be contaminated by the OSSF or could prevent the proper operation of the system shall be identified during the site evaluation. The separation requirements are in §285.91(10) of this title. All features and separation distances shall be clearly indicated on the site drawing, as required in §285.5(a) of this title.

Adopted August 20, 2008

Effective September 11, 2008

§285.31. Selection Criteria for Treatment and Disposal Systems.

(a) General Requirement. The type and size of an OSSF shall be determined on the basis of the soil and site information developed according to §285.30 of this title (relating to Site Evaluation).

(b) Suitability. A standard subsurface absorption system may be used if all the soil and site criteria are determined to be suitable under §285.91(5) of this title (relating to Tables). If one or more of the soil and site criteria categories are determined to be unsuitable, a standard subsurface absorption system cannot be used except as noted in §285.91(5) of this title. If it is determined that a standard subsurface absorption system cannot be used, either a proprietary or a non-standard system may be used, provided all soil and site criteria for that system can be met as required in §285.91(13) of this title.

(c) Surface drainage criteria.

(1) Topography. Uniform slopes under 30% are suitable for standard subsurface absorption systems. If the slope is less than 2%, steps shall be taken to ensure there is adequate surface drainage over any subsurface disposal field. The excavation for a standard subsurface absorption system shall be parallel to the contour of the ground.

(2) Flood hazard. Any potential OSSF site within a 100-year floodplain is subject to special planning requirements. The OSSF shall be located so that a flood will not damage the OSSF during a flood event, resulting in contamination of the environment. Planning materials shall indicate how tank flotation is eliminated. Additionally, if the site is within the regulated floodway, a professional engineer shall demonstrate that:

(A) the system shall not increase the height of the flood;

(B) all components, with the exception of risers, chlorinators, cleanouts, sprinklers, and inspection ports, shall be completely buried without adding fill; and

(C) non-buried components (e.g. alarms, junction boxes, and compressors) shall be elevated above the 100-year flood elevation.

(d) Separation requirements. OSSFs shall be separated from features, in the area where the OSSF is to be installed, that could be contaminated by the OSSF or could prevent the proper operation of the system. The separation requirements are in §285.91(10) of this title.

Adopted May 23, 2001

Effective June 13, 2001

§285.32. Criteria for Sewage Treatment Systems.

(a) Pipe from building to treatment system.

(1) The pipe from the sewer stub out to the treatment system shall be constructed of cast iron, ductile iron, polyvinyl chloride (PVC) Schedule 40, standard dimension ratio (SDR) 26 or other material approved by the executive director.

(2) The pipe shall be watertight.

(3) The slope of the pipe shall be no less than 1/8 inch fall per foot of pipe.

(4) The sewer stub out should be as shallow as possible to facilitate gravity flow.

(5) A two-way cleanout plug must be provided between the sewer stub out and the treatment tank. Only sanitary type fittings constructed of PVC Schedule 40 or SDR 26 shall be used on this section of the sewer. An additional cleanout plug shall be provided every 100 feet on long runs of pipe and within five feet of 90 degree bends.

(6) Additional cleanout plugs shall be of the single sanitary type.

(7) The pipe shall have a minimum inside diameter of three inches.

(8) Pipe that crosses drainage easements shall be sleeved with American Society for Testing and Materials (ASTM) Schedule 40 pipe; the pipes shall be buried at least one foot below the surface, or buried less than one foot and encased in concrete; the outside pipe shall have locater tape attached to the pipe; and markers shall be placed at the easement boundaries to indicate the location of the pipe crossing. Crossings shall

be designed and constructed in a manner that protects the pipe and the drainage way from erosion.

(b) Standard treatment systems.

(1) Septic tanks. A septic tank shall meet the following requirements.

(A) Tank volume. The liquid volume of a septic tank, measured from the bottom of the outlet, shall not be less than established in §285.91(2) of this title (relating to Tables). Additionally, the liquid depth of the tank shall not be less than 30 inches.

(B) Inlet and outlet devices. The flowline of the tank's inlet device in the first compartment of a two-compartment tank, or in the first tank in a series of tanks, shall be at least three inches higher than the flowline of the outlet device. For a configuration of the tank and inlet and outlet devices, see §285.90(6) and (7) of this title (relating to Figures). The inlet devices shall be "T" branch fittings, constructed baffles or other structures or fittings approved by the executive director. The outlet devices shall use a "T" unless an executive director approved fitting is installed on the outlet. All inlet and outlet devices shall be installed water tight to the septic tank walls and shall be a minimum of three inches in diameter.

(C) Baffles and series tanks. All septic tanks shall be divided into two or three compartments by the use of baffles or by connecting two or more tanks in a series.

(i) Baffled tanks. In a baffled tank, the baffle shall be located so that one half to two thirds of the total tank volume is located in the first compartment. Baffles shall be constructed the full width and height of the tank with a gap between the top of the baffle and the tank top. The baffle shall have an opening located below the liquid level of the tank at a depth between 25% and 50% of the liquid level. The opening may be a slot or hole. If a "T" is fitted to the slot or hole, the inlet to the fitting shall be at the depth stated in this paragraph. See §285.90(6) of this title for details. Any metal structures, fittings, or fastenings shall be stainless steel.

(ii) Series tanks. Two or more tanks shall be arranged in a series to attain the required liquid volume. The first tank in a two-tank system shall contain at least one half to two thirds the required volume. The first tank in a three-tank system shall contain at least one-third of the total required volume, but no less than 500 gallons. The first tank in a four or more tank system shall contain no less than 500 gallons, and the last tank in a four or more tank system shall contain no more than one third of the total required volume. Interconnecting inlet and outlet devices may be installed at the same elevation for multiple tank installations.

(D) Inspection or cleanout ports. All septic tanks shall have inspection or cleanout ports located on the tank top over the inlet and outlet devices. Each inspection or cleanout port shall be offset to allow for pumping of the tank. The ports may be configured in any manner as long as the smallest dimension of the opening is at least 12 inches, and is large enough to provide for maintenance and for equipment removal. Septic tanks buried more than 12 inches below the ground surface shall have risers over the port openings. The risers shall extend from the tank surface to no more than six inches below the ground. The risers shall be sealed to the tank. The risers shall have inside diameters which are equal to or larger than the inspection or cleanout ports. The risers shall be fitted with removable watertight caps and prevent unauthorized access.

(E) Septic tank design and construction materials. The septic tank shall be of sturdy, water-tight construction. The tank shall be designed and constructed so that all joints, seams, component parts, and fittings prevent groundwater from entering the tank, and prevent wastewater from exiting the tank, except through designed inlet and outlet openings. Materials used shall be steel-reinforced poured-in-place concrete, steel-reinforced precast concrete, fiberglass, reinforced plastic polyethylene, or other materials approved by the executive director. Metal septic tanks are prohibited. The septic tank shall be structurally designed to resist buckling from internal hydraulic loading and exterior loading caused by earth fill and additional surface loads. Tanks exhibiting deflections, leaks, or structural defects shall not be used. Sweating at construction joints is acceptable on concrete tanks.

(i) Precast concrete tanks. In addition to the general requirements in this subparagraph, precast concrete tanks shall conform to requirements in the Materials and Manufacture Section and the Structural Design Requirements Section of ASTM Designation: C 1227, Standard Specification for Precast Concrete Septic Tanks (2000) or under any other standards approved by the executive director. A professional engineer shall verify in writing that the manufacturer is in compliance with ASTM Standard C 1227. This verification shall be submitted to the permitting authority from the tank manufacturer. If this verification has not been previously submitted or accepted by the permitting authority, a new verification shall be completed within 30 days of the effective date of this section.

(ii) Fiberglass and plastic polyethylene tank specifications.

(I) The tank shall be fabricated to perform its intended function when installed. The tank shall not be adversely affected by normal vibration, shock, climate conditions, nor typical household chemicals. The tank shall be free of rough or sharp edges that would interfere with installation or service of the tank.

(II) Full or empty tanks shall not collapse or rupture when subjected to earth and hydrostatic pressures.

(iii) Poured-in-place concrete tanks. Concrete tanks shall be structurally sound and water-tight. The concrete tank shall be designed by a professional engineer.

(iv) Tank manufacturer specifications. All precast or prefabricated tanks shall be clearly and permanently marked, tagged, or stamped with the manufacturer's name, address, and tank capacity. The identification shall be near the level of the outlet and be clearly visible. Additionally, the direction of flow into and out of the tank shall be indicated by arrows or other identification, and shall be clearly marked at the inlet and outlet.

