SECTION .1900 - SEWAGE TREATMENT AND DISPOSAL SYSTEMS


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### 15A NCA 18A .1934 SCOPE

(a) The rules contained in this Section shall govern the treatment and disposal of domestic strength type wastewater sewage from septic tank ground absorption wastewater systems, privies,
incinerating toilets, mechanical toilets, composting toilets, recycling toilets, or other such systems serving single or multiple-family residences, places of business, or places of public assembly, the effluent from which is designed not to discharge to the land surface, or surface waters, or directly to ground water.

(b) Federal Regulations and North Carolina Rules are referenced where applicable. Recognized standards shall be referenced in this Section where applicable. The standards listed below are hereby adopted by reference in accordance with G.S. 150B-21.61 (4)(c). Copies may be inspected in the Department of Environment and Natural Resources, Division of Environmental Health, Onsite Wastewater Section located at 2728 Capital Blvd, Raleigh, NC in the Parker-Lincoln Building; and copies obtained from (when copyright permits) the Department of Environment and Natural Resources, Division of Environmental Health, Onsite Wastewater Section; 1642 Mail Service Center, Raleigh, North Carolina. 27699-1642. Standards used in this Section are: American Society for Testing Materials (ASTM); International Association of Plumbing and Mechanical Officials (IAPMO); United States Department of Agriculture (USDA), Natural Resources Conservation Service (NRCS); National Sanitation Foundation (NSF); American National Standards Institute, (ANSI); Underwriters Laboratory (UL) American Water Works Association (AWWA) and National Precast Concrete Association (NPCA) American Precast Institute (API). The following standards shall be used where noted:

(1) ASTM Standards:

(A) Standards for cement, concrete and septic tanks

(i) C-33, Standard Specifications for Concrete Aggregates,
(ii) C150, Standard Specification for Portland Cement,
(iii) C233-82 Standard Test Methods for Air-Entraining Admixtures for Concrete,
(iv) C260, Specifications for Air-Entraining Admixtures for Concrete (air entrainment agents),
(v) C494, Specifications for Chemical Admixtures for Concrete (water reducing agents),
(vi) C 805 Standard Test Method of Rebound Number for Hardened Concrete,
(vii) C 890-91 Standard for Traffic Rated Tanks,
(viii) C1227-93a Standard Specifications for Precast Concrete Septic Tanks,
(ix) C 923-02 Specifications for Resilient Connectors between Reinforced Concrete Manhole Structures, Pipes and Laterals,
(x) C 1017, Chemical Admixtures for Use in Producing Flowing Concrete (superplasticizers),
(xi) D 488 Standard Classification for Size of Aggregate for Road and Bridge Construction, and

(B) Standards for pipe

(i) D 1785 Standard Specifications for Poly. (Vinyl Chloride) PVC Plastic Pipe Schedule 40, 80, 120,
(ii) D 2466 Standard Specifications for Plastic Pipe Fittings Schedule 40,
(iii) D 2241 Poly (Vinyl Chloride) PVC Pressure Rated Pipe (SDR Series),
(iv) D 2321 Practice for Underground Installation of Thermoplastic Sewer Pipe.
(v) D 2774 Recommended Practice for Underground Installation of Thermoplastic Pressure Piping.
(vii) F 405, Specifications for Corrugated Polyethylene Tubing and Fittings.
(vii) F 481, Practice for Installation of Thermoplastic Pipe and Corrugated, Polyethylene Tubing in Septic Tank Leachfields.
(ix) F 667, Specifications for Large Diameter Corrugated Polyethylene Tubing and Fitting, and
(x) A211 Spiral Welded Steel pipe, A53 or A589 Circular Black or Galvanized Steel P

(C) Standards for geotextiles
(ii) D 4491 Standard Test Method for Water Permeability of Geotextiles by Permittivity, and

(D) Standards for soil
D 422 Standard Method for Particle Size Analysis of Soils.

(2) IAPMO Standards
PS 1-93 Material Property Standard for Prefabricated Septic Tanks.

(3) USDA Standards:
(A) Field Book for Describing and Sampling Soils USDA.
(B) USDA Methods of Soil Analysis, Soil Survey Investigations Report No. 45 and No. 42 for particle size analysis and for Cation-exchange capacity determination; and
(C) National Engineering Handbook, NRCS Chapter 18.

(4) EPA Methods
Modified EPA Method 9081 Cation-exchange capacity of soils (Sodium Acetate)

(5) NSF Standard 40 for Individual Aerobic Wastewater Treatment Plants;
(6) ANSI Policy and Procedures for Accreditation of Certification Programs;
(7) Drainmod Users Guide

(8) Water Resources Research Institute of the University of North Carolina
(A) Report No. 333.
(B) Report No. 334, and
(C) Project No. 70175 final report.

(9) API 5L Grade B High Strength Smooth Wall Casing.

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### 15A NCAC 18A .1935 DEFINITION

The following definitions shall apply throughout this Section:

1. **“Alluvial Soils”** means stratified soils without distinct horizons, deposited by floodwaters.

2. **“Alternative System”** means any approved ground absorption sewage treatment and disposal system other than an approved privy or an approved septic tank system.

3. **“Approved”** means that which is in accordance with this Section and Article 11 of Chapter 130A of the General Statutes of North Carolina as determined by having been considered acceptable to the State or local health department.

4. **“Approved Privy”** means a fly tight structure consisting of a pit, floor slab, and seat riser constructed in accordance with Rule .159 of this Section.

5. **“Approved Public or Community Sewage System”** means a single system of sewage collection, treatment, and disposal owned and operated by a sanitary district, a
(6) “Areas subject to frequent flooding” means those areas inundated at a 10-year or less frequency and includes alluvial soils and areas subject to tidal or storm overwash.

(3) “Bedroom” means any room designated or used as a bedroom and any room in a residence which is subject to present or future use as a private sleeping area and which has at least:
   (a) a method of ingress and egress (2 ways),
   (b) a way of allowing the room to be closed off from the remainder of the residence for privacy,
   (c) entry is from a common area, not through a room already deemed a bedroom, and
   (d) a closet.

(4) “Cation Exchange Capacity” (CEC) means the sum of exchangeable bases plus total soil acidity at a pH of 7.0. CEC is expressed in milliequivalents per 100 grams of soil (meq/100g of soil) or centimoles per kilogram of soil (cmols/kg of soil). The apparent soil CEC is calculated by determining the CEC using the neutral normal ammonium acetate method (pH of 7.0 neutral normal) and then dividing by the percent clay as determined by particle size distribution (pipette method) and then multiplying by 100 (Methods of Soil Analysis Soil Survey Laboratory Information Manual, and Soil Survey Laboratory Methods Manual, Reports #42 and #45). Sodium acetate may be substituted for ammonium acetate when EPA Method 9081 (modified) is used to determine CEC.

(5) “Collection sewer” means gravity flow pipelines, force mains, effluent supply lines, and appliances appurtenant thereto, used for conducting wastes from building drains to a treatment system or to a ground absorption sewage treatment and disposal system.

(6) “Design daily flow” means the maximum quantity of wastewater a facility is forecast to produce in a 24 hour period upon which system sizing and design are based, as determined in Rule .1949.

(7) “Designated wetland” means an area on the land surface established under the provisions of the Coastal Area Management Act or the Federal Clean Water Act.

(8) “Facility” means one or more dwelling units, places of business, or places of public assembly on:
   (a) a single lot or tract of land;
   (b) multiple lots or tracts of land served by a common ground absorption wastewater treatment and dispersal system; or
   (c) a single lot or tract of land or multiple lots or tracts of land where the dwelling units, places of business or places of public assembly are under multiple ownership (e.g. condominiums) and are served by a ground absorption wastewater treatment and dispersal system or multiple ground absorption wastewater treatment and dispersal systems which are under common or joint ownership or control.

(9) “Dwelling unit” means any room or group of rooms located within a structure and forming a single, habitable unit used or intended to be used for any or all of the following: living, sleeping, bathing, laundry usage, toilet usage, cooking, and eating.

(9) “Design unit” means one or more dwelling units, places of business, or places of public assembly on:
   (a) a single lot or tract of land;
(b) multiple lots or tracts of land served by a common ground absorption sewage treatment and disposal system; or

c) a single lot or tract of land or multiple lots or tracts of land where the dwelling units, places of business or places of public assembly are under multiple ownership (e.g., condominiums) and are served by a ground absorption system or multiple ground absorption systems which are under common or joint ownership or control.

(10) "Dwelling unit" means any room or group of rooms located within a structure and forming a single, habitable unit with facilities which are used or intended to be used for any or all of the following; living, sleeping, bathing, laundry usage, toilet usage, cooking, and eating.

(9) "Effluent" means the liquid discharge of a septic tank or other sewage wastewater treatment device.

(10) "Estimated saturated hydraulic conductivity" means a saturated hydraulic conductivity value based upon the soil profile evaluation and description of the soil texture, soil structure, soil consistency, soil pores, and roots following the procedures in Field Book for Describing and Sampling of Soils, NRCS, USDA and comparison to soil profile saturated hydraulic conductivity data for soil input files for similar soils. The Field Book is hereby incorporated by reference, including any subsequent amendments and editions, in accordance with G.S. 150B-21.6. Copies of the Field Book may be inspected at the Division of Environmental Health Raleigh Office, 2728 Capital Boulevard, Raleigh, 27604, and copies may be downloaded at no cost from the internet at http://soils.usda.gov/procedures/field_bk/main.htm#intro, or obtained from the National Soil Survey Center, MS 34, Room 152, 100 Centennial Mall North, Lincoln, NE 68508-3866.

(11) "Fill" means soil or parent material that has been artificially placed in its present location and shows no evidence of soil structure.

(12) "Ground absorption wastewater sewage treatment and dispersal system", referred to as "wastewater system" or "system", means a system that utilizes the soil for the subsurface treatment and dispersal disposal of partially treated or treated sewage effluent. The system includes all tanks, nitrification fields, reserve areas and appurtenances on a single lot, multiple lots, or tract of land under common or joint ownership or control.

(13) "Horizon" means a layer of soil, approximately parallel to the surface, that has distinct characteristics produced by soil forming processes.

(14) "Horizon subdivision" means a portion of a horizon, approximately parallel to the surface, that has distinct characteristics produced by soil forming processes.

(15) "Interceptor drain," means a groundwater interceptor that is installed as a trench to divert lateral water movement.

(16) "Invert" means the lowest portion of the internal cross-section of a pipe or fitting.

(17) "Lateral water movement" means the movement of water down gradient slope on sites of at least a 4% slope and above a less permeable horizon, and as observed periodically in bore holes, excavations, or monitoring wells.

(18) "Local health department," referred to as LHD, means any county, district, or other health department authorized to be organized under the General Statutes of North Carolina.

(19) "Matrix" means a volume equivalent to 50 percent or greater of the total volume of a horizon or horizon subdivision.

(20) "Mean high water mark" means, for coastal waters having six inches or more of lunar tide influence, the average height of the water over a 19 year period as may be
ascertained from the National Oceanic Survey or U.S. Army Corps of Engineers tide stations data or as otherwise determined under the provisions of the Coastal Area Management Act.

“Mottle” - means a feature(s) which occupies less than 50 percent of the total volume of a horizon or horizon subdivision.

“Naturally occurring soil” means soil formed in place due to natural soil formation and weathering processes and being unaltered by filling, removal, or other artificial man induced changes other than tillage.

“Nitrification field” means the area in which the nitrification trenches lines are located.

“Nitrification lines” means approved pipe, specially designed porous blocks, or other approved materials which receive partially treated sewage effluent for the distribution and absorption into the soil beneath the ground surface of effluent through the nitrification trench.

“Nitrification trench”, also referred to as a sewage absorption trench, means a ditch or excavation into which a nitrification line is placed, laid and covered by soil.

“Non-ground absorption sewage treatment system” means a facility component for waste treatment designed not to discharge to the soil, land surface, or surface waters, including but not limited to, approved vault privies, incinerating toilets, mechanical toilets, composting toilets, chemical toilets, and recycling systems.

“Off-site area or system” means any part of a ground absorption wastewater system that crosses a property line or requires an easement.

“Organic soils,” means those organic mucks and peats that have a histic epipedon, a thin organic soil horizon that is saturated with water at some period of the year unless artificially drained and that is at or near the surface of a mineral soil consisting of more than 20 percent organic matter (by dry weight) and 18 inches or greater in thickness.

“Owner or Owner’s representative” means a person who holds legal title to the property or a person such as a spouse, guardian, executor or someone who has power of attorney for real property to act on the owners behalf. The owner’s representative shall also mean an agent specifically designated by letter or contract to act on the owner’s behalf to obtain permits.

“Parallel Distribution” means the distribution of effluent by gravity flow that proportionally loads several sections of a final treatment and dispersal component at one time.

“Parent material” means the mineral matter that is in its present position through deposition by water, wind, gravity or by decomposition of rock and exposed at the land surface or overlain by soil or saprolite.

“Ped” means a type unit of soil structure, such as an aggregate, crumb, columnar, platy, wedge, prismatic, blocky, or granular formed by natural processes, in contrast with a clod, which is formed artificially.

“Perched water table” means a saturated soil horizon or horizon subdivision, with a free water surface periodically observed in a bore hole or shallow monitoring well, but generally above the normal water table, or may be as identified by drainage mottles or redoximorphic features, and caused by a less permeable lower horizon. 

“Person” means any individual, firm, association, organization, partnership, business trust, corporation, company, or unit of local government.

“Place of business” means any store, warehouse, manufacturing establishment, place of amusement or recreation, service station, foodhandling establishment, or any other place where people work or are served.
“Place of public assembly” means any fairground, auditorium, stadium, church, campground, theater, school, or any other place where people gather or congregate.

“Pressure dispersal” means an effluent pump or siphon is used to deliver effluent in a manner that assures no more than a ten per cent difference in the flow between the first and last orifices on each distribution lateral. Low-pressure pipe and drip dispersal are examples.

“Pressure distribution,” means the uniform distribution of effluent under pressure to more than one nitrification line using parallel distribution. A pressure manifold is an example.

“Pressure dosed” means the use of an effluent pump or siphon to deliver effluent to nitrification trenches.

“Privy building” means and includes all buildings which are used for privacy in the acts of urination and defecation which are constructed over pit privies and are not connected to a ground absorption sewage treatment and disposal system or a public or community sewage system.

“Public management entity” means a city (G.S. 160A, Article 16), county (G.S. 153A, Article 15), interlocal contract (G.S. 153A, Article 16), joint management agency (G.S. 160A-461 –462), county service district (G.S. 153A, Article 16), county water and sewer district (G.S. 162A, Article 6), sanitary district (G.S. 130A, Article 2), water and sewer authority (G.S. 162A, Article 1), metropolitan water district (G.S. 162A, Article 4), metropolitan sewerage district (G.S. 162A, Article 5), public utility [G.S. 62-3(23)], county or district health department (G.S. 130A, Article 2), or other public entity legally authorized to operate and maintain on-site sewage systems.

“Redoximorphic features” means a color pattern of a horizon or horizon subdivision due to a loss (depletion) or gain (concentration) of pigment compared to the matrix color, formed by oxidation/reduction of Fe and/or Mn coupled with their removal, translocation, or accrual; or a soil matrix color controlled by the presence of Fe+2 (see Field Book for Describing and Sampling of Soils, NRCS, USDA) which is hereby incorporated by reference, including any subsequent amendments and editions, in accordance with G.S. 150B 21.6.

“Relocation” means the displacement of a residence, place of business, or place of public assembly from one location to another.

“Repair area” means an area, either in its natural state or which is capable of being modified, consistent with these Rules, which is reserved for the installation of additional nitrification fields and is not covered with structures or impervious material.

“Reserve area” (formally repair area) means a designated area that has been classified Suitable or Provisionally Suitable in accordance with these Rules, without permanent structures, and the area is reserved for the replacement of a ground absorption wastewater system.

“Residence” means any home, hotel, motel, summer camp, labor work camp, mobile home, dwelling unit in a multiple-family structure, or any other place where people reside.

“Restrictive horizon” means a soil horizon that is capable of perching ground water or sewage and that is brittle and strongly compacted or strongly cemented with iron, aluminum, silica, organic matter, or other compounds. Restrictive horizons may occur as fragipans, iron pans or organic pans, and are recognized by their resistance in excavation or in using a soil auger.
“Rock” means the body of consolidated or partially consolidated material composed of minerals at or below the land surface. Rock includes bedrock and partially weathered rock that is relatively hard and cannot be dug with hand tools.

“Sanitary system of sewage treatment and disposal” means a complete system of sewage collection, treatment and disposal, including privies, septic tank systems, connection to public or community sewage systems, incinerators, mechanical toilets, composting toilets, recycling toilets, mechanical aeration systems, or other such systems.

“Rock controlled fabric” means the body of porous material formed in place by weathering of rock, and has a massive, rock-controlled structure, and retains the fabric (arrangement of minerals) of its parent rock.

“Saprolite” means the body of porous material formed in place by weathering of igneous or metamorphic rocks. Saprolite has a massive, rock-controlled structure, and retains the fabric (arrangement of minerals) of its parent rock in at least 50 percent of its volume. Saprolite can be dug with hand tools. The lower limit of saprolite is "rock" and its upper limit is "soil" or the land surface. The term "saprolite" does not include sedimentary parent materials.

“Saturated soils” means a horizon or horizon subdivision with a free water surface at the corresponding depth and observed in a borehole or monitoring well. Also, water held in the soil at or above atmospheric pressure.

“Septic tank” means a water-tight, covered receptacle designed for primary treatment of sewage and constructed to:
(a) receive the discharge of sewage from a building;
(b) separate settleable and floating solids from the liquid;
(c) digest organic matter by anaerobic bacterial action;
(d) store digested solids through a period of detention; and
(e) allow effluent clarified liquids to discharge for additional treatment and final dispersal/disposal.

“Septic tank system” means a subsurface sanitary sewage system consisting of a septic tank and a subsurface disposal field.

“Sewage” means the liquid and solid human waste and liquid waste generated by water-using fixtures and appliances, including those associated with food handling. The term does not include industrial process wastewater or sewage that is combined with industrial process wastewater.

“Serial Distribution” means the distribution of effluent by gravity flow (in the nitrification trench) that progressively loads one nitrification trench to a predetermined level before overflowing to the succeeding nitrification trench.

“Site” means the area in which the wastewater sewage treatment and disposal system is to be located and the area required to accommodate repairs and replacement of nitrification field and permit proper functioning, maintenance and operation of the system.

“Soil” means the unconsolidated mineral or organic material on the immediate surface of the earth that serves as a natural medium for the growth of land plants. The unconsolidated mineral or organic matter on the surface of the earth that has been subjected to and shows effects of genetic and environmental factors: climate (including water and temperature effects), and macro- and microorganisms, conditioned by relief, acting on parent material over a period of time. A product-soil differs from the material from which it is derived in many physical, chemical, biological, and morphological properties and characteristics, the naturally occurring body of porous mineral and organic materials on the land surface. Soil is composed of sand-, silt-, and clay-sized particles that are mixed with varying amounts of larger...
fragments and some organic material. Soil contains less than 50 percent of its volume as rock, saprolite, or coarse earth fraction (mineral particles greater than 2.0 millimeters). The upper limit of soil is the land surface, and its lower limit is “rock”, “saprolite”, or other parent materials.

(50) “Soil consistence” means the degree and kind of cohesion and adhesion that soil exhibits, and the resistance of soil to deformation or rupture under an applied stress.

(51) “Soil material” means soil as well as any naturally occurring unconsolidated mineral deposit, which is not a rock substratum.

(52) “Soil series” - means an official series name established by NRCS, USDA and confirmed to be present on the site by detailed on-site soil profile descriptions and taxonomic classification, and not necessarily the soil series mapped on the county soil survey.

(53) “Soil structure” means the arrangement of primary soil particles into compound particles, peds, or clusters that are separated by natural planes of weakness from adjoining aggregates.

(54) “Soil textural classes” means soil classification based upon size distribution of mineral particles in the fine earth fraction less than two millimeters in diameter. The fine earth fraction includes sand (2.0 - 0.05 mm in size), silt (less than 0.05 mm - 0.002 mm or greater in size), and clay (less than 0.002 mm in size) particles. The specific textural classes are defined as follows and as shown in Soil Taxonomy, Appendix I, which is hereby adopted by reference in accordance with G.S. 150B-14(e):

(a) “Sand” means soil material that contains 85 percent or more of sand; the percentage of silt plus 1.5 times the percentage of clay shall not exceed 15.

(b) “Loamy sand” means soil material that contains at the upper limit 85 to 90 percent sand, and the percentage silt plus 1.5 times the percentage of clay is not less than 15; at the lower limit it contains not less than 70 to 85 percent sand, and the percentage of silt plus twice the percentage of clay does not exceed 30.

(c) “Sandy loam” means soil material that contains either 20 percent clay or less, and the percentage of silt plus twice the percentage of clay exceeds 30, and contains 52 percent or more sand; or less than seven percent clay, less than 50 percent silt, and between 43 and 52 percent sand.

(d) “Loam” means soil material that contains 7 seven to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand.

(e) “Silt loam” means soil material that contains 50 percent or more silt and 12 to 27 percent clay; or contains 50 to 80 percent silt and less than 12 percent clay.

(f) “Silt” means soil material that contains 80 percent or more silt and less than 12 percent clay.

(g) “Sandy clay loam” means soil material that contains 20 to 35 percent clay, less than 28 percent silt, and 45 percent or more sand.

(h) “Clay loam” means soil material that contains 27 to 40 percent clay and 20 to 45 percent sand.

(i) “Silty clay loam” means soil material that contains 27 to 40 percent clay and less than 20 percent sand.

(j) “Sandy clay” means soil material that contains 35 percent or more clay and 45 percent or more sand.
(k) "Silty clay" means soil material that contains 40 percent or more clay and 40 percent or more silt.

(l) "Clay" means soil material that contains 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

(542) “State” means the Department of Environment and Natural Resources, Division of Environmental Health, On-Site Wastewater Section.

(553) “Stream” means a natural or manmade channel, including groundwater lowering ditches and devices, in which water flows or stands most of the year.

(564) “Subsurface disposal dispersal” means the application of sewage effluent beneath the surface of the ground by distribution through approved nitrification trenches lines.

(57) “Usable Soil Depth” means the depth of naturally occurring soil above an unsuitable soil horizon, characteristic, or material.

(58) “Unstable slopes,” means areas showing evidence of mass downslope movement such as debris flow, landslides, and rock fall. Active sand dunes are unstable. Appendix A has information on determining slope stability.

History Note: Authority G.S. 130A-335(e) and (f); Eff. July 1, 1982; Amended Eff. July 1, 1995; January 1, 1990; August 1, 1988; April 1, 1985.

.1937 PERMITS

(a) Any person owning or controlling a facility residence, place of business, or place of public assembly containing water-using fixtures connected to a water supply source shall discharge all wastewater directly to an approved wastewater system permitted for that specific use.

(b) An Improvement Permit, Authorization for Wastewater System Construction (Construction Authorization), Existing System Authorization, and Operation Permit, shall be required in accordance with G.S. 130A-336, G.S. 130A-337 and G.S. 130A-338. Rule .1949 and Rule .1950 of this Section shall be used to determine whether subsequent additions, modifications, or change in the type of facility, results in an increased wastewater flow, altered wastewater characteristics, or encroachment on the wastewater system.

(c) An application for an Improvement Permit, Construction Authorization, or Existing System Authorization, as applicable, shall be submitted to the LHD local health department for each site on which a wastewater system is to be installed, expanded, or used prior to the construction, location, or relocation of a residence, place of business, or place of public assembly. A completed application for an Improvement Permit, Construction Authorization, or Existing System Authorization shall be valid for six months from the date of the application. Applications for systems required to be designed by a professional engineer and applications for industrial process wastewater systems shall meet the provisions of Rule .1938 and Rule .1970 of this Section.

(d) The application for an Improvement Permit shall contain at least the following information:

(1) the applicant and the owner’s (if different) name, mailing address and phone number;
(2) location of the property;
(3) description of existing and proposed facilities and structures;
(4) plat of property or site plan;
(5) number of bedrooms and number of occupants, number of persons served, design daily flow, wastewater characteristics, and other factors required to determine wastewater system design;
(6) type of water supply, including the location of any proposed or existing well(s); and
(7) signature of owner or owner’s representative.
owner’s name, mailing address, and phone number, location of property, plat of property or site plan, description of existing and proposed facilities or structures, number of bedrooms, or number of persons served, or other factors required to determine wastewater system design flow or wastewater characteristics, type of water supply, and signature of owner or owner’s legal representative. The applicant shall be responsible for identifying in the field property lines and for making the site or sites accessible for an evaluation as required in Rule 1939 of this Section. In addition to the above items the applicant shall be responsible for notifying the LHD local health department on the application of the following, when applicable:

(1) if there are existing or proposed easements, rights of way, encroachments, buffers, the property contains designated wetlands or other areas on the property with legal restrictions;

(2) if wastewater other than sewage will be generated; or

(3) if the site is subject to approval by other public agencies.

(e) The application for a Construction Authorization or Existing System Authorization shall include at least:

(1) the information required in Paragraph (d) of this Rule; however, a plat or site plan shall not be required with the application for a Construction Authorization to replace or repair a previously permitted system when the additional nitrification trenches or other system components repairs will be placed accomplished on property owned and controlled by the applicant and for which the property lines are readily identifiable in the field;

(2) a site plan indicating the locations of the proposed facility, appurtenances, and the site for the system showing setbacks to property line(s) or other fixed reference point(s);

(3) the proposed wastewater system type as specified by the owner or owner’s legal representative and that meets the conditions of the Improvement Permit, the provisions of these Rules, and G.S. 130A, Article 11, and

(4) a floor plan of the facility.

(f) Upon receipt of a completed application for an Improvement Permit, an authorized agent of the State DEHNR shall evaluate the site in accordance with this Section. The authorized agent shall prepare a written report with reference to the soil/site conditions required to be evaluated pursuant to this Section. The report shall be signed and dated by the authorized agent. When the site is classified UNSUITABLE, the Improvement Permit shall be denied and the report shall be provided to the owner and the applicant. When the site is classified SUITABLE or PROVISIONALLY SUITABLE the authorized agent shall issue an Improvement Permit after determining that the site is suitable or provisionally suitable and that a system can be installed so as to meet the provisions of these Rules. The Improvement Permit shall include those items required in G.S. 130A-336(a) and the following:

(1) a diagram representing the location of the initial system and reserve area with dimensions and setbacks to fixed reference points;

(2) locations of existing and proposed well(s) and where applicable water lines;

(3) location and description of the facilities, structures, driveways, and other proposed improvements; and

(4) the proposed initial and reserve system types including permit conditions and site modifications.

An Improvement Permit for which a plat is provided shall be valid without expiration and an Improvement Permit for which a site plan is provided shall be valid for 60 months from the date of issue as provided in G.S. 130A-335(f) and 336(a). The Improvement Permit is transferable to subsequent owners except as provided in G.S. 130A-335(f) and 336(a).

(g) The Construction Authorization as provided in G.S. 130A-335(f) and G.S. 130A-336(b) shall be valid for a period equal to the period of validity of the Improvement Permit, not to exceed 60
months. A Construction Authorization is not transferable. Site modifications required as conditions of an Improvement Permit shall be completed prior to the issuance of a Construction Authorization. The Construction Authorization shall be issued by an authorized agent for the installation of a wastewater system when it is found that the Improvement Permit conditions and rules in this Section are met. The Construction Authorization shall contain the following:

1. a diagram representing the location of the initial system and the reserve area with dimensions and setbacks to fixed reference points;
2. location of existing and proposed well(s) and where applicable water lines;
3. location and description of the existing facilities, structures, driveways, and other proposed improvements;
4. the proposed initial and reserve system types;
5. installation requirements and system specifications, including tankage and pump requirements, distribution devices, nitrification trench widths, lengths, and depth;
6. system performance requirements that effect system design;
7. management entity requirements if applicable; and
8. any other permit conditions.

The property owner shall ensure that a Construction Authorization is obtained and is valid prior to the construction or repair of a system. The property owner shall obtain a Construction Authorization prior to the construction, location, or relocation of a residence, place of business, or place of public assembly. An Improvement Permit or Construction Authorization shall become invalid and may be revoked or suspended as applicable if:

1. the installation has not been completed during the period of validity of the Construction Authorization;
2. the information submitted in the application for an Improvement Permit or Construction Authorization is found to have been incorrect, falsified, or changed; or
3. the site is altered.

If the installation has not been completed during the period of validity of the Construction Authorization, the information submitted in the application for a Permit or Construction Authorization is found to have been incorrect, falsified or changed, or the site is altered, the Permit or Construction Authorization shall become invalid and may be suspended or revoked. When an Improvement Permit and or Construction Authorization has become invalid, suspended, or revoked, the installation shall not be commenced or completed until a new Improvement Permit or Construction Authorization has been obtained. Revised Construction Authorizations shall be issued for sites where Improvement Permits are valid without expiration in compliance with G.S. 130A-335(f1).

(h) Prior to the issuance of a Construction Authorization for a wastewater system to serve a condominium or other multiple-ownership development where the system will be under common or joint control, a draft agreement (tri-party) among the LHD local health department, developer, and a proposed non-profit, incorporated owners association shall be submitted to the LHD local health department for approval. Prior to the issuance of an Operation Permit for a system requiring a tri-party agreement, the agreement shall be properly executed among the LHD local health department, developer, and a non-profit, incorporated owners association and filed with the local register of deeds. The tri-party agreement shall address:

1. ownership;
2. transfer of ownership;
3. maintenance, repairs, and operation of the system; and
4. the necessary funds for the continued satisfactory performance of the wastewater system, including collection, treatment, disposal, and other appurtenances.
ownership, transfer of ownership, maintenance, repairs, operation, and the necessary funds for the continued satisfactory performance of the wastewater system, including collection, treatment, disposal, and other appurtenances.

(i) No residence, place of business, or place of public assembly shall be occupied nor shall any wastewater system be covered or placed into use until an authorized agent issues an Operation Permit. The Operation Permit shall not be issued or reissued until the authorized agent finds that the system is in compliance with Article 11 of G.S. Chapter 130A, these Rules, and all conditions prescribed by the Improvement Permit and Construction Authorization. The Operation Permit shall:

1. specify the system type in accordance with Table XV of Rule .1961 of this Section;
2. include a diagram representing the location of the system and components as installed, including trench lengths, widths, and depth, and relative elevations;
3. specify the location of the reserve area; and
4. include conditions for system performance, operation, maintenance, monitoring, and reporting.

At the review frequency specified in Rule .1961, Table XV(a) of this Section, an authorized agent shall determine whether a system is in compliance with the conditions of the Operation Permit, these Rules, and Article 11 of G.S. Chapter 130A. An authorized agent may modify, suspend or revoke the Operation Permit or seek other remedies under Article 2, Chapter 130A, if it is determined that the system is not being operated and maintained as specified in compliance with Article 11 of G.S. Chapter 130A, these Rules, and all conditions imposed by the Operation Permit.

(j) An Operation Permit shall be valid and remain in effect for a system provided:

1. the use of the facility remains unchanged,
2. the quantity and quality of the wastewater is unchanged,
3. no malfunction is found,
4. the conditions of the Operation Permit are complied with, and
5. the operation permit has not expired.

(k) For a Type V or VI system as specified in Rule .1961, Table XV(a) the Operation Permit shall expire either:

1. 60 months after the Operation Permit is issued for any system installed on or after the effective date of these Rules, or
2. 60 months after the effective date of these Rules for any system with a valid Operation Permit issued prior to the effective date of these Rules.

(l) Upon determining that an existing wastewater system including all subsystems and system components in a manufactured home park has a valid Operation Permit and is being operated and maintained as specified in compliance with Article 11 of G.S. Chapter 130A, these Rules, and permit conditions, the LHD local health department shall issue a written authorization for a manufactured home to be connected to the existing system.

(m) All permits (Improvement Permit, Construction Authorization, Operation Permit, and Existing System Authorization) shall be maintained in the county where issued and the system is located.

(n) Any person other than the owner or controller of a residence, place of business, or place of public assembly, who engages in the business of constructing, installing, or repairing wastewater systems shall register with the local health department in each county where he operates before constructing, installing, or repairing wastewater systems.

(n) Upon determining that an existing wastewater system including all subsystems and system components has a valid Operation Permit and is being operated and maintained as specified in Article 11 of Chapter 130A-335, 130A-337, and 130A-338 of the General Statutes of North Carolina, these Rules, permit conditions, and that a proposed change of use, location, relocation, or addition to the facility, or connection to the system is in compliance with the Operation Permit and the Rules, an authorized agent shall issue a written authorization for an Existing System. An
authorization issued by the LHD shall be valid for 6 months, and the authorization can be reissued for another 6 months if all of the above conditions are unchanged.

(m) An authorized agent shall prepare a written report with reference to the site and soil conditions required to be evaluated pursuant to this Section. When a permit is denied, the report shall be provided to the applicant. If modifications or alternatives are available, information shall be provided to the applicant. The report shall be signed and dated by an authorized agent of the State.

(o) If a permit (Improvement Permit, Construction Authorization, Operation Permit, and Existing System Authorization) expires or becomes invalid a new application shall be required.

History Note: Authority G.S. 130A-335(e) and (f);
Eff. July 1, 1982;
Amended Eff. August 1, 1991; January 1, 1990; January 1, 1984;
Amended Eff. August 1, 1998

15A NCAC 18A .1938 RESPONSIBILITIES

(a) The permitting of a wastewater system shall be the responsibility of agents authorized by the State in accordance with G.S. 130A-40, 130A-50, and registered with the State of North Carolina Board of Sanitarian Examiners if required in G.S. 90A Article 4. Where the wastewater system crosses county lines or the facility is in one county and the wastewater system is in another county or counties, the county that will access property taxes and issue permits under G. S. 130A-338 shall have its authorized agents carry out the requirements of this Section.

(b) The owner or applicant (as applicable) shall be responsible for:

(1) identifying property lines, property corners and fixed reference points in the field; fixed reference points may include horizontal or vertical controls that are replicable and maintained until the Operation Permit is issued. Examples of fixed reference points are: surveyed points, GPS locations, existing structures, stakes, iron pins or monuments;

(2) making the site accessible for an evaluation as required in Rule .1939 of this Section; and

(3) digging pits when necessary for proper evaluation of the soil at the site as determined by the LHD;

(c) The person owning or controlling the system shall be responsible for:

(1) assuring compliance with the laws, rules, and permit conditions regarding system location (initial and reserve) and installation;

(2) system operation, maintenance, monitoring, and reporting,

(3) repairing the system; and

(4) preventing encroachment from underground utilities, structures, roads, drives, parking, etc:

assuring compliance with the laws, rules, and permit conditions regarding system location, installation, operation, maintenance, monitoring, reporting, and repair.

(de) Prior to the issuance of an Improvement Permit or Construction Authorization, evaluations, plans and specifications may be required by the LHD where there is an unsuitable soil horizon, material or unsuitable characteristic and shall be required for drainage systems serving two or more lots. These evaluations, plans and specifications shall be required to be prepared by a person or persons who are licensed or registered to consult, investigate, evaluate, plan or design wastewater systems, soil and rock characteristics, ground water hydrology, or drainage in accordance with G.S. 89C, 89E, and 89F, and 90A Article 4.