(F) Installation of tanks. For gravity disposal systems, septic tanks must be installed with at least a 12 inch drop in elevation from the bottom of the outlet pipe to the bottom of the disposal area. A minimum of four inches of sand, sandy loam, clay loam, or pea gravel, free of rock larger than 1/2 inch in diameter, shall be placed under and around all tanks, except poured-in-place concrete tanks. Unless otherwise approved by the permitting authority, tank excavations shall be left open until they have been inspected by the permitting authority. Tank excavations must be backfilled with soil or pea gravel that is free of rock larger than 1/2 inch in diameter. Class IV soils and gravel larger than one-half inch in diameter are not acceptable for use as backfill material. If the top of a septic tank extends above the ground surface, soil may be mounded over the tank to maintain slope to the drainfield.

(G) Pretreatment (Trash) tanks. If an aerobic treatment unit does not prevent plastic and other non-digestible sewage from interfering with aeration lines and diffusers, the executive director may require the use of a pretreatment tank. All pretreatment tanks shall meet all applicable structural and fitting requirements of this section.

(H) Leak Testing. At the discretion of the permitting authority, leak testing using water filled to the inside level of the tank lid or to the top of the tank riser(s) may be required.

(2) Intermittent sand filters. A typical layout and cross-section of an intermittent sand filter is presented in §285.90(8) of this title. Requirements for intermittent sand filters are as follows.

(A) Sand media specifications. Sand filter media must meet ASTM C-33 specifications as outlined in §285.91(11) of this title.

(B) Loading rate. The loading rate shall not exceed 1.2 gallons per day per square foot.

(C) Surface area. The minimum surface area shall be calculated using the formula: $Q/1.2 = \text{Surface Area (Square Feet)}$, where Q is the wastewater flow in gallons per day.

(D) Thickness of sand media. There shall be a minimum of 24 inches of sand media.

(E) Filter bed containment. The filter bed containment shall be an impervious lined pit or tank. Liners shall meet the specifications detailed in §285.33(b)(2)(A) of this title (relating to Criteria for Effluent Disposal Systems).

(F) Underdrains. For gravity discharge of effluent to a drainfield, there shall be a three inch layer of pea gravel over a six inch layer of 0.75 inch gravel, that contains the underdrain collection pipe. When pumpwells are to be used to pump the effluent from the underdrain to the drainfield, they must be constructed of concrete or plastic sewer pipe. The pumpwell must contain a sufficient number of holes so that effluent can flow from the gravel void space as rapidly as the effluent is pumped out of the pumpwell to the drainfield. Refer to §285.90(9) of this title.

(c) Proprietary treatment systems. This subsection does not apply to proprietary septic tanks described in subsection (b)(1) of this section.

(1) Tank sizing. Proprietary treatment systems that serve single family residences, combined flows from single family residences, or multi-unit residential developments shall be designed using Table II in §285.91(2) of this title unless there is an equalization tank preceding the aerobic treatment unit. If there is an equalization tank preceding the aerobic treatment unit, the equalization tank shall meet the requirements set forth in §285.34(b)(4) of this title (relating to Other Requirements) and the aerobic treatment units can be sized using the wastewater flows in Table III in §285.91(3) of this title. Proprietary Treatment systems for non-residential facilities shall be sized using the wastewater flows in Table III in §285.91(3) of this title. Leak testing shall be performed in accordance with subsection (b)(1)(H) of this section.

(2) Installation. Proprietary treatment systems shall be installed according to this subchapter. If the manufacturer has installation specifications that are more stringent than given in this subchapter, the manufacturer shall submit these specifications to the executive director for review. If approved by the executive director, the treatment systems may be installed according to these more stringent specifications. Any subsequent changes to these manufacturer's installation specifications must be approved by the executive director before installation. Inspection, cleanout ports, or

maintenance ports shall have risers installed according to the riser installation provisions in subsection (b)(1)(D) of this section. Tank excavations shall be backfilled according to the backfill provisions in subsection (b)(1)(F) of this section. At the discretion of the permitting authority, leak testing using water filled to the inside level of the tank lid or to the top of the riser(s) may be required.

(3) System maintenance. Ongoing maintenance contracts are required for all proprietary treatment systems except those systems maintained by homeowners under the provisions of §285.7(d)(4) of this title (relating to Maintenance Requirements). The maintenance contract shall satisfy §285.7(d) of this title.

(4) Electrical wiring. Electrical wiring for proprietary systems shall be according to §285.34(c) of this title.

(5) Approval of proprietary treatment systems. Proprietary treatment systems must be approved by the executive director prior to their installation and use. Approval of proprietary treatment systems shall follow the procedures found in this section. After the effective date of these rules, only systems tested according to subparagraph (A) or (B) of this paragraph will be placed on the list of approved systems. The list may be obtained from the executive director. All systems on the list of approved systems on the effective date of these rules shall continue to be listed subject to the retesting requirements in paragraph (6) of this subsection. In addition, all proprietary treatment systems undergoing testing under this paragraph on the effective date of these rules shall be considered for inclusion on the list of approved systems.

(A) Treatment systems that have been tested by and are currently listed by National Sanitation Foundation (NSF) International as Class I systems under NSF Standard 40 (2005), or have been tested and certified as Class I systems according to NSF Standard 40 (2005), by an American National Standard Institute (ANSI) accredited testing institution, or under any other standards approved by the executive director, shall be considered for approval by the executive director. All systems approved by the executive director on the effective date of these rules shall continue to be listed on the list of approved systems, subject to retesting under the requirements of NSF Standard 40 (2005), and Certification Policies for Wastewater Treatment Devices (1997) or under any standards approved by the executive director. The manufacturers of proprietary treatment systems and the accredited certification institution must comply with all the provisions of NSF Standard 40 (2005), and Certification Policies for Wastewater Treatment Devices (1997) or under any standards approved by the executive director.

(i) Proprietary units under this section have been approved to treat flows equal to or less than their rated capacity and with an influent wastewater strength ranging from a 30-day average Carbonaceous Biochemical Oxygen Demand

(CBOD) concentration between 100 milligrams per liter (mg/l) and 300 mg/l and a 30-day average TSS concentration between 100 mg/l and 350 mg/l.

(ii) Proprietary units may be used as components in an overall treatment system treating influent stronger than the ranges listed in this section. However, the overall treatment system will be considered a non-standard treatment system and shall meet the requirements set forth in subsection (d) of this section.

(B) Treatment systems that will not be accepted for testing because of system size or type by NSF International, or ANSI accredited third party testing institutions, and are not approved systems at the time of the effective date of these rules, may only be approved in the following manner.

(i) The proprietary systems shall be tested by an independent third party for two years and all the supporting data from the test shall be submitted to the executive director for review and approval, or denial before the system is marketed for sale in the state.

(ii) The independent third party shall obtain a temporary authorization from the executive director before testing. The temporary authorization shall contain the following:

(I) the number of systems to be tested (between 20 and 50);

(II) the location of the test sites (the test sites must be typical of the sites where the system will be used if final authorization is granted);

(III) provisions as to how the proprietary system will be installed and maintained;

(IV) the testing protocol for collecting and analyzing samples from the system;

(V) the equipment monitoring procedures, if applicable; and

(VI) provisions for recording data and data retention necessary to evaluate the performance as well as the effect of the proprietary system on public health, groundwater, and surface waters.

(iii) Permitting authorities may issue authorizations to construct upon receipt of the temporary authorization. The owner must be advised, in

writing, that the system is temporarily approved for testing. If a system fails, regardless of the reason, it shall be replaced with a system that meets the requirements of this subchapter by the manufacturer at the manufacturer's expense. A system installed under this subparagraph is the responsibility of the manufacturer until the system has obtained final authorization by the executive director according to this subparagraph.

(iv) Upon completion of the two-year test period, the executive director shall require the independent third party to submit a detailed report on the performance of the system. After evaluating the report, the executive director may issue conditional approval of the system, or may deny use of the system.

(I) The conditional approval will authorize installations only in areas similar to the area in which the system was tested.

(II) The conditional approval shall be for a specified performance and evaluation (monitoring) period, not to exceed an additional five years. The system must be monitored according to a plan approved by the executive director. Approval or disapproval of these systems will be based on their performance during the monitoring period. Failure of one or more of the installed systems may be cause for disapproval of the proprietary system. The owner must be advised, in writing, that the system is conditionally approved.

(III) If the executive director denies use of the system after the two-year period, the executive director shall provide, in writing, the reasons for denying the use of the system. If a system fails, regardless of the reason, it shall be replaced with a system that meets the requirements of this subchapter by the manufacturer at the manufacturer's expense.

(v) Upon successful completion of the monitoring period, the monitoring requirements may be lifted by the executive director, the notice of approval may be made permanent for the test systems and the systems will be deemed suitable for use in conditions similar to areas in which the systems were tested and monitored.

(6) System reviews. The manufacturers of systems that are approved for listing under this section shall ensure that their systems are reviewed every seven years, or as often as deemed necessary by the executive director, starting from the date the system was originally added to the executive director's approved list. All reviews shall be completed before the end of the seven-year period. The manufacturer of any system that was approved by the executive director more than seven years before the effective date of these rules, will be given 365 days from the effective date of these rules to complete a review.

(A) The review shall be performed by either an ANSI accredited institution according to the reevaluation requirements in NSF Standard 40 (2005), and Certification Policies for Wastewater Treatment Devices (1997), or under any standards approved by the executive director, or by an independent third party for those systems not tested under NSF Standard 40.

(B) If the system being reviewed was not approved under the requirements of NSF Standard 40, the independent third party shall evaluate between 20 and 50 systems in the state that have been in operation for at least two years and are the same design as originally approved.

(C) The review under this subsection shall include an evaluation of:

- (i) the short-term and long-term effectiveness of the system;
- (ii) the structural integrity of the system;
- (iii) the maintenance of the system;
- (iv) owner access to maintenance support;
- (v) any impacts that system failures may have had on the environment; and
- (vi) an evaluation of the effectiveness of the manufacturer's installer training program.

(D) Any system that is not approved by the executive director as a result of the review will be removed from the list of approved systems. The manufacturer shall ensure that maintenance support remains available for the existing systems.

(d) Non-standard treatment systems. All OSSFs not described or defined in subsections (b) and (c) of this section are non-standard treatment systems. These systems shall be designed by a professional engineer or a professional sanitarian in accordance with §285.91(9) of this title, and the planning materials shall be submitted to the permitting authority for review according to §285.5(b)(2) of this title (relating to Submittal Requirements for Planning Materials). Upon approval of the planning materials, an authorization to construct will be issued by the permitting authority.

(1) Non-standard treatment systems include all forms of the activated sludge process, rotating biological contactors, recirculating sand filters, trickling type

filters, submerged rock biological filters, and sand filters not described in subsection (b)(2) of this section.

(2) The planning materials for non-standard treatment systems submitted for review will be evaluated using the criteria established in this chapter, or basic engineering and scientific principles.

(3) Approval for a non-standard treatment system is limited to the specific system described in the planning materials. Approval is on a case-by-case basis only.

(4) The need for ongoing maintenance contracts shall be determined by the permitting authority based on the review required by §285.5(b) of this title. If the permitting authority determines that a maintenance contract is required, the contract must meet the requirements in §285.7 of this title.

(5) Electrical wiring for non-standard treatment systems shall be installed according to §285.34(c)(4) of this title.

(e) Effluent quality. The following effluent criteria shall be met by the treatment systems for those disposal systems listed in §285.33 of this title that require secondary treatment.

Figure: 30 TAC §285.32(e)

Biochemical Oxygen Demand (BOD) and Total Suspended Solids (TSS):

30-day average.....	20 mg/l
seven-day average.....	30 mg/l
Daily Maximum.....	45 mg/l
Single Grab.....	65 mg/l

pH..... 6.0 - 9.0 standard units

Carbonaceous Biochemical Oxygen Demand (CBOD) - to be used instead of BOD for proprietary treatment systems tested after 1996

30-day average.....	15 mg/l
seven-day average.....	25 mg/l
Daily Maximum.....	40 mg/l
Single Grab.....	60 mg/l

The 30-day average is the average of all 30-day averages, and seven-day average is the average of all seven-day averages over the length of the testing period.

(f) Other Design Considerations.

(1) Restaurant/food establishment sewage. When designing for restaurants, food service establishments, or similar activities, the minimum design strength value shall be 1,200 mg/l Biochemical Oxygen Demand (BOD) after a properly sized grease trap/interceptor. It is the responsibility of the designer to properly design a system which reduces the wastewater strength to 140 mg/l BOD prior to disposal unless secondary treatment levels are required.

(2) Other high-strength sewage. For situations where sewage as defined in this chapter is expected to be a higher strength than residential sewage, it is the responsibility of the professional designer to justify sewage design strength estimations and properly design a system that reduces the wastewater strength to 140 mg/l BOD prior to disposal unless secondary treatment levels are required. Residential sewage is sewage that has a strength of less than 300 mg/l BOD.

(3) Flow equalization. The designer should consider whether flow-equalization will be needed for the treatment system to function properly.

Adopted December 5, 2012

Effective December 27, 2012

§285.33. Criteria for Effluent Disposal Systems.

(a) General requirements.

(1) All disposal systems in this section shall have an approved treatment system as specified in §285.32(b) - (d) of this title (relating to Criteria for Sewage Treatment Systems).

(2) All criteria in this section shall be met before the permitting authority issues an authorization to construct.

(3) The pipe between all treatment tanks and the pipe from the final treatment tank to a gravity disposal system shall be a minimum of three inches in diameter and be American Society for Testing and Materials (ASTM) 3034, Standard dimension ratio (SDR) 35 polyvinyl chloride (PVC) pipe or a pipe with an equivalent or stronger pipe stiffness at a 5% deflection. The pipe must maintain a continuous fall to the disposal system.

(4) The pipe from the final treatment tank to a gravity disposal system shall be a minimum of five feet in length.

(5) Except for drip irrigation tubing, pipe under internal pressure within any part of an on-site sewage facility system shall meet the minimum requirements of ASTM Schedule 40.

(6) Pipe that crosses drainage easements shall be sleeved with ASTM Schedule 40 pipe; the pipes shall be buried at least one foot below the surface, or buried less than one foot and encased in concrete; the outside pipe shall have locator tape attached to the pipe; and markers shall be placed at the easement boundaries to indicate the location of the pipe crossing. Crossings shall be designed and constructed in a manner that protects the pipe and the drainage way from erosion.

(b) Standard disposal systems. Acceptable standard disposal methods shall consist of a drainfield to disperse the effluent either into adjacent soil (absorptive) or into the surrounding air through evapotranspiration (evaporation and transpiration).

(1) Absorptive drainfield. An absorptive drainfield shall only be used in suitable soil. There shall be two feet of suitable soil from the bottom of the excavation to either a restrictive horizon or to groundwater.

(A) Excavation. The excavation must be made in suitable soils as described in §285.31(b) of this title (relating to Selection Criteria for Treatment and Disposal Systems).

(i) The excavation shall be at least 18 inches deep but shall not exceed a depth of either three feet or six inches below the soil freeze depth, whichever is deeper. Single excavations shall not exceed 150 feet.

(ii) In areas of the state where annual precipitation is less than 26 inches per year (as identified in the Climatic Atlas of Texas, (1983) published by the Texas Department of Water Resources or other standards approved by the executive director), the maximum permissible excavation depth shall be five feet.

(iii) Multiple excavations must be separated horizontally by at least three feet of undisturbed soil. The sidewalls and bottom of the excavation must be scarified as needed. When there are multiple excavations, it is recommended that the ends be looped together.

(iv) The bottom of the excavation shall be not less than 18 inches in width.

(v) The bottom of the excavation shall be level to within one inch over each 25 feet of excavation or within three inches over the entire excavation, whichever is less.

(vi) If the borings or backhoe pits excavated during the site evaluation encounter a rock horizon and the site evaluation shows that there is both suitable soil from the bottom of the rock horizon to two feet below the bottom of the proposed excavation and no groundwater anywhere within two feet of the bottom of the proposed excavation, a standard subsurface disposal system may be used, providing the following are met.

(I) The depth of the excavation shall comply with clause (i) of this subparagraph.

(II) The rock horizon shall be at least six inches above the bottom of the excavation.

(III) Surface runoff shall be prevented from flowing over the disposal area.

(IV) Subsurface flow along the top of the rock horizon shall be prevented from flowing into the excavation.

(V) The sidewall area will not be counted toward the required absorptive area.

(VI) The formulas in clause (vii)(I) - (III) of this subparagraph shall be adjusted so that no credit is given for sidewall area.

(VII) No single pipe drainfields on sloping ground as shown in §285.90(5) of this title (relating to Figures) or no systems using serial loading shall be used.

(vii) The size of the excavation shall be calculated using data from §285.91(1) and (3) of this title (relating to Tables). The soil application rate is based on the most restrictive horizon along the media, or within two feet below the bottom of the excavation. The formula $A = Q/Ra$ shall be used to determine the total absorptive area where:

Figure: 30 TAC §285.33(b)(1)(A)(vii)

A = absorptive area

Q = average daily sewage flow in gallons per day

Ra = soil application rate in gallons per square foot per day

(I) The absorptive area shall be calculated by adding the bottom area (L x W) of the excavation to the total absorptive area along the excavated perimeter $2(L+W)$, (in feet) multiplied by one foot.

Figure: 30 TAC §285.33(b)(1)(A)(vii)

Absorptive Area = $(L \times W) + 2(L+W) \times 1.0 \text{ ft}$

Where: L = excavation length

W = excavation width

(II) The length of the excavation may be determined as follows when the area and width are known.