(e) Any person who engages in constructing, installing, or repairing wastewater systems shall register annually, or before the first installation of a system during the year, with the LHD in each
county where the installer operates before constructing, installing, or repairing wastewater systems. The registration form shall contain at least the following information:

(1) the installer's name and company name if applicable,
(2) business mailing address,
(3) location of the business,
(4) business phone number, and
(5) signature of the owner of the company or the installer.

The wastewater system installer shall provide copies of all authorizations from the manufacturer(s) of innovative systems to install their product to the LHD.

(f) The wastewater system installer shall be responsible for notifying the LHD of the completion of the system installation. For systems installations that require multiple inspections, the installer shall notify the LHD at the completion of each stage. The registered installer or an employee of the installer shall be present during the inspection of the system; tank(s), nitrification trenches and other components by the LHD. The installer shall make corrections as required by the LHD. The wastewater system shall be covered by the installer after the approval and shall be in the same condition when covered as when it was approved. When an authorized agent determines that the installation of a system does not meet the Rules of this Section, corrections shall be made to bring the system into compliance with the Rules. If corrections can not be made to the system, the Operation Permit shall be denied and the authorized agent making the determination shall prepare a written report with reference to the system installation and the report shall be provided to the owner and the system installer.

(gd) Any wastewater system which meets one or more of the following conditions shall be designed by a registered professional engineer:

(1) The system is designed to handle over 3,000 gallons per day, as determined in Rule .1949(a) or (b) of this Section, except where the system is limited to an individual septic tank system serving an individual dwelling unit or several individual septic tank systems, each serving an individual dwelling unit.

(2) The system requires pretreatment before dispersal disposal, other than by a conventional septic tank or other system approved under Rule .1957 or .1969 of this Section.

(3) The system requires use of sewage or grinder pumps prior to the septic tank or other pretreatment system, except for systems subject to the North Carolina Plumbing Code or which consist of grinder pumps and associated pump basins that are approved and listed in accordance with standards adopted by the National Sanitation Foundation.

(4) The individual system is required by Rule .1952 of this Section to use more than one pump or siphon in a single pump tank.

(5) The system includes a collection sewer, prior to the septic tank or other pretreatment system, which serves two or more buildings, except for systems subject to the North Carolina Plumbing Code.

(6) The system includes structures which have not been pre-engineered.

(7) The system is designed for the collection, treatment and disposal of industrial process wastewater, except under the following circumstances:

(A) the State has determined that the wastewater generated by the proposed facility has a pollutant strength which is lower than or equal to domestic sewage, and does not require specialized pretreatment or management, or

(B) the State has pre-approved a predesigned pretreatment system or process and management method proposed by the facility owner which shall enable the industrial process wastewater to have a pollutant strength which is lower than or equal to domestic sewage.
Any other system serving a business or multi-family dwelling so specified by the **LHD** local health department.

The State shall review and approve the system layout on a site plan or plat, plans and specifications for all systems serving a design unit with a design flow greater than 3,000 gallons per day, as determined in Rule .1949(a) or (b) of this Section, except:

1. where the system is limited to an individual septic tank system serving an individual dwelling unit or several individual septic tank systems, each serving and individual dwelling unit, or
2. where the system is limited to an individual septic tank system serving an individual dwelling unit or several individual septic tank systems, each serving and individual unit, and which meets all of the following criteria:
   A. each individual system’s design flow does not exceed 1,500 gallons per day, as determined in Rule .1949(a) or (b) of this Section,
   B. the site for the nitrification field and repair area for each individual system is at least 20 feet from any other individual system site, and
   C. the design wastewater loading on the lot or tract of land containing the design unit is less than 1,500 gallons per day per acre for new or expanded systems and 3,000 gallons per day/acre for malfunctioning systems.

The state shall also review and approve plans and specifications for any industrial process wastewater system required by this Section to be designed by a registered professional engineer and any other system so specified by the local health department.

For systems that require State review and approval, an improvement permit shall not be issued unless the site plan or plat and system layout, including methods of operation and maintenance, are approved.

Prior to issuance of the operation permit for a system required to be designed by a registered professional engineer, the owner shall submit to the local health department a statement signed by a registered professional engineer stating that construction is complete and in accordance with approved plans and specifications and approved modifications. Periodic observations of construction and a final inspection for design compliance by the certifying registered professional engineer or his representative shall be required for this statement. The statement shall be affixed with the registered professional engineer’s seal.

Plans and specifications required to be prepared by a registered professional engineer shall contain all necessary information for construction of the system in accordance with applicable rules and laws and shall include at least one or more of the following, as determined to be applicable by the local health department or the State:

1. the engineer’s seal, signature, and the date on all plans and the first sheet of specifications;
2. a description of the facilities served and the calculations and basis for the design flow proposed;
3. a site plan based on a surveyed plat showing all system components, public water supply sources within 500 feet, private water supplies and surface water supplies within 200 feet, water lines serving the project and within ten feet of all components, building foundations, basements, property lines, embankments or cuts of two feet or more in vertical height, swimming pools, storm sewers, interceptor drains, surface drainage ditches, and adjacent nitrification fields;
4. specifications describing all materials to be used, methods of construction, means for assuring the quality and integrity of the finished product, and operation and maintenance procedures addressing requirements for the system operator, inspection schedules, residuals management provisions, process and performance monitoring schedules, and provisions for maintaining mechanical components and nitrification field vegetative cover;
(5) plan and profile drawings for collection sewers, force mains and supply lines, showing pipe diameter, depth of cover, cleanout and manhole locations, invert and ground surface elevations, valves and other appurtenances, lateral connections, proximity to utilities and pertinent features such as wells, water lines, storm drains, surface waters, structures, roads, and other trafficked areas;

(6) plans for all tanks, showing capacity, invert and ground elevations, access manholes, inlet and outlet details, and plans for built-in-place or non-state-approved, precast tanks, also showing dimensions, reinforcement details, liquid depth, and other pertinent construction features;

(7) calculations for pump or siphon sizing, pump curves, and plan and profile drawings for lift stations and effluent dosing tanks, showing anti-buoyancy provisions, pump or siphon locations, discharge piping, valves, vents, pump controls, pump removal system, electrical connection details, and activation levels for pumps or siphons and high water alarms;

(8) plan and profile drawings for wastewater treatment plants and other pretreatment systems, including cross section views of all relevant system components, and data and contact lists from comparable facilities for any non-standard systems;

(9) plans for nitrification field and repair area, showing the following:

(A) field locations with existing and final relative contour lines based on field measurements at intervals not exceeding two feet or spot elevations if field areas are essentially flat or of uniform grade;

(B) field layout, pipe sizes, length, spacing, connection and clean out details, invert elevations of flow distribution devices and laterals, valves, and appurtenances;

(C) trench plan and profile drawings and flow distribution device details; and

(D) location and design of associated surface and groundwater drainage systems; and

(10) any other information required by the local health department or the State.

(h) The entire wastewater sewage system shall be on property owned or controlled by the person owning or controlling the system. Necessary easements, right of ways, or encroachment agreements, as applicable, shall be obtained prior to the issuance of a Construction Authorization for the system installation or repair of a system proposed to be installed in a common area with other systems, in an area with multiple or third party ownership, or in a proposed off site area. An easement shall be required when the system and the facility are located on different properties. Terms of the easement, right-of-way or encroachment agreement shall provide that the easement, right-of-way, or encroachment agreement:

1. is appurtenant to specifically described property and runs with the land and is not affected by change of ownership or control;
2. is valid for as long as the wastewater system is required for the facility that it is designed to serve;
3. describes and specifies the uses being granted and shall include ingress and egress, system installation, operation, maintenance, monitoring, and repairs;
4. specifies by metes and bounds description or attached plat, the area or site required for the each individual wastewater system and appurtenances including a site for any required system replacement; and
5. shall be recorded with the register of deeds in the county where the system and facility is located.

(i) The person owning or controlling the wastewater system shall be responsible for keeping prohibited materials from entering the system. Prohibited Discharge Standards shall include but not be limited to the following:
General Prohibitions. No system user shall contribute or cause to be contributed into the wastewater treatment and dispersal system, directly or indirectly, any pollutant or wastewater which causes interference or results in groundwater standards exceedance at the 15A NCAC 2L.0107(i) compliance boundary.

Specific Prohibitions. No system user shall contribute or cause to be contributed into the wastewater treatment and dispersal system the following pollutants, substances, or wastewater:

(A) Pollutants which create a fire or explosive hazard, including, but not limited to, wastestreams with a closed cup flashpoint of less than 140°F (60°C) using the test methods specified in 40 CFR 261.21.

(B) Solid or viscous substances in amounts which will cause obstruction of flow resulting in interference but in no case solids greater than one half inch (1/2") in any dimension, unless specifically permitted in the operation permit.

(C) Petroleum oil, nonbiodegradable cutting oil, or products of mineral oil origin, in amounts that will cause interference or pass through, unless specifically permitted in the operation permit.

(D) Any wastewater having a pH less than 5.0 or more than 10.5 or wastewater having any other corrosive property capable of causing damage to the wastewater treatment and disposal system, unless specifically permitted in the operation permit.

(E) Any wastewater containing pollutants, including oxygen-demanding pollutants, (BOD, etc) in sufficient quantity, (flow or concentration) either singly or by interaction with other pollutants, to cause interference with the wastewater treatment and disposal system.

(F) Any wastewater having a temperature greater than 150°F (55°C), or which will inhibit biological activity in the wastewater treatment and disposal system resulting in interference, unless specifically permitted in the operation permit.

(G) Any pollutants which result in the presence of toxic gases, vapors or fumes within wastewater treatment and disposal system in a quantity that may cause acute worker health and safety problems.

(H) Any noxious or malodorous liquids, gases, or solids or other wastewater which, either singly or by interaction with other wastes, are sufficient to create a public nuisance or hazard to life.

(I) Any substance which may cause the wastewater treatment and disposal system’s effluent or any by-product such as residues, sludges, or scums, to be unsuitable for reclamation and reuse or to interfere with the reclamation process. In no case, shall a substance discharged to the wastewater treatment and disposal system cause the wastewater treatment and disposal system to be in noncompliance with sludge use or disposal regulations or permits issued under section 405 of the Act; the Solid Waste Disposal Act, the Clean Air Act, the Toxic Substances Control Act, or State criteria applicable to the sludge and septage management method being used.

(J) Any wastewater containing any radioactive wastes or isotopes except as specifically approved by the State and in compliance with applicable State or Federal regulations.
(K) Storm water, surface water, ground water, artesian well water, roof runoff, subsurface drainage, swimming pool drainage, condensate, deionized water, noncontact cooling water, water filtration backwash, and unpolluted industrial wastewater, unless specifically permitted in the operation permit.

(L) Any wastewater generated from a non residential garbage disposal or grinder, unless specifically authorized by the State and LHD.

(M) Any sludges, screenings or other residues from the pretreatment of industrial wastes.

(N) Any medical wastes, unless specifically permitted in the operation permit.

(O) Any material that would be identified as hazardous waste according to 40 CFR Part 261.

(P) At no time shall two successive readings on an explosion hazard meter, at the point of discharge into the system (or at any point in the system), be more than five percent (5%) nor any single reading over ten percent (10%) of the lower explosive limit (LEL) of the meter.

(Q) Any wastewater treatment chemical and biological agents, including but not limited enzymes and bacterial seed, unless specifically permitted in the operation permit.

(3) Pollutants, substances, wastewater, or other wastes prohibited by this section shall not be processed or stored in such a manner that they could be discharged to the wastewater treatment and disposal system.

(4) Floor drains are specifically prohibited in any vehicle maintenance area, as required in Fed. Rule.

History Note: Authority G.S. 130A-335(e) and (f); Eff. July 1, 1982; Amended Eff. January 1, 1990; April 1, 1985; Temporary Amendment Eff. January 20, 1997.

15A NCAC 18A .1939 SITE EVALUATION

(a) The LHD local health department shall investigate each proposed site. The field investigation shall include the evaluation and written field descriptions (profile descriptions) of the following factors:

(1) topography, slope and landscape position;
(2) soil characteristics (morphology) including:
   (A) horizons, color,
   (B) texture,
   (C) structure, and
   (D) consistence;
(3) soil wetness;
(4) soil depth;
(5) restrictive horizons, and the suitability and long term acceptance rate of each soil boring or pit, and.
(6) available space.

(b) Soil profiles shall be evaluated at the site by borings, pits or other means of excavation. Soil profiles shall be described to at least 48 inches; or to an UNSUITABLE characteristic material or horizon; or to a depth of 12 inches (18 inches Group I soil) below the proposed trench bottom and
A determination shall be made as to the suitability of the soil to treat and disperse septic tank effluent. The owner or Applicants may be required to dig pits when necessary for proper evaluation of the soil at the site as determined by the LHD. There shall be at least one soil profile description for the proposed nitrification field and at least one soil profile description for the reserve area. Additional profile descriptions shall be made as needed.

(c) Site evaluations shall be made in accordance with Rules .1940 through .1948 of this Section. Based on this evaluation, each of the factors listed in Paragraph (a) of this Rule shall be classified as SUITABLE (S), PROVISIONALLY SUITABLE (PS), or UNSUITABLE (U) for any system that can be permitted by the LHD without a report or plans in accordance with G.S. 89C, 89E, and 89F.

(d) The LHD local health department shall determine the overall site classification and suitability in accordance with Rule .1947 and the long-term acceptance rate to be used for sites classified SUITABLE OR PROVISIONALLY SUITABLE in accordance with Rule .1948 of these rules. Sites classified UNSUITABLE in accordance with Rule .1947 maybe reclassified PROVISIONALLY SUITABLE under Rule .1948 (b), (c), and (d).

History Note: Authority G.S. 130A-335(e); Eff. July 1, 1982; Amended Eff. January 1, 1990.

15A NCAC 19A .1940 TOPOGRAPHY AND LANDSCAPE POSITION
(a) Uniform stable slopes under 65 percent shall be considered SUITABLE with respect to topography when:

1. The soil characteristics (morphology) can be classified as SUITABLE to a depth of at least one-foot below the bottom of the nitrification trench at upslope side of the trench.

2. Surface water runoff can be diverted around the nitrification field if necessary to prevent scouring or erosion of the soil over the field as required by the LHD.

3. The finished grade over the nitrification field can be returned to the original topography, seeded and stabilized to prevent soil erosion, unless otherwise specified by the LHD.

(b) Unstable slopes under 65 percent shall be considered UNSUITABLE with respect to topography. Uniform slopes between 15 percent and 30 percent shall be considered PROVISIONALLY SUITABLE with respect to topography.

(c) Slopes greater than 65 percent shall be considered UNSUITABLE as to topography. Slopes greater than 30 percent may be reclassified as PROVISIONALLY SUITABLE after an investigation indicates that a modified system may be installed in accordance with Rule .1956 of this Section; however, slopes greater than 65 percent shall not be reclassified as PROVISIONALLY SUITABLE.

(d) Complex slope patterns (topography) that prohibit the design, installation, maintenance, monitoring and replacement of the nitrification trenches and slopes dissected by gullies and ravines shall be considered UNSUITABLE with respect to topography.

(e) Depressions shall be considered UNSUITABLE with respect to landscape position except when the surface water can be diverted away from the depression or the depression can be drained and the site complies essentially with the requirements of this Section and is specifically approved by the LHD local health department.

(f) The surface area on or around a ground absorption sewage treatment and disposal system shall be landscaped to provide adequate drainage if directed by the local health department. The interception of perched or lateral ground-water movement shall be provided where necessary to prevent soil saturation on or around the ground absorption sewage treatment and disposal system.

(g) A designated wetland shall be considered UNSUITABLE with respect to landscape position, unless the proposed use is specifically approved in writing by the U.S. Army Corps of Engineers or the North Carolina Division of Coastal Management.
(h) A Floodway shall be considered UNSUITABLE with respect to landscape position.

(i) Uniform stable slopes greater than 65 percent may be approved on a site-specific basis in accordance with Rule .1948 (d) of this Section.

History Note: Authority G.S. 130A-335(e);
Eff. July 1, 1982;

15A NCAC 18A .1941 SOIL CHARACTERISTICS (MORPHOLOGY)

(a) The soil characteristics (morphology) which shall be evaluated by the authorized agent in accordance with the Field Book for Describing and Sampling Soils, local health department are as follows: The evaluation shall include the determination of the suitability of: texture, rock content (percent volume and size), structure, mineralogy (consistency), and the presence of organic horizons.

(1) Texture - The relative proportions of sand, silt, and clay sized mineral particles in the fine-earth fraction of the soil are referred to as soil texture. The texture of the different horizons of soils shall be classified into four general groups and 12 soil textural classes based upon the relative proportions of sand, silt, and clay sized mineral particles.

(A) SOIL GROUP I - SANDY TEXTURE SOILS. The sandy group includes the sand and loamy sand soil textural classes and shall be considered SUITABLE with respect to texture.

(B) SOIL GROUP II - COARSE LOAMY TEXTURE SOILS. The coarse loamy group includes sandy loam and loam soil textural classes and shall be considered SUITABLE with respect to texture.

(C) SOIL GROUP III - FINE LOAMY TEXTURE SOILS. The fine loamy group includes silt, silt loam, sandy clay loam, clay loam, and silty clay loam textural classes and shall be considered PROVISIONALLY SUITABLE with respect to texture.

(D) SOIL GROUP IV - CLAYEY TEXTURE SOILS. The clayey group includes sandy clay, silty clay, and clay textural classes and shall be considered PROVISIONALLY SUITABLE with respect to texture.

(E) The soil textural class shall be determined in the field by hand texturing samples of each soil horizon in the soil profile using the following criteria: A procedure for hand texturing of soil is in Appendix B.

(i) Sand: Sand has a gritty feel, does not stain the fingers, and does not form a ribbon or ball when wet or moist.

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

(iii) Sandy Loam: Sandy loam has a gritty feel and forms a ball that can be picked up with the fingers and handled with care without breaking.

(iv) Loam: Loam may have a slightly gritty feel but does not show a fingerprint and forms only short ribbons of from 0.25 inch to 0.50 inch in length. Loam will form a ball that can be handled without breaking.

(v) Silt Loam: Silt loam has a floury feel when moist and will show a fingerprint but will not ribbon and forms only a weak ball.

(vi) Silt: Silt has a floury feel when moist and sticky when wet but will not ribbon and forms a ball that will tolerate some handling.
Sandy Clay Loam: Sandy clay loam has a gritty feel but contains enough clay to form a firm ball and may ribbon to form 0.75-inch to one-inch long pieces.

Silty Clay Loam: Silty clay loam is sticky when moist and will ribbon from one to two inches. Rubbing silty clay loam with the thumbnail produces a moderate sheen. Silty clay loam produces a distinct fingerprint.

Clay Loam: Clay loam is sticky when moist. Clay loam forms a thin ribbon of one to two inches in length and produces a slight sheen when rubbed with the thumbnail. Clay loam produces a nondistinct fingerprint.

Sandy Clay: Sandy clay is plastic, gritty, and sticky when moist and forms a firm ball and produces a thin ribbon to over two inches in length.

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

Clay: Clay is both sticky and plastic when moist, produces a thin ribbon over two inches in length, produces a high sheen when rubbed with the thumbnail, and forms a strong ball resistant to breaking.

<table>
<thead>
<tr>
<th>Soil Group</th>
<th>Soil Texture</th>
<th>Percent sand, silt, clay</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>sand</td>
<td>≥85 percent sand, percentage of silt plus 1.5 times percentage of clay &lt; 15</td>
<td>Suitable</td>
</tr>
<tr>
<td></td>
<td>Loamy sand</td>
<td>85 to 90 percent sand, percentage of silt plus 1.5 times percentage of clay ≥ 15</td>
<td>Suitable</td>
</tr>
<tr>
<td></td>
<td>upper limit</td>
<td>70 to 85 percent sand, percentage of silt plus twice the percentage of clay ≥ 30</td>
<td>Suitable</td>
</tr>
<tr>
<td></td>
<td>Lower limit</td>
<td>7 to 27 percent clay, 28 to 50 percent silt, and &lt; 52 percent sand</td>
<td>Suitable</td>
</tr>
<tr>
<td>II</td>
<td>Sandy loam</td>
<td>20 percent or less clay, the percentage of silt plus twice the percentage of clay &gt; 30, and contains ≥52 percent sand, or &lt; 7 percent clay, &lt; 50 percent silt and between 42 and 50 percent sand</td>
<td>Suitable</td>
</tr>
<tr>
<td></td>
<td>Loam</td>
<td>7 to 27 percent clay, 28 to 50 percent silt, and &lt; 52 percent sand</td>
<td>Suitable</td>
</tr>
<tr>
<td>III</td>
<td>Silt</td>
<td>≥ 80 percent silt and &lt; 12 percent clay</td>
<td>Suitable</td>
</tr>
<tr>
<td></td>
<td>Silt loam</td>
<td>≥ 50 percent silt, 12 to 27 percent clay, or 50 to 80 percent silt and &lt; 12 percent clay</td>
<td>Suitable</td>
</tr>
<tr>
<td></td>
<td>Silty clay loam</td>
<td>27 to 40 percent clay and &lt; 20 percent sand</td>
<td>Suitable</td>
</tr>
<tr>
<td></td>
<td>Sandy clay loam</td>
<td>20 to 35 percent clay, &lt; 28 percent silt, and ≥ 45 percent sand</td>
<td>Suitable</td>
</tr>
</tbody>
</table>
### Soil Textural Classification

<table>
<thead>
<tr>
<th>Texture</th>
<th>Clay (percent)</th>
<th>Sand (percent)</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clay loam</td>
<td>27 to 40</td>
<td>20 to 45</td>
<td>Suitable</td>
</tr>
<tr>
<td>IV Sandy clay</td>
<td>≥ 35</td>
<td>≥ 50</td>
<td>Suitable</td>
</tr>
<tr>
<td>Silty clay</td>
<td>≥ 40</td>
<td>≥ 40</td>
<td>Suitable</td>
</tr>
<tr>
<td>Clay</td>
<td>≥ 40</td>
<td>&lt; 45, ≤ 40</td>
<td>Suitable</td>
</tr>
</tbody>
</table>

The **LHD and the On-Site Wastewater Section** Department may substitute laboratory determination of the soil textural class as defined in these Rules by particle-size analysis of the fine-earth fraction (less than 2.0 mm in size) using the sand, silt, and clay particle sizes as defined in these Rules for field testing when conducted in accordance with the pipette method (ASA-CSSA-SSSA), USDA Methods of Soil Analysis, Soil Survey Laboratory Information Manual, and Soil Survey Laboratory Methods Manual, or ASTM (American Society for Testing and Materials) D-422 procedures for sieve and hydrometer analyses which are hereby adopted by reference in accordance with G.S. 150B-14(c). For fine loamy and clayey soils (Groups III and IV), the dispersion time shall be increased to 12 hours.

Copies may be inspected at and copies obtained from the On-Site Wastewater Section, Division of Environmental Health, P.O. Box 29594, Raleigh, North Carolina 27626-0594.

#### Table III-A Volume of Rock

<table>
<thead>
<tr>
<th>Fragment content % by volume</th>
<th>Rock fragment modifier usage</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 15</td>
<td>None</td>
<td>Suitable</td>
</tr>
<tr>
<td>More than 15 but less than 35</td>
<td>Gravelly, cobbly, stoney</td>
<td>Suitable</td>
</tr>
<tr>
<td>More than 35 but less than 60</td>
<td>Very gravelly, very cobbly, very stony</td>
<td>Suitable</td>
</tr>
<tr>
<td>More than 60</td>
<td>Extremely gravelly, extremely cobbly, extremely stony</td>
<td>Unsuitable</td>
</tr>
</tbody>
</table>

The following requirements for sampling and reporting shall be met.

- **(A)** The soil samples shall be collected and an analysis shall be prepared and submitted to the LHD by individuals qualified by training and experience and who are licensed in North Carolina if required in G.S. 89C (Engineers), G.S. 89E (Geologists), and G.S. 89F (Soil Scientists).
- **(B)** The LHD shall be notified 48 hours before samples are to be taken by the consultant.
- **(C)** The LHD and the consultant shall be present when the sample(s) are taken if requested by the LHD.
- **(D)** The sample(s) shall be split, if requested by the LHD.
- **(E)** The consultant shall submit a chain of custody, and
- **(F)** The consultant shall seal, sign and date the first page of the report.

Rock content shall be described by percent volume and the size of the rock (diameter). If the authorized agent determines that the soil evaluation can not be performed by auger borings or the size and percentage of rock can not be determined, pits shall be used to evaluate the site.
### Table III-B Size of Rock

<table>
<thead>
<tr>
<th>Size of rock in millimeters</th>
<th>Name</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>More than 2 but less than 75 (3 in)</td>
<td>Spherical or cubelike</td>
<td></td>
</tr>
<tr>
<td>More than 75 but less than 250 (3 in. to 10 in.)</td>
<td>Gravely</td>
<td>Suitable</td>
</tr>
<tr>
<td>More than 250 but less than 600 (10 in. to 24.5 in.)</td>
<td>Cobbly</td>
<td>Suitable</td>
</tr>
<tr>
<td>More than 600</td>
<td>Stony</td>
<td>Suitable</td>
</tr>
<tr>
<td>More than 2 but less than 150 (6 in.)</td>
<td>Flat</td>
<td></td>
</tr>
<tr>
<td>More than 150 but less than 380 (6 in. to 15.5 in.)</td>
<td>Channers</td>
<td>Suitable</td>
</tr>
<tr>
<td>More than 380 but less than 600 (15.5 in to 25.5 in)</td>
<td>Flagstones</td>
<td>Suitable</td>
</tr>
<tr>
<td>More than 600 (15.5 in to 25.5 in)</td>
<td>Stones</td>
<td>Suitable</td>
</tr>
</tbody>
</table>

### Table IV Structure

<table>
<thead>
<tr>
<th>Structure</th>
<th>Size</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Granular</td>
<td>N/A</td>
<td>Suitable</td>
</tr>
<tr>
<td>Blocky</td>
<td></td>
<td>Suitable</td>
</tr>
<tr>
<td>Fine to medium</td>
<td>&lt;.79 in. (20 mm)</td>
<td>Suitable</td>
</tr>
<tr>
<td>Coarse*</td>
<td>&lt;.79 inch (20mm) to 2 inches (50mm)</td>
<td>Suitable</td>
</tr>
<tr>
<td>Very coarse*</td>
<td>≥ 2 inches (50mm)</td>
<td>Unsuitable</td>
</tr>
<tr>
<td>Platy*</td>
<td>N/A</td>
<td>Unsuitable</td>
</tr>
<tr>
<td>Prismatic*</td>
<td>N/A</td>
<td>Unsuitable</td>
</tr>
<tr>
<td>Wedge*</td>
<td>N/A</td>
<td>Unsuitable</td>
</tr>
<tr>
<td>Absence of structure</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single grain</td>
<td></td>
<td>Suitable</td>
</tr>
<tr>
<td>Rock controlled fabric*</td>
<td></td>
<td>Suitable</td>
</tr>
<tr>
<td>Massive (no structural peds)</td>
<td></td>
<td>Unsuitable</td>
</tr>
</tbody>
</table>

*Pits shall be used to evaluate this structure.*
PLATY SOIL STRUCTURE – soils which have platy soil structure within 36 inches of the naturally occurring soil surface shall be considered UNSUITABLE as to structure.

PRISMATIC SOIL STRUCTURE – Soils which have prismatic soil structure within 36 inches of the naturally occurring soil surface shall be considered UNSUITABLE as to structure.

ABSENCE OF SOIL STRUCTURE – Soils which are single grained and exhibit no structural aggregates shall be considered SUITABLE as to structure. Soils which are massive and exhibit no structural peds within 36 inches of the naturally occurring soil surface shall be considered UNSUITABLE as to structure.

Structure shall be evaluated using Soil Taxonomy, Appendix I, which is hereby adopted by reference in accordance with G.S. 150B-14(c). Copies may be inspected in, and copies obtained from, the On-Site Wastewater Section, Division of Environmental Health, P.O. Box 29594, Raleigh, North Carolina 27626-0594.

Soil Clay Mineralogy - Along with soil texture, the mineralogy of the clay-sized fraction determines the degree to which some soils swell when wetted and thereby affects the size and number of pores available for movement of sewage effluent through the soil. There are two major types of clays, including the 1:1 clays, such as Kaolinite, which do not shrink or swell extensively when dried or wetted; and the 2:1 clays, including mixed mineralogy clays, such as clays containing both Kaolinite and Montmorillonite that will shrink and swell when dried and wetted. The type of soil clay mineralogy in the clay-sized fraction shall be determined by a field evaluation of moist soil consistence or of wet soil consistence using Soil Taxonomy, Appendix I, which is hereby adopted by reference in accordance with G.S. 150B-14(c). The Department may substitute laboratory determination of the expansive clay mineralogy as defined in these Rules for field testing when conducted in accordance with ASTM D-4318, procedures A and B, for the determination of liquid limit, plastic limit, and plasticity index of soils. These procedures are hereby adopted by reference in accordance with G.S. 150B-14(c). If the liquid limit exceeds 50 percent and the plasticity index exceeds 30, the soil shall be considered as having an expansive clay mineralogy. Copies may be inspected in, and copies obtained from, the On-Site Wastewater Section, Division of Environmental Health, P.O. Box 29594, Raleigh, North Carolina 27626-0594.

SLIGHTLY EXPANSIVE CLAY MINERALOGY – Soils which have loose, very friable, friable or firm moist soil consistence, or have slightly sticky to sticky or nonplastic, slightly plastic to plastic wet soil consistence, are considered to have predominantly 1:1 clay minerals and shall be considered SUITABLE as to clay mineralogy.

EXPANSIVE CLAY MINERALOGY – Soils which have either very firm or extremely firm moist soil consistence, or have either very sticky or very plastic wet soil consistence, are considered to have predominantly 2:1 clay minerals (including mixed mineralogy clays) and shall be considered UNSUITABLE as to clay mineralogy.

<table>
<thead>
<tr>
<th>Consistency</th>
<th>Mineralogy</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Moist</td>
<td>Moist</td>
<td>Moist</td>
</tr>
<tr>
<td>Loose, very friable</td>
<td>Non expansive</td>
<td>Suitable</td>
</tr>
<tr>
<td>Friable, firm</td>
<td>Slightly expansive</td>
<td>Suitable</td>
</tr>
</tbody>
</table>
Laboratory determination of the expansive soil mineralogy as defined in these Rules shall be substituted for the field evaluation when the clay content of the soil is 35 percent or more, organic matter content is 0.5 percent or less, the pipette method for determining soil texture is used, and the apparent cation exchange capacity (CEC) is calculated.

<table>
<thead>
<tr>
<th>Aparent CEC/cmol/kg</th>
<th>Mineralogy</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;16.3</td>
<td>Slightly expansive</td>
<td>Suitable</td>
</tr>
<tr>
<td>&gt;16.3</td>
<td>Expansive</td>
<td>Unsuitable</td>
</tr>
</tbody>
</table>

The following requirements for sampling and reporting shall be met.

(A) The expansive soil mineralogy samples shall be collected and an analysis shall be prepared and submitted to the LHD by individuals qualified by training and experience and who are licensed in North Carolina if required in G.S. 89C (Engineers), G.S. 89E (Geologists), and G.S. 89F (Soil Scientists).

(B) The LHD shall be notified 48 hours before samples are to be taken by the consultant.

(C) The LHD and the consultant shall be present when the samples are taken, if requested by the LHD.

(D) The sample shall be split, if requested by the LHD.

(E) The consultant shall submit a chain of custody.

(F) The consultant shall seal, sign and date the first page of the report.

(b) Where the site is UNSUITABLE with respect to structure or soil clay mineralogy, it may be reclassified PROVISIONALLY SUITABLE on a site-specific basis in accordance with Rule .1948 (d) of this Section after an investigation indicates that a modified or alternative system may be installed in accordance with Rule .1956 or Rule .1957 of this Section.

History Note: Authority G.S. 130A-335(e); Eff. July 1, 1982; Amended Eff. January 1, 1990.

15A NCAC 18A .1942 SOIL WETNESS CONDITIONS

(a) Soil wetness conditions caused by seasonal high-water table, perched water table, tidal water, seasonally saturated soil or by lateral water movement shall be determined by field evaluation for soil wetness colors and field observations, and may be assessed by well monitoring, computer modeling, or a combination of monitoring and modeling as required by this Rule. All sites shall be evaluated by an Authorized Agent of the Department using Basic Field Evaluation Procedures pursuant to Paragraph (b) of this Rule.

(b) Basic Field Evaluation Procedures:
A soil wetness condition shall be determined by the indication of colors of chroma 2 or less (Munsell Color System Charts) at ≥2% of soil volume in mottles or matrix of a horizon or horizon subdivision. However, colors of chroma 2 or less which are relic from minerals of the parent material shall not be considered indicative of a soil wetness condition; or

Soil wetness condition shall also be determined by the periodic direct observation or indication of saturated soils or a perched water table, or lateral water movement flowing into a bore hole, monitoring well, or open excavation above a less permeable horizon or horizon subdivision, that may occur without the presence of colors of chroma 2 or less. A soil wetness condition caused by saturated soils or a perched water table shall be confirmed to extend for at least three consecutive days. The shallowest depth to soil wetness condition determined by Subparagraph (b)(1) or (b)(2) of this Rule shall take precedence.

(c) Site Suitability as to Soil Wetness: Initial suitability of the site as to soil wetness shall be determined based upon the findings of the Basic Field Evaluation Procedures made pursuant to Paragraph (b) of this Rule. Sites where soil wetness conditions are greater than 12 48 inches below the naturally occurring soil surface shall be considered SUITABLE with respect to soil wetness. Sites where soil wetness conditions are between 36 and 48 inches below the naturally occurring soil surface shall be considered PROVISIONALLY SUITABLE with respect to soil wetness. Sites where soil wetness conditions are less than 36 inches below the naturally occurring soil surface shall be considered UNSUITABLE with respect to soil wetness. Sites where a soil wetness condition is determined based upon the observation or indication of lateral water movement within 48 inches of the naturally occurring soil surface shall be considered UNSUITABLE, except when such water can be intercepted in accordance with 15A NCAC 18A.1956(4).

(d) Alternative Procedures for Soil Wetness Determination: The Owner or the Owner's Legal Representative (Applicant) shall have the opportunity to submit documentation that the soil wetness condition and resultant site classification be alternately determined and reclassified by direct monitoring, computer modeling, or a combination of monitoring and modeling, in accordance with a Direct Monitoring Procedure, Monitoring and Modeling Procedure, or Modeling Procedure made pursuant to Paragraphs (e), (f), or (g) of this Rule. This determination shall take precedence over the determination made pursuant to the Basic Field Evaluation Procedures [Paragraph (b) of this Rule], when the conditions of Paragraphs (e), (f), or (g) of this Rule are met. Determination by one of these Monitoring or Modeling procedures shall also be required when:

(1) the Owner proposes to use a wastewater system requiring a deeper depth to a soil wetness condition than the depth determined by the Basic Field Evaluation Procedures pursuant to Paragraph (b) of this Rule; or

(2) the Owner proposes to use sites with Group III or IV soil within 36 inches of the surface and where drainage modifications are proposed to be made, including the installation of subsurface drain tile, open drainage ditches, or surface landscape modifications, or on such sites when fill is proposed to be used in conjunction with existing or proposed drainage modifications. Final determination of soil wetness condition for these sites shall be made pursuant to the Modeling Procedure in Paragraph (g) of this Rule

(e) Direct Monitoring Procedure. Soil wetness conditions may be determined by direct observation of the water surface in wells during periods of typically high water elevations utilizing the following monitoring procedures and interpretation method.

(1) The applicant shall notify the local health department of the intent to monitor water surface elevations by submitting a proposal that includes a site plan, well and soil profile at each monitoring location, and a monitoring plan no later than 30 days prior to the monitoring period. An applicant other than the property owner shall have written authorization from the owner to be the owner’s legal representative. Soil
wetness and rainfall monitoring shall be conducted under the responsible charge of a third-party consultant(s), licensed or registered in accordance with G.S. 89C (Engineers), G.S. 89E (Geologists), G.S. 89F (Soil Scientists), or G.S. 90A Article 4 (Registered Sanitarians), or by the property owner/applicant. The Owner shall submit the name(s) of the consultant(s) performing any monitoring on their behalf to the local health department.

(2) The applicant shall submit a site plan showing proposed sites for wastewater system, shall provide the longitude and latitude of the site, location of monitoring wells, and all drainage features that may influence the soil wetness conditions, and specify any proposed fill and drainage modifications.

(3) The applicant shall submit a monitoring plan indicating the proposed number, installation depth, screening depth, soil and well profile, materials and installation procedures for each monitoring well, and proposed method of analysis. A minimum of three water level monitoring wells shall be installed for water surface observation at each site. Additional wells shall be required for sites handling systems with a design flow greater than 600 gallons per day (minimum of one additional well per 600 gallons per day increment).

(4) The LHD local health department shall be given the opportunity to conduct a site visit and verify the appropriateness of the proposed plan. Well locations shall include portions of the initial and replacement drainfield site(s) containing the most limiting soil/site conditions. Prior to installation of the wells the LHD local health department shall approve the plan. If the plan is disapproved, the LHD local health department shall include specific changes necessary for approval of the monitoring plan.

(5) Wells shall extend at least five feet below the natural soil surface, or existing soil surface for fill installed prior to July 1, 1977 meeting the requirements for consideration of a site with existing fill of G.S. 130A-341 and the rules adopted pursuant thereto. However, a well or wells which extend(s) down only 40 inches may be used if they provide a continuous record of the water table for at least half of the monitoring period, and one or more shallower wells may be required on sites where shallow lateral water movement or perched soil wetness conditions are anticipated.

(6) Water surface in the monitoring wells shall be recorded at least daily from January 1 to April 30, taken at the same time during the day (plus or minus one three hours). A rain (precipitation) gauge is required on site within one half mile of the site. At least daily rainfall shall be recorded beginning no later than December 1 through April 30 (the end of the well monitoring period).

(7) Interpretation Method for Direct Monitoring Procedure: The following method of determining depth to soil wetness condition from water surface observations in wells shall be used when the 60-day weighted rainfall index for the January through April monitoring period equals or exceeds the site’s long-term (historic) 60-day weighted rainfall index for January to April rainfall with a 30 percent recurrence frequency (wetter than the 9th driest year of 30, on average). The 60-day weighted rainfall index for the monitoring period and historic rainfall record shall be computed as:

\[
WRI_{60} = 0.5P_D + P_J + P_F + P_M + 0.5P_A
\]

Where

- \( WRI_{60} \) = 60-day weighted rainfall index for January to April
- \( P_D \) = Total December rainfall
- \( P_J \) = Total January rainfall
- \( P_F \) = Total February rainfall
- \( P_M \) = Total March rainfall
\[ P_A = \text{Total April rainfall} \]

The Department shall prepare contour maps for each county where this interpretation procedure is proposed. Contours shall be prepared following standard interpolation procedures using normalized data collected from all National Weather Service Stations, NCSU Climate Center, or equivalent, from which appropriate data are available, at least prior to February 1 of the monitoring season. Data from each station shall be normalized by fitting a 2-parameter gamma distribution to the 60-day weighted rainfall index computed for at least the most recent three decades of historic data, in accordance with procedures outlined in Chapter 18 of the National Engineering Handbook, NRCS, USDA. From this fitted distribution, the 60-day weighted rainfall index for January through April rainfall with a 30%, 50%, 70% and 80% recurrence frequency shall be computed for each Station, to provide the raw data points from which the contour maps shall be prepared. From these maps, the site's 60-day weighted rainfall index for the January through April monitoring period shall be compared to the long-term (historic) January to April 60-day weighted rainfall index at different expected recurrence frequencies. The soil wetness condition shall be determined as the highest level that is continuously saturated for the number of consecutive days during the January through April monitoring period shown in the following table:

<table>
<thead>
<tr>
<th>Recurrence Frequency Range</th>
<th>Number of Consecutive Days of Continuous Saturation for Soil Wetness Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>30% to 49.9%</td>
<td>3 days or 72 hours</td>
</tr>
<tr>
<td>50% to 69.9%</td>
<td>6 days or 144 hours</td>
</tr>
<tr>
<td>70% to 79.9%</td>
<td>9 days or 216 hours</td>
</tr>
<tr>
<td>80% to 100%</td>
<td>14 days or 336 hours</td>
</tr>
</tbody>
</table>

(8) If monitoring well data is collected during monitoring periods that span multiple years, the year which yields the highest (shallowest) soil wetness condition shall be applicable.

(f) Monitoring and Modeling Procedure: A combination of monitoring and modeling may be used to determine a soil wetness condition utilizing the following monitoring procedures and interpretation method.

(1) The procedures described for the Direct Monitoring Procedure in Subparagraphs (e)(1), (2), (3), (4), (5), and (6) of this Rule shall be used to monitor water surface elevation and precipitation for determining soil wetness conditions by a combination of direct observation and modeling, except that the rainfall gauge and each monitoring well shall use a recording device and a data file (DRAINMOD-compatible) shall be submitted with the report to the LHD local health department (devices shall record rainfall at least hourly and well water level at least daily).

(2) The ground water simulation model DRAINMOD shall be used to predict daily water levels over at least a 30 year historic time period after the model is calibrated using the water surface and rainfall observations made on-site during the monitoring period. The soil wetness condition shall be determined as the highest level predicted by the model to be saturated for a 14-day continuous period between January 1 and
April 30 with a recurrence frequency of 30 percent (an average of at least 9 years in 30).

(A) Weather input files, required to run the DRAINMOD, shall be developed from hourly rainfall gauge data taken within a half-mile of on the site and from daily temperature and hourly or daily rainfall data collected over a minimum 30-year period from the closest available National Weather Service, NCSU Climate Center, or equivalent, measuring station to the site. DRAINMOD weather data files on file with the Department shall be made available upon request to the applicant or applicant's consultants. Daily maximum and minimum temperature data for the January 1 through April 30 monitoring period, plus for at least 30 days prior to this period, shall be obtained from the closest available weather station.

(B) Soil and Site inputs for DRAINMOD, including a soils data file closest to the soil series identified, depths of soil horizons, estimated saturated hydraulic conductivity of each horizon, depth and spacing of drainage features and depression storage, shall be selected in accordance with procedures outlined in the DRAINMOD Users Guide, and guidance is also available in Reports 333 and 342 of the University of North Carolinas Water Resources Research Institute. DRAINMOD soils data files on file with the Department shall be made available upon request to the applicant or applicant’s consultants.

(C) Inputs shall be based upon site specific soil profile descriptions. Soil and site input factors shall be adjusted during the model calibration process to achieve a best fit by least squares analysis of the daily observations over the whole monitoring period (mean absolute deviation between measured and predicted values no greater than eight inches), and to achieve the best possible match between the highest water table depth during the monitoring period (measured-vs-predicted) that is saturated for 14 consecutive days.

(D) For sites intended to receive over 1500 gallons per day, the soil wetness determination using DRAINMOD shall take into consideration the impact of wastewater application on the projected water table surface.

(E) The ground water simulation analysis shall be prepared and submitted to the LHD local health department by individuals qualified to use DRAINMOD by training and experience and who are licensed or registered in North Carolina if required in G.S. 89C (Engineers), G.S. 89E (Geologists), and G.S. 89F (Soil Scientists). The LHD local health department or Owner may request a technical review by State Department prior to approval of the soil wetness condition determination.

(g) Modeling Procedure: A soil wetness condition may be determined by application of DRAINMOD to predict daily water levels over at least a 30 year historic time period after all site-specific input parameters have been obtained, as outlined in the DRAINMOD Users Guide. This modeling procedure shall be used when a ground water lowering system is proposed for a site with Group III or IV soils within 36 inches of the naturally occurring soil surface. This procedure shall also be used to evaluate sites with Group III or IV soils within 36 inches of the naturally occurring soil surface, where the soil wetness condition was initially determined using a procedure described in Paragraphs (e) or (f) of this Rule and where drainage modifications are proposed or when fill is proposed to be used in conjunction with existing or proposed drainage modifications. The soil wetness condition shall be determined as the highest level predicted by the model to be saturated for a 14-day continuous period between January 1 and April 30 with a recurrence frequency of 30 percent (an average of at least 9 years in 30).
(1) Weather input files, required to run DRAINMOD, shall consist of hourly rainfall and daily temperature data collected over the entire period of record but for at least a 30-year period from the closest available National Weather Service, NCSU Climate Center or equivalent, measuring station to the site. DRAINMOD weather data files on file with the Department shall be made available upon request to the applicant or applicant's consultants.

(2) Soil and Site inputs for DRAINMOD, including a soils data file closest to the soil series identified, depths of soil horizons, hydraulic conductivity of each horizon, depth and spacing of proposed drainage features and surface storage and drainage parameters, shall be selected in accordance with procedures outlined in the DRAINMOD User's Guide. DRAINMOD soils data files on file with the Department shall be made available upon request to the applicant or applicant's consultants. Inputs shall include:

(A) Soil input file with the soil moisture characteristic curve and data for the soil profile that is closest to the described soil profile that is present on the site;

(B) Soil horizon depths determined on site;

(C) Site measured or proposed drain depth and spacing, and drain outlet elevation;

(D) In-situ saturated hydraulic conductivity measurements for at least three representative locations on the site and at each location for at least three most representative soil horizons within five feet of the surface. Conductivity measurements shall be for one representative soil horizon at or above redoximorphic depletion features and two representative soil horizons at and below redoximorphic concentration features at each location on the site;

(E) All other model parameters based upon the DRAINMOD User's Guide, or other accepted values consistent with the simulation model; and

(F) A sensitivity analysis shall be conducted for the following model parameters:

(i) Soil input files for at least two other most closely related soil profiles;

(ii) Saturated hydraulic conductivity of each of horizons measured on-site;

(iii) Drain depth and spacing; and

(iv) Surface storage and depth of surface flow inputs.

The sensitivity analysis shall be used to evaluate the range of soil and site characteristics for choosing input parameters related to the soil profiles, hydraulic conductivity input values based upon the range of hydraulic conductivity values measured on the site, and inputs for surface and subsurface drainage features based upon the range of possible elevations and distances that occur or may occur after installation of improvements. The sensitivity analysis shall establish which parameters are most critical for determination of the depth to soil wetness condition. Conservative values for the most critical parameters shall be used in applying the model to the site.

(3) For sites designed to receive over 600 gallons per day, the soil wetness determination using DRAINMOD shall take into consideration the impact of wastewater application on the projected water table surface.

(4) The ground water simulation analysis shall be prepared and submitted to the LHD local health department by individuals qualified to use DRAINMOD by training and experience and who are licensed or registered in North Carolina if required in G.S. 89C (Engineers), G.S. 89E (Geologists), and G.S. 89F (Soil Scientists). The LHD
local health department shall submit the ground water simulation analysis to the State Department for technical review prior to approval of the soil wetness condition determination.

(h) A report of the investigations made for the Direct Monitoring Procedure, Monitoring and Modeling Procedure or Modeling Procedure pursuant to Paragraphs (e), (f), or (g) of this Rule shall be prepared prior to approval of the soil wetness condition determination. Reports prepared by a licensed or registered professional shall bear the professional seal of the person(s) whom conducted the investigation (Engineer, Geologist, Soil Scientist or Registered Sanitarian). A request for technical review of the report by the State Department On-Site Wastewater Section shall include digital copies of monitoring data and digital copies of model inputs, output data, and graphic results, as applicable.

(i) Where the site is UNSUITABLE with respect to soil wetness conditions, it may be reclassified PROVISIONALLY SUITABLE on a site-specific basis in accordance with Rule .1948 (b), (c) and (d) of this Section if a modified, alternative or innovative system can be installed in accordance with 15A NCAC 18A.1956, 1957, or 1969.

History Note: Authority G.S. 130A-335(e):
Eff. July 1, 1982;
Amended Eff. January 1, 1990;
Amended Eff.__________

15A NCAC 18A .1943 SOIL DEPTH
(a) Soil depths to saprolite, rock, or parent unsuitable soil material greater than 18 48 inches or greater shall be considered SUITABLE as to soil depth. Soil depths to saprolite, rock, or parent material between 36 inches and 48 inches shall be considered PROVISIONALLY SUITABLE as to soil depth. Soil depths to saprolite, rock, or parent material less than 18 36 inches shall be classified UNSUITABLE as to soil depth.

(b) Where the site is UNSUITABLE with respect to depth, it may be reclassified PROVISIONALLY SUITABLE after a special investigation indicates that a modified or alternative system can be installed in accordance with Rule .1956 or Rule .1957 of this Section.

History Note: Authority G.S. 130A-335(e);
Eff. July 1, 1982;

15A NCAC 18A .1944 RESTRICTIVE HORIZONS
(a) Soils in which restrictive horizons are three inches or more in thickness and at depths greater than 48 inches below the naturally occurring soil surface shall be considered SUITABLE as to depth to restrictive horizons. Soils in which restrictive horizons are three inches or more in thickness and at depths between 36 inches and 48 inches shall be considered PROVISIONALLY SUITABLE as to depth to restrictive horizons. Soils in which restrictive horizons are three inches or more in thickness and at depths less than 36 inches shall be considered UNSUITABLE as to depth to restrictive horizons.

(b) Where the site is UNSUITABLE with respect to restrictive horizons, it may be reclassified PROVISIONALLY SUITABLE after an investigation indicates that a modified or alternative system can be installed in accordance with Rules .1956 or .1957 of this Section.

History Note: Authority G.S. 130A-335(e);
15A NCAC 18A .1945 AVAILABLE SPACE

(a) Sites shall have sufficient available space to permit the installation and proper functioning of ground absorption wastewater sewage treatment and dispersal disposal systems, based upon the square footage of nitrification field required for the long-term acceptance rate determined in accordance with these Rules. If the system (initial and reserve) is in more than one location, the system shall be drawn to scale on the Improvement Permit and the Construction Authorization and located (flagged or staked) on site.

(b) Sites shall have sufficient available space for a reserve repair area separate from the area determined in Paragraph (a) of this Rule. The reserve repair area shall be based upon the area of the nitrification field required to accommodate the installation of a replacement system as specified in Rule .1955, .1956, or .1957 or 1969 of this Section. Prior to issuance of the initial Improvement Permit for a site, the authorized agent local health department shall designate on the Improvement Permit as specified in Rule .1937 (f)(4) and the Construction Authorization Rule as specified in Rule .1937 (g)(4) the original system layout, the reserve repair area, and the type of replacement system. A determination shall be made by the authorized agent that the system (initial and reserve) can be designed, installed, operated, maintained and monitored in accordance with these Rules.

(c) The reserve repair area requirement of Paragraph (b) of this Rule shall not apply to a lot or tract of land:

(1) which is specifically described in a document on file with the LHD local health department on July 1, 1982, or which is specifically described in a recorded deed or a recorded plat on January 1, 1983; and

(2) which is of insufficient size to satisfy the reserve repair area requirement of Paragraph (b) of this Rule, as determined by the LHD local health department; and

(3) on which a ground absorption sewage treatment and disposal system with a design daily flow from the facility is of:

(A) no more than 480 gallons is to be installed; or

(B) more than 480 gallons is to be installed if an application for an improvement permit which meets the requirements of Rule .1937(c) of this Subchapter is received by the LHD local health department on or before April 1, 1983.

Examples of special situations when a reserve area is required and when a reserve area is not required can be found in Appendix C.

(d) If an off site area or system is used a reserve area shall be required. When an existing malfunctioning system is replaced in an off-site area, an additional reserve area shall not be required.

(e) Although a lot or tract of land is exempted under Paragraph (c) from the repair area requirement of Paragraph (b), the maximum feasible area, as determined by the LHD local health department, shall be allocated for a reserve repair area.

History Note: Authority G.S. 130A-335(e) and (f);
Eff. July 1, 1982;
Amended Eff. February 1, 1992; July 1, 1983; January 1, 1983.

15A NCAC 18A .1946 OTHER APPLICABLE FACTORS

The site evaluation shall include consideration of any other applicable factors on a case-by-case basis involving accepted public health principles, such as, but need not be limited to:

(1) The proximity of a large-capacity water-supply well, the cone of influence of which would dictate a larger separation distance than the minimum distance specified in Rule .1950 of this Section;

Examples of special situations when a reserve area is required and when a reserve area is not required can be found in Appendix C.
The potential public health hazard due to possible failures of soil ground absorption wastewater systems when specifically identified, would dictate larger separation distances than the minimums specified in Rule .1950 (setbacks) and Rule .1955(m) (trench bottom separation) of this Section;

The potential public health hazard of possible massive failures of soil ground absorption systems proposed to serve large numbers of dwelling units residences, as in residential subdivisions or mobile home parks.

For sites serving systems designed to handle over 3,000 gallons per day, as determined in Rule .1949 (a) or (b) of this Section, which include one or more nitrification fields with a design flow of greater than 1500 gallons per day, the applicant shall submit sufficient site-specific data to predict the height of the water table mound that will develop beneath the field (level sites) and the rate of lateral and vertical flow away from the nitrification trenches (sloping sites). The data submitted may include soil borings to depths greater than 48 inches, permeability and hydraulic conductivity measurements, water level readings, and other information determined to be necessary by the local health department or the State. The site shall be considered UNSUITABLE if the data indicate that the groundwater mound which will develop beneath the site cannot be maintained two feet or more below the bottom of the nitrification trenches or it is determined that effluent is likely to become exposed on the ground surface within, or adjacent to, the nitrification field.

History Note: Authority G.S. 130A-335(e);
Eff. July 1, 1982;

15A NCAC 18A .1947 DETERMINATION OF OVERALL SITE CLASSIFICATION AND SUITABILITY

(a) All of the criteria in Rules .1940 through .1946 of this Section shall be determined to be SUITABLE, PROVISIONALLY SUITABLE, or UNSUITABLE, as indicated. If all criteria are classified the same, that classification will prevail. Where there is a variation in classification of the several criteria, the most limiting uncorrectable characteristics shall be used to determine the overall site classification.

(b) Usable soil depths shall be used to determine site suitability. The required usable soil depth shall increase as the slope increases.

(1) Usable soil depths on a level site of 30 inches or more (36 inches Group I) shall be considered SUITABLE.

(2) Usable soil depths on a level site between 18 inches (24 inches Group I) and 30 inches (36 inches Group I) shall be considered PROVISIONALLY SUITABLE.

(3) Usable soil depths on a level site less than 18 inches (24 inches Group I) shall be considered UNSUITABLE, except for Rule .1957(b) (1) Fill Systems where the separation to soil wetness may be reduced to 12 inches when pressure dispersal system is used.

(4) For sloping sites a calculation of the additional usable soil depth required shall be made to determine if the site is Suitable, Provisionally Suitable, or Unsuitable. The usable soil depth shall be calculated using the following formula or table V.

\[
USDR = MSD + (TW \times S)
\]

Where

\[USDR\] = usable soil depth required
\[MSD\] = minimum soil depth from (1, 2, or 3 above)
\[TW\] = trench width (installed)
\( S = \text{percent slope} \)

### Table VII Slope Correction

<table>
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<th>Slope (%)</th>
<th>Trench Width (inches)</th>
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<th>24</th>
<th>30</th>
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(a) Table VI shall be used in determining the maximum long-term acceptance rate for wastewater systems. The long-term acceptance rate shall be based on the most hydraulically limiting naturally occurring soil horizon from the ground surface to a depth of one foot below trench bottom.

### TABLE VIII Long Term Acceptance Rate

<table>
<thead>
<tr>
<th>Soil Group</th>
<th>Soil Texture</th>
<th>Soil Structure Type</th>
<th>Grade of structure</th>
<th>Long Term Acceptance Rate gal./day/ft²</th>
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<tbody>
<tr>
<td>I</td>
<td>Sand</td>
<td>Single grain</td>
<td>Structureless</td>
<td>1.2 to 0.9</td>
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<td>Sand</td>
<td>Single grain</td>
<td>Rock controlled fabric</td>
<td>0.8 to 0.6</td>
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<td></td>
<td>Loamy sand</td>
<td>Single grain</td>
<td>Structureless</td>
<td>1.0 to 0.8</td>
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<tr>
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<td>Loamy sand</td>
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<td>0.7 to 0.5</td>
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<td>Sandy loam</td>
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<td>Loam</td>
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<td>0.4 to 0.2</td>
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<td>Sandy clay loam</td>
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<td>Silty clay</td>
<td>Blocky</td>
<td>Moderate, strong</td>
<td>0.3 to 0.1</td>
</tr>
<tr>
<td></td>
<td>Silty clay</td>
<td>Blocky</td>
<td>Weak</td>
<td>0.2 to 0.1</td>
</tr>
</tbody>
</table>

The long-term acceptance rate shall be adjusted for the size of the structural peds, soil mineralogy (consistence), percent of rock, and for landscape position. Appendix D has examples of LTAR’s for various soil/site conditions. The long-term acceptance rate shall not exceed the mean rate of the applicable soil group for food service facilities; meat markets; fish markets; or other places of business, places of public assembly, or institutions where accumulation of grease can cause premature failure of a wastewater system. Long-term acceptance rates may be increased up to the maximum of the applicable soil group for facilities where data from comparable facilities indicates
that the fats, grease, and oil content of the effluent will be less than 25 mg/l; 5 day biological oxygen
demand (BOD) will be less than 200 mg/l; and the total suspended solids (TSS) will be less than 200
mg/l.

Sites classified as SUITABLE may be utilized for a ground absorption sewage treatment and
disposal system consistent with these Rules. A suitable classification generally indicates soil and site
conditions favorable for the operation of a ground absorption sewage treatment and disposal system
or have slight limitations that are readily overcome by proper design and installation.
(b) Sites classified UNSUITABLE as to soil wetness conditions, may be classified PROVISIONALLY
SUITABLE when modifications can be made to meet the requirements in Rule .1955(h) and .1956
(8) and (9) of this Section for the separation between the water table and the bottom of the
nitrification trench. The soils are Groups I and II with SUITABLE structure and mineralogy.
Soil Groups III and IV may be used if site specific data is collected (rainfall, soil profile descriptions,
drainage specifications, etc.) and modeling indicates the requirements of Rule .1942 can be met.
Sites classified as PROVISIONALLY SUITABLE may be utilized for a ground absorption sewage
treatment and disposal system consistent with these Rules but have moderate limitations. Sites
classified Provisionally Suitable require some modifications and careful planning, design, and
installation in order for a ground absorption sewage treatment and disposal system to function
satisfactorily.
(c) Sites classified as UNSUITABLE as to soil wetness conditions because of the presence of lateral
water movement may be classified PROVISIONALLY SUITABLE as to soil wetness conditions
when such water is intercepted and diverted to prevent saturation of the wastewater system. Sites
classified UNSUITABLE have severe limitations for the installation and use of a properly
functioning ground absorption sewage treatment and disposal system. An improvement permit shall
not be issued for a site which is classified as UNSUITABLE. However, where a site is
UNSUITABLE, it may be reclassified PROVISIONALLY SUITABLE if a special investigation
indicates that a modified or alternative system can be installed in accordance with Rules .1956 or
.1957 of this Section.
(d) A site classified as UNSUITABLE may be used for a ground absorption wastewater
treatment and disposal system specifically identified in Rules .1955, .1956, or .1957 of this Section or a system
approved under Rule .1969 if written documentation containing substantiating data, which may
include any or all of the following: engineering, hydrogeologic, geologic or soil studies, indicates to
the LHD local health department that the proposed system can be expected to overcome the soil/site
conditions that were UNSUITABLE. The proposed wastewater system shall perform as well as a
system identified in Rules .1955, .1956, or .1957 of this Section or a system approved under Rule
.1969 satisfactorily. These evaluations, plans, and specifications shall be prepared and submitted to
the LHD by individuals qualified by training and experience and are licensed in North Carolina in
accordance with G.S. 89C (Engineers), G.S. 89E (Geologists), and G.S. 89F (Soil Scientists), to
consult, investigate, evaluate, plan or design wastewater systems, soil and rock characteristics,
ground water hydrology, or drainage. This person or persons shall:
(1) notify the LHD 48 hours before visits are to be made to the site;
(2) give the LHD the option to be present during any evaluations, sample collection(s),
or other tests that are conducted;
(3) split any sample(s)if taken, if requested by the LHD;
(4) submit a chain of custody;
(5) submit a proposal showing the location of the initial and reserve system, proposed
LTAR, system type, trench lengths, widths and depths and any other information
necessary for the LHD to permit the site; and
(6) seal, sign and date the first page of the report.
Such sites shall be reclassified as PROVISIONALLY SUITABLE and an Improvement Permit and
Construction Authorization shall be issued as applicable, under Rule .1937 (f) and (g).
if the local health department determines that the substantiating data indicate that:
(1) a ground absorption system can be installed so that the effluent will be non-pathogenic, non-infectious, non-toxic, and non-hazardous;
(2) the effluent will not contaminate groundwater or surface water; and
(3) the effluent will not be exposed on the ground surface or be discharged to surface waters where it could come in contact with people, animals, or vectors.

The State shall review the substantiating data if a written request is received from the LHD local health department. The applicant may request a peer review of the substantiating data. The applicant shall fund any costs incurred in conducting the peer review. The findings of the peer review committee shall not be binding on the LHD.

History Note: Authority G.S. 130A-335(e); Eff. July 1, 1982; Amended Eff. April 1, 1993; January 1, 1990.

15A NCAC 18A .1949 SEWAGE WASTEWATER FLOW RATES FOR DESIGN UNITS FACILITIES
(a) Table IX-A shall be used to determine the design daily flow volume of sewage from dwelling units, the flow rate shall be 120 gallons per day per bedroom. The minimum design daily flow volume of sewage from each dwelling unit shall be 240 gallons per day, and each additional bedroom above two bedrooms shall increase the volume of sewage by 120 gallons per day. In determining the number of bedrooms in a dwelling unit, each bedroom and any other room or addition that can reasonably be expected to function as a bedroom shall be considered a bedroom for design purposes.

OPTION 1

Table IX-A Design Daily Flow for Dwelling Units

<table>
<thead>
<tr>
<th>Number bedrooms/occupancy</th>
<th>Design daily flow gallons/day</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 bedrooms/4 people</td>
<td>240</td>
<td>&gt;4 people/60 gal/person/day</td>
</tr>
<tr>
<td>3 bedrooms/6 people</td>
<td>360</td>
<td>&gt;6 people/60 gal/person/day</td>
</tr>
<tr>
<td>4 bedrooms/8 people</td>
<td>480</td>
<td>&gt;8 people/60 gal/person/day</td>
</tr>
<tr>
<td>5 bedrooms/10 people</td>
<td>600</td>
<td>&gt;10 people/60 gal/person/day</td>
</tr>
<tr>
<td>6 bedrooms/12 people</td>
<td>720</td>
<td>&gt;12 people/60 gal/person/day</td>
</tr>
<tr>
<td>&gt; 6 bedrooms</td>
<td># bedrooms x 120 gal/day</td>
<td>&gt;12 people/60 gal/person/day</td>
</tr>
</tbody>
</table>

When the owner(s) resides in a occupancy of a dwelling unit for less than 95 days per year and rents the unit for the remainder of the year, or for full time rental units the design daily flow exceeds two persons per bedroom the volume of sewage shall be determined by the maximum occupancy at a rate of 60 gallons per person per day.

OPTION 2

Table IX-A Design Daily Flow for Dwelling Units

<table>
<thead>
<tr>
<th>Number bedrooms/occupancy</th>
<th>Design daily flow gallons/day</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 bedrooms/4 people</td>
<td>240</td>
<td>&gt;4 people/60 gal/person/day</td>
</tr>
<tr>
<td>3 bedrooms/6 people</td>
<td>360</td>
<td>&gt;6 people/60 gal/person/day</td>
</tr>
<tr>
<td>4 bedrooms/8 people</td>
<td>480</td>
<td>&gt;8 people/60 gal/person/day</td>
</tr>
<tr>
<td>5 bedrooms/10 people</td>
<td>600</td>
<td>&gt;10 people/60 gal/person/day</td>
</tr>
<tr>
<td>6 bedrooms/12 people</td>
<td>720</td>
<td>&gt;12 people/60 gal/person/day</td>
</tr>
<tr>
<td>&gt; 6 bedrooms</td>
<td># bedrooms x 120 gal/day</td>
<td>&gt;12 people/60 gal/person/day</td>
</tr>
</tbody>
</table>
## TABLE NO. I

<table>
<thead>
<tr>
<th>TYPE OF ESTABLISHMENT</th>
<th>DAILY FLOW FOR DESIGN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Airports</td>
<td>5 gal/passenger</td>
</tr>
<tr>
<td>(Also R.R. stations, bus terminals—not</td>
<td></td>
</tr>
<tr>
<td>including food service facilities)</td>
<td></td>
</tr>
<tr>
<td>Barber Shops</td>
<td>50 gal/chair</td>
</tr>
<tr>
<td>Bars, Cocktail Lounges (Not including</td>
<td></td>
</tr>
<tr>
<td>food service)</td>
<td>20 gal/seat</td>
</tr>
<tr>
<td>Beauty Shops (Style Shops)</td>
<td>125 gal/chair</td>
</tr>
<tr>
<td>Bowling Lanes</td>
<td>50 gal/lane</td>
</tr>
<tr>
<td>Businesses (other than those listed</td>
<td>25 gal/employee</td>
</tr>
<tr>
<td>elsewhere in this table)</td>
<td></td>
</tr>
<tr>
<td>Camps</td>
<td></td>
</tr>
<tr>
<td>Construction or Work Camps</td>
<td>60 gal/person</td>
</tr>
<tr>
<td>Construction or Work Camps (with chemical</td>
<td>40 gal/person</td>
</tr>
<tr>
<td>toilets)</td>
<td></td>
</tr>
<tr>
<td>Summer Camps</td>
<td>60 gal/person</td>
</tr>
<tr>
<td>Campgrounds—With Comfort Station</td>
<td>100 gal/campsite</td>
</tr>
<tr>
<td>(Without water and sewer hookups)</td>
<td></td>
</tr>
<tr>
<td>Travel Trailer/Recreational Vehicle Park</td>
<td>120 gal/space</td>
</tr>
<tr>
<td>(With water and sewer hookups)</td>
<td></td>
</tr>
<tr>
<td>Churches (Not including a Kitchen, Food</td>
<td></td>
</tr>
<tr>
<td>Service)</td>
<td></td>
</tr>
</tbody>
</table>

For dwelling units with a heated floor space of 4,000 square feet or more the design daily flow shall be determined by square footage of heated floor space. Each 1,000 ft\(^2\) shall equal 150 gallons per day with a maximum occupancy of 2 people per 1,000 ft\(^2\). When the owner(s) resides in a occupancy of a dwelling unit for less than 95 days per year and rents the unit for the remainder of the year, or for full time rental units the design daily flow exceeds two persons per bedroom the volume of sewage shall be determined by the maximum occupancy at a rate of 60 gallons per person per day.

(b) Table No. IX-B shall be used to determine the minimum design daily flow of wastewater required in calculating the design volume of wastewater sanitary sewage systems to serve selected types of facilities establishments. The minimum design daily flow volume of wastewater from any non residential facility establishment shall be 100 gallons per day. Design of sewage treatment and disposal systems for establishments not identified in this Rule shall be determined using available flow data, water using fixtures, occupancy or operation patterns, and other measured data.