Figure: 30 TAC §285.33(b)(1)(A)(vii)(II)

$L = (A - 2W) / (W + 2)$

A = absorptive area

W = excavation width

(III) For excavations three feet wide or less, use the following formula, or §285.91(8) of this title to determine L.

Figure: 30 TAC §285.33(b)(1)(A)(vii)(III)

$L = A / (W + 2)$

A = absorptive area

W = excavation width

(B) Media. The media shall consist of clean, washed and graded gravel, broken concrete, rock, crushed stone, chipped tires, or similar aggregate that is

generally one uniform size and approved by the executive director. The size of the media must range from 0.75 - 2.0 inches as measured along its greatest dimension except as noted in clause (i) of this subparagraph.

(i) If chipped tires are used:

(I) a geotextile fabric heavier than specified in subparagraph (E) of this paragraph must be used; and

(II) the size of the chipped tires must not exceed three inches as measured along their greatest dimension.

(ii) Soft media such as oyster shell and soft limestone shall not be used.

(C) Drainline. The drainline shall be constructed of perforated distribution pipe and fittings in compliance with any one of the following specifications:

(i) three- or four-inch diameter PVC pipe with an SDR of 35 or stronger;

(ii) four-inch diameter corrugated polyethylene, ASTM F405 in rigid ten foot joints;

(iii) three- or four-inch diameter polyethylene smoothwall, ASTM F810;

(iv) three- or four-inch diameter PVC ASTM D2729 pipe;

(v) three- or four-inch diameter polyethylene ASTM F892 corrugated pipe with a smoothwall interior and fittings; or

(vi) any other pipe approved by the executive director.

(D) Drainline installation requirements. The drainline shall be placed in the media with at least six inches of media between the bottom of the excavation and the bottom of the drainline. The drainline shall be completely covered by the media and the drainline perforations shall be below the horizontal center line of the pipe. For typical drainfield configurations, see §285.90(5) of this title. For excavations greater than four feet in width, the maximum distance between parallel drainlines shall be four feet (center to center). Multiple drainlines shall be manifolded together with solid or perforated pipe. Additionally, the ends of the multiple drainlines opposite the

manifolded end shall either be manifolded together with a solid line, looped together using a perforated pipe and media, or capped.

(E) Permeable soil barrier. Geotextile fabric shall be used as the permeable soil barrier and shall be placed between the top of the media and the excavation backfill. Geotextile fabric shall conform to the following specifications for unwoven, spun-bounded polypropylene, polyester, or nylon filter wrap.

Figure: 30 TAC §285.33(b)(1)(E)

Minimum values

Weight oz/sq yd (ASTM D3776) 0.70

Grab Strength lbs (ASTM D4632) 11

Air Permeability cfm/sq ft (ASTM D737) 500

Water Flow Rate gpm/sq ft @ 3" head (ASTM D4491) 33

Trapezoidal Tear Strength Lbs (ASTM D4533) 6

(F) Backfilling. Only Class Ib, II, or III soils as described in §285.30 of this title (relating to Site Evaluation) shall be used for backfill. Class Ia and IV soils are specifically prohibited for use as a backfill material. The backfill material shall be mounded over the excavated area so that the center of the backfilled area slopes down to the outer perimeter of the excavated area to allow for settling. Surface runoff impacting the disposal area is not permitted and the diversion method shall be addressed during development of the planning materials.

(G) Drainfields on irregular terrain. Where the ground slope is greater than 15% but less than 30%, a multiple line drainfield may be constructed along descending contours as shown in §285.90(5) of this title. An overflow line shall be provided from the upper excavations to the lower excavations. The overflow line shall be constructed from solid pipe with an SDR of 35 or stronger, and the excavation carrying the overflow pipe shall be backfilled with soil only.

(H) Drainfield plans. A number of sketches, specifications, and details for drainfield construction are provided in §285.90(4) and (5) of this title.

(2) Evapotranspirative (ET) system. An ET system may be used in soils which are classified as unsuitable for standard subsurface absorption systems according to §285.31(b) of this title with respect to texture, restrictive horizons, or groundwater.

Water saving devices must be used if an ET system is to be installed. ET systems shall only be used in areas of the state where the annual average evaporation exceeds the annual rainfall. Evaporation data is provided in §285.91(7) of this title.

(A) Liners. An impervious liner shall be used between the excavated surface and the ET system in all Class Ia soils, where seasonal groundwater tables penetrate the excavation, and where a minimum of two feet of suitable soil does not exist between the excavated surface and either a restrictive horizon or groundwater. Liners shall be rubber, plastic, reinforced concrete, gunite, or compacted clay (one foot thick or more). If the liner is rubber or plastic, it must be impervious, and each layer must be at least 20 mils thick. Rubber or plastic liners must be protected from exposed rocks and stones by covering the excavated surface with a uniform sand cushion at least four inches thick. Clay liners shall have a permeability of 10^{-7} centimeters/second or less, as tested by a certified soil laboratory.

(B) ET system sizing. The following formula shall be used to calculate the top surface area of an ET system.

Figure: 30 TAC §285.33(b)(2)(B)

$$A = 1.6 Q / \text{Ret}$$

Where: A = total top surface area of the excavations.

Q = estimated daily water usage in gallons/day in §285.91(3) of this title (relating to Tables).

Ret = net local evaporation rate in §285.91(7) of this title.

(C) The owner of the ET system shall be advised by the person preparing the planning materials of the limits placed on the system by the Q selected. If the Q is less than required by §285.91(3) of this title, the flow rate shall be included as a condition to the permit, and stated in an affidavit properly filed and recorded in the deed records of the county as specified in §285.3(b)(3) of this title (relating to General Requirements).

(D) Backfill material. Backfill material shall consist of Class II soil as described in §285.30 of this title. All drainlines must be surrounded by a minimum of one foot of media. Backfill shall be used to fill the excavation between the media to allow the backfill material to contact the bottom of the excavation.

(E) Vegetative cover for transpiration. The final grade shall be covered with vegetation fully capable of taking maximum advantage of transpiration. Evergreen bushes with shallow root systems may be planted in the disposal area to assist in water uptake. Grasses with dormant periods shall be overseeded to provide year-round transpiration.

(F) ET systems. ET systems shall be divided into two or more equal excavations connected by flow control valves. One excavation may be removed from service for an extended period of time to allow it to dry out and decompose biological material which might plug the excavation. If one of the excavations is removed from service, the daily water usage must be reduced to prevent overloading of the excavation(s) still in operation. Normally, an excavation must be removed from service for two to three dry months for biological breakdown to occur.

(G) ET system plans. A number of sketches for ET system construction are provided in §285.90(4) and (5) of this title.

(3) Pumped effluent drainfield. Pumped effluent drainfields shall use the specifications for low-pressure dosed drainfields described in subsection (d)(1) of this section, with the following exceptions.

(A) Applicability. If the slope of the site is greater than 2.0%, pumped effluent drainfields shall not be used. Pumped effluent drainfields may only be used by single family dwellings.

(B) Length of distribution pipe. There shall be at least 1,000 linear feet of perforated pipe for a two bedroom single family dwelling. For each additional bedroom, there shall be an additional 400 linear feet of perforated pipe. No individual distribution line shall exceed 70 feet in length from the header.

(C) Excavation width and horizontal separation. The excavated area shall be at least six inches wide. There shall be at least three feet of separation between trenches.

(D) Lateral depth and vertical separation. All drainfield laterals shall be between 18 inches and three feet deep. There shall be a minimum vertical separation distance of one foot from the bottom of the excavation to a restrictive horizon, and a minimum vertical separation of two feet from the bottom of the excavation to groundwater.

(E) Media. Each dosing pipe shall be placed with the drain holes facing down and placed on top of at least six inches of media (pea gravel or media up to two inches measured along its greatest dimension).

(F) Pipe and hole size. The distribution (dosing) and manifold (header) pipe shall be 1.25 - 1.5 inches in diameter. The manifold may have a diameter larger than the distribution pipe, but shall not exceed 1.5 inches in diameter. Distribution (dosing) pipe holes shall be 3/16 - 1/4 inch in diameter and shall be spaced five feet apart.

(G) Pump size. Pumped effluent drainfields shall use at least a 1/2 horsepower pump.

(H) Backfilling. Only Class Ib, II, or III soils as described in §285.30(b)(1)(A) of this title shall be used for backfill.

(c) Proprietary disposal systems.

(1) Gravel-less drainfield piping. Gravel-less pipe may be used only on sites suitable for standard subsurface sewage disposal methods. Gravel-less pipe shall be eight-inch or ten-inch diameter corrugated perforated polyethylene pipe. The pipe shall be enclosed in a layer of unwoven spun-bonded polypropylene, polyester, or nylon filter wrap. Gravel-less pipe shall meet ASTM F-667 Standard Specifications for large diameter corrugated high density polyethylene (ASTM D 1248) tubing. The filter cloth must meet the same material specifications as described under subsection (b)(1)(E) of this section.