<table>
<thead>
<tr>
<th>TYPE OF ESTABLISHMENT</th>
<th>DAILY FLOW FOR DESIGN</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 bedrooms/4 people</td>
<td>240</td>
</tr>
<tr>
<td></td>
<td>&gt;4 people/60 gal/person/day</td>
</tr>
<tr>
<td>3 bedrooms/6 people</td>
<td>360</td>
</tr>
<tr>
<td></td>
<td>&gt;6 people/60 gal/person/day</td>
</tr>
<tr>
<td>4 bedrooms/8 people</td>
<td>480</td>
</tr>
<tr>
<td></td>
<td>&gt;8 people/60 gal/person/day</td>
</tr>
<tr>
<td>5 bedrooms/10 people</td>
<td>600</td>
</tr>
<tr>
<td></td>
<td>&gt;10 people/60 gal/person/day</td>
</tr>
<tr>
<td>6 bedrooms/12 people</td>
<td>720</td>
</tr>
<tr>
<td></td>
<td>&gt;12 people/60 gal/person/day</td>
</tr>
<tr>
<td>≥ 6 bedrooms</td>
<td># bedrooms x 120 gal/day</td>
</tr>
<tr>
<td></td>
<td>&gt;12 people/60 gal/person/day</td>
</tr>
<tr>
<td>Type of facility</td>
<td>Design daily flow</td>
</tr>
<tr>
<td>----------------------------------------------</td>
<td>-------------------</td>
</tr>
<tr>
<td>Churches (With a Kitchen but, not including a Food Service Facility, Day Care, or Camp)</td>
<td>5 gal/seat</td>
</tr>
<tr>
<td>Country Clubs</td>
<td>20 gal/member</td>
</tr>
<tr>
<td>Day Care Facilities</td>
<td>15 gal/person</td>
</tr>
<tr>
<td>Factories (Exclusive of industrial waste)</td>
<td>25 gal/person/shift</td>
</tr>
<tr>
<td>Add for showers</td>
<td>10 gal/person/shift</td>
</tr>
<tr>
<td>Food Service Facilities</td>
<td></td>
</tr>
<tr>
<td>Restaurants</td>
<td>40 gal/seat or</td>
</tr>
<tr>
<td>40 gal/15 ft² of dining area, whichever is greater</td>
<td></td>
</tr>
<tr>
<td>24-hour Restaurant</td>
<td>75 gal/seat</td>
</tr>
<tr>
<td>Food Stands</td>
<td></td>
</tr>
<tr>
<td>(1) Per 100 square feet of food stand floor space</td>
<td>50 gal</td>
</tr>
<tr>
<td>(2) Add per food employee</td>
<td>25 gal</td>
</tr>
<tr>
<td>Other Food Service Facilities</td>
<td>5 gal/meal</td>
</tr>
<tr>
<td>Hospitals</td>
<td>300 gal/bed</td>
</tr>
<tr>
<td>Marinas</td>
<td>10 gal/boat slip</td>
</tr>
<tr>
<td>With bathhouse</td>
<td>30 gal/boat slip</td>
</tr>
<tr>
<td>Meat Markets</td>
<td></td>
</tr>
<tr>
<td>(1) Per 100 square feet of market floor space</td>
<td>50 gal</td>
</tr>
<tr>
<td>(2) Add per market employee</td>
<td>25 gal</td>
</tr>
<tr>
<td>Motels/Hotels</td>
<td>120 gal/room</td>
</tr>
<tr>
<td>With cooking facilities</td>
<td>175 gal/room</td>
</tr>
<tr>
<td>Offices (per shift)</td>
<td>25 gal/person/person</td>
</tr>
<tr>
<td>Residential Care Facilities</td>
<td>60 gal/person</td>
</tr>
<tr>
<td>Rest Homes and Nursing Homes</td>
<td></td>
</tr>
<tr>
<td>With laundry</td>
<td>120 gal/bed</td>
</tr>
<tr>
<td>Without laundry</td>
<td>60 gal/bed</td>
</tr>
<tr>
<td>Schools</td>
<td></td>
</tr>
<tr>
<td>Day Schools</td>
<td></td>
</tr>
<tr>
<td>With cafeteria, gym, and showers</td>
<td>15 gal/student</td>
</tr>
<tr>
<td>With cafeteria only</td>
<td>12 gal/student</td>
</tr>
<tr>
<td>With neither cafeteria nor showers</td>
<td>10 gal/student</td>
</tr>
<tr>
<td>Boarding Schools</td>
<td>60 gal/person</td>
</tr>
<tr>
<td>Service Stations</td>
<td>250 gal/water</td>
</tr>
<tr>
<td>closet or urinal</td>
<td></td>
</tr>
<tr>
<td>24-hour Service Stations</td>
<td>325 gal/water closet</td>
</tr>
<tr>
<td>Stores, Shopping Centers, and Malls</td>
<td></td>
</tr>
<tr>
<td>(Exclusive of food service and meat markets)</td>
<td>120 gal/1000 ft²</td>
</tr>
<tr>
<td>of retail sales area</td>
<td></td>
</tr>
<tr>
<td>Stadium, Auditorium, Theater, Drive-in</td>
<td>5 gal/seat or space</td>
</tr>
<tr>
<td>Swimming Pools, Spas, and Bathhouses</td>
<td>10 gal/person</td>
</tr>
</tbody>
</table>

<p>| Table IX-B Design Daily Flow for Facilities |</p>
<table>
<thead>
<tr>
<th>Business</th>
<th>5 gal/person</th>
<th>Food preparation not included</th>
</tr>
</thead>
<tbody>
<tr>
<td>Airport, railroad stations, bus terminals, etc</td>
<td>50 gal/chair</td>
<td>No shampooing of hair</td>
</tr>
<tr>
<td>Barber shops</td>
<td>20 gal/seat and 20 gal/employee</td>
<td>Food preparation not included</td>
</tr>
<tr>
<td>Bars, cocktail lounges*</td>
<td>125 gal/chair and 20 gal/employee</td>
<td></td>
</tr>
<tr>
<td>Beauty shops/style shops</td>
<td>130 gal/room</td>
<td></td>
</tr>
<tr>
<td>Bed and breakfast</td>
<td>5 gal/person</td>
<td></td>
</tr>
<tr>
<td>Bowling lanes*</td>
<td>200 gal/1000 Ft² of floor space and 20 gal/employee/shift</td>
<td>Minimum flow 200gal/day, food preparation not included</td>
</tr>
<tr>
<td>Coffee shops</td>
<td>120 gal/room, add 55gal/room with cooking facilities</td>
<td></td>
</tr>
<tr>
<td>Dog Kennels (Grooming)</td>
<td>60 gal/person</td>
<td></td>
</tr>
<tr>
<td>Flea markets</td>
<td>20 gal/polyee/shift</td>
<td></td>
</tr>
<tr>
<td>Laundromats</td>
<td>500 gal/machine</td>
<td></td>
</tr>
<tr>
<td>Marinas</td>
<td>30 gal/boatslip</td>
<td>With bathhouse</td>
</tr>
<tr>
<td>Motels/hotels</td>
<td>120 gal/room, add 55gal/room with cooking facilities</td>
<td></td>
</tr>
<tr>
<td>Offices &amp; factories</td>
<td>20 gal/employee /8 hr. shift, 10 gal/employee for &lt; 4 hrs/day, add 10 gal/employee for showers</td>
<td>Industrial Process Wastewater not included</td>
</tr>
<tr>
<td>Stores, shopping centers, and malls*</td>
<td>120 gal/1000 ft² of retail sales area, and 20 gal/employee/shift</td>
<td>Food preparation not included</td>
</tr>
<tr>
<td>Veterinian</td>
<td>300 gal/1000 sq. ft of clinic or 25 gal/employee</td>
<td>No medical waste, no waste from x-ray equipment, animal waste is IPWW</td>
</tr>
<tr>
<td>Winery*</td>
<td>200 gal/1000 Ft² of floor space and 20 gal/employee</td>
<td>Minimum flow 200gal/day, food preparation not included</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Camps/Campgrounds</th>
<th>15 gal/person/food preparation, 20 gal/person/toilet facilities, 10 gal/person/bathing facilities, 15 gal/person/laundry facilities</th>
<th>If facilities are on separate systems, or camp does not have all components</th>
</tr>
</thead>
<tbody>
<tr>
<td>Summer camps</td>
<td>8 gal/camper and 20gal/employee, add 2 gal/camper for showers, add for cafeteria</td>
<td>5 gal/camper for cafeteria with multi use service, or 3 gal/camper for cafeteria with single use service</td>
</tr>
<tr>
<td>Day camps</td>
<td>60 gal/person</td>
<td>40 gal/person with chemical toilets</td>
</tr>
<tr>
<td>Construction or work camp</td>
<td>120 gal/space</td>
<td></td>
</tr>
<tr>
<td>Travel trailer/recreation vehicle park</td>
<td>100 gal/campsite</td>
<td></td>
</tr>
<tr>
<td>Bathhouse</td>
<td>175 gal/space</td>
<td>In a recreational vehicle park, no laundry in RV</td>
</tr>
<tr>
<td>Park model RV</td>
<td>40 gal/person with chemical toilets</td>
<td></td>
</tr>
<tr>
<td>Food preparation facilities</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-----------------------------</td>
<td>--</td>
<td></td>
</tr>
<tr>
<td><strong>Restaurants</strong></td>
<td>25 gal/seat or 25 gal/15 ft² of floor space</td>
<td>Multi-use service and open 6 hrs/day or less</td>
</tr>
<tr>
<td></td>
<td>17 gal/seat or 17 gal/15 ft² of floor space</td>
<td>All single use service and open 6 hrs/day or less</td>
</tr>
<tr>
<td></td>
<td>40 gal/seat or 40 gal/15 ft² of floor space</td>
<td>Multi-use service and open 6 to 16 hrs/day</td>
</tr>
<tr>
<td></td>
<td>27 gal/seat or 27 gal/15 ft² of floor space</td>
<td>All single use service and open 6 to 16 hrs/day</td>
</tr>
<tr>
<td></td>
<td>75 gal/seat or 75 gal/15 ft² of floor space</td>
<td>Multi-use service and open 16 to 24 hrs/day</td>
</tr>
<tr>
<td></td>
<td>50 gal/seat or 50 gal/15 ft² of floor space</td>
<td>Single use service and open 16 to 24 hrs/day</td>
</tr>
<tr>
<td><strong>Food stand</strong></td>
<td>50 gal/100 ft² of food stand floor space, and 25 gal/food stand employee/shift</td>
<td></td>
</tr>
<tr>
<td><strong>Other food service facilities</strong></td>
<td>5 gal/meal served, 3 gal/meal served</td>
<td>Multi-use service, single use service</td>
</tr>
<tr>
<td><strong>Meat markets/fish markets</strong></td>
<td>50 gal/100 ft² of floor space, and 25 gal/market employee/shift</td>
<td>Domestic waste only</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Health Care &amp; Institutions</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Dentist</strong></td>
<td>480 gal/1000 sq. ft of clinic or 25 gal/employee plus 8 gal/patient</td>
</tr>
<tr>
<td><strong>Doctor</strong></td>
<td>300 gal/1000 sq. ft of clinic or 25 gal/employee plus 4 gal/patient</td>
</tr>
<tr>
<td><strong>Hospitals</strong></td>
<td>300 gal/bed</td>
</tr>
<tr>
<td><strong>Rest homes and nursing homes</strong></td>
<td>120 gal/bed, or 60 gal/bed, and 25 gal/employee/8 hr shift</td>
</tr>
<tr>
<td><strong>Day care facilities</strong></td>
<td>15 gal/person/8 hr shift, and 20 gal/employee/8 hr shift, add 4 gal/person for &lt; 4 hrs/day</td>
</tr>
<tr>
<td><strong>Other institutions</strong></td>
<td>75 gal/person, and 25 gal employee/8 hr shift</td>
</tr>
<tr>
<td><strong>Orphanages</strong></td>
<td>60 gal/student/resident employee and 20 gal for non resident employee</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Public access restrooms</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Convenience store, service station, truck stop</strong></td>
<td>250 gal/plumbing fixture, and 20 gal/employee/shift</td>
</tr>
<tr>
<td></td>
<td>325 gal/plumbing fixture, and 20 gal/employee/shift</td>
</tr>
<tr>
<td>Facility Type</td>
<td>Flow Requirements</td>
</tr>
<tr>
<td>-------------------------------------</td>
<td>------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Highway rest areas and visitor centers</td>
<td>5 gal/person and 10 gal/parking spot as alternative at 2 people/car</td>
</tr>
<tr>
<td>Recreational facilities</td>
<td></td>
</tr>
<tr>
<td>Community center, gym, *</td>
<td>5 gal/person, and 20 gal/employee/shift 10 gal/parking spot as alternative at 2 people/car</td>
</tr>
<tr>
<td>Fitness center, spas *</td>
<td>5 gal/member, and 20 gal/employee/shift 10 gal/parking spot as alternative at 2 people/car</td>
</tr>
<tr>
<td>Country club/golf course/ driving range</td>
<td>3 gal/person (public), and 20 gal/employee/shift 600-gal/day minimum flow, food preparation not included; 10 gal/parking spot as alternative at 2 people/car</td>
</tr>
<tr>
<td>Fairground</td>
<td>2/gal/person 10 gal/parking spot as alternative at 2 people/car</td>
</tr>
<tr>
<td>Park</td>
<td>2/gal/person 10 gal/parking spot as alternative at 2 people/car</td>
</tr>
<tr>
<td>Stadium*, auditorium*, theater*, drive-in theater</td>
<td>5 gal seat or space Food preparation not included; 10 gal/parking spot as alternative at 2 people/car</td>
</tr>
<tr>
<td>Swimming pools* and bathhouses</td>
<td>5 gal/person, and 20 gal/employee/shift Domestic waste only, capacity of pool as alternative method of sizing</td>
</tr>
<tr>
<td>Religious *</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2 gal/seat/service/day No kitchen, school, day care or camp</td>
</tr>
<tr>
<td></td>
<td>3 gal/seat/service/day With kitchen, no school, day care or camp</td>
</tr>
<tr>
<td>Schools</td>
<td></td>
</tr>
<tr>
<td>after school programs</td>
<td>8 gal/student and 20 gal/employee, add 2 gal/student for showers, add for cafeteria 5 gal/student for multi-use service and 3 gal/student for single service</td>
</tr>
<tr>
<td>boarding schools</td>
<td>60 gal/student/resident employee and 20 gal for non resident employee Add to flow for regular school day</td>
</tr>
</tbody>
</table>

* May use the maximum building occupancy assigned by the local fire marshal in determining design daily flow.

The flows used in Table IX-B assume the use of low-flow fixtures, such as 1.6 gallon/flush toilets, and 1.0 gallon/minute faucets. Adjusted design daily flows shall be used for facilities with higher flow fixtures. Facilities with public access restrooms located near (within ½ mile) interstate highways, thoroughfares, and heavy traffic areas require special sizing considerations and an increase in design daily flow.
(1) two times design daily flow if along an interstate highway,
(2) one and a half times design daily flow if along US highways, and
(3) no increase along other highways or roads.

c) For facilities not shown in Table IX-B, the LHD and the State shall determine design daily flow by using one of the following methods; available flow data, by the proposed or existing water using fixtures for the facility or occupancy and operation patterns. An adjusted design daily sewage flow may be granted by the local health department upon a showing as specified in Subparagraphs (c)(1) through (c)(2) that a sewage system is adequate to meet actual daily water consumption from a facility included in Paragraph (b) of this Rule.

(1) Documented data from the facility or a comparable facility justifying a flow rate reduction shall be submitted to the LHD. Further adjustments shall be made in the design daily sewage flow rate used for sizing nitrification fields and tankage pretreatment systems when the sampled or projected wastewater characteristics exceed those of domestic wastewater, fats, oil and grease (FOG) less than 25 mg/l; 5 day biological oxygen demand (BOD) 200 mg/l; and total suspended solids (TSS) 200 mg/l.) such as wastewater from restaurants or meat markets. Minimum tankage capacities shall be determined by the design daily flow rate of Table IX-B of this Rule.

(2) An adjusted design daily sewage flow rate may be granted contingent upon use of extreme water-conserving fixtures, such as toilets which use 0.8 gallons per flush or less, motion sensor or foot activated spring-loaded faucets with flow rates of one gallon per minute or less, and showerheads with flow rates of one gallon per minute or less. The amount of wastewater sewage flow rate reduction shall be determined by the LHD local health department or at its request a determination shall be made by the State based upon the type of fixtures and documentation of the amount of flow reduction to be expected from the proposed facility. Adjusted design daily flow rates based upon use of water-conserving fixtures shall apply only to design capacity requirements of dosing and distribution systems and nitrification fields. Minimum tankage pretreatment capacities shall be determined by the design daily flow rate of Table IX-B of this Rule.


15A NCAC 18A .1950 LOCATION OF GROUND ABSORPTION WASTEWATER SANITARY SEWAGE SYSTEMS

(a) Every ground absorption wastewater sanitary sewage treatment and disposal system shall be located at least the minimum horizontal distance from the following: feature, structure, water source, etc.

(1) Any private water supply source, including any well or spring—100 feet;
(2) Any public water supply source 100 feet;
(3) Streams classified as WS-I 100 feet;
(4) Waters classified as S.A. 100 feet, from mean high water mark;
(5) Other coastal waters 50 feet, from mean high water mark;
(6) Any other stream, canal, marsh, or other surface waters 50 feet;
(7) Any Class I or Class II reservoir 100 feet, from normal pool elevation;
(8) Any permanent storm water retention pond 50 feet, from flood pool elevation;
(9) Any other lake or pond 50 feet, from normal pool elevation;
(10) Any building foundation 5 feet;
(11) Any basement 15 feet;
(12) Any property line 10 feet;
(13) Top of slope of embankments or cuts of 2 feet or more vertical height 15 feet;
(14) Any water line 10 feet;
(15) Drainage Systems:
   (A) Interceptor drains, foundation drains, and storm water diversions
       (i) upslope 10 feet,
       (ii) sideslope 15 feet, and
       (iii) downslope 25 feet;
   (B) Groundwater lowering ditches and devices 25 feet;
(16) Any swimming pool 15 feet;
(17) Any other nitrification field (except repair area) 20 feet;

<table>
<thead>
<tr>
<th>Feature, structure, water source etc.</th>
<th>Setback in feet</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public water supply well</td>
<td>200</td>
<td></td>
</tr>
<tr>
<td>Private water supply source, serving &lt;25 people or &lt;15 connections</td>
<td>100</td>
<td>Does not apply to monitoring wells, observation wells and piezometers</td>
</tr>
<tr>
<td>Well serving a single family residence</td>
<td>100</td>
<td>May be reduced for repairs, lot size or other fixed conditions to the maximum feasible distance, but in no case less than 50 feet. Does not apply to monitoring wells, observation wells and piezometers</td>
</tr>
<tr>
<td>Other well</td>
<td>50</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Percentage</td>
<td>Notes</td>
</tr>
<tr>
<td>------------------------------</td>
<td>------------</td>
<td>--------------------------------------------</td>
</tr>
<tr>
<td><strong>Surface waters</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>S.A. waters</td>
<td>100</td>
<td>From mean high water mark</td>
</tr>
<tr>
<td>Other coastal waters</td>
<td>50</td>
<td>From mean high water mark</td>
</tr>
<tr>
<td>Streams</td>
<td>100</td>
<td>WS-1 waters</td>
</tr>
<tr>
<td>Streams, canal, marsh, or other surface waters</td>
<td>50</td>
<td></td>
</tr>
<tr>
<td>Reservoir</td>
<td>100</td>
<td>Class I or II</td>
</tr>
<tr>
<td>Lake or pond</td>
<td>50</td>
<td>All others, from normal pool elevation</td>
</tr>
<tr>
<td>Stormwater retention/detention or treatment device (infiltration galleries)</td>
<td>50</td>
<td>Permanent devices only, from flood pool elevation</td>
</tr>
<tr>
<td>Storm water diversions</td>
<td>25</td>
<td>Downslope</td>
</tr>
<tr>
<td></td>
<td>15</td>
<td>Sideslope</td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>Upslope</td>
</tr>
<tr>
<td><strong>Structures</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Foundation</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Supports for porch, deck, etc</td>
<td>5</td>
<td>Tank may be under porch, deck, etc if access is provided to the tank</td>
</tr>
<tr>
<td>Foundation drain</td>
<td>25</td>
<td>Downslope</td>
</tr>
<tr>
<td>Appendix D for when required</td>
<td>15</td>
<td>Sideslope</td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>Upslope</td>
</tr>
<tr>
<td><strong>Utilities/property lines</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Property line</td>
<td>10</td>
<td>All</td>
</tr>
<tr>
<td>Underground utility line</td>
<td>15</td>
<td>All</td>
</tr>
<tr>
<td>Water line</td>
<td>10</td>
<td>All</td>
</tr>
<tr>
<td>Wastewater easement boundary</td>
<td>10</td>
<td>Nitrification trench and septic tank</td>
</tr>
<tr>
<td><strong>Site modifications</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Groundwater lowering ditches and devices</td>
<td>25</td>
<td></td>
</tr>
<tr>
<td>Interceptor drain and storm water diversions</td>
<td>25</td>
<td>Downslope</td>
</tr>
<tr>
<td></td>
<td>15</td>
<td>Sideslope</td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>Upslope</td>
</tr>
<tr>
<td>Top of slope of embankments with a slope greater than 25 per cent and a vertical cut of 1 foot or more</td>
<td>15</td>
<td>Downslope &amp; Sideslope</td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>Upslope</td>
</tr>
<tr>
<td>Piped surface water</td>
<td></td>
<td>Captured in waterproof pipe</td>
</tr>
<tr>
<td><strong>Other</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Irrigation systems</td>
<td>5</td>
<td>From wetted area</td>
</tr>
<tr>
<td>Nitrification field</td>
<td>20</td>
<td>Other nitrification fields serving</td>
</tr>
</tbody>
</table>
(b) Ground absorption sewage treatment and disposal systems may be located closer than 100 feet from a private water supply, except springs and uncased wells located downslope and used as a source of drinking water, for repairs, space limitations, and other site-planning considerations but shall be located the maximum feasible distance and in no case less than 50 feet.

(e) Nitrification fields and reserve repair areas shall not be located under paved areas or areas subject to vehicular traffic roads, drives, parking areas, buildings and other structures. Activities that result in soil disturbance or soil compaction shall not occur over the nitrification field. If effluent is to be conveyed under areas subject to vehicular traffic, soil disturbance or soil compaction the supply line shall be:

(1) ductile iron pipe,
(2) Schedule 40 PVC pipe sleeved in spiral welded steel pipe in accordance with ASTM A211Spiral Welded Steel Pipe, or
(3) Schedule 80 PVC pipe placed a minimum of 30 inches deep with compacted cover.

(d) In addition to the requirements of Paragraph (a) of this Rule, sites to be used for subsurface disposal for design units with flows over 3,000 gallons per day, as determined in Rule .1949 (a) or (b) of this Section, which include one or more nitrification fields with individual capacities of greater than 1,500 gallons per day, shall be located at least the minimum horizontal distance from the following:

(1) Any Class I or II reservoir or any public water supply source utilizing a shallow (under 50 feet) groundwater aquifer 500 feet;
(2) Any other public water supply source, unless determined to utilize a confined aquifer 200 feet;
(3) Any private water supply source, unless determined to utilize a confined aquifer 100 feet;
(4) Waters classified as SA 200 feet, from mean high water mark;
(5) Any waters classified as WS-I 200 feet;
(6) Any surface waters classified as WS-II, WS-III, B, or SB 100 feet; and
(7) Any property line 25 feet.

(e) Collection sewers, force mains, and supply lines shall be located at least the minimum horizontal distance from the following feature, structure, water source, etc.:

(1) Any public water supply source, including wells, springs, and Class I or Class II reservoirs 100 feet, unless constructed of leakproof pipe, such as ductile iron pipe with mechanical joints equivalent to water main standards, in which case the minimum setback may be reduced to 50 feet;
(2) Any private water supply source, including wells and springs, 50 feet, unless constructed of similar leakproof pipe, such as ductile iron pipe with mechanical joints—equivalent to water main standards, in which case the minimum setback may be reduced to 25 feet;

(3) Any waters classified as WS-I, WS-II, WS-III, B, SA, or SB 50 feet, unless constructed of similar leakproof pipe, such as ductile iron pipe with mechanical joints equivalent to water main standards, in which case the minimum setback may be reduced to 10 feet;

(4) Any other stream, canal, marsh, coastal waters, lakes and other impoundments, or other surface waters 10 feet;

(5) Any basement 10 feet;

(6) Any property line 5 feet;

(7) Top of slope of embankments or cuts of two feet or more vertical height 10 feet;

(8) Drainage Systems:

   (A) Interceptor drains, storm drains, and storm water diversions 5 feet;

   (B) Ground water lowering ditches and devices 10 feet;

(9) Any swimming pool 10 feet;

(10) Any other nitrification field 5 feet.

### Table X-B Setbacks for Piping

<table>
<thead>
<tr>
<th>Feature, structure, water source etc.</th>
<th>Setback in feet</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public water supply well reverse</td>
<td>50</td>
<td>If constructed of leakproof pipe, such as ductile iron pipe ANSI A21.51 with mechanical joints equivalent to water main standards</td>
</tr>
<tr>
<td>Private water supply source, serving &lt;25 people or &lt;13 connections</td>
<td>25</td>
<td>If constructed of leakproof pipe, such as ductile iron pipe ANSI A21.51 with mechanical joints equivalent to water main standards</td>
</tr>
<tr>
<td>Well serving a single family residence</td>
<td>25</td>
<td>If constructed of leakproof pipe, such as ductile iron pipe ANSI A21.51 with mechanical joints equivalent to water main standards</td>
</tr>
<tr>
<td>Other water supply well</td>
<td>25</td>
<td>If constructed of leakproof pipe, such as ductile iron pipe ANSI A21.51 with mechanical joints equivalent to water main standards</td>
</tr>
<tr>
<td>Category</td>
<td>Zoning (feet)</td>
<td>Notes</td>
</tr>
<tr>
<td>----------------------------------------------------</td>
<td>---------------</td>
<td>----------------------------------------------------------------------</td>
</tr>
<tr>
<td><strong>Surface waters</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>S.A. waters</td>
<td>10</td>
<td>From mean high water mark. If constructed of leakproof pipe, such as ductile iron pipe ANSI A21.51 with mechanical joints equivalent to water main standards</td>
</tr>
<tr>
<td>Other coastal waters</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Streams</td>
<td>10</td>
<td>From mean high water mark.</td>
</tr>
<tr>
<td>Streams, canal, marsh, or other surface waters</td>
<td>10</td>
<td>WS-I waters</td>
</tr>
<tr>
<td>Reservoir</td>
<td>50</td>
<td>Class I or II</td>
</tr>
<tr>
<td>Lake or pond</td>
<td>10</td>
<td>All others, from normal pool elevation</td>
</tr>
<tr>
<td>Stormwater retention/detention or treatment device</td>
<td>10</td>
<td>Permanent devices only, from flood pool elevation</td>
</tr>
<tr>
<td><strong>Structures</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Foundation</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Supports for porch, deck, etc.</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Foundation drain</td>
<td>5</td>
<td>All</td>
</tr>
<tr>
<td><strong>Utilities/property lines</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Property line</td>
<td>5</td>
<td>All</td>
</tr>
<tr>
<td>Underground utility line</td>
<td>5</td>
<td>All</td>
</tr>
<tr>
<td>Water line</td>
<td>10</td>
<td>All</td>
</tr>
<tr>
<td>Wastewater easement boundary</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td><strong>Site modifications</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Groundwater lowering ditches and devices</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Interceptor drain and storm water diversions</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Top of slope of embankments with a slope greater than 25 per cent and a vertical cut of 1 foot or more</td>
<td>5</td>
<td>Parallel to cut</td>
</tr>
<tr>
<td><strong>Other</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Irrigation systems</td>
<td>5</td>
<td>From spray pattern</td>
</tr>
<tr>
<td>Nitrification field</td>
<td>5</td>
<td>All others except for reserve area</td>
</tr>
<tr>
<td>Swimming pool</td>
<td>10</td>
<td>In ground</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Above ground</td>
</tr>
</tbody>
</table>
When reduced setbacks are used, collection sewers, force mains and supply lines shall be pressure tested.

(d) Sewer lines may cross a water line if 18 inches clear separation distance is maintained, with the sewer line passing under the water line. When conditions prevent an 18-inch clear separation from being maintained or whenever it is necessary for the water line to cross under the sewer, the sewer line shall be constructed of ductile iron pipe (AWWA C150/A21.50) with mechanical joints or restrained push-on joints or its equivalent and the water line shall be constructed of ferrous materials equivalent to water main standards for a distance of at least ten feet on each side of the point of crossing, with full sections of pipe centered at the point of crossing.

(g) Sewer lines may cross a storm drain if:

(1) 12 inches clear separation distance is maintained; or
(2) the sewer is of ductile iron pipe (AWWA C150/A21.50) with mechanical joints or restrained push-on joints or encased in concrete or ductile iron pipe for at least five feet on either side of the crossing.

(h) Sewer lines may cross a stream if at least three feet of stable cover can be maintained or the sewer line is of ductile iron pipe (AWWA C150/A21.50) with mechanical joints or restrained push-on joints or encased in concrete or ductile iron pipe for at least ten feet on either side of the crossing and protected against the normal range of high and low water conditions, including the 100-year flood/wave action. Aerial crossings shall be by ductile iron pipe (AWWA C150/A21.50) with mechanical joints or restrained push-on joints or steel pipe. Pipe shall be anchored for at least ten feet on either side of the crossing.

(i) Septic tanks, pump tanks (dosing tanks), grease tanks, lift stations, wastewater treatment plants, sand filters, and other pretreatment systems shall not be located in areas subject to frequent flooding (areas inundated by flood or tidal waters at a ten-year or less frequency) unless designed, and installed and demonstrated to be watertight and to remain operable during a ten-year storm. Mechanical or electrical components of treatment systems shall be above the 100-year flood level or otherwise protected against a 100-year flood.

History Note: Authority G.S. 130A-335(e) and (f); Eff. July 1, 1982; Amended Eff. January 1, 1990; October 1, 1982.

15A NCAC 18A .1951 APPLICABILITY OF RULES
(a) Except as required in Paragraph (b) of this Rule, the minimum horizontal distance requirements in Rule .1950(a)(4), (11), (12), or (13) for SA waters, foundation drains, property line, or top of slope of embankments with a slope greater than 25 percent or cuts of one foot or more vertical height, shall not apply to the installation of a single wastewater septic tank system serving a single-family dwelling unit/residence not to exceed four bedrooms on a lot or tract of land:

(1) which, on July 1, 1977, is specifically described in a deed, contract, or other instrument conveying fee title or which is specifically described in a recorded plat; and
(2) which, on July 1, 1977, is of insufficient size to satisfy the minimum horizontal distance requirements in Rule .1950(a of this Section; and
(3) which, on the date system construction is proposed to begin, is not capable of being served by a community or public sewerage system.

(b) For those lots or tracts of land described in Rule .1951(a) of this Section, where any of the minimum horizontal distance requirements prescribed in Rule .1950(a)(4), (11), (12), or (13) for SA waters, foundation drains, property line, or top of slope of embankments with a slope greater than 25 percent or cuts of one foot or more vertical height, of this Section can be met, such minimum horizontal distances shall be required.
(c) For those lots or tracts of land described in Rule .1951(a) of this Section, where a specific minimum horizontal distance requirement prescribed in Rule .1950(a) of this Section cannot be met, the maximum feasible horizontal distance, as determined by the **LHD local agency**, shall be required. Provided, however, that at least the following minimum horizontal distances shown in Table XI **Reduced Setbacks** shall be required in all cases:

(1) — Rule .1950(a)(4) of this Section, the minimum horizontal distance shall be not less than 50 feet;
(2) — Rule .1950(a)(11) of this Section, the minimum horizontal distance shall be not less than 8 feet;
(3) — Rule .1950(a)(12) and (13) of this Section, the minimum horizontal distance shall be not less than 5 feet.

<table>
<thead>
<tr>
<th>Table NO. XI Reduced Setbacks</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Rule .1950</strong></td>
</tr>
<tr>
<td>S.A. waters</td>
</tr>
<tr>
<td>Basement</td>
</tr>
<tr>
<td>Property line</td>
</tr>
<tr>
<td>Top of slope of embankments with a slope greater than 25 per cent and a vertical cut of 1 foot or more</td>
</tr>
<tr>
<td>Ground water lowering ditches and devices</td>
</tr>
</tbody>
</table>

(d) All other provisions of this Section except as exempted by this Rule shall apply to the lots or tracts of land described in Rule .1951(a) of this Section. Any rules and regulations of the Commission for Health Services or any local board of health in effect on June 30, 1977, which establish greater minimum distance requirements than those provided for in this Section, shall remain in effect and shall apply to a lot or tract of land to which Rule .1950(a) Table X-A Setbacks (4), (11), (12), or (13) of this Section do not apply.

(e) It shall be the responsibility of any owner of a lot or tract of land, who applies for a permit required by Rule .1937 of this Section, and who seeks, under the provisions of Rule .1951(a) of this Section, to exempt his lot or tract of land from any of the minimum horizontal distance requirements of Rule .1950(a) Table X-A Setbacks (4), (11), (12), or (13) of this Section to provide to the **LHD local health department** necessary records of title to the lot or tract of land for which the exemption is sought in order that the **LHD local agency** may determine whether the applicant is entitled to any such exemption.

(f) For those lots or tracts of land which, on the effective date of this Section, are specifically described in a deed or recorded plat, and the minimum horizontal distance requirements prescribed in Rule .1950(a)(15)(B) cannot be met, the maximum feasible horizontal distance, as determined by the local health department, shall be required, but shall not be less than ten feet.

(†g) For those lots or tracts of land which, on 1 July 1977, are specifically described in a deed, recorded plat or other instrument of conveying fee simple title, and the minimum horizontal requirements prescribed in Rule .1950(a) Table X Setbacks (minimum separation between nitrification fields) cannot be met, the maximum feasible horizontal distance, as determined by the LHD, shall be required, but shall not be less than 10 feet from any other wastewater system, when all of the following conditions are met:

(1) The system will receive sewage from only one single family dwelling unit not to exceed four bedrooms.
(2) The dwelling unit is not capable of being served by a public or community wastewater system at the time of construction of the system commences;

(3) The system will be installed in sand or loamy sand soils as defined in 15A NCAC 18A.1941 and installed in accordance with this Section; and

(4) The permit application is received on and after 20 July 2004.

History Note: Authority G.S. 130A-335(e); Eff. July 1, 1982; Amended Eff. January 1, 1990.

15A NCAC 18A.1952 SEPTIC TANK, EFFLUENT FILTER, **PUMP (DOSING)** TANK AND LIFT STATION DESIGN

(a) **OPTION I** A septic tank, or **pump (dosing)** tank, or **grease tank** shall be watertight, structurally sound, and not subject to excessive corrosion or decay. Septic tanks shall be of two-compartment design. The inlet compartment of a two-compartment tank shall hold between two-thirds and three-fourths of the total tank capacity. Septic tanks shall have an approved effluent filter and access devices. The effluent filter shall function without a bypass of unfiltered wastewater, sludge or scum. The effluent filter case shall be designed to function as a sanitary tee with the inlet extending down to between 25 and 50 percent of the liquid depth. The requirement(s) for an effluent filter and access devices shall apply to septic tanks for which a Construction Authorization is issued on or after January 1, 1999. A properly designed dosing siphon or pump shall be used for discharging sewage effluent into nitrification lines when the total length of such lines exceeds 750 linear feet in a single system and as required for any pressure-dosed system. When the design daily flow from a single system exceeds 3,000 gallons per day or when the total length of nitrification lines exceeds 2,000 linear feet in a single system, alternating siphons or pumps shall be used which shall discharge to separate nitrification fields. The dose volume from pump or siphon systems shall be of such design so as to fill the nitrification lines from 66 percent to 75 percent of their capacity at each discharge except as required for low pressure distribution systems. The discharge rate from dosing systems shall be designed to maximize the distribution of the effluent throughout the nitrification field. Septic tanks installed where the top will be deeper than six inches below the finished grade shall have an access **riser manhole** over each compartment with cover, extending to within six inches of the finished grade, and having a minimum opening adequate to accommodate the installation or removal of the septic tank lid, septage removal, and maintenance of the effluent filter. When the top of the septic tank or access manhole is below the finished grade, the location of each manhole shall be visibly marked at finished grade. The access opening shall provided for:

(1) cleaning or rodding out of the inlet pipe,
(2) cleaning or clearing the air or gas passage space above the partition,
(3) pumping of each compartment, and
(4) for the maintenance of the effluent filter.

This shall be accomplished by properly locating two access openings with each having a minimum opening of 15 inches by 15 inches or 17 inches in diameter as the opening cuts the plane of the bottom side of the top of the tank or other equidimensional opening with at least 225 square inches. Any system serving a design unit with a design sewage flow greater than 3,000 gallons per day shall have access manholes that extend at least to finished grade and be designed and maintained to prevent surface water inflow. The manholes shall be sized to allow proper inspection and maintenance. All dosing tanks shall have a properly functioning high water alarm. The alarm shall be audible and visible by system users and weatherproof if installed outdoors. The alarm circuit shall be provided with a manual disconnect in a watertight, corrosion-resistant outside enclosure (NEMA 4X or equivalent) adjacent to the dosing tank.
(a) **OPTION 2** A septic tank, or *pump* (dosing) tank, or *grease* tank shall be watertight, structurally sound, and not subject to excessive corrosion or decay. Septic tanks shall be of two-compartment design. The inlet compartment of a two-compartment tank shall hold between two-thirds and three-fourths of the total tank capacity. Septic tanks shall have an approved effluent filter and access devices. The effluent filter shall function without a bypass of unfiltered wastewater, sludge or scum. The effluent filter case shall be designed to function as a sanitary tee with the inlet extending down to between 25 and 50 percent of the liquid depth. The requirement(s) for an effluent filter and access devices shall apply to septic tanks for which a Construction Authorization is issued on or after January 1, 1999. A properly designed dosing siphon or pump shall be used for discharging sewage effluent into nitrification lines when the total length of such lines exceeds 750 linear feet in a single system and as required for any pressure dosed system. When the design daily flow from a single system exceeds 2,000 gallons per day or when the total length of nitrification lines exceeds 2,000 linear feet in a single system, alternating siphons or pumps shall be used which shall discharge to separate nitrification fields. The dose volume from pump or siphon systems shall be of such design so as to fill the nitrification lines from 66 percent to 75 percent of their capacity at each discharge except as required for low-pressure distribution systems. The discharge rate from dosing systems shall be designed to maximize the distribution of the effluent throughout the nitrification field. Septic tanks installed where the top will be deeper than six inches below the finished grade shall have an access *riser manhole* over each compartment with cover, extending to within six inches of the finished grade, and having an *minimum* opening adequate to accommodate the installation or removal of the septic tank lid, septage removal, and maintenance of the effluent filter. When the top of the septic tank or access *riser manhole* is below the finished grade, the location of the tank *manhole* shall be visibly marked at finished grade. Systems that require a management entity, other than the owner (Rule 1961), where the top of the septic tank will be deeper than six inches below the finished grade, shall have an access *riser manhole* over each compartment with cover, extending to finished grade and have an opening adequate to accommodate the installation or removal of the septic tank lid. Access shall be provided for:

1. Cleaning or rodding out of the inlet pipe,
2. Cleaning or clearing the air or gas passage space above the partition,
3. Pumping of each compartment, and
4. For the maintenance of the effluent filter.

This shall be accomplished by properly locating two access openings with each having a minimum opening of 15 inches by 15 inches or 17 inches in diameter as the opening cuts the plane of the bottom side of the top of the tank or other equidimensional opening with at least 225 square inches. Any system serving a design unit with a design sewage flow greater than 3,000 gallons per day shall have access manholes that extend at least to finished grade and be designed and maintained to prevent surface water inflow. The manholes shall be sized to allow proper inspection and maintenance. All dosing tanks shall have a properly functioning high-water alarm. The alarm shall be audible and visible by system users and weatherproof if installed outdoors. The alarm circuit shall be provided with a manual disconnect in a watertight, corrosion-resistant outside enclosure (NEMA 4X or equivalent) adjacent to the dosing tank.

(b) Minimum liquid capacities for septic tanks shall be in accordance with the following:

1. Residential Septic Tanks (for each individual residence or dwelling unit):

<table>
<thead>
<tr>
<th>Number of bedrooms</th>
<th>Minimum liquid capacity/gallons</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 or 3</td>
<td>1000</td>
<td>900 gal until January 1, 2006</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1500 if garbage disposal</td>
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<tr>
<td>4</td>
<td>1200</td>
<td>1800 if garbage disposal</td>
</tr>
<tr>
<td>5</td>
<td>1500</td>
<td>2250 if garbage disposal</td>
</tr>
<tr>
<td>Number of Bedrooms</td>
<td>Minimum Liquid Capacity Per Bedroom</td>
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<tr>
<td>3 or less</td>
<td>900 gallons</td>
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<td></td>
<td>300 gallons</td>
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<td>4</td>
<td>1000 gallons</td>
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<tr>
<td></td>
<td>250 gallons</td>
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<tr>
<td>5</td>
<td>1,500 gallons</td>
<td></td>
</tr>
<tr>
<td></td>
<td>250 gallons</td>
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</tr>
</tbody>
</table>

(2) Septic tanks for large dwelling units/residences, multiple dwelling units, or places of business, or places of public assembly or institutions shall be in accordance with the following:

(A) The liquid capacity of septic tanks for facilities places of business or places of public assembly with a design daily sewage flow of 600 gallons per day or less shall be determined in accordance with the following: \( V = 2Q \); where \( V \) is the liquid capacity of the septic tank and \( Q \) is the design daily sewage flow. However, the minimum capacity of any septic tanks shall be 750 gallons.

(B) Individual dwelling units/residences with more than five bedrooms, multiple dwelling units - family residences, individual septic tank systems serving two or more residences, or any place of business or public assembly or facilities where the design sewage daily flow is greater than 600 gallons per day, but less than 1,500 gallons per day, the liquid capacity of the septic tank shall be designed in accordance with the following: \( V = 1.4767Q + 500 \); where \( V \) is the liquid capacity of the septic tank and \( Q \) is the design daily sewage flow. The minimum liquid capacity of a septic tank serving two or more dwelling units/residences (5 bedrooms or less) shall be 1,500 gallons.

(C) Where the design sewage daily flow is between 1,500 gallons per day and 4,500 gallons per day, the liquid capacity of the septic tank shall be designed in accordance with the following: \( V = 0.75Q + 1,125 \); where \( V \) is the liquid capacity of the septic tank and \( Q \) is the design daily sewage flow.

(D) Where the design sewage daily flow exceeds 4,500 gallons per day, the septic tank shall be designed in accordance with the following: \( V = Q \); where \( V \) is the liquid capacity of the septic tank and \( Q \) is the design daily sewage flow.

(E) The minimum liquid capacity requirements of Subparagraph (b) (1) and (2) of this Rule shall be met by use of a single two-compartment septic tank or by two tanks installed in series, provided the first tank is constructed without a baffle wall and contains at least two-thirds of the total required liquid capacity.

(3) When a grinder pump or sewage lift pump is installed to lift wastewater to the septic tank, the septic tank shall be of four-compartment design. This requirement may be met by installing two septic tanks in series, each tank to contain two compartments. An access riser shall be provided over each compartment. An approved effluent filter shall be located in the fourth compartment (second septic tank). The State shall consider other septic tank designs on a case by case basis.

(c) The following are minimum standards of design and construction of pump (dosing) tanks and pump dosing systems:

(1) The liquid capacity of a pump tank shall be considered as the entire internal volume with no additional requirement for freeboard. Pump tanks shall have a minimum liquid capacity in accordance with the following:
(A) Pump tanks for systems with nitrification fields installed in Soil Group I, II, or III soils, as defined in these rules, shall have a minimum liquid capacity equal to two thirds of the required septic tank liquid capacity.

(B) Pump tanks for systems installed into Group IV soils shall have a minimum liquid capacity equal to the required septic tank liquid capacity.

(C) The minimum liquid capacity of any pump tank shall be 750 gallons.

(2) The liquid capacity of a pump tank shall provide for:

(A) pump submergence or as recommended by the manufacturer or 5 inches of effluent above intake with the intake being at least 5 inches from the bottom of the tank,

(B) required dosing volume,

(C) flow equalization storage, if applicable, and

(D) 24-hour emergency storage above the high water activation level.

(D) An alternate method to determine minimum liquid capacity of a pump tank shall be to provide for the minimum pump submergence requirement (Subparagraph (c)(5) of this Rule), the minimum dose volume requirement (Paragraph (a) of this Rule), and the minimum emergency storage capacity requirement. The emergency storage capacity requirement is determined based on the type of facility served, the classification of surface waters which would be impacted by a pump tank failure, and the availability of standby power devices and emergency maintenance personnel. The emergency storage capacity shall be the freeboard space in the pump tank above the high-water alarm activation level plus the available freeboard space in previous tankage and in the collection system below the lowest ground elevation between the pump tank and the lowest connected building drain invert. The minimum emergency storage capacity for residential systems and other systems in full-time use on sites draining into WS-I, WS-II, WS-III, SA, SB, and B waters shall be 24 hours, without standby power, or 12 hours with standby power manually activated, or four hours with standby power automatically activated or with a high-water alarm automatically contacting a 24-hour maintenance service. The minimum emergency storage capacity for systems not in full-time use and for all systems at sites draining into all other surface waters shall be 12 hours without standby power, or eight hours with standby power manually activated, or four hours with standby power automatically activated or with a high-water alarm automatically contacting a 24-hour maintenance service.

(E) Notwithstanding Paragraphs (c)(1)(A)-(D), other criteria for pump tank capacity may be approved by the local health department and the State for raw sewage lift stations, pressure sewer systems, and systems with design flows exceeding 3,000 gallons per day.

(3) The access opening shall provide for routine maintenance, pump replacement, float replacement and tank pumping. The access opening shall be a minimum of 22 inches by 22 inches or 24 inches in diameter as the opening cuts the plane of the bottom side of the top of the tank or other equidimensional opening with at least 484 square inches.

(4) The minimum liquid capacity of any pump tank shall be 1000 gallons.

(d) The following are minimum standards for design and construction of grease tanks. Grease tanks or grease interceptors shall be required at food preparation facilities, food processing facilities, meat markets, places of business, places of public assembly and institutions where the accumulation of fats, oils and grease can cause premature failure of a ground absorption wastewater treatment and disposal system. The following design criteria shall be met:
(1) The grease tank shall be plumbed to receive all wastes associated with food handling and no toilet wastes;

(2) The grease tank liquid capacity shall be sufficient to provide for at least five gallons of storage per meal served per day, or equal to the required septic tank liquid capacity, or a capacity as determined in accordance with the following:

\[
LC = D \times GL \times ST \times HR/2 \times LF
\]

Where

- \( LC \) = grease tank liquid capacity (gallons)
- \( D \) = number of seats in dining area
- \( GL \) = gallons of wastewater per meal (1.5 single-use; 2.5 multi-use)
- \( ST \) = storage capacity factor = 2.5
- \( HR \) = number of hours open
- \( LF \) = loading factor = (1.25 if along an interstate highway = 1.0 if along US highways and recreational areas = 0.8 if along other roads)

This formula is to be used where large volumes of fats, oil and grease can be expected, based on the menu, food served or processed and high customer traffic.

(3) Three or more chambers shall be provided, with total length-to-width ratio at least 4:1. The required length to width ratio may be obtained by connecting two or more tanks in series.

(4) The final chamber shall contain an effluent filter and case extending down at least 50 percent of the liquid depth. The effluent filter shall be sized, designed, manufactured, and approved by the State for use in grease tanks, which shall receive wastewater containing 25 mg/l or more of fats, grease and oil. The effluent filter shall be sized for the design daily flow.

(5) The access opening shall provide for routine maintenance, cleaning or rodding out of the inlet pipe, cleaning or clearing the air or gas passage space above the partition, pumping of each compartment, and for maintenance of the effluent filter. The access opening shall be a minimum of 24 inches by 24 inches or 24 inches in diameter as the opening cuts the plane of the bottom side of the top of the tank or other equidimensional opening with at least 576 square inches.

(6) The owner of the facility shall be notified of the service requirements of grease tanks and filters.

(c) The following are minimum standards for design and construction of siphon dosing tanks:

Siphons and siphon dosing tanks may be used when at least two feet of elevation drop can be maintained between the siphon outlet invert and the inlet invert in the nitrification field distribution system.

(1) Siphon dosing tanks shall be designed in accordance with the minimum dose requirements in this Rule and shall meet the construction requirements of this Section. The siphon dose tank shall provide at least 12 inches of freeboard, and the inlet pipe shall be at least three inches above the siphon trip level. The high water alarm shall be set to activate within two inches of the siphon trip level.

(2) Siphon dosing tanks shall have a watertight access opening over each siphon. The access opening shall be a minimum of 22 inches by 22 inches or a minimum diameter of 24 inches as the opening cuts the plane of the bottom side of the top of the tank or other equidimensional opening with at least 484 square inches, and extending to finished grade and designed to prevent surface water inflow.

(3) The slope and size of the siphon discharge line shall be sufficient to handle the peak siphon discharge by gravity flow without the discharge line flowing full. Vents for
the discharge lines shall be located outside of the dosing tank or otherwise designed to not serve as an overflow for the tank.

(4) All siphon parts shall be installed in accordance with the manufacturer's specifications. All materials must be corrosion-resistant, of cast iron, high-density plastic, fiberglass, stainless steel, or equal.

(5) Siphon dosing tanks shall have a properly functioning high-water alarm that is audible and visible by system users and weatherproof if installed outdoors in an enclosure (NEMA 4X or equivalent).

e) Raw sewage lift stations shall meet the construction standards of this Section and all horizontal setback requirements for sewage treatment and disposal systems in accordance with Rule .1950(a) of this Section unless the station is a sealed, watertight chamber, in which case the setback requirements for collection sewers in Rule .1950(c) of this Section shall apply. Sealed, watertight chambers shall be of a single, prefabricated unit, such as fiberglass, with sealed top cover, and preformed inlet and outlet pipe openings connected with solvent welds, O-ring seals, rubber boots, stainless steel straps, or equivalent. Dual pumps shall be provided for stations serving two or more buildings or for a facility with more than six water closets. Pumps shall be listed by Underwriter's Laboratories or an equivalent third party electrical testing and listing agency, and shall be grinder pumps or solids-handling pumps capable of handling at least three-inch spheres unless the station serves no more than a single water closet, lavatory, and shower, in which case two-inch solids handling pumps shall be acceptable. Minimum pump capacity shall be 2.5 times the average daily flow rate. The dosing volume shall be set so that the pump off time does not exceed 30 minutes, except for stations serving single buildings, and pump run time shall be from three to ten minutes at average flow. Pump station emergency storage capacity and total liquid capacity shall be determined in accordance with Paragraph (e)(1)(D) of this Rule except for a sealed, watertight chamber serving an individual building, in which case a minimum storage capacity of eight hours shall be required. All other applicable requirements for pump tanks and pump dosing systems in accordance with Paragraph (e) of this Rule shall also apply to raw sewage lift stations.

History Note: Authority G.S. 130A-335 (e)(f)(f1)[2nd];
Eff. July 1, 1982;
Amended Eff. August 1, 1991; January 1, 1990;
Temporary Amendment Eff. January 1, 1999;

15A NCAC 18A .1953 PLANS FOR PREFABRICATED SEPTIC TANKS, AND PUMP (DOSSING) TANKS AND GREASE TANKS

(a) When prefabricated concrete tanks or tanks of other material are used, they shall be constructed in accordance with the plans which have been approved by the State and shall comply with all requirements of this Section. At least three complete sets of plans and specifications for the initial design of the prefabricated septic tank or subsequent changes and modifications shall be submitted to the Department of Environment, and Natural Resources, On-Site Wastewater Section. 1642 Mail Service Center-PO Box 29594, Raleigh, North Carolina 27699-1642 27626-0594. Separate plans and specifications for the design of each septic tank, grease tank or pump (dosing) tank to be produced shall be submitted to the On-Site Wastewater Section for approval. These plans and specifications shall show the design of the septic tank in detail, including:

(1) All pertinent dimensions;
(2) Reinforcement material and location;
(3) Material strength;
(4) Liquid depth;
(5) Pipe penetration, joint material and method of sealing;
(6) Access manhole riser, lid, and other proposed appurtenances to the septic tank;
(7) Approved effluent filter(s), filter support detail and filter access detail; and
(8) Other design features; and
(9) Third party testing for quality assurance, where applicable.

(b) Glass-fiber-reinforced tanks shall be based on ASTM D 4021-81, Standard Specifications for Glass-Fiber-Reinforced Polyester Underground Petroleum Storage Tanks and IAMO PS 1-93, Material and Property Standard for Prefabricated Septic Tanks, section 5.3 or equivalent.
(c) Polyethylene tanks shall be based on IAPMO PS 1-93, Materials and Property Standard for Prefabricated Septic Tanks, section 4.4.
(d) Plans for prefabricated tanks, risers and riser covers, other than those approved under this Rule shall be approved on an individual basis as determined by information furnished by the designer to the State. The information shall indicate the tank, riser or riser cover will provide equivalent effectiveness as those designed in accordance with the provisions of this section.
(c) For tanks constructed of materials other than precast concrete all applicable design and testing requirements of .1954 shall be met, and subject to vacuum testing. An empty tank shall be subjected to a vacuum pressure of seven inches of mercury without loosing vacuum and exceeding deflection along the longest sidewall of more than L/240, where L is the length of the longest sidewall (in inches).

**History Note:** Authority G.S. 130A-335 (e)(f)(f1)[2nd];
Eff. July 1, 1982;
Amended Eff. January 1, 1990;
Temporary Amendment Eff. January 1, 1999;

15A NCAC 18A .1954 MINIMUM STANDARDS FOR PRECAST REINFORCED CONCRETE TANKS
(a) The following are minimum standards of design and construction of precast reinforced concrete septic tanks:

(1) The minimum requirement for the liquid depth is 36 inches.
(2) A minimum of nine inches freeboard is required, the freeboard being the air space between the top of the liquid and the bottom side of the lid or cap of the tank.
(3) The length of the septic tank shall be at least twice as long as the width.
(4) There **inlet pipe penetration point(s)** shall be **located** three openings in the tank as shown in the approved plans one on the tank end and one on each sidewall of the inlet end of the tank. The blockouts for these openings shall leave a concrete thickness of not less than one inch in the tank wall. The blockouts shall be made for a minimum of four-inch pipe or a maximum of six-inch pipe. The **inlet and outlet** pipe penetrations of the tank shall be through a resilient, watertight, sealed, non-corrosive and flexible connective sleeve. The sleeve shall make and maintain a gas tight seal around the pipe, prevent movement of the pipe within the tank, and meet ASTM C-923-02; Specifications For Resilient Connectors Between Reinforced Concrete Manhole Structures, Pipes, and Laterals. The outlet **and inlet** pipe penetrations shall be precast to be compatible with the connective sleeve. No pipe penetration points or openings shall be permitted below the tank liquid level.
(5) The inlet pipe in the tank shall be **inserted through the connective sleeve and shall not have a tee**. a straight pipe.
(6) The outlet shall be through an approved effluent filter secured in place in an effluent filter support case. The effluent filter support case shall serve as a functioning sanitary tee with the bottom inlet extending down between 25 and 50 percent of
the liquid depth. The approved effluent filter and support case shall be furnished by the septic tank manufacturer. The invert of the outlet shall be at least two inches lower in elevation than the invert of the inlet.

(7) Other equivalent methods of supporting the effluent filter and for making the pipe penetrations shall be approved by the State On-Site Wastewater Section.

(8) In order to obtain approval of an effluent filter, the filter manufacturer shall submit to the State the following information with supporting documentation:
   (A) For each septic tank system that is designed to treat 3,000 gallons per day or less of wastewater sewage, a written certification that the effluent filter is designed, constructed, and performs in compliance with G.S. 130A-335.1(a)(1)(2)(3), and (4);
   (B) Sizing as to capacity and wastewater strength for all models of proposed filters to be approved; and
   (C) Specifications for application, installation, operation, and maintenance.

(9) All tanks shall be manufactured with a cast-in-place partition so that the tank contains two compartments. The partition shall be located at a point not less than two-thirds nor more than three-fourths the length of the tank from the inlet end. The top of the partition shall be constructed to create a gas passage, not less than the area of the inlet pipe, and the passage shall not extend lower than six inches from the bottom side of the tank top. The passage shall terminate two inches below the bottom side of the tank top in order to leave space for air or gas passage between compartments. The top and bottom halves of the partition shall be cast in such manner as to leave a water passage slot four inches high for the full width of the tank or a minimum of three 4 inch openings shall be cast into the partition. The liquid passage shall be located between 45 and 55 percent of the operating liquid depth. The partition (both halves) shall be reinforced by the placing of six-inch by six-inch No. 10 gage welded reinforcing wire. The reinforcing wire shall be bent to form an angle of 90 degrees on the ends in order to form a leg not less than four inches long. When the wire is placed in the mold the four inch legs should lay parallel with the sidewall wire and adjacent to it. It is recognized that there are other methods of constructing a partition or two-compartment tank. Any method other than the one described will be considered on an individual basis for approval by the State On-Site Wastewater Section. However, the tank wall thickness must remain not less than two and one-half inches thick throughout the tank except for the pipe penetrations.

(10) Adequate access openings shall be provided in the tank top. Access shall be provided for:
   (A) cleaning or rodding out of the inlet pipe,
   (B) cleaning or clearing the air or gas passage space above the partition,
   (C) pumping of each compartment, and
   (D) the maintenance of the effluent filter. This shall be accomplished by properly locating two manholes or access openings with each having a minimum opening of 15 inches by 15 inches or 17 inches in diameter as the opening cuts the plane of the bottom side of the top of the tank or other equidimensional opening with at least 225 square inches. The tank lids manhole covers shall be beveled on all sides in such manner as to accommodate a uniform load of 300 pounds per square foot without damage to the lid cover or the top of the tank. If protected by a riser and riser cover, the tank lid may be replaced by a State approved non-corrosive lid, capable of supporting a uniform live load of 300 pounds per square foot. If the top of the tank is to be
multislab construction, the slabs over the inlet of the tank, partition, and outlet of the tank must not weigh in excess of 150 pounds each. Multislab construction allows for the elimination of the manholes. Manhole covers, tank lids and access opening riser covers, or slabs shall have a handle of steel or other rot-resistant material equivalent in strength to a No. 3 reinforcing rod (rebar).

The concrete tank and tank lid shall be reinforced by using a minimum reinforcing of six-inch by six-inch No. 10 gage welded steel reinforcing wire in the top, bottom ends, and sides of the tank. The reinforcing wire shall be lapped at least six inches. Concrete cover shall be required for all reinforcement. Reinforcement shall be placed to maximize the structural integrity of the tank. The tank, tank lid, riser and riser cover shall be able to withstand a uniform live loading of 300 pounds per square foot in addition to all loads to which an underground tanks, riser, or riser cover is normally subjected, such as the dead weight of the concrete and soil cover, active soil pressure on tank walls, and the uplifting force of the ground water.

Additional reinforcement shall be required when the loads on a concrete tank, tank lid, riser, or riser cover are exceeded by subjecting it to vehicular traffic or when the top of the tank is placed deeper than three feet below the finished grade; ASTM C 890 –91 Standard for Traffic Rated Tanks. The additional reinforcement must be approved by the State. A tank subject to vehicular traffic may have a reinforced concrete slab constructed over the tank to bear the load. The concrete slab reinforcement shall be designed by a Professional Engineer and approved by the State.

Fiber reinforced concrete may be used as an alternative to six-inch by six-inch No. 10 gage wire when approved by the State. Fiber reinforced concrete tanks shall use approved fiber, the amount of fiber per cubic yard of concrete recommended by the fiber manufacturer and as approved in the plans. Fibers shall be approved when the following minimum standards are meet:

(A) Synthetic Macro-Fibers shall be a minimum of 1.5 inches in length,
(B) Usage of a minimum of 4 pounds per cubic yard of concrete,
(C) Minimum residual strength of 175 psi,
(E) Minimum tensile strength of 70ksi, and
(F) A modulus of elasticity of 600ksi.

Tanks manufactured using fiber reinforced concrete shall retain the welded wire fabric approved for use in the top and bottom of the tank. Fiber-reinforced concrete is to be used as a replacement for welded wire fabric, not additional rebar reinforcement.

The top, bottom, ends, and sides of the tank must have a minimum thickness of two and one-half inches.

A minimum 28-day concrete compressive strength of 3,500 pounds per square inch shall be used in the construction of the septic tank, concrete access riser and riser cover. The aggregate shall conform to ASTM C-33; Standard Specifications for Concrete Aggregates or C-330. The cement shall conform to ASTM C150; Standard Specification for Portland Cement. Chemical admixtures when used shall conform to ASTM C260; Specifications for Air-Entraining Admixtures for Concrete (air entrainment agents); ASTM C494; Specifications for Chemical Admixtures for Concrete (water reducing agents); and ASTM 1017; Chemical Admixtures for Use in Producing Flowing Concrete (superplasticizers). Other admixtures will be considered on an individual basis by the State.

The concrete shall achieve a
minimum compressive strength of 4000 pounds per square inch prior to removal of the tank from the place of manufacture. It shall be the responsibility of the manufacturer to certify that this condition has been met prior to shipment. A septic tank shall be subject to testing to ascertain the strength of the concrete prior to its being approved for installation. Recognized devices for testing the strength of concrete include a properly calibrated Schmidt Rebound Hammer or Windsor Probe Test. Accelerated curing in the mold by use of propane gas or other fuels is prohibited, except in accordance with accepted methods and upon prior approval of the State.

(15) After curing, tanks manufactured in two sections and as required, concrete risers shall be joined and sealed at the joint by using a mastic, butyl rubber, or other pliable sealant meeting ASTM C–990-91; need or equivalent that is waterproof, corrosion-resistant, and approved for use in septic tanks. The sealant shall have a minimum size of one-inch nominal diameter or equivalent other size as approved in the plans, Rule .1953(a). Before sealing, the joint shall be smooth, intact, and free of all deleterious substances. Tank halves shall be properly aligned to ensure a tight seal. The sealant shall be provided by the manufacturer. Tanks installed or delivered to the site and accepted by the system installer become the responsibility of the system installer as to compliance with this Section.

(16) All septic tanks produced shall bear an imprint identifying the manufacturer, the septic tank serial number assigned to the manufacturer's plans and specifications approved by the State, and the liquid or working capacity of the tanks. This imprint shall be located to the right of the outlet pipe penetration point blockout made for the outlet pipe on the outlet end of the tank. All tanks shall also be permanently marked with the date of manufacture adjacent to the tank imprint or on the top of the tank directly above the imprint.

(17) Risers and access covers shall have a clear opening sized to allow for maintenance and removal of internal devices of the septic tank and shall not allow accidental entry. The access cover and tank lid shall be designed, constructed, and maintained to prevent unauthorized access. Risers shall be sealed watertight where they join the top of the septic tank, and constructed to prevent water inflow through the lid or cover. Precast concrete access risers and riser covers shall have a clear opening sized large enough to allow for removal and replacement of tank lids. Tank lids and riser covers shall weigh at least fifty pounds but no more than one hundred pounds or be locked or otherwise secured to the riser to limit unauthorized entry. Risers shall be sealed watertight to the top of the tank by using the pliable sealant used to seal the tank halves. Riser sealing shall be the responsibility of the tank installer. Access risers and riser covers shall be designed, manufactured, and installed to prevent water inflow.

(b) Pump tanks shall meet the construction requirements of Paragraph (a) of this Rule with the following modifications.

(1) Tanks shall be cast with a single compartment, or, if a partition is provided, the partition shall be cast to contain a minimum of two four-inch diameter circular openings, or equivalent, located no more than 12 inches above the tank bottom.

(2) There shall be no requirement as to tank length, width, or shape, provided the tank satisfies all other requirements of this Section.

(3) The invert of the inlet openings shall be located within 12 inches of the tank top. No freeboard shall be required in the pump tank.

(4) After joining, tanks manufactured in two sections shall be waterproofed plastered along the joint with hydraulic cement, cement mortar, or other waterproofing sealant. Other The methods of waterproofing tanks may be used as specifically
approved in the plans and specifications for the tank shall be used. Prior to backfilling, the LHD local health department shall make a finding that a two section pump tank is watertight if a soil wetness condition is present within five feet of the elevation of the top of the tank.

(E) (5) Tanks shall be vented, if more than 150 feet from the facility, and accessible for routine maintenance, pump replacement, float replacement and tank pumping. A watertight access riser manhole with removable cover lid shall be provided over the pump with a minimum diameter of 24 inches. The access opening shall be a minimum of 22 inches by 22 inches or 24 inches in diameter as the opening cuts the plane of the bottom side of the top of the tank or other equidimensional opening with at least 484 square inches. The access riser manhole shall extend at least to six inches above finished grade and be designed and maintained to prevent surface water inflow. Larger or multiple access risers manholes shall be provided when two or more pumps are required. Pumps shall be removable without requiring entrance into the tank. Precast concrete access covers Manhole lids shall weigh at least 50 pounds but no more than 100 pounds or be locked or otherwise secured to limit unauthorized entry and electrical controls shall be secured against unauthorized access. Manhole risers shall be joined to the tank top and sealed in accordance with Paragraphs (a)(14) and (b)(4) of this Rule. Risers shall be sealed watertight to the top of the tank using the pliable sealant used to seal the tank halves. Riser sealing shall be the responsibility of the tank installer. Access risers and riser covers shall be designed, manufactured, and installed to prevent water inflow.

(6) Pump tank access risers must have a conduit penetration point constructed as a blockout or a resilient, watertight, sealed, non-corrosive and flexible sleeve to allow for routing of electrical conduit out of the tank. The wire penetration shall be precast to be compatible with the connective sleeve.

(67) All pump tanks shall bear an imprint identifying the manufacturer, the pump tank serial number assigned to the manufacturer by the State Division of Environmental Health, and the liquid or working capacity of the tank. The imprint shall be located to the left of the outlet pipe penetration point blockout. All tanks shall also be permanently marked with the date of manufacture adjacent to the tank imprint or on the top of the tank directly above the imprint.

(c) Grease tanks shall meet the construction requirements of Paragraph (a) of this rule with the following modifications.

(1) Access openings shall be a minimum of 24 inches by 24 inches or 24 inches in diameter as the opening cuts the plane of the bottom side of the top of the tank or other equidimensional opening with at least 576 square inches. Access openings shall extend at least to finished grade and be capped with manhole rings and covers. Manhole rings and covers shall be designed, manufactured and installed to prevent surface water infiltration. Aluminum hatches may be substituted for manhole rings and covers in non-traffic areas, and shall be designed, manufactured and installed to prevent surface water infiltration.

(2) The final chamber shall contain an effluent filter and case extending down at least 50 percent of the liquid depth. The effluent filter shall be sized, designed, manufactured, and approved by the State for use in grease tanks, which shall receive wastewater containing 25 mg/l or more of fats, grease and oil. The effluent filter shall be sized for the design daily flow.

(3) Where it has been demonstrated that specially designed grease interceptors will provide improved performance, the grease trap liquid capacity may be reduced by up to 50 percent.
(4) All grease tanks shall bear an imprint identifying the manufacturer, grease tank serial number assigned by the State, and the liquid or working capacity of the tank. The imprint shall be located to the left of the outlet pipe penetration.

(e) Plans for prefabricated tanks, risers and riser covers, other than those approved under Paragraph (a), or (b) or (c) of this Rule shall be approved on an individual basis as determined by the information furnished by the designer which indicates the tank, riser or riser cover will provide equivalent effectiveness as those designed in accordance with the provisions of Paragraphs (a), (b) and (c) of this Rule.

(e) Tanks other than approved prefabricated tanks shall be constructed consistent with the provisions of this Rule, except as follows: Cast in place tanks shall be designed by a registered professional engineer and approved by the State.

(1) Cast in place concrete septic and pump tanks shall have a minimum wall thickness of six inches.

(2) Concrete block or brick masonry tanks shall have a minimum wall thickness of at least six inches when the design volume is less than 1,000 gallons and a minimum wall thickness of at least eight inches when the design volume is 1,000 gallons or more. All joints between masonry units shall be mortarred using masonry cement mortar or equivalent. The joints shall have a nominal thickness of three eighths inch. All concrete block masonry tanks shall have a minimum wall reinforcement of number three reinforcing bars on 20-inch centers, or equivalent. The maximum allowable reinforcement spacing in either direction shall be four feet. All block wall cores shall be filled with concrete with a minimum compressive strength of 3,000 pounds per square inch. All tanks constructed of block or brick shall be plastered on the inside with a 1:3 mix (one part cement, three parts sand) of Portland cement at least three eighths inch thick or the equivalent using other approved waterproofing material.

(3) The bottom of the built-in-place tank shall be poured concrete with a minimum thickness of four inches. All built-in-place tanks shall be reinforced to satisfy the structural strength requirements of Paragraph (a)(9) of this Rule. Reinforcement shall be placed in both directions throughout the entire tank, including top, bottom, walls, and ends.

(e) Manufacturers of septic tanks, effluent filters, pump tanks, grease tanks, risers, and riser locators shall comply with the General Statutes, this Section, and Approval conditions. If the approved products or materials are found to be in non-compliance, the Operation Permit shall not be issued or shall be denied. The State shall suspend or revoke the product approval upon a finding that the information submitted is falsified, the product has been subsequently altered, or subsequent experience with the product results in altered conclusions about its design or performance. Suspension or revocation of the product approval shall not affect systems previously installed pursuant to the approval.

(g) Tank manufacturing facilities, septic tanks, pump (dosing) tanks and grease tanks may be subject to inspections by the State and LHD for conformance with the approved plans, specifications and the provisions of this Rule, including:

(1) Concrete compressive strength using a properly calibrated Schmidt Rebound Hammer ASTM C 805; Test Method for Rebound Number of Hardened Concrete, Windsor Probe or other approved device;

(2) Reinforcement using a metal detector;

(3) Concrete consolidation, tank access, reinforcement placement, sealant, and structural integrity by visual inspection of tanks;

(4) Inspection of the production facilities and manufacturing processes;

(5) Raw materials records or ready mix records shall be available for inspection;

(6) Measuring relevant tank dimensions, concrete consolidation, manufacturer information.
tank access, sealing and sealant, and structural integrity; and

(6) Inspection of other tank components.

(h) Septic tanks, pump (dosing) tanks and grease tanks may be subjected to a test for watertightness. Watertightness testing shall include a static water test by ASTM C1227-93, Section 9.2.1; Standard Specifications for Precast Concrete Tanks or vacuum testing by The National Precast Concrete Association (NPCA) standard.

(1) ASTM C1227-93 method. Seal the tank, fill with water, and let stand for 24 hours. Refill the tank. The tank is approved if the water level is held for 1 hour.

(2) NPCA method. Introduce a vacuum of 4 inches of mercury. Hold this pressure for 5 minutes. During this initial 5 minutes, there is an allowable pressure equalization loss of up to one-half inch of mercury. If the pressure drops, it must be brought back to 4 inches of mercury and held for a further 5 minutes with no pressure drop.

(i) Tanks found to be in noncompliance with the approved plans or these Rules shall not be used unless corrections can be made to bring the tanks into compliance. The authorizing agent of the State making the finding shall mark tanks that can not be brought into compliance as defective. When a tank is determined to not meet the Rules of this Section, corrections shall be made to bring the tank into compliance with Rules .1952, .1953 and .1954 as applicable. If corrections can not be made to the tank, the authorized agent making the determination shall prepare a written report with reference to the tank inspection and the report shall be provided to the owner, and the system installer.


15A NCAC 18A .1955 DESIGN INSTALLATION CRITERIA FOR CONVENTIONAL WASTEWATER SEWAGE SYSTEMS

(a) OPTION 1 Conventional septic tank wastewater systems shall utilize a septic tank of approved construction with an approved effluent filter and support case, access devices, and design volume which provides primary treatment of the sewage in accordance with the provisions of these Rules. The effluent filter support case shall be solvent welded to a PVC Schedule 40 outlet pipe with a minimum diameter of three inches inserted through the outlet connective sleeve creating a watertight and mechanically sound joint and shall extend at least 24 36 inches beyond the tank outlet. The outlet pipe shall be placed on a solid foundation to prevent differential settling of the pipe. The filter and support case shall be installed and maintained in accordance with the filter manufacturer's specifications. The effluent filter shall be accessible without the operator entering the septic tank and removable by hand. The effluent filter shall be secured in the support case and located under the outlet access opening or riser manhole. All septic tanks shall come to finished grade or have a riser to finished grade. When the top of the septic tank or access manhole is installed below finished grade, the location of each access opening or manhole shall be visibly marked at finished grade. The visible marker(s) shall be located over or within a five-foot radius of each access opening or manhole. The marker(s) shall be identified as a septic tank locator. When not placed over each access opening or manhole, the marker(s) shall indicate location of tank access opening(s) or manhole(s). The excavation to receive the tank shall be large enough to permit the proper placement of the tank, provide for tank inspection, and placement of backfill. The tank excavation shall be at least 3 feet from any nitrification trench. Tanks shall be installed level on a solid base that will not settle. Where rock or other protruding obstacles are encountered, the bottom of the excavation shall be backfilled with sand, gravel or stone to the proper grade. Backfill around the tank shall be placed in such a manner as to prevent undue strain or damage to the tank or connected pipe. Septic tanks other than
precast concrete tanks shall be installed according to their approval as an innovative component under Rule .1969 or as required in the septic tank plans approved under Rule .1953. The filtered effluent from the septic tank shall be conveyed to an approved nitrification line where the soil provides for final treatment and disposal of the sewage.