(A) Planning parameters. Gravel-less drainfield pipe may be substituted for drainline pipe in both absorptive and ET systems. When gravel-less pipe is substituted, media will not be required. ET systems shall be backfilled with Class II soils only. All other planning parameters for absorptive or ET systems apply to drainfields using gravel-less pipe.

(B) Installation. The connection from the solid line leaving the treatment tank to the gravel-less line shall be made by using an eight or ten-inch offset connector. The gravel-less line shall be laid level, the continuous stripe shall be up, and the lines shall be joined together with couplings. A filter cloth must be pulled over the joint to eliminate soil infiltration. The gravel-less pipe must be held in place during initial backfilling to prevent movement of the pipe. The end of each gravel-less line shall have an end cap and an inspection port. The inspection port shall allow for easy monitoring of the amount of sludge or suspended solids in the line, and allow the distribution lines to be back-flushed.

(C) Drainfield sizing. To determine appropriate drainfield sizing, use a drainfield width of $W = 2.0$ feet for an eight-inch diameter gravel-less pipe, and an excavation width of $W = 2.5$ for a ten-inch gravel-less pipe.

Figure: 30 TAC §285.33(c)(1)(C)

$$L = A/(W+2)$$

A = absorptive area as calculated in subsection (b)(1)(A)(vii) of this section

W = excavation width

(2) Leaching chambers. Leaching chambers are bottomless chambers that are installed in a drainfield excavation with the open bottom of the chamber in direct contact with the excavation. The ends of the chamber rows shall be linked together with non-perforated sewer pipe. The chambers shall completely cover the excavation, and adjacent chambers must be in contact with each other in such a manner that the chambers will not separate. To obtain the reduction in drainfield size allowed in subparagraph (A)(i) and (ii) of this paragraph for excavations wider than the chambers, the chambers shall be placed edge to edge.

(A) The following formulas shall be used to determine the length of an excavation using leaching chambers.

(i) The following formula is used for leaching chambers without water saving devices and the excavation is the same width as the chamber.

Figure: 30 TAC §285.33(c)(2)(A)(i)

$$L = 0.6A/(W+2)$$

Where: A = minimum absorptive area calculated with no flow reduction; and

W = leaching chamber panel width

(ii) The following formula is used for leaching chambers with water saving devices and the excavation is the same width as the chamber.

Figure: 30 TAC §285.33(c)(2)(A)(ii)

$$L = 0.75A/(W+2)$$

Where: A = minimum absorptive area calculated with flow reduction; and

W = leaching chamber panel width

(iii) The following formula is used for leaching chambers without water saving devices and the excavation width is greater than the width of the chamber.

Figure: 30 TAC §285.33(c)(2)(A)(iii)

$$L = (0.6A-2W)/(W+2)$$

Where: A = minimum absorptive area calculated with no flow reduction; and

W = width of excavation

(iv) The following formula is used for leaching chambers with water saving devices and the excavation width is greater than the width of the chamber.

Figure: 30 TAC §285.33(c)(2)(A)(iv)

$$L = (0.75A-2W)/(W+2)$$

Where: A = minimum absorptive area calculated with no flow reduction; and

W = width of excavation

(B) Leaching chambers shall not be used for absorptive drainfields in Class Ia or IV soils. Leaching chambers may be used instead of media in ET systems, low-pressure dosed drainfields, and soil substitution drainfields; however, the size of the drainfield shall not be reduced from the required area.

(C) Backfill covering leaching chambers shall be Class Ib, II, or III soil.

(3) Drip irrigation. Drip irrigation systems using secondary treatment may be used in all soil classes including Class IV soils. The system must be equipped with a filtering device capable of filtering particles larger than 100 microns and that meets the manufacturer's requirements.

(A) Drainfield layout. The drainfield shall consist of a matrix of small-diameter pressurized lines, buried at least six inches deep, and pressure reducing emitters spaced at a maximum of 30-inch intervals. The pressure reducing emitter shall restrict the flow of effluent to a flow rate low enough to ensure equal distribution of effluent throughout the drainfield.

(B) Effluent quality. The treatment preceding a drip irrigation system shall treat the wastewater to secondary treatment as described in §285.32(e) of this title unless the drip irrigation system has been approved by the executive director as a proprietary disposal system without the use of secondary treatment.

(C) System flushing. Systems must be equipped to flush the contents of the lines back to the pretreatment unit when intermittent flushing is used. If continuous flushing is used during the pumping cycle, the contents of the lines must be returned to the pump tank.

(D) Loading rates. Pressure reducing emitters can be used in all classes of soils using loading rates specified in §285.91(1) of this title. Pressure reducing emitters are assumed to wet four square feet of absorptive area per emitter; however, overlapping areas shall only be counted once toward absorptive area requirements. The loading rate shall be based on the most restrictive soil horizon within one foot of the pressure reducing emitter. When solid rock is less than 12 inches below the pressure reducing emitter, the loading rate shall be based on Class IV soils.

(E) Vertical separation distance. There shall be a minimum of one foot of soil (with less than 60% gravel) between the pressure reducing emitter and groundwater and six inches between the pressure reducing emitter and solid rock, or fractured rock. For proprietary disposal systems that do not pretreat to secondary treatment, there shall be two feet of soil (with less than 30% gravel) between the groundwater and pressure reducing emitter and one foot of soil between solid rock or fractured rock and the pressure reducing emitter.

(F) Labeling or listing. All drip irrigation system devices shall either be labeled by the manufacturer as suitable for use with domestic sewage, or be on the list of approved devices maintained by the executive director according to §285.32(c)(4) of this title.

(4) Approval of proprietary disposal systems. All proprietary disposal systems, other than those described in this section, shall be approved by the executive director before they may be used. Proprietary disposal systems shall be approved by the executive director using the procedures established in §285.32(c)(4)(B) of this title.

(d) Nonstandard disposal systems. All disposal systems not described or defined in subsections (b) and (c) of this section are nonstandard disposal systems. Planning materials for nonstandard disposal systems must be developed by a professional engineer or professional sanitarian using basic engineering and scientific principles. The planning materials for paragraphs (1) - (5) of this subsection shall be submitted to the permitting authority and the permitting authority shall review and either approve or disapprove them on a case-by-case basis according to §285.5 of this title (relating to Submittal Requirements for Planning Materials). Electrical wiring for nonstandard disposal systems shall be installed according to §285.34(c) of this title (relating to Other Requirements). Upon approval of the planning materials, an authorization to construct will be issued by the permitting authority. Approval for a nonstandard disposal system is limited to the specific system described in the planning materials for the specific location. The systems identified in paragraphs (1) - (5) of this subsection must meet these requirements, in addition to the requirements identified for each specific system in this section.

(1) Low-pressure dosed drainfield. Effluent from this type of system shall be pumped, under low pressure, into a solid wall force main and then into a perforated distribution pipe installed within the drainfield area.

(A) The effluent pump in the pump tank must be capable of an operating range that will assure that effluent is delivered to the most distant point of the perforated piping network, yet not be excessive to the point that blowouts occur.

(B) A start/stop switch or timer must be included in the system to control the dosing pump. An audible and visible high water alarm, on an electric circuit separate from the pump, must be provided.

(C) Pressure dosing systems shall be installed according to either design criteria in the North Carolina State University Sea Grant College Publication UNC-S82-03 (1982) or other publications containing criteria or data on pressure dosed systems which are acceptable to the permitting authority. Additionally, the following sizing parameters are required for all low-pressure dosed drainfields and shall be used in place of the sizing parameters in the North Carolina State University Sea Grant College Publication or other acceptable publications.

(i) The low-pressure dosed drainfield area shall be sized according to the effluent loading rates in §285.91(1) of this title and the wastewater

usage rates in §285.91(3) of this title. The effluent loading rate (Ra) in the formula in §285.91(1) of this title shall be based on the most restrictive horizon one foot below the bottom of the excavation. Excavated areas can be as close as three feet apart, measured center to center. All excavations shall be at least six inches wide. To determine the length of the excavation, use the following formulas, where L = excavation length, and A = absorptive area.

(I) If the media in the excavation is at least one foot deep, the length of the excavation is $L = A/(w+2)$ where:

(-a-) w = the width of the excavation for excavations one foot wide or greater; or

(-b-) w = 1 for all excavations less than one foot wide.

(II) If the media in the excavation is less than one foot deep, the length of the excavation is $L = A/(w + 2H)$, where H = the depth of the media in feet and:

(-a-) w = the width of the excavation for excavations one foot wide or greater; or

(-b-) w = 1 for all excavations less than one foot wide.

(ii) Each dosing pipe shall be placed with the drain holes facing down and placed on top of at least six inches of media (pea gravel or media up to two inches measured along the greatest dimension).