(b) **OPTION 2** Conventional septic tank wastewater systems shall utilize a septic tank of approved construction with an approved effluent filter and support case, access devices, and design volume which provides primary treatment of the sewage in accordance with the provisions of these Rules. The effluent filter support case shall be solvent welded to a PVC Schedule 40 outlet pipe with a minimum diameter of three inches inserted through the outlet connective sleeve creating a watertight and mechanically sound joint and shall extend at least 24 36 inches beyond the tank outlet. The outlet pipe shall be placed on a solid foundation to prevent differential settling of the pipe. The filter and support case shall be installed and maintained in accordance with the filter manufacturer's specifications. The effluent filter shall be accessible without the operator entering the septic tank and removable by hand. The effluent filter shall be secured in the support case and located under the outlet access opening or riser manhole. Systems that require a management entity, other than the owner (Rule .1961), where the top of the septic tank will be deeper than six inches below the finished grade, shall have an access riser over each compartment with cover, extending to finished grade and have an opening adequate to accommodate the installation or removal of the septic tank lid. For all other systems, when the top of the septic tank or access riser manhole is installed below finished grade, the location of the tank each access opening or manhole shall be visibly marked at finished grade. The visible marker(s) shall be located over or within a five foot radius of each access opening or manhole. The marker(s) shall be identified as a septic tank locator. When not placed over each access opening or manhole, the marker(s) shall indicate location of tank access opening(s) or manhole(s). The excavation to receive the tank shall be large enough to permit the proper placement of the tank, provide for tank inspection, and placement of backfill. The tank excavation shall be at least 3 feet from any nitrification trench. Tanks shall be installed level on a solid base that will not settle. Where rock or other protruding obstacles are encountered, the bottom of the excavation shall be backfilled with sand, gravel or stone to the proper grade. Backfill around the tank shall be placed in such a manner as to prevent undue strain or damage to the tank or connected pipe. Septic tanks other than precast concrete tanks shall be installed according to their approval as an innovative component under Rule .1969 or as required in the septic tank plans approved under Rule .1953. The filtered effluent from the septic tank shall be conveyed to an approved nitrification line where the soil provides for final treatment and disposal of the sewage.

(b) Table II shall be used in determining the maximum long-term acceptance rate for septic tank systems of conventional trench design. The long-term acceptance rate shall be based on the most hydraulically limiting naturally occurring soil horizon within three feet of the ground surface or to a depth of one foot below trench bottom, whichever is deeper.

<table>
<thead>
<tr>
<th>SOIL GROUP</th>
<th>SOIL TEXTURE CLASSES (USDA CLASSIFICATION)</th>
<th>ACCEPTANCE gpd/ft²</th>
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</thead>
<tbody>
<tr>
<td>I</td>
<td>Sands</td>
<td>1.2 - 0.8</td>
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<tr>
<td></td>
<td>(With S or PS Loamy Sand structure and clay mineralogy)</td>
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The long-term acceptance rate shall not exceed the mean rate for the applicable soil group for food service facilities, meat markets, and other places of business where accumulation of grease can cause premature failure of a soil absorption system. Long-term acceptance rates may be increased up to the maximum for the applicable soil group by data from comparable facilities indicating that the grease and oil content of the effluent will be less than 30 mg/l and the chemical oxygen demand (COD) will be less than 500 mg/l.

The design daily sewage flow shall be divided by the long-term acceptance rate to determine the minimum area of nitrification trench bottom. The total length of the nitrification line trench shall be determined by dividing the required area of nitrification trench bottom by the trench width, not to exceed 36 inches. Trenches shall be located not less than three times the trench width nine feet on centers with a minimum spacing of five feet on centers.

(d) The local health department may permit the use of a bed system on sites where the soil texture can be classified into either Soil Groups I, II, or III, meeting the other requirements of this Section, and only on lots which are limited by topography, space, or other site planning considerations. In such cases, the number of square feet of bottom area needed shall be increased by 50 percent over what would be required for a trench system. Nitrification lines shall be at least 18 inches from the side of the bed and shall have lines on three-foot centers. When the design daily flow exceeds 600 gallons per day, bed systems shall not be used.

(ed) The pipe or tubing used between the septic tank and the nitrification line shall be a minimum of three-inch nominal size Schedule 40 polyvinyl chloride (PVC) ASTM D 1785; Standard Specifications for Poly (Vinyl Chloride) PVC Plastic Pipe Schedule 40, 80, 120-polyethylene (PE), or acrylonitrile-butadiene-styrene (ABS) or equivalent with a minimum fall of one-eighth inch per foot. However, three-inch or greater nonperforated polyethylene (PE) corrugated tubing may be substituted for Schedule 40 pipe between a distribution device and the nitrification line if the following conditions are met:

1. the trench has a minimum bottom width of one foot;
2. the trench bed is compacted, smooth, and at a uniform grade;
3. the pipe is placed in the middle of the trench with a minimum of three inches of clearance between the pipe and the trench walls;
4. washed stone or washed gravel envelope is placed in the trench on both sides of the pipe and up to a point at least two inches above the top of the pipe;
(5) A minimum of six inches of soil cover is placed and compacted over the stone or gravel envelope; and

(6) Earthen dams consisting of two feet of undisturbed or compacted soil are placed at both ends of the trench separating the trench from the distribution device and the nitrification line.

All joints in the pipe from the septic tank to the nitrification line trench shall be watertight. Solvent cement joints shall be made in a two-step process with primer manufactured for thermoplastic piping systems and solvent cement conforming to ASTM D2564, Standard Specifications or other approved method of making a watertight joint.

(f1) When four or six-inch diameter corrugated plastic tubing is used for nitrification lines, it shall be certified as complying with ASTM F 405, Standard Specification for Corrugated Polyethylene (PE) Tubing and Fittings, which is hereby adopted by reference in accordance with G.S. 150B-21.6. The corrugated tubing shall have three rows of holes, each hole between one-half inch and three-fourths inch in diameter, and spaced longitudinally approximately four inches on centers. The rows of holes may be equally spaced 120 degrees on centers around the periphery, or three rows may be located in the lower portion of the tubing, the outside rows being approximately on 120-degree centers. The holes may be located in the same corrugation or staggered in adjacent corrugations. Other types of pipe may be used for nitrification lines provided the pipe satisfies the requirements of this Section and is approved by the State for hole size and spacing and the pipe has a stiffness equivalent to corrugated polyethylene tubing (ASTM F 405) or stronger. The nitrification line shall be located in the center of the nitrification trench.

(f) Effluent distribution devices including distribution boxes, flow dividers, drop boxes and flow diversion devices, shall be of sound construction, watertight, corrosion resistant, and of adequate design as approved by the State. When constructed of precast concrete the device shall have a minimum compressive strength of 4000 pounds per square inch prior to removal from the place of manufacture. The lid for the device shall be a minimum of 2 ½ inches thick, have reinforcement and a handle if the lid weighs more than 25 pounds. Effluent distribution devices shall be separated from the septic tank and nitrification trenches by a minimum of three feet of undisturbed soil and shall be placed level on a solid foundation of undisturbed soil or concrete to prevent differential settlement of the device. Effluent distribution devices, other than precast concrete, shall have the backfill placed by hand to minimize disturbance of the device.

(h) Serial distribution may be used when approved by the LHD. The effluent in an individual nitrification trench must reach a level of two inches above the nitrification line (pipe) before effluent is distributed to the next lower trench. Step-downs shall be constructed of three linear feet of undisturbed soil, and the effluent shall be conveyed over the step-down through Schedule 40 PVC pipe or equivalent. Area taken up by step-downs and drop boxes shall not be included as part of the minimum area required for nitrification trench bottoms.

(g) Nitrification trenches shall be constructed, as level as possible but in no case shall the fall in a single trench bottom exceed one-fourth inch in 10 feet as determined by an engineer's level, laser level or equivalent. When surface slopes are greater than two percent, the bottom of the nitrification trenches shall follow the contour of the ground. Unless the authorized agent makes a determination on a case by case basis that installation of nitrification trenches on contour is not required. An engineer's level, laser level or equivalent shall be used for: installation and inspection

(1) Staking (flagging) the location of nitrification trenches on site before installation begins,

(2) Installation of the nitrification trenches, and

(3) Inspection of the nitrification trenches.
The nitrification trench shall not exceed a width of three feet and a depth of three feet on the downslope side of the trench, except as approved by the local health department.

(j) Nitrification trenches shall be installed with at least one foot of naturally occurring usable soil or soil material between the trench bottom and any unsuitable soil material, characteristic or horizon. If the separation between the bottom of the nitrification trench and any soil wetness condition is less than 18 inches, and if more than six inches of this separation consists of Group I soils, a low pressure pipe system or other type of pressure dispersal system or advanced treatment shall be required.

(hk) Rock used in soil absorption systems shall be clean, washed gravel or crushed stone and graded or sized in accordance with size numbers 3, 4, 5, 57, or 6 of ASTM D-448; Standard Classification for Size of Aggregate for Road and Bridge Construction (standard sizes of coarse aggregate) which is hereby adopted by reference in accordance with G.S.150B-21.6. Copies may be inspected in, and copies obtained from the Division of Environmental Health, P.O. Box 27687, Raleigh, North Carolina 27611-7687. The rock shall be placed a minimum of one foot deep with at least six inches below the pipe and two inches over the pipe and distributed uniformly across the trench bottom and over the pipe. The rock shall be placed at least six inches below the naturally occurring soil surface on the downslope side of the trench. When the trench excavation passes through rills, gullies or irregular topography and the trench bottom is less than eighteen inches below the naturally occurring soil surface, rock shall not be placed in that section of trench and Schedule 40 PVC pipe shall be used to connect sections of the nitrification trench.

(l) The rock shall be covered with a single and continuous layer of non-woven filter fabric extending across the top of the rock before backfilling. Minimum average values for fabric shall have a unit weight of 1.5 oz./sq.yd. (per ASTMD 5261), a permissivity of 1.0 sec¹ (per ASTM D 4491) and a trapezoid tear of 1515 pounds (per ASTM D 4533). All non-woven fabric shall bear the appropriate manufacturer’s label specifying the products name and number.

(hm) The soil cover over the nitrification field shall be to a depth of at least six inches. The finished grade over the nitrification field shall be landscaped to prevent the ponding of surface water and runoff of surface water shall be diverted away from the nitrification field. Soil cover above the original grade shall be placed at a uniform depth over the entire nitrification field, except as required to prevent the ponding of surface water, and shall extend laterally five feet beyond the nitrification trench. The finished grade over the nitrification field shall be returned to the original topography, seeded and stabilized to prevent soil erosion, unless otherwise specified by the LHD. Nitrification fields and reserve areas shall not be located under roads, drives, parking areas, buildings and other structures. Activities that result in soil disturbance or soil compaction shall not occur over the nitrification field. The soil cover shall be placed over a nitrification field only after proper preparation of the original ground surface. The type of soil cover and placement shall be approved by the local health department.

(j) Effluent distribution devices, including distribution boxes, flow dividers, and flow diversion devices, shall be of sound construction, watertight, not subject to excessive corrosion, and of adequate design as approved by the local health department. Effluent distribution devices shall be separated from the septic tank and nitrification lines by a minimum of two feet of undisturbed or compacted soil and shall be placed level on a solid foundation of soil or concrete to prevent differential settlement of the device. The installer shall demonstrate that the distribution devices perform as designed.

(k) Grease traps or grease interceptors shall be required at food service facilities, meat markets, and other places of business where the accumulation of grease can cause premature failure of a soil absorption system. The following design criteria shall be met:

(1) The grease trap shall be plumbed to receive all wastes associated with food handling and no toilet wastes;

(2) The grease trap liquid capacity shall be sufficient to provide for at least five gallons of storage per meal served per day, or at least two-thirds of the required septic tank liquid capacity, or a capacity as determined in accordance with the following:
LC = D x GL x ST x HR/2 x LF

where
- LC = grease trap liquid capacity (gallons)
- D = number of seats in dining area
- GL = gallons of wastewater per meal (1.5 single-service; 2.5 full service)
- ST = storage capacity factor = 2.5
- HR = number of hours open
- LF = loading factor (1.25 interstate highway = 1.0 other highways and recreational areas = 0.8 secondary roads)

(3) Two or more chambers must be provided, with total length to width ratio at least 6:1. Chamber opening and outlet sanitary tee must extend down at least 50 percent of the liquid depth.

(4) Access manholes, with a minimum diameter of 24 inches, shall be provided over each chamber and sanitary tee. The access manholes shall extend at least to finished grade and be designed and maintained to prevent surface water infiltration. The manholes shall also have readily removable covers to facilitate inspection, filter maintenance, and grease removal.

(5) One tank or multiple tanks, in series, shall be constructed in accordance with Rules .1952, .1953, and .1954 of this Section, and the provisions of Paragraphs (k)(3) and (k)(4) of this Rule.

(6) Where it has been demonstrated that specially designed grease interceptors will provide improved performance, the grease trap liquid capacity may be reduced by up to 50 percent.

(n) The LHD may approve trench widths between 18 inches and 36 inches. The total length of nitrification trench shall be determined by dividing the required area of nitrification trench bottom (paragraph b of this rule) by the trench width. Trenches shall be located not less than three times the trench width on centers with a minimum spacing of five feet on centers. Stepdowns or drop boxes may be used where it is determined by the local health department that topography prohibits the placement of nitrification trenches on level grade. Stepdowns shall be constructed of two linear feet of undisturbed soil and constructed to a height which fully utilizes the upstream nitrification trench. Effluent shall be conveyed over the stepdown through nonperforated pipe or tubing and backfilled with compacted soil. Drop boxes shall be constructed so that the invert of the inlet supply pipe is one inch above the invert of the outlet supply pipe which is connected to the next lower drop box. The top of the trench outlet laterals, which allow effluent to move to the nitrification lines, shall be two inches below the invert of the outlet supply line. Area taken up by stepdowns and drop boxes shall not be included as part of the minimum area required for nitrification trench bottoms.

(m) The design and installation requirements of this rule shall apply to all other ground absorption wastewater systems and components unless otherwise stated in these Rules or in an innovative approval for that system or component. Nitrification trenches shall be installed with at least one foot of naturally occurring soil between the trench bottom and saprolite, rock, or any soil horizon unsuitable as to structure, clay mineralogy or wetness. If the separation between the bottom of the nitrification trench and any soil wetness condition is less than 18 inches, and if more than six inches of this separation consists of Group I soils, a low pressure pipe system shall be required.

(n) If sewage effluent pumps are used, the applicable requirements of Rule .1952 of this Section shall apply.

(o) Collection sewers shall be designed and constructed in accordance with the following minimum criteria:
Building drains and building sewers shall be in accordance with the state plumbing code and approved by the local building inspector.

Pipe material shall be specified to comply with the applicable ASTM standards, with methods of joining and other special installation procedures specified which are appropriate for the pipe to be used.

Gravity sewers shall be designed to maintain scour velocities of at least two feet per second with the pipe half full and a minimum of one foot per second at the peak projected instantaneous flow rate. Force mains shall be sized to obtain at least a two-foot per second scour velocity at the projected pump operating flow rate.

Infiltration and exfiltration shall not exceed 100 gallons per day per inch diameter per mile of gravity sewer pipe or 20 gallons per day per inch diameter per mile of pressure pipe in force mains and supply lines.

Three-foot minimum cover shall be provided for all sewers unless ferrous material pipe is specified. Ferrous material pipe or other pipe with proper bedding to develop design-supporting strength shall be provided where sewers are subject to traffic-bearing loads.

Manholes shall be used for sewers at any bends, junctions, and at least every 425 feet along the sewer lines. Drop manholes are required where the inlet to outlet elevation difference exceeds 2.5 feet. Manhole lids shall be watertight if located below the 100-year flood elevation, within 100 feet of any public water supply source, or within 50 feet of any private water supply source or any surface waters classified WS-I, WS-II, WS-III, SA, SB, or B.

Cleanouts may be used instead of manholes for four-inch and six-inch sewers serving one or two buildings or as otherwise allowed by the North Carolina Plumbing Code. When used, cleanouts are required at least every 50 feet for four-inch sewers and every 100 feet for six-inch sewers and at all junctions and bends which exceed 45 degrees.

Additional ventilation provisions may be required for collection sewers. Air relief valves shall be provided as needed for force mains.

When an authorized agent determines that the installation of a system does not meet the Rules of this Section, corrections shall be made to bring the system into compliance with the Rules. If corrections can not be made to the system, the Operation Permit shall be denied and the authorized agent making the determination shall prepare a written report with reference to the system installation and the report shall be provided to the owner, and the system installer. Alternating dual field nitrification systems may be utilized where soils are limited by high clogging potentials (Soil Groups III and IV) and where the potential for malfunction and need for immediate repair is required. Alternating dual nitrification fields shall be designed with two complete nitrification fields, each sized a minimum of 75 percent of the total area required for a single field and separated by an effluent flow diversion valve. The diversion valve shall be constructed to resist 500 pounds crushing strength, structurally sound, and shall be resistant to corrosion. Valves placed below ground level shall be provided with a valve box and suitable valve stem so that they may be operated from the ground surface.

History Note: Authority G.S. 130A-335 (e)(f)(f1)[2nd];
Eff. July 1, 1982;
Amended Eff. August 1, 1991; January 1, 1990; August 1, 1988; February 1, 1987;
Temporary Amendment Eff. January 1, 1999;
15A NCAC 18A .1956 MODIFICATIONS TO CONVENTIONAL WASTEWATER SEPTIC TANK SYSTEMS

The following are modifications to conventional wastewater septic tank systems or sites which may be utilized singly or in combination to overcome selected soil and site limitations. Except as required in this Rule, the provisions for design and installation of Rule .1955 of this Section shall apply:

(1) SHALLOW SYSTEMS: Sites classified UNSUITABLE as to soil depth or soil wetness may be reclassified PROVISIONALLY SUITABLE with respect as to usable soil depth or soil wetness conditions by utilizing shallow placement of nitrification trenches in the naturally occurring soil. Shallow trenches may be used where at least 24 inches of naturally occurring usable soil or soil material, on the downslope side of the trench, are present above an unsuitable soil horizon, material or characteristic saprolite, rock, or soil wetness conditions and all other factors are PROVISIONALLY SUITABLE or SUITABLE. Shallow trenches shall be designed and constructed with at least one foot of naturally occurring soil or soil material between the trench bottom and any unsuitable soil horizon, material or characteristic. If the separation between the bottom of the nitrification trench and any soil wetness condition is less than 18 inches, and if more than six inches of this separation consists of Group I soils, a low pressure pipe system or a pressure dispersal system or advanced treatment shall be required. The long-term acceptance rate shall be based on the most hydraulically limiting naturally occurring soil horizon within 24 inches of the ground surface or to a depth of one foot below the trench bottom, whichever is deeper. Soil cover above the original grade shall be placed at a uniform depth over the entire nitrification field and shall extend laterally five feet beyond the nitrification trench. The soil cover shall be placed over a nitrification field only after proper preparation of the original ground surface. The local health department LHD shall approve the type and placement of soil cover. The cover material shall have no more than ten percent by volume of fibrous organics, building rubble, rocks or other debris. Shallow systems shall not be installed on slopes greater than 30 percent, unless a slope stabilization plan is designed by a licensed professional listed in Rule .1938 (c) and approved by the LHD or a proposal can be made under Rule .1948(d).

(2) ALTERNATING NITRIFICATION FIELD SYSTEMS. Alternating dual field nitrification systems may be utilized when the following conditions are met:

(a) Alternating dual nitrification fields shall be designed with two complete nitrification fields (initial and reserve), each sized a minimum of seventy-five (75) percent of the total area required for a single field and separated by an effluent flow diversion valve.

(b) No additional reduction in linear footage of nitrification trench shall be taken.

(c) The diversion valve shall be approved by the State, and shall be structurally sound, resistant to corrosion and resist 500 pounds crushing strength, and

(d) Valves placed below finished ground level shall be provided with a valve box and suitable valve stems so that they may be operated from the ground surface.

(3) BED SYSTEMS. The LHD may permit the use of a bed system (any trench greater than 36 inches wide) on sites where the soil texture can be classified into either Soil Groups I, II, or III, meeting the other requirements of this Section, and only on lots which are limited by space. In such cases, the number of square feet of bottom area needed shall be increased by 50 percent over what would be required for a trench.
system. Nitrification lines shall be at least 18 inches from the side of the bed and shall have lines on three-foot centers. When the design daily flow exceeds 600 gallons per day, bed systems shall not be used. The narrow dimension of the bed shall not exceed 10 feet. At least 10 feet of undisturbed naturally occurring soil shall separate beds.

(4) PRESSURE DOSED SYSTEMS: A properly designed dosing siphon or pump shall be used for discharging effluent into nitrification lines when the total length of such lines exceeds 750 linear feet in a single system and as required for any pressure-dosed system. When the design daily flow from a single system exceeds 3,000 gallons per day or when the total length of nitrification trench exceeds 2,000 linear feet in a single system, alternating siphons or pumps shall be used which shall discharge to separate nitrification fields. The dose volume from pump or siphon systems shall be of such design so as to fill the nitrification lines from 66 percent to 75 (44 to 50 gallon per 100 feet of pipe) percent of their capacity at each discharge except as required for low-pressure distribution systems. The discharge rate from dosing systems shall be designed to maximize the distribution of the effluent throughout the nitrification field.

(a) The effluent pump shall be capable of handling at least one-half inch solids or be a properly screened, high head pump specifically designed for effluent. The pump must be designed to meet the discharge rate and total dynamic head requirements of the effluent distribution system. The pump shall be listed by Underwriter's Laboratory or an equivalent third party electrical testing and listing agency, unless a registered professional engineer specifies the proposed pump model.

(b) Pump discharge piping shall be of Schedule 40 PVC or stronger material, pressure rated for water service at a minimum of two times the operating pressure (ASTM D 1784, D 1785 and D 2466) and adequately secured. Vent or antisiphon holes (three-sixteenth inch minimum) shall be provided in the pump discharge piping between the pump and the check valve, or in accordance with pump manufacturer's specifications. A threaded union, flange, camlock or similar disconnect device shall be provided in each pump discharge line. Provisions shall be made by the use of check valves or other type valves to prevent the back flow of effluent from the drainfield or supply line back into the pump tank. These back flow devices shall be located on the drainfield side of the union. Fittings and valves shall be of compatible non-corrosive material. Shut-off valves and disconnects shall be located within 18 inches of the top of the access riser opening. All submersible pumps shall be provided with a non-corrosive rope or chain attached to each pump enabling pump removal from the ground surface without requiring dewatering or entrance into the tank.

(c) Sealed control floats or similar devices designed for detecting liquid levels in septic tank effluent shall be provided to control pump cycles. Pump-off level shall be set to keep the pump submerged at all times, at least five inches above the intake, or in accordance with the manufacturer's specifications. A separate sealed control float shall be provided to activate the high-water alarm. A minimum of 12 inches of effluent shall be maintained in the bottom of the pump tank. The high-water alarm float shall be set to activate within six inches of the pump-on level. The lag pump float switch, where provided, shall be located at or above the high-water alarm activation level. Floats shall be supported utilizing durable, corrosion resistant material, and designed to be adjustable, removable, and replaceable from the ground.
A control panel shall be provided for all systems requiring use of a pump. The panel enclosure shall be NEMA 4X or equivalent. Underwriter’s Laboratory or an equivalent third party electrical testing and listing agency shall list the panel. The panel shall include for each pump:

(i) an independent overload protection (if not integral with the pump motor);
(ii) a circuit breaker;
(iii) a motor contactor which breaks all current to the pump and controls;
(iv) a latching hand-off-automatic (H-O-A) switch;
(v) a run light;
(vi) a pump circuit power light;
(vii) an alarm circuit power light;
(viii) an elapsed time meter, and
(ix) an event counter.

An automatic pump sequencer shall be provided in systems requiring multiple pumps and shall remain operable whenever any pump or pump circuit is inoperable. The control panel shall be mounted at least 12 inches above finished grade adjacent to the pump tank or in view of the pump tank on the side of the facility. In no case shall the control panel be located more than 50 feet from the pump tank. The control panel shall remain accessible at all times to the system operator. For systems designed by a registered professional engineer, other panel construction and location criteria may be specified which meet these panel performance criteria and which comply with local electrical codes and are approved by the local electrical inspector.

Wiring shall be conveyed to the disconnect enclosure through waterproof, gasproof, and corrosion-resistant conduits, with no splices or junction boxes provided inside the tank. Wire grips, duct seal, or other suitable material or methods shall be used to seal around wire and wire conduit openings inside the pump tank and disconnect enclosure.

(d) The pump tank shall have a properly functioning high-water alarm. The alarm shall be audible and visible to the system users and the operator. The alarm design shall provide for manual testing, and shall enable the audible alarm to be silenced by the system user. The audible alarm shall automatically reset when the high water condition is relieved. The alarm system shall remain operable whenever the pump, pump circuit or pilot circuit is inoperable. The alarm enclosure shall be watertight and corrosion resistant. The alarm shall be mounted outside and shall remain accessible at all times to the system user and operator.

(e) Dual and multiple fields shall be independently dosed by separate pumps which shall automatically alternate or sequence. The supply lines shall be "H" connected to permit manual alternation between fields dosed by each pump. "H" connection valving shall be readily accessible from the ground surface, either from the pump tank access manhole or in a separate valve chamber outside the pump tank. Other equivalent methods of dosing dual or multiple fields may be approved by the State.

(f) All pump systems shall have their performance demonstrated using clean water prior to issuance of an Operation Permit. The test shall include, but not be limited to demonstration of:
(i) pump delivery rate.
(g) Siphons and siphon dosing tanks may be used when at least two feet of elevation drop can be maintained between the siphon outlet invert and the inlet invert in the nitrification field distribution system.

(i) The high-water alarm shall be set to activate within two inches of the siphon trip level.

(ii) The slope and size of the siphon discharge line shall be sufficient to handle the peak siphon discharge by gravity flow without the discharge line flowing full. Vents for the discharge lines shall be located outside of the dosing tank or otherwise designed to not serve as an overflow for the tank.

(iii) All siphon parts shall be installed in accordance with the manufacturer's specifications. All materials must be corrosion-resistant, of cast iron, high-density plastic, fiberglass, stainless steel, or equal.

(iv) Siphon dosing tanks shall have a properly functioning high-water alarm that is audible and visible by system users and weatherproof if installed outdoors in an enclosure (NEMA 4X or equivalent).

(h) Raw sewage lift stations shall meet the construction standards of this Section and all horizontal setback requirements for wastewater treatment and disposal systems in accordance with Rule .1950(a) of this Section unless the station is a sealed, watertight chamber, in which case the setback requirements for collection sewers in Rule .1950(e) of this Section shall apply. Sealed, watertight chambers shall be of a single, prefabricated unit, such as fiberglass, with sealed top cover, and preformed inlet and outlet pipe openings connected with solvent welds, O-ring seals, rubber boots, stainless steel straps, or equivalent. Dual pumps shall be provided for stations serving two or more buildings or for a facility with more than six water closets. Pumps shall be listed by Underwriter's Laboratories or an equivalent third party electrical testing and listing agency, and shall be grinder pumps or solids-handling pumps capable of handling at least three-inch spheres unless the station serves no more than a single water closet, lavatory, and shower, in which case two-inch solids handling pumps shall be acceptable. Minimum pump capacity shall be 2.5 times the average daily flow rate. The dosing volume shall be set so that the pump-off time does not exceed 30 minutes, except for stations serving single buildings, and pump run-time shall be from three to ten minutes at average flow. Pump station emergency storage capacity and total liquid capacity shall be determined in accordance with Paragraph (c)(1)(D) of Rule .1952 except for a sealed, watertight chamber serving an individual building, in which case a minimum storage capacity of eight hours shall be required. All other applicable requirements for pump tanks and pump dosing systems in accordance with Paragraph (4) of Rule .1956 shall also apply to raw sewage lift stations.

(5 2)DRAINAGE AND RESTRICTIVE HORIZONS SYSTEMS AND INTERCEPTOR DRAINS: Sites classified UNSUITABLE as to soil wetness conditions or restrictive horizons may be reclassified PROVISIONALLY SUITABLE as to soil wetness conditions or restrictive horizons when:
(a) **Sites reclassified PROVISIONALLY SUITABLE** under Rule .1948(b) (drainage systems) and .1948(c) (interceptor drains) shall meet the following requirements where applicable: Soils are Soil Groups I or II with SUITABLE structure, and clay mineralogy;

(b) Restrictive horizons, if present, are less than three inches thick or less than 12 inches from the soil surface;

(e) Modifications can be made to meet the requirements in Rule .1955(m) of this Section for the separation between the water table and the bottom of the nitrification trench at all times and when provisions are made for maintenance of the drainage systems;

(d i) Easements are recorded and have adequate width, in no case less than 15 feet plus the width of the drainage system, for egress and ingress for maintenance of drainage systems serving two or more lots.

(e ii) Maintenance of the drainage system is made a condition of the **Construction Authorization and the Operation Permit** any permit issued for the use or operation of a sanitary sewage system; and

(f iii) For drainage systems serving two or more lots, plans and specifications shall be required by the LHD, in accordance with Rule .1938(c) (plans and specifications prepared by a person or persons as required in G. S. 89C, 89E or 89F), prior to the issuance of an Improvement Permit or Construction Authorization. Drainage may be used in other types of soil when the requirements of Rule .1948(d) in this Section are met.

(b) **Drainage systems and interceptor drains** shall meet the following minimum design and installation requirements:

(i) the drain trench width shall be at least 3 times the width of the drain pipe or a minimum of twelve inches.

(ii) the fall on the bottom of the trench not to exceed 2 feet per 100 ft of trench

(iii) agricultural drainage pipe (with slots),

(iv) clean, washed #5 gravel or stone sized in accordance with ASTM D-448, or other approved media

(v) a minimum of 3 inches of rock below pipe and six inches above pipe, if gravel is media used

(vi) a geotextile fabric placed on top of gravel, stone, or other media

(vii) drain trench should penetrate the impermeable or slowly permeable layer, but no deeper than 6 ft

(viii) the last 10 ft of pipe Schedule 40 PVC pipe ASTM, spiral welded steel pipe ASTM A 211 or equivalent

(ix) a guard installed at the outlet end of the pipe to prevent animal damage,

(x) begin trench installation at outlet, and

(xi) an inspection of the excavated trench made by the LHD before the rock and pipe are installed.

(6 3) **GRAVELLESS TRENCHES LARGE DIAMETER PIPE AND PREFABRICATED, PERMEABLE BLOCK PANEL SYSTEM**: Modified nitrification trenches or lines, including using large diameter pipe (greater than four inches I.D.), and specially designed prefabricated permeable block panel systems (PPBPS) may be permitted by the LHD local health department.

(a) Large diameter pipe and prefabricated permeable block panel systems Gravelless nitrification trench systems may be substituted for conventional
(rockgravel) trench systems on any site, found to be suitable or provisionally suitable in accordance with Rules .1940 to .1947 and .1948 of this Section to eliminate the need for gravel, minimize site disturbance, or for other site planning considerations. Large diameter pipe and prefabricated permeable block panel—Gravelless nitrification trench systems shall not be used, however, where wastes contain high amounts of fats, grease and oil (25mg/l or more), such as restaurants, food processing facilities, and vehicle washes.

(i) Large diameter pipe systems shall consist of eight-inch or ten-inch (inside diameter), corrugated, polyethylene tubing encased in a nylon, polyester, or nylon/polyester blend filter wrap installed in a nitrification trench, 12 or more inches wide and backfilled with soil classified as soil group I, II, or III. Nitrification area requirement shall be determined in accordance with Rules .1955(b) and .1955(c), or in Rule .1956(6)(b), Table III of this Section, when applicable. The design daily flow shall be divided by long-term acceptance rate to determine the minimum area of nitrification trench bottom. The total length of nitrification trench shall be determined by dividing the required area of nitrification trench bottom by the trench width with eight-inch tubing considered equivalent to a two-foot-wide conventional trench and ten-inch tubing considered equivalent to a two and one-half-foot-wide conventional trench. The long-term acceptance rate shall not exceed 0.8 gallons per day per square foot. Tubing and fittings shall comply with the requirements of ASTM F-667, which is hereby incorporated by reference including any subsequent amendments and editions. Copies of the standards may be inspected in and copies obtained from the Division of Environmental Health, P.O. Box 27687, Raleigh, NC 27699-1642 27611-7687 at no cost. The corrugated tubing shall have two rows of holes, each hole between three-eighths and one-half-inch in diameter, located 120 degrees apart along the bottom half of the pipe (each 60 degrees from the bottom center line) and staggered so that one hole is present in the valley of each corrugation. The tubing shall be marked with a visible top location indicator, 120 degrees away from each row of holes. Filter wrap shall be spun, bonded, or spunlaced nylon, polyester, or nylon/polyester blend nylon filter wrap meeting the following minimum requirements:

Unit Weight: Oz/yd² = 1.0

Sheet Grab Tensile: MD - 23 lbs.

Trapezoid Tear: MD - 6.2 lbs. XD - 5.1 lbs.

Mullen Burst: PSI = 40 KPa = 276

Frazier Air Perm, CFM/ft 0.5 "H2O: 500"
Corrugated Tubing shall be covered with filter wrap at the factory and each joint shall be immediately encased in a black polyethylene sleeve which shall continue to encase the large diameter pipe and wrap until just prior to installation in the trench. Large diameter pipe systems shall be installed in accordance with this Rule and the manufacturer's guidelines. Large diameter pipe systems shall be installed in accordance with the following:

(A) The trench bottom and pipe shall be level (with a maximum fall of one inch in 100 feet).
(B) Filter wrap encasing the tubing shall not be exposed to sunlight (ultraviolet radiation) for extended periods.
(C) Rocks and large soil clumps shall be removed from backfill material prior to being used.
(D) Clayey soils (soil group IV) shall not be used for backfill.
(E) The near end of the large diameter pipe shall have an eight-inch by four-inch offset adapter (small end opening at top) suitable for receiving the pipe from the septic tank or distribution device and making a mechanical joint in the nitrification trench.

The trench bottom and pipe shall be level (with a maximum fall of one inch in 100 feet). Filter wrap encasing the tubing shall not be exposed to sunlight (ultraviolet radiation) for extended periods. Rocks and large soil clumps shall be removed from backfill material prior to being used. Clayey soils (soil group IV) shall not be used for backfill. The near end of the large diameter pipe shall have an eight-inch by four-inch offset adapter (small end opening at top) suitable for receiving the pipe from the septic tank or distribution device and making a mechanical joint in the nitrification trench.