(iii) Geotextile fabric meeting the criteria in subsection (b)(1)(E) of this section shall be placed over the media. The excavation shall be backfilled with Class Ib, II, or III soil.

(iv) There shall be a minimum of one foot of soil (with less than 30% gravel) between the bottom of the excavation and solid or fractured rock. There shall be a minimum of two feet of soil (with less than 30% gravel) between the bottom of the excavation and groundwater.

(2) Surface application systems. Surface application systems include those systems that spray treated effluent onto the ground.

(A) Acceptable surface application areas. Land acceptable for surface application shall have a flat terrain (with less than or equal to 15% slope) and shall be covered with grasses, evergreen shrubs, bushes, trees, or landscaped beds containing mixed vegetation. There shall be nothing in the surface application area within ten feet of the sprinkler which would interfere with the uniform application of the effluent. Sloped land (with greater than 15%) may be acceptable if it is properly landscaped and terraced to minimize runoff.

(B) Unacceptable surface application areas. Land that is used for growing food, gardens, orchards, or crops that may be used for human consumption, as well as unseeded bare ground, shall not be used for surface application.

(C) Technical report. A technical report shall be prepared for any system using surface application and shall be submitted with the planning materials required in §285.5(a) of this title. The technical report shall describe the operation of the entire on-site sewage facility OSSF system, and shall include construction drawings, calculations, and the system flow diagram. Proprietary aerobic systems may reference the executive director's approval list instead of furnishing construction drawings for the system.

(D) Effluent disinfection. Treated effluent must be disinfected before surface application. The effluent quality in the pump tank must meet the minimum required test results specified in §285.91(4) of this title. All new disinfection equipment shall be listed as approved dispensers or disinfection devices for wastewater systems by National Sanitation Foundation (NSF) International or by an ANSI accredited testing institution under ANSI/NSF Standard 46, or approved by the executive director. After January 1, 2016, all new disinfection equipment shall be listed as disinfection devices for wastewater systems by NSF International or by an ANSI accredited testing institution under ANSI/NSF Standard 46, or approved by the executive director. Installation of disinfection devices on new systems shall be performed by a licensed installer II. Tablet or other dry chlorinators shall use calcium hypochlorite properly labeled for wastewater disinfection. The effectiveness of the disinfection procedure will be established by monitoring either the fecal coliform count or total chlorine residual from representative effluent grab samples as directed in the testing and reporting schedule. The frequency of testing, the type of tests, and the required results are shown in §285.91(4) of this title. Replacement of disinfection devices on existing systems may be considered an emergency repair as described in §285.35 of this title (relating to Emergency Repairs) and shall be performed by either a licensed installer II, a licensed maintenance provider, or a registered maintenance technician.

(E) Minimum required application area. The minimum surface application area required shall be determined by dividing the daily usage rate (Q), established in §285.91(3) of this title, by the allowable surface application rate ($R_i =$

effective loading rate in gallons per square foot per day) found in §285.90(1) of this title or as approved by the permitting authority.

(F) Landscaping plan. Applications for surface application disposal systems shall include a landscape plan. The landscape plan shall describe, in detail, the type of vegetation to be maintained in the disposal area. Surface application systems may apply treated and disinfected effluent upon areas with existing vegetation. If any ground within the proposed surface application area does not have vegetation, that bare area shall be seeded or covered with sod before system start-up. The vegetation shall be capable of growth, before system start-up.

(G) Uniform application of effluent. Distribution pipes, sprinklers, and other application methods or devices must provide uniform distribution of treated effluent. The application rate must be adjusted so that there is no runoff.

(i) Sprinkler criteria. The maximum inlet pressure for sprinklers shall be 40 pounds per square inch. Low angle nozzles (15 degrees or less in trajectory) shall be used in the sprinklers to keep the spray stream low and reduce aerosols. If the separation distance between the property line and the edge of the surface application area is less than 20 feet, sprinkler operation shall be controlled by commercial irrigation timers set to spray between midnight and 5:00 a.m.

(ii) Planning criteria. Circular spray patterns may overlap to cover all irrigated area including rectangular shapes. The overlapped area will be counted only once toward the total application area. For large systems, multiple sprinkler heads are preferred to single gun delivery systems.

(iii) Effluent storage and pumping requirements.

(I) For systems controlled by a commercial irrigation timer and required to spray between midnight and 5:00 a.m., there shall be at least one day of storage between the alarm-on level and the pump-on level, and a storage volume of one-third the daily flow between the alarm-on level and the inlet to the pump tank.

(II) For systems not controlled by a commercial irrigation timer, the minimum dosing volume shall be at least one-half the daily flow, and a storage volume of one-third the daily flow between the alarm-on level and the inlet to the pump tank.

(III) Pump tank construction and installation shall be according to §285.34(b) of this title.

(iv) Distribution piping. Distribution piping shall be installed below the ground surface and hose bibs shall not be connected to the distribution piping. An unthreaded sampling port shall be provided in the treated effluent line in the pump tank.

(v) Color coding of distribution system. All new distribution piping, fittings, valve box covers, and sprinkler tops shall be permanently colored purple to identify the system as a reclaimed water system according to Chapter 210 of this title (relating to Use of Reclaimed Water).

(3) Mound drainfields. A mound drainfield is an absorptive drainfield constructed above the native soil surface. The mound consists of a distribution area installed within fill material placed on the native soil surface. The required area of the fill material is a function of the texture of the native soil surface, the depth of the native soil, basal area sizing considerations, and sideslope requirements. A description of mound construction, as well as construction requirements not addressed in this section can be found in the North Carolina State University Sea Grant College Publication UNC-SG-82-04 (1982).

(A) A mound drainfield shall only be installed at a site where there is at least one foot of native soil; however, approval for installation on sites with less than one foot of native soil may be granted by the permitting authority on a case-by-case basis.

(B) Mounds and mound distribution systems must be constructed with the longest dimension parallel to the contour of the site.

(C) Soil classification, loading rates (R(a)), and wastewater usage rates (Q) shall all be obtained from this chapter.

(D) The depth of soil material (with less than 30% gravel) between the bottom of the media and a restrictive horizon must be at least 1.5 feet to the restrictive horizon or two feet to groundwater. The soil material includes both the fill and the native soil.

(E) The distribution area is defined as the interface area between the media containing the distribution piping and the fill material or the native soil, if applicable. The distribution length is the dimension parallel with the contour and equivalent to the length of the distribution media which must also run parallel with the contour. The distribution lines within the distribution media must extend to 12 inches of the end of the distribution media. The distribution width is defined as the distribution area divided by the distribution length.

(i) The formula $A(d) = Q/R(a)$ shall be used for calculating the minimum required distribution area of the mound where:

Figure: 30 TAC §285.33(d)(3)(E)(i)

$A(d)$ = minimum required distribution absorptive area in square feet

Q = design wastewater usage rate in gallons per day

$R(a)$ = most restrictive application rate between the fill material or the soil surface if the soil surface is within four inches of the bottom of the distribution media. The application rate is in gallons per square foot per day.

(ii) The area credited toward the minimum required distribution area can be determined in either of the following ways.

(I) If the distribution area consists of a continuous six-inch layer of media over the fill, the credited area is the bottom interface area between the media and soil beneath the media.

(II) If the distribution area consists of rows of media and distribution piping, the credited area can be calculated using the formulas listed in paragraph (1)(C)(i)(I) or (II) of this subsection depending on the depth of the media.

(iii) For sites with greater than 2% slopes and solid bedrock, saturated zones, or class IV horizons within two feet of the native soil surface, the length to width ratio of the distribution area must be at least 7:1. For sites with greater than 2% slopes and no solid bedrock, saturated zones, or class IV horizons within two feet of the native soil surface, the length to width ratio of the distribution area must be at least 4:1. No length to width ratio is required on a site with 2% slope or less.

(iv) Effluent must be pressure dosed into the distribution piping to ensure equal distribution and to control application rates.

(v) If a continuous layer of media is used, the dosing lines must not be spaced more than three feet apart. If rows of media are used, the rows may be as close as three feet apart, measured edge to edge.

(vi) The dosing holes must not be greater than three feet apart.

(F) The basal area is defined as the interface area between the native soil surface and the fill material. The formula $A(b) = Q/R(a)$ must be used for calculating the minimum required basal area of the mound where: $A(b)$ = minimum required basal absorptive area in square feet; Q = design wastewater usage rate in gallons per day; $R(a)$ = application rate of the native soil surface in gallons per square foot per day.

(i) On sites with greater than 2% slope, the area credited toward the required minimum basal area is computed by multiplying the length of the distribution system by the distance from the upslope edge of the distribution system to the downslope toe of the mound.

(ii) On sites with 2% slopes or less, the area credited toward the minimum required basal area sizing includes all areas below the distribution system as well as the side slope area on all side slope areas greater than six inches deep.

(G) Mounds shall only be installed on sites with less than 10% slope.