(ii) A Prefabricated, Permeable Block Panel System (PPBPS), unitizing both horizontal and vertical air chambers and special construction to promote downline and horizontal distribution of effluent, may be used under the following conditions:

(A) in calculating the required linear footage for a PPBPS's nitrification field, the linear footage for the nitrification line as determined in Rule .1955 (b); the design daily flow shall be divided by long-term acceptance rate to determine the minimum area of nitrification trench bottom, then divide the required area of nitrification trench bottom by 3 feet to get the required linear footage of nitrification trench, and (c), or in Rule .1956 (6)(b), Table III of this Section when applicable, shall be multiplied by 0.5 for a 16 inch PPBPS;
(B) installation of the PPBPS shall be in accordance with these Rules except:
   (I) the PPBPS trench shall be located not less than eight feet on centers for 2 feet wide trenches;
   (II) the installation shall be in accordance with the manufacturer's specifications; and
   (III) the sidewalls of nitrification trenches placed in Group IV soils shall be raked to open pores which were damaged or sealed during excavation;
(D) Where design sewage flow is more than 480 gallons per day, the system shall be pressure-dosed, for nitrification trench lengths between 50 and 70 feet a pressure manifold shall be required, for nitrification trench lengths exceeding 70 feet or for nitrification trench lengths that are unequal low pressure pipe shall be required; and

(E) The long-term acceptance rate shall not exceed 0.8 gallons per day per square foot.

(b) Other types of nitrification trenches or lines may be approved by the local health department on a site-specific basis in accordance with Rule .1969 of this Section.

(4) Interceptor Drains: Sites classified as unsuitable as to soil wetness conditions because of the presence of lateral water movement may be reclassified provisionally suitable as to soil wetness conditions when such water is intercepted and diverted to prevent saturation of the soil absorption system.

(5) Steep Slopes: Stable slopes greater than 30 percent may be reclassified as provisionally suitable when:

(a) The soil characteristics can be classified as suitable or provisionally suitable to a depth of at least one foot below the bottom of the nitrification trench at the upslope side of the trench;

(b) Surface water runoff is diverted around the nitrification field if necessary to prevent scouring or erosion of the soil over the field; and

(c) The finished grade over the nitrification field site is returned to the original topography and adequately seeded, unless otherwise specified by the local health department.

(6) Saprolite System: Sites classified unsuitable as to soil depth, with saprolite present, may be reclassified provisionally suitable as to soil depth when the provisions of this Paragraph are met.

(a) An investigation of the site using pits at locations specified by the local health department shall be conducted. The following physical properties and characteristics shall be present in the two feet of saprolite below the proposed trench bottom:

(i) the saprolite texture shall be sand, loamy sand, sandy loam, loam, or silt loam;

(ii) clay mineralogy shall be suitable;

(iii) greater than two-thirds of the material shall have a moist consistence of loose, very friable, friable, or firm;

(iv) the saprolite wet consistence shall be nonsticky or slightly sticky and nonplastic or slightly plastic;

(v) the saprolite shall be in an undisturbed, naturally occurring state; and

(vi) the saprolite shall have no open and continuous joints, quartz veins, or fractures relic of parent rock to a depth of two feet below the proposed trench bottom.

(b) Table III shall be used in determining the long-term acceptance rate for septic tank systems installed pursuant to Paragraph (6) of this Rule. The long-term acceptance rate shall be based on the most hydraulically limiting, naturally occurring saprolite to a depth of two feet below trench bottom.

**TABLE III**
If a low pressure pipe system is used, the long term acceptance rate in Table III shall be reduced by one half and the system shall be designed in accordance with Rule .1957(a) of this Section, except that Rule .1957(a)(2)(B) and Rule .1957(a)(3) shall not apply. Saprolite textural classifications shall be determined from disturbed materials and determined by Rule .1941(a)(1) of this Section.

Low pressure distribution shall be used when the total length of nitrification lines exceeds 750 feet in a single system.

(c) The design daily flow shall not exceed 1000 gallons.

(d) The nitrification field shall be constructed using nitrification trenches with a maximum width of three feet and a maximum depth of three feet on the downslope side of the nitrification trench. The bottom of a nitrification trench shall be a minimum of two feet above rock, or saprolite that does not meet the requirements of Subparagraph (6)(a) of this Rule. However, where SUITABLE or PROVISIONALLY SUITABLE soil underlies the trench bottom, this separation distance may be reduced by subtracting the actual soil depth beneath the trench bottom from 24 inches to establish the minimum separation distance from the trench bottom to rock.

(e) The bottom of any nitrification trench shall be a minimum of two feet above any wetness condition.

(f) Surface and subsurface interceptor drains shall be required on sites with more slowly permeable horizons above the usable saprolite to intercept laterally flowing waters or perched waters.

(g) Exceptions to the provisions of Rule .1950(a) found in Rule .1950 and .1951, of this Section shall not apply to systems installed pursuant to this Paragraph [Rule .1956(6)].

(h) Other saprolite systems may be approved on a site-specific basis in accordance with Rule .1948(d) of this Section.

(8) DEEP SYSTEM: When the nitrification trench bottom is to be deeper than three feet on the downslope side of the trench the provisions of this Paragraph shall be met:

(a) An investigation of the site using a minimum of five pits or pits to five feet and auger borings from five to seven feet at locations specified by the LHD shall be conducted. The following physical properties and characteristics shall be present in the two feet of soil or soil material below the proposed trench bottom:

(i) the mineralogy shall be suitable;
(ii) the structure shall be suitable,
(iii) be in an undisturbed, naturally occurring state; and
(iv) no open and continuous joints, quartz veins, or fractures relic of parent rock to a depth of two feet below the proposed trench bottom.

(b) The long-term acceptance rate shall be based on the most hydraulically limiting, naturally occurring soil or soil material to a depth of two feet below the proposed trench bottom. The design daily flow shall be divided by
the long term acceptance rate (Rule .1948 Table VIII) to determine the minimum area of nitrification trench bottom. The total length of nitrification trench shall be determined by dividing the required area of nitrification trench bottom by the trench width, not to exceed 36 inches, and multiplying this length of trench by two. Textural classifications shall be determined from disturbed materials (Rule .1941 Table II).

(c) Pressure dispersal shall be used when the total length of nitrification lines exceeds 750 feet in a single system.

(d) The nitrification field shall be constructed using nitrification trenches with a maximum width of three feet and a maximum depth of five feet on the upslope side of the nitrification trench. The bottom of a nitrification trench shall be a minimum of two feet above rock or other unsuitable soil material, characteristic or horizon.

(e) If the separation between the bottom of the nitrification trench and any soil wetness condition is less than 24 inches, and if more than six inches of this separation consists of Group I soils or soil material, a low pressure pipe system or pressure dispersal system or advanced treatment shall be required.

(f) Wetness conditions encountered above the proposed trench bottom shall have surface and subsurface interceptor drains installed to intercept laterally flowing waters or perched waters.

(g) Rock shall be clean, washed gravel or crushed stone and graded or sized in accordance with size numbers 4, 5, or 6 of ASTM D-448; Standard Classification for Size of Aggregate for Road and Bridge Construction. The rock shall be placed a minimum of one foot deep with at least six inches below the pipe and two inches over the pipe and distributed uniformly across the trench bottom and over the pipe.

(h) The nitrification trenches shall be located at least 100 feet from any well.

(i) All of the requirements of Rule .1955 except (b) (system sizing), and (j) (trench bottom separation) shall be met.

(9) SAND LINED TRENCH SYSTEM: When the nitrification trench bottom is to be deeper than three feet on the downslope side of the trench, a sand lined trench system may be used.

(a) An investigation of the site using a minimum of five pits or pits to five feet and auger borings from five to seven feet at locations specified by the LHD shall be conducted. The following physical properties and characteristics shall be present in the two feet of soil or soil material below the proposed trench bottom:

(i) the mineralogy shall be suitable;

(ii) the structure shall be suitable;

(iii) be in an undisturbed, naturally occurring state; and

(iv) have no open and continuous joints, quartz veins, or fractures relic of parent rock.

(b) The Long-term Acceptance Rates shall be determined by the type of backfill over the nitrification trench.

(i) If native backfill is used, Rule .1948 Table VIII shall be used for system sizing with the LTAR being the lowest rate for the applicable soil group. Textural classifications shall be determined from disturbed materials and determined by Rule .1941 Table II of this Section.

(ii) If Group I or II backfill is used, the LTAR shall be determined from Table XIII.
**TABLE NO XIII**

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<tr>
<th>Type</th>
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<th>% passing 200 mesh</th>
<th>Distribution</th>
<th>Max. LTAR*</th>
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<td>Gravity</td>
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</table>

* Max. LTAR can not exceed the LTAR of the underlying material.

** Pressure distribution includes LPP, Drip, Pressure Manifold distribution systems

(c) The design daily flow shall not exceed 1500 gallons.

(d) The nitrification field shall be constructed using nitrification trenches with a maximum width of three feet and a maximum depth of five feet on the upslope side of the nitrification trench. The bottom of a nitrification trench shall be a minimum of two feet above rock, or other unsuitable soil material, characteristic or horizon.

(f) If the separation between the bottom of the nitrification trench and any soil wetness condition is less than 24 inches, and if more than six inches of this separation consists of Group I soils or soil material, a low pressure pipe or pressure dispersal system or advanced treatment shall be required.

(g) Wetness conditions encountered above the proposed trench bottom shall have surface and subsurface interceptor drains installed to intercept laterally flowing waters or perched waters.

(h) The nitrification trenches shall be located at least 100 feet from any well.

(i) All of the requirements of Rule .1955 except (b) (system sizing), and (j) (trench bottom separation) shall be met.

(j) The following additional system installation requirements shall be met:

(i) Group I or Group II textured soil material shall be used as backfill to within six inches of finished grade. The final six inches of backfill to cover the system shall have a finer texture (Group II or III) for the establishment of a vegetative cover.

(ii) All soil with Group III or IV texture shall be removed from the nitrification trench and the trench shall extend at least six inches into the underlying material.

(iii) Approved material in accordance with Table XIII shall be placed in the excavated trench to within two feet of the finished grade of the system.

(iv) Twelve inches of rock shall be placed into the trench as specified in Rule .1955(i), and the top of the rock in the nitrification trenches should be no more than twelve inches below the finished grade.

(v) Surface swales shall be installed to divert surface water away from the system. Swales shall be 18 inches deep and located 25 feet off the edge of the nitrification trenches.

(vi) A preconstruction conference between the installer, owner (or owner’s agent), LHD, and the designer shall be required prior to construction to discuss system design, installation, surface and subsurface drainage requirements, and landscaping.
(vii) The installer shall provide written laboratory verification of the sand quality prior to the sand backfill being placed in the nitrification trench.

(10) OFF SITE SYSTEMS. A ground absorption wastewater system may be placed on an area that is not contiguous with the building site when the conditions of this paragraph are met.

(a) The nitrification trenches for the initial system and the reserve system shall be field located (flagged or staked) on the site.

(b) The system footprint (area) shall be increased by 10 percent to allow for staging, material storage, construction equipment, other vehicles, etc.

(c) Three or more contiguous off site areas without road frontage shall have an access easement of at least 20 feet in width and designed solely for access to the system area.

(d) All off site areas and access easements shall have permanent monuments identifying the lot corners and corresponding lot numbers placed by a Registered Land Surveyor prior to the issuance of the CA.

(e) Contiguous off site areas receiving 1,500 gpd/acre or more shall require a water table separation analysis as specified in Rule .1970 (d) (13).

(f) When the on site area does not have sufficient available space, Rule .1945, for the initial and reserve systems the off site area shall be designated the initial system and the reserve area shall be on the building lot.

(g) When both systems are off site, both the initial and reserve systems shall be installed at the same time. When the initial and reserve systems have different types of nitrification fields, a determination shall be made by the authorized agent that both systems can be designed, installed, operated, and maintained. If a pump is required the pump and control panel shall be capable of delivering effluent to each field as required by the design. If not separate pumps and control panels shall be required as applicable.

(h) The developer/owner shall submit proposed supply line installation plans drawn to scale and showing pipe specifications and relative locations of all pipes, turnups, and road crossings prior to issuance of the CA.

(i) Conditions of the Improvement Permit shall include:

   (i) all supply lines shall be installed at the same time and prior to the issuance of the CA,

   (ii) all supply lines shall have lot numbers permanently marked on each joint and at the end of the supply line, and

   (iii) supply lines shall be pressure checked before the CA is issued.

(j) All vehicular traffic shall be excluded from the off site areas except that necessary for system installation and maintenance.

(k) Off site areas shall be kept accessible as specified in .1961(i).

(l) As built drawings shall be submitted to the LHD showing the location by metes and bounds of the items in this paragraph. The as build drawings shall be prepared by a Registered Land Surveyor.

(11) Collection sewers shall be designed and constructed in accordance with the following minimum criteria:

   (a) Building drains and building sewers shall be in accordance with the state plumbing code and approved by the local building inspector.

   (b) Pipe material shall be specified to comply with the applicable ASTM standards, with methods of joining and other special installation procedures specified which are appropriate for the pipe to be used.
(c) Gravity sewers shall be designed to maintain scour velocities of at least two feet per second with the pipe half full and a minimum of one foot per second at the peak projected instantaneous flow rate. Force mains shall be sized to obtain at least a two-foot per second scour velocity at the projected pump operating flow rate.

(d) Infiltration and exfiltration shall not exceed 100 gallons per day per inch diameter per mile of gravity sewer pipe or 20 gallons per day per inch diameter per mile of pressure pipe in force mains and supply lines.

(e) Three-foot minimum cover shall be provided for all sewers unless ferrous material pipe is specified. Ferrous material pipe or other pipe with proper bedding to develop design-supporting strength shall be provided where sewers are subject to traffic-bearing loads.

(f) Manholes shall be used for sewers at any bends, junctions, and at least every 425 feet along the sewer lines. Drop manholes are required where the inlet to outlet elevation difference exceeds 2.5 feet. Manhole lids shall be watertight if located below the 100-year flood elevation, within 100 feet of any public water supply source, or within 50 feet of any private water supply source or any surface waters classified WS-I, WS-II, WS-III, SA, SB, or B.

(g) Cleanouts may be used instead of manholes for four-inch and six-inch sewers serving one or two buildings or as otherwise allowed by the North Carolina Plumbing Code. When used, cleanouts are required at least every 50 feet for four-inch sewers and every 100 feet for six-inch sewers and at all junctions and bends which exceed 45 degrees.

(h) Additional ventilation provisions may be required for collection sewers. Air relief valves shall be provided as needed for force mains.

History Note: Authority G.S. 130A-335(e) and (f);
Eff. July 1, 1982;
Amended Eff. November 1, 1999; July 1, 1995; April 1, 1993; January 1, 1990; August 1, 1988.

15A NCAC 18A .1957 DESIGN CRITERIA FOR DESIGN OF ALTERNATIVE SYSTEMS
(1) The LPP system shall consist of the following basic components:
(A) a network of small diameter (one to two inches) perforated PVC 160 psi pipe or equivalent placed in naturally occurring soil at shallow depths (generally 12 to 18 inches) in narrow trenches not less than eight inches in width and spaced not less than five feet on center. Trenches shall include at least five inches of washed stone or washed gravel below the pipe and two inches above the pipe; and four inches of soil cover.
(B) a properly designed, two-compartment septic tank or other approved pretreatment system, and a pumping or dosing tank;
(C) a watertight supply manifold pipe, of Schedule 40 PVC or equivalent, for conveying effluent from the dosing chamber to the low-pressure network.
(2) The soil and site criteria for LPP systems shall meet the following minimum requirements:
At least one foot of naturally occurring soil or soil material is between the trench bottom and any unsuitable soil characteristic, horizon or material and;

LPP nitrification fields shall not be installed on slopes in excess of ten percent unless special design procedures to assure proper distribution of effluent over the nitrification field are approved. Landscaping of the LPP distribution field shall be constructed to shed rainwater or runoff. All other requirements of Rule .1940 of this Section shall be met.

Site suitability for an LPP system shall be based on the first 24 inches of usable soil beneath the naturally occurring soil surface. This 24 inches shall consist of SUITABLE or PROVISIONALLY SUITABLE soil as determined in accordance with Rules .1941 through .1944 and .1956 of this Section.

Location of the septic tank, other approved pretreatment unit, pumping or (dosing) tank chamber, and nitrification field shall be in accordance with Rule .1950 of this Section. Horizontal distances from the nitrification field shall be measured from a margin two and one-half feet beyond the lateral and manifold pipes.

There shall be no soil disturbance of the site or repair area for an LPP system except the minimum required for installation.

The available space requirements of Rule .1945 of this Section shall apply.

Table IV shall be used in determining the long-term acceptance rate for LPP systems. The long-term acceptance rate shall be based on the most hydraulically limiting, naturally occurring soil horizon within two feet of the ground surface or to a depth of one foot below the trench bottom, whichever is deeper.

TABLE IV

<table>
<thead>
<tr>
<th>SOIL GROUP</th>
<th>SOIL TEXTURAL CLASSES</th>
<th>ACCEPTANCE RATE (USDA CLASSIFICATION) gpd/ft²</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Sands</td>
<td>0.6 – 0.4</td>
</tr>
<tr>
<td></td>
<td>(With S or PS Loamy Sand</td>
<td></td>
</tr>
<tr>
<td></td>
<td>structure and clay mineralogy)</td>
<td></td>
</tr>
<tr>
<td>II</td>
<td>Coarse Loams</td>
<td>0.4 – 0.3</td>
</tr>
<tr>
<td></td>
<td>(With S or PS Loam</td>
<td></td>
</tr>
<tr>
<td></td>
<td>structure and clay mineralogy)</td>
<td></td>
</tr>
<tr>
<td>III</td>
<td>Fine Loams</td>
<td>0.3 – 0.15</td>
</tr>
<tr>
<td></td>
<td>(With S or PS Silt Loam</td>
<td></td>
</tr>
<tr>
<td></td>
<td>structure and clay mineralogy)</td>
<td></td>
</tr>
<tr>
<td>IV</td>
<td>Clays</td>
<td>0.2 – 0.05</td>
</tr>
<tr>
<td></td>
<td>(with S or PS Silty Clay)</td>
<td></td>
</tr>
</tbody>
</table>
The long-term acceptance rate shall not exceed the mean rate for the applicable soil group for food service facilities, meat markets, and other places of business where accumulation of grease can cause premature failure of a soil absorption system. Long-term acceptance rates up to the maximum for the applicable soil group may be permitted for facilities where data from comparable facilities indicates that the grease and oil content of the effluent will be less than 30 mg/l and the chemical oxygen demand (COD) will be less than 500 mg/l.

(2) LPP systems shall be sized on the following criteria:

(A) The long-term acceptance rate shall be based on the most hydraulically limiting, naturally occurring soil horizon within 24 inches of the ground surface or to a depth of one foot below the trench bottom, whichever is deeper.

(B) The design daily flow shall be divided by long-term acceptance rate (Rule .1948) to determine the minimum area of nitrification trench bottom. The total length of nitrification trench shall be determined by dividing the required area of nitrification trench bottom by the trench width and multiplying by .75. This sizing criterion shall not apply to Improvement Permits and Constructions Authorizations issued before January 1, 2006.

(3) SHALLOW LOW PRESSURE PIPE SYSTEMS: Sites classified UNSUITABLE as to usable soil depth (Rule .1947) may be reevaluated and classified PROVISIONALLY SUITABLE by utilizing shallow placement of nitrification trenches in the naturally occurring soil. Shallow trenches may be used where at least 20 inches of naturally occurring usable soil or soil material, on the downslope side of the trench, are present above an unsuitable soil characteristic, horizon or material and all other factors are SUITABLE. Shallow trenches shall be designed and constructed with at least one foot of naturally occurring soil or soil material between the trench bottom and any unsuitable soil horizon, material or characteristic. The trench aggregate shall be maintained below the naturally occurring soil surface. The long-term acceptance rate shall be based on the most hydraulically limiting naturally occurring soil horizon within 20 inches of the ground surface or to a depth of one foot below the trench bottom, whichever is deeper. Soil cover above the original grade shall be placed at a uniform depth over the entire nitrification field and shall extend laterally five feet beyond the nitrification trench. The fill material shall have no more than ten percent by volume of fibrous organics, building rubble, rocks or other debris. Shallow systems shall not be installed on slopes greater than 30 percent, unless a slope stabilization plan is designed by a licensed professional listed in Rule .1938 (c) and approved by the LHD or a proposal can be made under .1948 (d).

(4) In calculating the number of square feet for the nitrification field, the design sewage flow shall be divided by the long-term acceptance rate from Table IV. In calculating the minimum length of trenches in the LPP system, the total square footage of the nitrification field shall be divided by five feet. The LPP system shall consist of the following basic components:

(A) A properly designed, two-compartment septic tank or other approved pretreatment system, and a pump (dosing) tank. Septic tanks, pump tanks, pump dosing systems, siphons, and siphon dosing tanks shall be provided in accordance with Rule .1956(4) of this Section.
A watertight supply line of solvent welded Schedule 40 PVC pipe; ASTM D 1784, D 1785, and D2466, pressure rated for water service at a minimum of two times the operating pressure (Rule .1956 4) or equivalent, for conveying effluent from the dosing chamber to the low-pressure network.

A pressure distribution network of small Schedule 40 PVC pipes placed in aggregate filled trenches 18 to 36 inches wide and spaced not less than five feet on center.

Trenches shall include at least eight inches of approved aggregate with no less than four inches below the discharge piping and four inches of soil cover after settling.

The orifice shall be protected by sleeving the lateral within four inch corrugated plastic tubing (meets Rule .1955(e) of this Section) typically used for conventional nitrification lines, or specially designed approved orifice shields.

Low-pressure systems shall be designed for uniform distribution of effluent. The trenches shall be level and parallel to the ground elevation contours.

The maximum lateral length shall yield no more than a ten-percent difference in discharge rate between the first and last hole along the lateral.

Minimum hole size shall be 5/32-inch for at least two-thirds of the field lateral lines. Smaller holes (no less than 1/8-inch) may be used in no more than one third of the lateral lines where necessary to balance flow distribution on sloping sites. However, for systems serving restaurants, foodstands, meat markets and other establishments where effluent is expected to have a high clogging potential, the minimum hole size shall be 5/32-inch.

Maximum hole spacing shall be as follows: Soil Group I, five feet; Soil Group II, six feet; Soil Group III, eight feet; and Soil Group IV, ten feet.

The following design provisions are required for sloping sites:

(i) Separately valved manifolds are required for all subfield segments where the elevation difference between the highest and lowest laterals exceeds three feet.

(ii) The hole spacing, hole size or both shall be adjusted to compensate for relative head differences between laterals branching off a common supply manifold and to compensate for the bottom lines receiving more effluent at the beginning and end of a dosing cycle. The lateral network shall be designed to achieve a ten to 30 percent higher steady state (pipe full) flow rate into the upper lines, relative to the lower lines, depending on the amount of elevation difference.

(iii) Maximum elevation difference between the highest and lowest laterals in a field shall not exceed ten feet unless the flow is divided using multiple pumps hydraulically or split between subfield segments with approved automatically alternating valves without requiring simultaneous adjustment of multiple valves.

Turn-ups shall be provided at the ends of each lateral, constructed of Schedule 40 PVC pipe or equivalent, and protected with either valve boxes or sleeves of Schedule 40 PVC pipe with a secured cover larger diameter pipe (six inches or greater). Turn-ups and sleeves shall be cut off and capped at or above the ground surface, designed to be protected from damage, and easily accessible.

The supply manifold shall be constructed of solvent welded Schedule 40 PVC pipe; ASTM D 1784, D 1785, and D2466 pressure rated for water.
service at a minimum of two times the operating pressure (Rule .1956 4) or equivalent, and sized large enough relative to the size and number of laterals served so that friction losses and differential entry losses along the manifold do not result in more than a 15 percent variation in discharge rate between the first and last laterals, when feeding the manifold from the downhill side.

(i) The ratio of the supply manifold inside cross sectional area to the sum of the inside cross sectional areas of the laterals served shall exceed 0.7:1.

(ii) The reduction between the manifold and connecting laterals shall be made directly off the manifold using reducing tees.

(iii) Cleanouts to the ground surface shall be installed at the ends of the supply manifold, and shall be sleeved with valve boxes or sleeves of six-inch Schedule 40 PVC pipe with threaded plugs.

(G) Gate valves or other approved valves shall be provided for pressure adjustment at the fields whenever the supply line exceeds 100 feet in length. Valves shall be readily accessible from the ground surface and adequately protected in valve boxes.

(6) Septic tanks, pump tanks, pump dosing systems, siphons, and siphon dosing tanks shall be provided in accordance with Rule .1952 of this Section.

(A) The design flow rate shall be based upon delivering two feet to five feet of static pressure head at the distal end of all lateral lines.

(7) The dose volume shall be between five and ten times the liquid capacity of the lateral pipe dosed, plus the liquid capacity of the portions of manifold and supply lines which drain between doses.

(c b) FILL SYSTEM: A fill system (including new and existing fill) is a system in which all or part of the nitrification trench(es) is installed in fill material. A fill system, including an existing fill site, may be approved where soil and site conditions prohibit the installation of a conventional (Rule .1955), or modified (Rule .1956), or innovative (Rule .1969) septic tank wastewater system if the requirements of this Paragraph are met.

(1) Fill systems may be installed on sites where at least the first 18 inches below the naturally occurring soil surface consists of usable soil that is suitable, no unsuitable soil horizon, characteristic or material, except soil wetness. Further, no soil wetness condition shall exist within the first 12 inches below the naturally occurring soil surface and a groundwater lowering system shall not be used to meet this requirement. Fill systems shall not be utilized on designated wetlands unless the proposed use is specifically approved in writing by the designating agency. The following requirements shall also be met:

(A) Nitrification trenches shall be installed with at least 24 inches separating the trench bottom and any unsuitable soil horizon, characteristic or material unsuitable as to soil structure, clay mineralogy, organic soil, rock or saprolite. However, if a low pressure pipe system or other pressure dispersal system is used, the minimum separation distance shall be 18 inches.

(B) Nitrification trenches shall be installed with at least 18 inches separating the trench bottom and any soil wetness condition. This separation requirement for soil wetness conditions may be met with the use of a groundwater lowering system only in Soil Groups I and II, with suitable structure and clay soil mineralogy. However, if a low pressure pipe system or other pressure dispersal system is used, the minimum separation distance shall be 12 inches.
(C) Systems shall be installed only on sites with uniform slopes less than 10-15 percent. Storm water diversions and subsurface interceptor drains or swales may be required upslope of the system.

(C) The long-term acceptance rate shall be based on the most hydraulically limiting soil horizon within 18 inches of the naturally occurring soil surface or to a depth one foot below the trench bottom, whichever is deeper. The lowest long-term acceptance rate for the applicable soil group shall be used for systems installed pursuant to this Rule. However, the long-term acceptance rate shall not exceed 1.0 gallons per day per square foot for gravity distribution or 0.5 gallons per day per square foot for low-pressure pipe systems installed on sites with at least 18 inches of Group I soils below the naturally occurring soil surface or to a depth of one foot below the trench bottom, whichever is deeper.

(E) If the fill system uses low-pressure pipe distribution, all the requirements of Paragraph (a) of this Rule, except Paragraph (a)(2)(B) (LTAR shall be based on the first 24 inches of naturally occurring soil) shall apply. Systems with a design daily flow greater than 480 gallons per day shall use low-pressure pipe distribution or other type of pressure dispersal.

(F) Fill material soil texture shall have such soil texture to be classified as sand or loamy sand (Soil Group I) up to the top of the nitrification trenches. The final cover over the nitrification field after settling shall be six inches. The final six inches of fill used to cover the system shall have a finer texture (such as Group II, III) for the establishment of a vegetative cover. To facilitate drainage and to accommodate the landscaping requirements of the site additional fill may be added, provided the bottom of the nitrification trench or bed is no deeper than 30 inches from final grade. Existing fill material shall have no more than ten percent by volume of fibrous organics, building rubble, or other debris and shall not have discreet layers containing greater than 35 percent of shell fragments.

(G) Where fill material is added, the fill material and the existing soil shall be mixed to a depth of six inches below the interface. Heavy vegetative cover or O horizon (organic litter) shall be removed before the additional fill material is incorporated.

(H) The fill system shall be constructed as an elongated berm with the long axis parallel to the ground elevation contours of the slope.

(I) The side slope of the fill shall not exceed a rise to run ratio of 1:4. However, if the first 18 inches below the naturally occurring soil surface is Group I soil, the side slope of the fill shall not exceed a rise to run ratio of 1:3.

(J) The outside edge of the nitrification trench shall be located at least five feet horizontally from the top of the side slope.

(K) The fill system shall be shaped to shed surface water and shall be stabilized with a vegetative cover against erosion.

(L) The setback requirements shall be measured from the projected toe of the slope. However, if this setback cannot be met, the setback requirements shall be measured from a point five feet from the nearest edge of the nitrification trench if the following conditions are met:

(i) Slope of the site shall not exceed two percent;
(ii) The first 18 inches of soil beneath the naturally occurring soil surface shall consist of Group I soils;
(iii) The lot or tract of land was recorded on or before December 31, 1989, and...
(iv) A condition is placed upon the Improvement Permit to require connection to a public or community sewage system within 90 days after such system is available for connection and after it is determined that 300 feet or less of sewer line is required for connection.

(M) The available space requirements of Rule .1945 of this Section shall apply.

(2) An existing fill site that does not meet the requirements of Paragraph (b)(1) of this Rule may be utilized for a sanitary sewage system if the following requirements are met:

(A) Substantiating data are provided by the lot owner (if not readily available to the local health department) indicating that the fill material was placed on the site prior to July 1, 1977.

(B) The fill material placed on the site prior to July 1, 1977 shall have a soil texture to be classified as sand or loam sand (Group I) for a depth of at least 24 inches below the existing ground surface. This fill material shall have no more than ten percent by volume of fibrous organics, building rubble, or other debris. This fill shall not have discreet layers containing greater than 35 percent of shell fragments. However, if at least 24 inches of Group I fill material was in place prior to July 1, 1977, additional fill with soil texture classified as Group I may be added to meet the separation requirements of Paragraph (b)(2)(D) of this Rule.

(C) The fill material placed on the site after July 1, 1977 shall have evidence of soil formation. This fill material shall have no more than ten percent by volume of fibrous organics, building rubble, or other debris. This fill shall not have discreet layers, nor rock comprising more than 20 percent by volume.

(D) Soil wetness conditions, as determined by Rule .1942(a) in this Section, are 18 inches or greater below the ground surface of the fill placed on the lot prior to July 1, 1977. This requirement shall be met without the use of a groundwater lowering system.

(E) Low-pressure pipe distribution shall be used and shall meet all the requirements of Paragraph (a) of this Rule, except Paragraph (a)(2)(B). The long-term acceptance rate shall not exceed 0.5 gallons per day per square foot. However, for existing fill sites with 48 inches of Group I soils, conventional nitrification trenches utilizing a maximum long-term acceptance rate of 1.0 gallons per day per square foot may be installed in lieu of low-pressure pipe systems. The minimum separation distance between the trench bottom and any soil wetness condition or any other unsuitable soil horizon, unsuitable as to soil structure, clay mineralogy, organic soil, rock or saprolite characteristic or material shall be 24 inches for low-pressure pipe systems and 48 inches for conventional systems. This separation requirement may be met by adding additional Group I soil, but shall not be met with the use of a groundwater lowering system. Where fill is to be added, the requirements of Paragraphs (b)(1)(C), (F), (G), (H), (J), (K), of this Rule and the following requirements shall be met:

(i) Systems shall be installed only on sites with uniform slopes less than 10 percent. Storm water diversions and subsurface interceptor drains or swales shall be required upslope of the system.

(ii) Fill material soil texture shall be classified as sand or loamy sand (Soil Group I) up to the top of the nitrification trenches. The final cover over the nitrification field after settling shall be six inches.
The final six inches of fill used to cover the system shall have a finer texture (such as Group II, III) for the establishment of a vegetative cover. To facilitate drainage and to accommodate the landscaping requirements of the site additional fill may be added, provided the bottom of the nitrification trench or bed is no deeper than 30 inches from final grade. Existing fill material shall have no more than ten percent by volume of fibrous organics, building rubble, or other debris and shall not have discreet layers containing greater than 35 percent of shell fragments.

(iii) Where fill material is added, the fill material and the existing soil shall be mixed to a depth of six inches below the interface. Vegetative cover or O horizon (organic litter) shall be removed before the additional fill material is incorporated.

(iv) The fill system shall be constructed as an elongated berm with the long axis parallel to the ground elevation contours of the slope.

(vi) The outside edge of the nitrification trench shall be located at least five feet horizontally from the top of the side slope.

(vii) The fill system shall be shaped to shed surface water and shall be stabilized with a vegetative cover against erosion.

(viii) The side slope of the fill shall not exceed a side slope ratio of 1:3, and:

(ix) The setback requirements shall be measured from the projected toe of the slope.

(F.E) The available space requirements of Rule .1945 of this Section shall apply.

(G.F) The design flow shall not exceed 480 gallons per day.

(3) Other fill systems may be approved by the LHD local health department on a site-specific basis in accordance with Rule .1948(d) of this Section.

(e) Residential Wastewater Treatment Systems, to be referred to as ATU’s. Individual aerobic sewage treatment units shall be sited, designed, constructed and operated in accordance with this Rule to serve a facility design unit with a design daily flow rate of up to 1500 gallons per day, as determined in Rule .1949(a) or .1949(b) of this Section. ATU’s shall not be used, however, where wastes contain high amounts of fats, grease and oil (25 mg/l or more), including restaurants and food service facilities or Industrial Process Wastewater systems. The strength of the influent wastewater shall be similar to domestic wastewater sewage with Biological Oxygen Demand (BOD) 200 mg/l and suspended solids 200 mg/l not to exceed 300 parts per million. ATUs shall comply with the requirements of the National Sanitation Foundation (NSF) Standard 40 for Individual Aerobic Wastewater Treatment Plants and shall be classified as meeting Class I effluent quality. ATU’s shall bear the NSF mark and the NSF listed model number or shall bear the certification mark and listed model number of a third party certification program accredited by the American National Standards Institute (ANSI), pursuant to ANSI Policy and Procedures for Accreditation of Certification Programs to certify ATUs in accordance with NSF Standard Number 40. The ANSI policy and Procedures for Accreditation of Certification Programs is hereby incorporated by reference including any subsequent amendments and editions. Copies of the standard may be inspected in and copies obtained from the Division of Environmental Health, P. O. Box 27687, Raleigh, N. C. 27612-7687 at no cost. ATU’s shall only be permitted where the unit is to be operated and maintained by a certified wastewater treatment facility operator.

(1) ATU’s shall be constructed and installed in accordance with the plans, which have been approved by the State Division of Environmental Health and shall comply with all requirements of this Rule. Procedures for plan review and approval shall be in accordance with Rule(s) .1953 and .1969 of this Section.
(2) The rated capacity of ATU’s listed as complying with NSF Standard 40 shall not be less than the design daily flow as determined by Rule .1949(a) or .1949(b) of this Section.

(3) The following are minimum standards of design and construction of ATUs

(A) The inlet and outlet pipe penetrations of the tank shall be through a resilient, watertight, sealed, non-corrosive and flexible connective sleeve. The sleeve shall make and maintain a gas tight seal around the pipe, prevent movement of the pipe within the tank, and meet ASTM C-923-02; Specifications For Resilient Connectors Between Reinforced Concrete Manhole Structures, Pipes, and Laterals. The outlet and inlet pipe penetrations shall be precast to be compatible with the connective sleeve. The inlet pipe penetration point shall be on the opposite end of the tank from the outlet pipe penetration point, unless the approved plans allow for different pipe inlet location(s). No pipe penetration points or openings shall be permitted below the tank liquid level.