(H) The toe of the mound is considered the edge of the soil absorption system.

(I) The side slopes must be no steeper than three to one.

(J) There must be at least six inches of backfill over the distribution media and the mound shall be crowned to shed water.

(4) Soil substitution drainfields. Soil substitution drainfields may be constructed in Class Ia soils, highly permeable fractured rock, highly permeable fissured rock, or Class II and III soils with greater than 30% gravel.

(A) A soil substitution drainfield must not be used in Class IV soils or Class IV soils with greater than 30% gravel. Class III or IV soil shall not be used as the substituted soil in a soil substitution drainfield. There must be at least two feet of substituted soil between the bottom of the media and groundwater.

(B) A soil substitution drainfield is constructed similar to a standard absorptive drainfield except that a minimum two foot thick Class Ib or Class II soil buffer shall be placed below and on all sides of the drainfield excavation. The soil buffer must extend at least to the top of the media. The two-foot buffer area along the sides of the excavation is not credited as bottom area in calculating absorptive area. However, the interface between the media and the substituted soil is credited as absorptive area.

(C) Soil substitution drainfields must be designed to address soil compaction to prevent unlevel disposal. It is recommended that low-pressure dosing be used for effluent distribution. The edge of the substituted soil is considered the edge of the soil absorption drainfield in determining the appropriate separation distances as listed in §285.91(10) of this title.

(D) Class Ia soils do not provide adequate treatment of wastewater through soil contact. A soil substitution drainfield may be constructed in Class Ia soils in order to provide adequate soil for treatment. Absorptive area sizing must be based on the textural class of the substituted soil and must follow the formulas in subsection (b)(1)(A)(vii)(I) of this section.

(E) Highly permeable fractured and fissured rock, which contains soil in the fractures and fissures, does not provide adequate treatment of wastewater through soil contact. A soil substitution drainfield can be constructed in this permeable fractured and fissured rock in order to provide adequate soil for treatment. Absorptive area sizing must be based on the most restrictive textural class between either the native soil residing in the fractures or fissures or the substituted soil. The sizing must follow the formulas in subsection (b)(1)(A)(vii)(I) of this section.

(F) Class II and III soils with greater than 30% gravel do not provide adequate treatment of wastewater through soil contact. A soil substitution drainfield can be constructed in Class II or III soils with greater than 30% gravel in order to provide adequate soil for treatment. Absorptive area sizing must be based on the most restrictive textural class between either the non-gravel portion of the native soil or the substituted soil. The sizing must follow the formulas in subsection (b)(1)(A)(vii)(I) of this section.

(5) Drainfields following secondary treatment and disinfection. Subsurface drainfields following secondary treatment and disinfection may be constructed in Class Ia soils, fractured rock, fissured rock, or other conditions where insufficient soil depth will allow septic tank effluent to reach fractured rock or fissured rock, as long as the following conditions are met.

(A) Drainfield sizing.

(i) If the unsuitable feature is Class Ia soil, the disposal area sizing shall be based on the application rate for Class Ib soil. Some form of pressure distribution shall be used for effluent disposal.

(ii) If the unsuitable feature is fractured or fissured rock, the system sizing should be based on the application rate for Class III soil. Some form of pressure distribution system shall be used for effluent disposal.

(B) Effluent disinfection. Treated effluent must be disinfected as indicated in §285.32(e) of this title before discharging into the drainfield.

(C) Other requirements. The affidavit, maintenance, and testing and reporting requirements of §285.3(b)(3) of this title and §285.7(a) and (d) of this title (relating to Maintenance Requirements) apply to these systems.

(6) All other nonstandard disposal systems. The planning materials for all non-standard disposal systems not described in paragraphs (1) - (5) of this subsection shall be submitted to the executive director for review according to §285.5(b)(2) of this title before the systems can be installed.

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Effective December 27, 2012

§285.34. Other Requirements.

(a) Septic tank effluent filters. Effective 180 days after the effective date of these rules, all effluent filters that are installed in septic tanks shall be listed and approved under the National Sanitation Foundation (NSF) Standard 46 (2000) or under any standard approved by the executive director.

(b) Pump tanks. Pump tanks may be necessary when the septic tank outlet is at a lower elevation than the disposal field or for systems that require pressure disposal. All requirements in §285.32(b)(1)(D) - (F) of this title (relating to Criteria for Sewage Treatment Systems) also apply to pump tanks. The pump tank shall be constructed according to the following specifications.

(1) Pump tank criteria. When effluent must be pumped to a disposal area, an appropriate pump shall be placed in a separate water-tight tank or chamber. A check valve may be required if the disposal area is above the pump tank. The pump tank shall be equipped to prevent siphoning. The tank shall be provided with an audible and visible high water alarm. If an electrical alarm is used, the power circuit for the alarm shall be separate from the power circuit for the pump. Batteries may be used for back-up power supply only. All electrical components shall be listed and labeled by Underwriters Laboratories (UL). At the discretion of the permitting authority, leak testing using water filled to the inside level of the tank lid or to the top of the riser(s) may be required.

(2) Pump tank sizing. Pump tanks shall be sized to contain one-third of a day's flow between the alarm-on level and the inlet to the pump tank. The capacity above the alarm-on level may be reduced to four hours average daily flow if the pump tank is equipped with multiple pumps. See §285.33(d)(2)(G)(iii) of this title (relating to Criteria for Effluent Disposal Systems) for sizing of pump tanks for surface application systems.

(3) Pump specifications. A single pump may be used for flows equal to or less than 1,000 gallons per day. Dual pumps are required for flows greater than 1,000 gallons per day. A dual pump system shall have the "alarm on" level below the "second pump on" level, and shall have a lock-on feature in the alarm circuit so that once it is activated it will not go off when the second pump draws the liquid level below the "alarm on" level. All audible and visible alarms shall have a manual "silence" switch. The pump switch-gear shall be set such that each pump operates as the first pump on an alternating basis. All pumps shall be rated by the manufacturer for pumping sewage or sewage effluent.

(4) Equalization tanks. In addition to the requirements for pump tanks in this section, equalization tanks shall meet the following criteria:

(A) The equalization tank must be preceded by a pretreatment tank;

(B) If an equalization tank is serving residences, the tank shall have a volume between the pump intake level and the high water level of at least 50% of the design flow and be designed to time dose at equal intervals and equal doses throughout a 24-hour period. The tank may contain a gravity line located above the high water alarm level which allows flow to the aerobic treatment unit. The design will use no fewer than 12 doses throughout the 24-hour period.

(C) If an equalization tank is designed to equalize flows over periods longer than a 24-hour period, the tank shall be designed to time dose at equal intervals and equal doses over the flow equalization time period. The design shall have a storage between the highest wastewater flow line during the period and the high level alarm equal to at least 20% of the flow generated during peak days. The tank may contain a gravity line located above the high water alarm level which allows flow to the aerobic treatment unit.

(c) Electrical wiring. All electrical wiring shall conform to the requirements the National Electric Code (1999) or under any other standards approved by the executive director. Additionally, all external wiring shall be installed in approved, rigid, non-metallic gray code electrical conduit. The conduit shall be buried according to the requirements in the National Electrical Code and terminated at a main circuit breaker panel or sub-panel. Connections shall be in approved junction boxes. All electrical components shall have an electrical disconnect within direct vision from the place where the electrical device is being serviced. Electrical disconnects must be weatherproof (approved for outdoor use) and have maintenance lockout provisions.

(d) Grease interceptors. Grease interceptors shall be used on kitchen waste-lines from institutions, hotels, restaurants, schools with lunchrooms, and other buildings that may discharge large amounts of greases and oils to the OSSF. Grease interceptors shall

be structurally equivalent to, and backfilled according to, the requirements established for septic tanks under §285.32(b)(1)(D) - (F) of this title. The interceptor shall be installed near the plumbing fixture that discharges greasy wastewater and shall be easily accessible for cleaning. Grease interceptors shall be cleaned out periodically to prevent the discharge of grease to the disposal system. Grease interceptors shall be properly sized and installed according to the requirements of the 2000 edition of the Uniform Plumbing Code, the 1980 EPA Design Manual: Onsite Wastewater Treatment and Disposal Systems, or other prevailing code.

(e) Holding tanks. Tanks shall be constructed according to the requirements established for septic tanks under §285.32(b)(1)(D) - (E) of this title. Inlet fittings are required. No outlet fitting shall be provided. A baffle is not required. Holding tanks shall be used only on sites where other methods of sewage disposal are not feasible (these holding tank provisions do not apply to portable toilets or to an office trailer at a construction site). All holding tanks shall be equipped with an audible and visible alarm to indicate when the tank has been filled to within 75% of its rated capacity. A port with its smallest dimension being at least 12 inches shall be provided in the tank lid for inspection, cleaning, and maintenance. This port shall be accessible from the ground surface and must be easily removable and watertight.

(1) Minimum capacity. The minimum capacity of the holding tank shall be sufficient to store the estimated or calculated daily wastewater flow for a period of one week (wastewater usage rate in gallons per day x seven days).

(2) Location. Holding tanks shall be installed in an area readily accessible to a pump truck under all weather conditions, and at a location that meets the minimum distance requirements in §285.91(10) of this title (relating to Tables).

(3) Pumping requirements. A scheduled pumping contract with a waste transporter, holding a current registration with the executive director, must be provided to the permitting authority before a holding tank may be installed. Pumping records must be retained for five years.

(f) Composting toilets. Composting toilets will be approved by the executive director provided the system has been tested and certified under NSF International Standard 41 (1999) or under any other standards approved by the executive director.

(g) Condensation. If condensate lines are plumbed directly into an OSSF, the increased water volume must be accounted for (added to the usage rate) in the system planning materials.

§285.35. Emergency Repairs.

(a) An emergency repair may be made to an on-site sewage facility (OSSF) providing that the repair:

(1) is made for the abatement of an immediate, serious and dangerous health hazard; and

(2) does not constitute an alteration of that OSSF system's planning materials and function.

(b) Emergency repairs include tasks such as replacing tank lids, replacing inlet and outlet devices, repairing risers and riser caps, repairing or replacing disinfection devices, repairing damaged drip irrigation tubing and repairing solid lines. Such repairs must meet criteria established in this chapter.

(c) The individual authorized to make the repair shall notify the permitting authority, in writing, within 72 hours after starting the emergency repairs. The notice must include a detailed description of the methods and materials used in the repair.

(d) An inspection of the emergency repairs may be required at the discretion of the permitting authority.

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Effective December 27, 2012

§285.36. Abandoned Tanks, Boreholes, Cesspools, and Seepage Pits.

(a) A tank that is not to be used again for holding sewage shall be abandoned.

(b) To properly abandon, the owner shall conduct the following actions, in the order listed.

(1) All tanks, boreholes, cesspools, seepage pits, holding tanks, and pump tanks shall have the wastewater removed by a waste transporter, holding a current registration with the executive director.

(2) All tanks, boreholes, cesspools, seepage pits, holding tanks, and pump tanks shall be filled to ground level with fill material (less than three inches in diameter) which is free of organic and construction debris.

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§285.37. On-Site Sewage Facilities and Water Treatment Equipment and Appliances.

(a) Water treatment equipment is defined as an appliance, which includes water softeners and reverse osmosis systems, used to:

- (1) alter the mineral content of water;
- (2) alter the microbiological content of water;
- (3) alter other substances found in water; or
- (4) purify water.

(b) Back flush or discharge from water treatment equipment installed on or after September 1, 2003, may be discharged into an on-site sewage facility (OSSF) as provided in this subsection.

(1) Water softener.

(A) The water softener must regenerate using a demand-initiated regeneration (DIR) control device. The water softener must be clearly labeled as being equipped with a DIR control device as follows:

(i) the label shall be affixed to the outside of the water softener so the label can be easily inspected and read; and

(ii) the label shall provide the name of the company that installed the water softener.

(B) A water softener may be connected to an OSSF with a non-standard or proprietary treatment system only as described in §285.32(c) and (d) of this title (relating to Criteria for Sewage Treatment Systems) if the water softener drain line:

(i) bypasses the treatment system; and

(ii) connects directly to a pump tank if the OSSF has a pump tank or directly to the pipe between the treatment system and the disposal system if no pump tank exists.

(C) An owner may continue to use a water softener that discharges to an OSSF and does not meet the requirements of subparagraph (A) of this paragraph if the water softener was installed before September 1, 2003. An owner must replace any

water softener installed before September 1, 2003, with a water softener that meets the requirements of subparagraphs (A) and (B) of this paragraph at such time as:

(i) an owner replaces the existing water softener; or

(ii) an owner or installer installs, alters, constructs, or repairs an OSSF for the structure or property served by the existing water softener.

(2) Reverse osmosis system.

(A) Point-of-use (under sink unit) reverse osmosis systems. The back flush from a point-of-use reverse osmosis system may be discharged into an OSSF without including calculations of the back flush water volume in the OSSF planning materials.

(B) Point-of-entry (whole house unit) reverse osmosis systems. The back flush from a point-of-entry reverse osmosis system may be discharged into an OSSF if:

(i) the owner can demonstrate that the point-of-entry reverse osmosis system does not cause hydraulic overloading of the OSSF; or

(ii) the water volume from the point-of-entry reverse osmosis system is accounted for (added to the usage rate in §285.91(3) of this title (relating to Tables)) by providing calculations of the increase in wastewater volume with the OSSF planning materials.

(3) Water treatment equipment other than water softeners and reverse osmosis systems. If an owner uses water treatment equipment other than water softeners or reverse osmosis systems, the back flush from the water treatment equipment may be discharged into an OSSF if the water volume is added to the OSSF usage rate in §285.91(3) of this title. This water volume calculation must be provided with the OSSF planning materials.

(c) Discharges from all water treatment equipment shall enter the OSSF system through an airgap or an airgap device as required in the Uniform Plumbing Code (2000).

Adopted April 7, 2004

Effective April 28, 2004

§285.38. Prevention of Unauthorized Access to On-Site Sewage Facilities (OSSFs).

(a) Applicability.

(1) The construction criteria under this subsection applies to:

(A) pretreatment (trash) tanks referenced in §285.32(b)(1)(G) of this title (relating to Criteria for Sewage Treatment Systems);

(B) proprietary treatment units referenced in §285.32(c) of this title;

(C) non-standard treatment units referenced in §285.32(d) of this title;

(D) pump tanks referenced in §285.34(b) of this title (relating to Other Requirements);

(E) holding tanks referenced in §285.34(e) of this title; and

(F) septic tanks referenced in §285.32(b)(1) of this title.

(2) The construction criteria found in this subsection is in addition to the construction criteria in §285.32 of this title.

(b) All tanks must have inspection or cleanout ports located on the tank top over all inlet and outlet devices. Each inspection or cleanout port must be offset to allow for pumping of the tank. The ports may be configured in any manner as long as the smallest dimension of the opening is at least 12 inches, and is large enough to provide for maintenance and equipment removal.

(c) With the exception of septic tanks, all inspection and cleanout ports shall have risers over the port openings which extend to the ground surface. A secondary plug, cap, or other suitable restraint system shall be provided below the riser cap to prevent tank entry if the cap is unknowingly damaged or removed.

(d) All septic tanks buried more than 12 inches below the ground shall have risers over the port openings. The risers shall extend from the tank surface to no more than six inches below the ground. A secondary plug, cap, or other suitable restraint system shall be provided below the riser cap to prevent tank entry if the cap is unknowingly damaged or removed.

(e) Risers.

(1) The risers shall have inside diameters which are equal to or larger than the inspection or cleanout ports.

(2) Risers must be permanently fastened to the tank lid or cast into the tank. The connection between the riser and the tank lid must be watertight.

(3) Risers must be fitted with removable watertight caps and protected against unauthorized intrusions. Acceptable protective measures include:

(A) a padlock;

(B) a cover that can be removed with tools;

(C) a cover having a minimum net weight of 29.5 kilograms (65 pounds) set into a recess of the tank lid; or

(D) any other means approved by the executive director.

(4) Risers and riser caps exposed to sunlight must have ultraviolet light protection.

(5) Risers must be able to withstand the pressures created by the surrounding soil.

(f) Installation of a riser to any component of a new OSSF is considered construction under this chapter and must be performed by a licensed installer.

(g) Installation of risers for OSSF components installed on or after September 1, 2012, are considered an emergency repair as described in §285.35 of this title (relating to Emergency Repairs) and may be performed by either a licensed Installer, licensed maintenance provider, or registered maintenance technician.

(h) Any person who accesses any secured lid(s) or cover(s) on an OSSF shall secure the lid(s) or cover(s) when access is complete.

(i) All inspection reports sent to Authorized Agents, Regional Offices, and homeowners must document that the access to the OSSF inspection and cleanout ports was secured after the maintenance or inspection activities were completed or that the OSSF system owner refused to pay for repairs that were needed to secure the OSSF inspection and cleanout ports.

§285.39. On-Site Sewage Facilities Maintenance and Management Practices.

(a) An installer shall provide the owner of an on-site sewage facility (OSSF) with written information regarding maintenance and management practices and water conservation measures related to the OSSF installed, repaired, or maintained by the installer.

(b) Owners shall have the treatment tanks pumped on a regular basis in order to prevent sludge accumulation from spilling over to the next tank or the outlet device. Owners of treatment tanks shall engage only persons registered with the executive director to transport the treatment tank contents.

(c) Owners shall not allow driveways, storage buildings, or other structures to be constructed over the treatment or disposal systems.

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