Blockouts in concrete ATU inlet openings shall leave a concrete thickness not less than one inch in the plant wall. Inlet and outlet blockouts shall be made for a minimum of four inch pipe and a maximum of six inch pipe. No blockouts or openings shall be permitted below the liquid level of the ATU.

(B) The inlet into the ATU shall be a straight pipe.

(C) The invert of the outlet shall be at least two inches lower in elevation than the invert of the inlet.

(D) Access openings shall be provided in the ATU top. Access shall be provided for:
   (i) cleaning or rodding out of the inlet pipe;
   (ii) cleaning or clearing the air or gas passage space above the partition;
   (iii) pumping of each compartment;
   (iv) sampling the effluent; and
   (v) repairing any system component or maintaining system components requiring repair or maintenance.

Interior baffle walls in concrete units shall be reinforced by the placing of six-inch by six-inch No. 10 gauge welded reinforcing wire. The reinforcing wire shall be bent to form an angle of 90 degrees on the ends in order to form a leg not less than four inches long. When the wire is placed in the mold, the four inch legs shall lay parallel with the side wall wire and adjacent to it.

(E) Access openings shall be provided in the ATU top. Access shall be provided for cleaning or rodding out the inlet pipe, for cleaning or clearing air or gas passage spaces, as an entrance for inserting the suction hose in compartments that are required to be pumped out, to allow for sampling the effluent, and for access to repair or maintain any system components requiring repair and maintenance. Precast concrete access risers and riser covers shall have a clear opening sized large enough to allow for removal and replacement of tank lids. Tank lids and riser covers shall weigh at least fifty pounds but no more than one hundred pounds or be locked or otherwise secured to the riser to limit unauthorized entry. Risers shall be sealed watertight to the top of the tank by using the pliable sealant used to seal the tank halves. Sealant shall be provided by the tank manufacturer. Riser sealing shall be the responsibility of the tank installer. Access risers and riser covers shall be designed, manufactured and installed to prevent water inflow. All access openings shall have risers sealed to the top of the ATU and extended at least to six inches above finished grade and designed and
maintained to prevent surface water inflow. Rule .1950(i) \( (\text{areas subject to frequent flooding}) \) of this Section shall also be met.

(F) Concrete ATUs shall be constructed in accordance with Rule .1954(a)(9) \( (\text{partition}, \ (11 \ 10), \ (\text{reinforcement}) \ and \ (13 \ 12) \ (2\frac{1}{2} \text{ inch walls minimum}) \) and .1954(b)(4) \( (\text{methods of waterproofing}) \) of this Section.

(G) Fiberglass reinforced plastic ATUs shall be based on ASTM D 4021-81, Standard Specifications for Glass-Fiber-Reinforced Polyester Underground Petroleum Storage Tanks and IAMO PS 1-93, Material and Property Standard for Prefabricated Septic Tanks, section 5.3 \( (\text{constructed with materials capable of resisting corrosion from sewage and sewage gases, and the active and passive loads on the unit walls.}) \) Documentation shall be provided that each model of fiberglass reinforced plastic ATU meets specified physical properties. A vacuum test shall be performed on at least one ATU of each model number by an independent testing laboratory, in accordance with ASTM D-4021, Standard Specification for Glass-Fiber Reinforced Polyester Underground Petroleum Storage Tanks. Unit must withstand negative pressure of 2.5 pounds per square inch (69.3 inches of water) without leakage or failure. Test results shall be included with the specifications that are provided to the State for approval.

(i) ATUs shall have the following minimum physical properties:

- Ultimate tensile strength: \( 12,000 \text{ psi} \)
- Flexural strength: \( 19,000 \text{ psi} \)
- Flexural modulus of elasticity: \( 800,000 \text{ psi} \)

(ii) A vacuum test shall be performed on at least one ATU of each model number by an independent testing laboratory, in accordance with ASTM D-4021, Standard Specification for Glass-Fiber Reinforced Polyester Underground Petroleum Storage Tanks, which is hereby incorporated by reference including any subsequent amendments and editions. Copies of the standards may be inspected in and copies obtained from the Division of Environmental Health, P.O. Box 27687, Raleigh, N.C. 27611-27687 at no cost. Unit must withstand negative pressure of 2.5 pounds per square inch (69.3 inches of water) without leakage or failure. Test results shall be included with the specifications that are provided to the State for approval.

(iii) Composition of the finished unit shall be at least 30 percent fiberglass reinforcement by weight. Minimum wall thickness shall be one-fourth inch. However, a wall thickness of not less than three-sixteenth inch may be allowed in small, isolated areas of the ATU.

(iv) Interior and exterior surfaces shall have no exposed fibers or projections, no blisters larger than one-fourth inch in diameter, and no pores or indentations deeper than one-sixteenth inch. The tank shall be watertight.

(H) Prefabricated ATUs other than precast reinforced concrete or fiberglass reinforced plastic units shall meet the requirements of Rule .1969 of this Section, be approved on an individual basis based on information furnished by the designer which indicates the unit will provide effectiveness equivalent to reinforced concrete or fiberglass reinforced plastic units.
(I) ATUs shall bear an imprint identifying the manufacturer, the ATU serial number assigned to the manufacturer’s plans and specifications approved by the State Division of Environmental Health, and the liquid or working capacity of the unit. The imprint shall be located to the right of the pipe penetration point blockout or opening made for the outlet pipe on the outlet end outside of the unit. ATUs shall also be permanently marked with the date of manufacture adjacent to the unit imprint or on the top of the unit directly above the imprint.

(J) The design, construction, and operation of ATUs shall prevent bypass of wastewater.

(K) Electrical circuits to the ATU shall be provided with manual circuit disconnects within a watertight, corrosion-resistant, outside enclosure (NEMA 4X or equivalent) adjacent to the ATU securely mounted at least 12 inches above the finished grade. Control panels provided by the manufacturer shall be installed in a watertight, corrosion-resistant enclosure (NEMA 4X or equivalent) adjacent to the unit or on the side of the facility readily visible from the unit and accessible by maintenance personnel. The control panel shall be located more than 50 feet from the ATU. The control panel shall remain accessible at all times to the system operator (ORC). Conductors shall be conveyed to the disconnect enclosure and control panel through waterproof, gasproof, and corrosion-resistant conduits. Splices and wire junctions, if needed, shall be made outside the ATU in a watertight, corrosion-resistant enclosure (NEMA 4X or equivalent) securely mounted adjacent to the unit at least 12 inches above the finished grade. Wire grips, duct seal, or other suitable material shall be used to seal around wire and wire conduit openings inside the ATU and disconnect enclosure. The ATU shall have an alarm device or devices to warn the user or operator (ORC) of a unit malfunction or a high water condition. The alarm shall be audible and visible by system users and securely mounted adjacent to the ATU, at least 12 inches above finished grade or in view of the ATU on the side of the facility. In no case shall the control panel be located more than 50 feet from the ATU. The control panel shall remain accessible at all times to the system operator (ORC). Conductors shall be conveyed to the disconnect enclosure and control panel through waterproof, gasproof, and corrosion-resistant conduits. Splices and wire junctions, if needed, shall be made outside the ATU in a watertight, corrosion-resistant enclosure (NEMA 4X or equivalent) securely mounted adjacent to the unit at least 12 inches above the finished grade. Wire grips, duct seal, or other suitable material shall be used to seal around wire and wire conduit openings inside the ATU and disconnect enclosure. The ATU shall have an alarm device or devices to warn the user or operator (ORC) of a unit malfunction or a high water condition. The alarm shall be audible and visible by system users and securely mounted adjacent to the ATU, at least 12 inches above finished grade or in view of the ATU on the side of the facility. In no case shall the alarm be located more than 50 feet from the ATU. The alarm shall remain accessible at all times to the system operator (ORC) on the side of the facility in clear view of the unit, or inside the finished occupied space of the facility. If mounted outside, the alarm shall meet NEMA 4X standards or equivalent. The alarm circuit or circuits shall be supplied ahead of any ATU electrical control circuit overload and short circuit protective devices.

(4) A settling tank shall be required prior to an ATU serving a facility design unit with a design daily flow greater than 500 gallons, as determined in Rule 1.1949(a) or 1.1949(b) of this Section. The liquid capacity of the settling tank shall be at least equal to the design daily flow as determined in Rule 1.1949(a) or (b) of this Section. The settling tank may either be an approved prefabricated septic tank or another tank specially designed for a specific individual aerobic sewage treatment plant and approved by the State Division of Environmental Health as a part of the plans for the plant.

(5) Blower location shall be shown and specifications and drawings shall be provided of proposed corrosion-resistance blower enclosure.

(6) Ground absorption wastewater systems receiving effluent from approved ATUs may be used on sites classified as SUITABLE or PROVISIONALLY
SUITABLE provisionally suitable for conventional, modified, or alternative or innovative systems in accordance with this Section. The following modifications to siting and design criteria shall be acceptable:

(A) The minimum horizontal setback requirements of Rule .1950(a) of this Section shall be met, except as follows:

<table>
<thead>
<tr>
<th>Feature, structure</th>
<th>Setback in feet</th>
<th>comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Well serving a single family residence, except any uncased well or spring</td>
<td>100</td>
<td>May be reduced for repairs, lot size or other fixed conditions to the maximum feasible distance, but in no case less than 50 feet</td>
</tr>
<tr>
<td>Streams</td>
<td>70</td>
<td>WS-I waters</td>
</tr>
<tr>
<td>S.A. waters</td>
<td>70</td>
<td>From mean high water mark</td>
</tr>
<tr>
<td>Other coastal waters</td>
<td>35</td>
<td>From mean high water mark</td>
</tr>
<tr>
<td>Streams, canal, marsh, or other surface waters</td>
<td>35</td>
<td></td>
</tr>
<tr>
<td>Reservoir</td>
<td>70</td>
<td>Class I or II from flood pool elevation</td>
</tr>
<tr>
<td>Storm water retention pond</td>
<td>35</td>
<td>Permanent ponds from flood pool elevation</td>
</tr>
<tr>
<td>Lake or pond</td>
<td>35</td>
<td>All others, from normal pool elevation</td>
</tr>
</tbody>
</table>

(i) Any private water supply source, except any uncased well or spring
   — 50 feet.
(ii) Streams classified as WS-I
    — 70 feet.
(iii) Waters classified as SA
      — 70 feet.
(iv) Other coastal waters not classified as SA
    — 35 feet.
(v) Any other stream, canal, marsh, or other surface waters
    — 35 feet.
(vi) Any Class I or Class II reservoir
     — 70 feet, from normal pool elevation.
(vii) Any permanent storm water retention pond
     — 35 feet, from flood pool elevation.
(viii) Any other lake or pond
      — 35 feet, from normal pool elevation.

(B) The requirements of Rules .1955(hm) trench bottom separation, .1956(1) shallow systems, .1956(52) drainage systems, .1956(6), .1957(b)(1) fill systems, and .1957(b)(2) existing fill of this Section shall be met, except:

(i) A low-pressure pipe system shall not be required where the separation between the bottom of the nitrification trench and any soil wetness condition is at least 12 inches, but less than 18 inches, and more than six inches of this separation consists of Group I soils.
The restriction in Rule .1956(6)(a)(v) of this Section that saprolite be overlain by at least one foot of suitable or provisionally suitable naturally occurring soil shall not apply.

For new fill systems, a low pressure pipe system shall not be required in order for the minimum separation distance between the trench bottom and any unsuitable soil horizon, rock, or characteristic or material saprolite to be reduced to 18 inches.

For existing fill systems, the minimum separation requirements of Rule .1957(b)(2)(E) of this Section shall be reduced from 48 to 36 inches for conventional systems and from 24 to 18 inches for low-pressure pipe system.

The maximum long-term acceptance rate shall be increased by 25 percent for any ground absorption system in soils which are Groups I or II with suitable structure and soil clay mineralogy. No other reductions in linear footage of nitrification trench or system area shall be applied, except where based on an adjusted design daily sewage flow rate granted in accordance with Rule .1949(c) of this Section.

Prior to issuance of an Operation Permit for an ATU, the manufacturer or his licensed representative shall certify that the unit has been properly installed and a contract for operation and maintenance shall have been executed between the unit owner and the county in accordance with Rule .1961(b) of this Section. It shall be a condition of the Operation Permit that subsequent owners of an ATU execute such a contract. The contract shall include the specific requirements for maintenance and operation, responsibilities of the owner and system operator, provisions that the contract shall be in effect for as long as the system is in use, and other requirements for the continued proper performance of the ATU. A condition of the Operation Permit shall be that the unit continue to perform in accordance with Class I effluent quality requirements of the National Sanitation Foundation (NSF) Standard Number 40 effective on the date the improvement permit was issued.

Performance monitoring shall be carried out by the operator. (ORC).

(A) During each inspection, the operator shall confirm proper mechanical performance, conduct a visual check for unusual color, clogging, oily film, odors, foam, measure settleable aeration chamber solids, and ascertain the need for removing solids, backwash and cleaning of filters, and other maintenance activities. The ground absorption wastewater system shall also be inspected and an evaluation of performance shall be made. Rule .1961. The operator shall take the necessary steps to assure that needed maintenance is carried out.

(B) Semi-annually, effluent samples shall be collected by the system operator and analyzed by a state-approved wastewater testing laboratory. The effluent shall be sampled as required in the Operation Permit for Five-Day Biological Oxygen Demand, Suspended Solids, and pH. The aeration tank shall be sampled for mixed liquor suspended solids.

(C) Performance monitoring results shall be reported to the local health department and the State as required in Rule .1961 Table XV quarterly.

(D) Remedial action and additional sampling shall be required if monitoring results or inspection indicate that Class I effluent standards are not met.

History Note

Authority G.S. 130A-335(e),(f); 130A-342; Eff. July 1, 1982;
**15A NCAC 18A .1958 NON-GROUND ABSORPTION SEWAGE TREATMENT SYSTEMS**

(a) Where an approved privy, an approved septic tank system, or a connection to an approved public or community wastewater system is impossible or impractical, this Section shall not prohibit the state or LHD local health department from permitting approved non-ground absorption treatment systems utilizing heat or other approved means for reducing the toilet contents to an inert or stabilized residue or to an otherwise harmless condition, rendering such contents noninfectious or noncontaminating. **Other non-ground absorption wastewater Alternative systems shall be designed to comply with the purposes and intent of this Section.**

(b) Holding tanks shall not be considered as an acceptable sewage treatment and disposal system. An improvement permit shall not be issued for a sewage holding tank for any new construction. However, an Authorization to Construct may be issued for a holding tank for pumping and hauling of wastewater effluent to a wastewater system approved under this Section when the owner has provided a showing that a malfunctioning system cannot otherwise be repaired by connection to a system approved under this Section or connection to a system approved under the rules of the Environmental Management Commission. Pumping and hauling wastewater effluent shall be performed by a septage management firm permitted in accordance with G.S. 130A-291.1. **Design and permitting shall include requirements such as; a high water alarm, notification telemetry, water supply limit valves, minimum tank requirements and a contract between the owner of the facility and the septage management firm.**

(c) Incinerating, composting, vault privies, and mechanical toilets shall be approved by the state agency or LHD local health department only when all of the wastewater generated by any other plumbing fixtures is handled by a system approved under this Section.

(d) Wastewater recycling systems which produce discharge treated waste-water meeting N. C. Plumbing Code requirements and the applicable state drinking water reuse standards approved under the rules adopted by the Environmental Management Commission may be used only for toilet flushing. **Recycled wastewater sewage shall not be used for body contact or human consumption.**

(e) Chemical or portable toilets for human waste may be approved in accordance with G.S. 130A-335. **Chemical or portable toilets shall have a watertight waste receptacle constructed of nonabsorbent, acid resistant, noncorrosive material.**

**History Note:** Authority G.S. 89C; 89E; 89F; 90A; 130A-335; Eff. July 1, 1982;
Amended Eff. August 1, 1991; January 1, 1990;
Temporary Amendment Eff. January 20, 1997;

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**15A NCAC 18A .1959 PRIVY CONSTRUCTION AND MAINTENANCE**

(a) An "approved privy" shall consist of a pit, floor slab, and seat assembly housed in a building which affords privacy and reasonable protection from the weather.

1. The pit shall consist of an excavation **with a bottom surface area of at least 42 inches square. and The maximum depth of the pit shall not exceed 36 inches, and** in no case shall the bottom of an excavation be closer than one foot from the seasonally high water table or rock.

2. The pit shall be properly curbed to prevent caving. In sandy or loose soil, the curb should extend the full depth of the pit. In **clay tight soils, partial curbing is acceptable if it prevents caving.**
(3) The privy floor slab shall be constructed of reinforced concrete. Where it is impractical to secure or construct reinforced concrete floor assemblies, wood construction shall be acceptable provided the floor slab is made of rot resistant joists rough sub-flooring and covered with tight tongue-and-groove rot resistant flooring or other approved type flooring materials to provide strength, durability and prevent entrance of flies and mosquitoes to the privy pit. Where wood construction is used, floors shall be anchored to at least four-inch by four-inch sills.

(4) The pit shall be vented through approved screened PVC Schedule 40 pipe at least 4 inches in diameter, and extending above the roofline. Wood used for riser, seat assemblies, and the floor slab shall be tongue-and-groove or plywood (exterior or marine) material.

(5) Privies shall not be used for the disposal of water-carried sewage.

(b) Any person owning or controlling the property upon which a privy is located shall be responsible for the following requirements:

(1) The privy building shall afford a reasonable degree of protection from bad weather conditions.

(2) When the pit becomes filled to within 18 inches of the top of the ground, the privy building shall be moved to a new pit and the old pit completely filled with clean soil.

(3) If the pit caves in, a new pit shall be provided.

History Note: Authority G.S. 130A-335(e); Eff. July 1, 1982; Amended Eff. December 1, 1990.
(a) Any person owning or controlling the property upon which a ground absorption wastewater sewage treatment and disposal system is installed shall be responsible for the following items regarding the maintenance of the system:

(1) Ground absorption wastewater sewage treatment and disposal systems shall be operated and maintained to prevent the following conditions:
   (A) a discharge of sewage or effluent to the surface of the ground, the surface waters, or directly into groundwater at any time; or
   (B) a back-up of sewage or effluent into the facility, building drains, collection system, or freeboard volume of the tanks; or
   (C) effluent a free liquid surface within three inches of finished grade over the nitrification trench for two or more observations made not less than 48 24 hours apart. Observations shall be made greater than 48 24 hours after a rainfall event.

The system shall be considered to be malfunctioning when it fails to meet one or more of these requirements, either continuously or intermittently, or if it is necessary to remove the contents of the tank(s) at a frequency greater than once per month in order to satisfy the conditions of Parts (A), (B), or (C) of this Paragraph. Legal remedies may be pursued after an authorized agent has observed and documented one or more of the malfunctioning conditions and has issued a notice of violation.

(2) Ground absorption wastewater sewage treatment and disposal systems shall be inspected, and the contents of the septic tank removed, periodically from all compartments, to ensure proper operation of the system. The contents shall be pumped whenever the solids level (seum plus sludge) is found to be more than 1/3 of the liquid depth in any compartment. The effluent filter shall be cleaned or replaced and reinstalled as needed.

(b) System management in accordance with Table XIII V(a) and V(b) of this Rule shall be required for all systems installed or repaired after July 1, 1992. After July 1, 1992, system management in accordance with Table XIII V(a) and V(b) shall be required for all existing Type V and Type VI systems.

(c) No Improvement Permit, or Construction Authorization or Operation Permit shall be issued for Type IV, Type V, or Type VI systems, unless the LHD has a management and inspection program that is specifically authorized, funded, and operational and a management entity of the type specified in Table XIII V(b) to carry out this management program in the service area where the proposed system is located. The LHD shall notify the State yearly regarding the status of the county management and inspection program.

(d) A local health department may be the public management entity only for systems classified Type IV, V(a) and V(b) and only when specifically authorized by resolution of the local board of health.

(e) A contract shall be executed between the system owner or owners representative and a management entity prior to the issuance of an Operation Permit for a system required to be maintained by a public or private management entity, unless the system owner and certified operator are the same. The contract shall include:

   (1) specific requirements for maintenance and operation,
   (2) responsibilities of the owner or owners representative,
   (3) responsibilities of the system operator,
   (4) provisions that the contract shall be in effect for as long as the system is in use,
   (5) other requirements for the continued proper performance of the system, and
   (6) a condition of the Operation Permit that subsequent owners of the system execute such a contract.

include the specific requirements for maintenance and operation, responsibilities of the owner and system operator, provisions that the contract shall be in effect for as long as the system is in use, and
other requirements for the continued proper performance of the system. It shall also be a condition of the Operation Permit that subsequent owners of the system execute such a contract.

(f) Inspections of the system shall be performed by a management entity at the frequency specified in Table XV(b). The management entity shall report the results of their inspections to the LHD local health department at the specified reporting frequency. However, where inspections indicate the need for system repairs, the management entity shall notify the LHD local health department within 48 hours in order to obtain a Construction Authorization for the repairs.

(g) The management entity shall be responsible for assuring routine maintenance procedures and monitoring requirements in accordance with the conditions of the Operation Permit and the contract.

(h) The ground surface over and around a nitrification field shall be shaped to shed surface water. The field shall be maintained to shed surface water and prevent erosion.

(i) The nitrification field shall be kept free of debris and mowed or cleared as needed to keep the site accessible for monitoring, maintenance, inspection, and as specified by the conditions of the Operation Permit.

(j) Wastewater Sewage systems with multiple components shall be classified by their highest or most complex system type in accordance with Table XV to determine LHD local health department and management entity responsibilities.

(k) The State shall classify wastewater Sewage systems not identified in this Rule shall be classified by the Division of Environmental Health after consultation with the appropriate commission governing operators of pollution control facilities.

(l) The system shall be maintained to meet the effluent quality standards as specified in the Operation Permit. Influent and effluent sampling may be required for food preparation and/or processing facilities, industrial process wastewater, and other systems as specified in the Operation Permit.

(m) The LHD local health department shall routinely review the performance and operation reports submitted in accordance with Table XV(b) of this Rule and shall perform an on-site inspection of the systems as required in Table XV(a). More frequent inspections may be performed by the LHD if needed or requested by the system owner, his representative or the operator.

(n) The certified operator shall hold a valid and current certificate or certificates as required for the system operated from the appropriate commission, and nothing in this Section shall preclude any requirements for system operators, in accordance with Article 3 of G.S. 90A.

### TABLE XV Management Responsibilities

<table>
<thead>
<tr>
<th>System Classification</th>
<th>System Description</th>
<th>Health Department Minimum Inspection Frequency</th>
<th>Management Entity (M.E.)</th>
<th>M.E. Minimum Maintenance Inspection Frequency</th>
<th>Minimum M.E. Reporting Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type I</td>
<td>a Privy</td>
<td>N/A</td>
<td>Owner</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td>b Chemical Toilet</td>
<td>N/A</td>
<td>Owner</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td>c Incineration toilet</td>
<td>N/A</td>
<td>Owner</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td>d Other toilet system</td>
<td>N/A</td>
<td>Owner</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td>e Grease tank</td>
<td>Contract with pumper</td>
<td>12 times per year minimum by owner</td>
<td>Maintain pump records</td>
<td></td>
</tr>
<tr>
<td>Type II</td>
<td>a Conventional System</td>
<td>N/A</td>
<td>Owner</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Type III</td>
<td>a Gravity fill system</td>
<td>N/A</td>
<td>Owner</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td></td>
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<td></td>
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<td>---</td>
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<td></td>
</tr>
<tr>
<td>b</td>
<td>PPBPS gravity system</td>
<td>N/A</td>
<td>Owner</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>c</td>
<td>Large diameter pipe system</td>
<td>N/A</td>
<td>Owner</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>d</td>
<td>Other gravity systems</td>
<td>N/A</td>
<td>Owner</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type IV</td>
<td>a</td>
<td>LPP distribution</td>
<td>Every 5 years</td>
<td>Certified Operator</td>
<td>2/year (170 to 190 days apart)</td>
</tr>
<tr>
<td></td>
<td>b</td>
<td>Any pump or siphon system</td>
<td>Every 5 years</td>
<td>Certified Operator</td>
<td>&lt;1499 gpd: 1/year &gt;1500 gpd: 2/yr (170 to 190 days apart)</td>
</tr>
<tr>
<td></td>
<td>c</td>
<td>Off site system</td>
<td>Every 5 years</td>
<td>Certified Operator</td>
<td>1/year</td>
</tr>
<tr>
<td></td>
<td>d</td>
<td>Flow equalization</td>
<td>&lt;1,500 gpd every 3 years &gt; 1500 gpd: 1 year</td>
<td>Certified Operator</td>
<td>&lt;1500 gpd: 2/year (170 to 190 days apart) &gt;1500 gpd: 4/yr (80 to 100 days apart)</td>
</tr>
<tr>
<td></td>
<td>e</td>
<td>System with sewage pump or grinder pump before septic tank collection sewer or PE design except ones under plumbing code</td>
<td>Every 3 years</td>
<td>Certified Operator</td>
<td>1/year</td>
</tr>
<tr>
<td></td>
<td>f</td>
<td>Drainage systems all types</td>
<td>Every 5 yr. during the wet season</td>
<td>Certified operator</td>
<td>2/yr pump drainage 1/yr gravity drainage during the wet season</td>
</tr>
<tr>
<td></td>
<td>g</td>
<td>Dual alternating field</td>
<td>Every 3 years</td>
<td>Certified operator</td>
<td>2/year (170 to 190 days apart)</td>
</tr>
<tr>
<td></td>
<td>h</td>
<td>Sand backfilled trench</td>
<td>Every 5 years</td>
<td>Certified operator</td>
<td>1/year</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type V</td>
<td>a</td>
<td>Fixed media pretreatment</td>
<td>1 year</td>
<td>Certified Operator</td>
<td>&lt; 1500 gpd flow: 2/year (170 to 190 days apart) &gt; 1500 gpd flow: 4/year (80 to 100 days apart)</td>
</tr>
<tr>
<td></td>
<td>b</td>
<td>System &gt; 3000 gpd with field &gt;1500 gpd</td>
<td>1 year</td>
<td>Certified Operator</td>
<td>3000-10000 gpd flow: monthly &gt; 10000 gpd flow: weekly</td>
</tr>
<tr>
<td></td>
<td>c</td>
<td>IPWW</td>
<td>1 year</td>
<td>Certified Operator</td>
<td>&lt; 1500 gpd flow: 2/year (170 to 190 days apart)</td>
</tr>
<tr>
<td>Type</td>
<td>Description</td>
<td>Minimum System Review</td>
<td>Classification</td>
<td>Description</td>
<td>Required Permits</td>
</tr>
<tr>
<td>------</td>
<td>-------------</td>
<td>-----------------------</td>
<td>----------------</td>
<td>-------------</td>
<td>------------------</td>
</tr>
<tr>
<td>d</td>
<td>ATUs</td>
<td></td>
<td></td>
<td></td>
<td>Certified Operator</td>
</tr>
<tr>
<td>e</td>
<td>Other mechanical, biological, or chemical treatment plant &lt;1500 gpd</td>
<td>1 year</td>
<td>Certified Operator</td>
<td>monthly</td>
<td>within 30 days after inspection</td>
</tr>
<tr>
<td>Type VI</td>
<td>Any system &gt;3000 gpd with mechanical, biological or chemical pretreatment plant</td>
<td>6 months</td>
<td>Certified Operator</td>
<td>3000-4999 gpd flow: 1/week 5000-19999 gpd flow: 2/week 20000-49999 gpd flow: 3/week 50000-74999 gpd flow: 5/week &gt;75000 gpd flow: daily</td>
<td>monthly</td>
</tr>
<tr>
<td>b</td>
<td>Wastewater reuse/recycle</td>
<td>6 months</td>
<td>Certified Operator</td>
<td>monthly</td>
<td>within 30 days after inspection</td>
</tr>
</tbody>
</table>

**TABLE V(a)**
LOCAL HEALTH DEPARTMENT RESPONSIBILITIES

1. **Type I**
   a. Privy Improvement N/A
   b. Chemical toilet Permit, Construction
   c. Incinerating toilet Authorization, and Operation
   d. Other toilet system Permit
   e. Grease trap

2. **Type II**
   a. Conventional septic system Improvement N/A
(single-family or 480 GPD ________ Permit, Construction or less) _______________ Authorization, and
b. Conventional septic system _______________ Operation Permit
with 750 linear feet of
nitrification line or less
c. Conventional system with
shallow placement

Type III
a. Conventional septic system _______________ Improvement _____________ 5 yrs. (IIIb only)
> 480 GPD (excluding ________ Permit, Construction single-family residence) ___________ Authorization, and Operation
b. Septic system with _______________ Permit single effluent pump
or siphon
c. Gravity-fill system
d. Dual gravity field system
e. PPBPS system, gravity-dosed
f. Large-diameter pipe system
g. Other non-conventional trench systems

Type IV
a. Any system with LPP _______________ Improvement _____________ 3 yrs. distribution _______________ Permit, Construction
b. System with more than ___________ Authorization, and Operation
1 pump or siphon _______________ Permit

Type V
a. Sand filter pretreatment _______________ Improvement _____________ 12 mos. system _______________ Permit, Construction
b. Any > 3,000-GPD septic ___________ Authorization, and Operation
tank system with a _______________ Permit nitrification field
designed for > 1500 GPD
e. Aerobic Treatment Unit (ATU)
d. Other mechanical, biological,
or chemical pretreatment plant
(< 3000 GPD)

Type VI
a. Any > 3,000 GPD system _______________ Improvement _____________ 6 mos. with mechanical, biological, _______________ Permit, Construction or chemical pretreatment ___________ Authorization, and Operation system plant _______________ Permit
b. Wastewater reuse/recycle
### TABLE V(b)

**MANAGEMENT ENTITY RESPONSIBILITIES**

<table>
<thead>
<tr>
<th>Classification</th>
<th>Management Entity</th>
<th>Inspection/Maintenance Frequency</th>
<th>Reporting Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type I</td>
<td>Owner</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Type II</td>
<td>Owner</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Type III</td>
<td>Owner</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Type IV</td>
<td>Public Management</td>
<td>2/yr.</td>
<td>12 mos.</td>
</tr>
<tr>
<td></td>
<td>Entity with a</td>
<td>4/yr. (0-1500 GPD)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Certified Operator or a private Certified Operator</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type V</td>
<td>Public Management</td>
<td>a. 2/yr (0-1500 GPD)</td>
<td>6 mos.</td>
</tr>
<tr>
<td></td>
<td>Entity With</td>
<td>4/yr (1500-3000 GPD)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>a Certified Operator or a private Certified Operator</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>b. 12/yr (3000-10000 GPD)</td>
<td>1/wk (&gt; 10000 GPD)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>c. 4/yr.</td>
<td>1/wk (&gt; 10000 GPD)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>d. 12/yr.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type VI</td>
<td>Public Management Entity</td>
<td>a. 1/wk (3000-10000 GPD)</td>
<td>3 mos.</td>
</tr>
<tr>
<td></td>
<td>With a Certified Operator</td>
<td>2/wk (10000-25000 GPD)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>3/wk (25000-50000 GPD)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>5/wk (&gt; 75000 GPD)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>b. 12/yr.</td>
<td></td>
</tr>
</tbody>
</table>

(1) A wastewater sewage collection, treatment, and disposal system that creates or has created a public health hazard or nuisance by surfacing of effluent or discharge directly into groundwater or surface waters, or that is partially or totally destroyed or malfunctioning shall be repaired within 30 days of notification by the state or LHD local health department unless the notification otherwise specifies a repair period in writing. If a system described in the preceding sentence has for any reason been disconnected, the system shall be repaired prior to reuse. The state or LHD local health department shall use its best professional judgement in requiring repairs that will reasonably enable the system to function properly. If, for any reason, a malfunctioning ground absorption wastewater sewage collection, treatment, and disposal system is found to be nonrepairable, or is no longer
required, the system shall not be used, and the system owner may be required to have any contents removed, collapse any tanks or components and backfill, or otherwise secured as directed by the authorized agent to protect the public health and safety. A registered installer (contractor) shall perform the work and an inspection shall be performed by the authorized agent.

(m) When necessary to protect the public health, the state or LHD local health department shall require the owner or controller of a malfunctioning wastewater system to pump and haul sewage to an approved wastewater system during the time needed to repair the system.

History Note: Filed as a Temporary Amendment Eff. July 3, 1991, for a period of 180 days to expire on December 30, 1991; Filed as a Temporary Amendment Eff. June 30, 1990, for a period of 180 days to expire on December 27, 1990; Authority G.S. 130A-335(e),(f); Eff. July 1, 1982; Amended Eff. August 1, 1991; October 1, 1990; January 1, 1990; August 1, 1988; Temporary Amendment Eff. January 20, 1997; Amended Eff. August 1, 1998.

15A NCAC 18A .1962 APPLICABILITY

The provisions of this Section shall not apply to properly functioning ground absorption wastewater sewage collection, treatment, and disposal systems in use during the prior year or for which a valid permit to install a system has been issued prior to July 1, 1977. This provision is applicable only where the sewage flow and sewage characteristics are unchanged. This provision does not affect the requirements for system operation, maintenance, and management in accordance with Rule .1961 of this Section. Systems in use are not applicable when alterations change the wastewater characteristics or increase wastewater flow. If the use of a facility is changed or if additions or alterations to a facility are proposed which increase wastewater flow, change wastewater characteristics, or compromise the integrity or function of the system, the on-site wastewater treatment and disposal system serving such facility shall be brought into full compliance with the provisions and requirements of these rules. Alterations that change the wastewater characteristics or increase wastewater flow will require the owner or the owner’s representative to apply for and receive reapproval of the system by the LHD prior to alteration of the structure. After the initial inspection the owner or person controlling the system shall have the septic tank pumped by a permitted septage firm to determine tank volume and structural integrity, and shall submit the results to the LHD. A system out of service for more than a year shall be inspected by the LHD and brought into compliance with current requirements of this section. This provision does not affect the requirements for system operation, maintenance, and management in accordance with Rule .1961 of this Section.

History Note: Authority G.S. 130A-335(e); Eff. July 1, 1982; Amended Eff. August 1, 1991; December 1, 1990.

15A NCAC 18A .1963 DISUSE OF SEWAGE SYSTEM

History Note: Authority G.S. 130A-335(e); Eff. July 1, 1982;
15A NCAC 18A .1964 INTERPRETATION AND TECHNICAL ASSISTANCE
(a) The provisions of this Section shall be interpreted, as applicable, in accordance with the recognized principles and practices of soil science, geology, engineering, and public health.
(b) The State will provide technical assistance. LHDs Local health departments may obtain technical information and assistance from appropriate personnel as may be needed for interpretation of this Section.

History Note: Authority G.S. 130A-335(e);
Eff. July 1, 1982;

15A NCAC 18A .1965 APPEALS PROCEDURE
Appeals concerning the interpretation and enforcement of the rules in this Section shall be made in accordance with G.S. 150B and 10 NCAC 1B.

History Note: Authority G.S. 130A-335(e);
Eff. July 1, 1982;

15A NCAC 18A .1966 SEVERABILITY
If any provision of these Rules or the application thereof to any person or circumstance is held invalid, the remainder of the rules or the application of such provisions to other persons or circumstances shall not be affected thereby.

History Note: Authority G.S. 130A-335(e);

15A NCAC 18A .1967 INJUNCTIONS
A person who violates any rule of this Section is subject to the injunctive relief provisions of G.S. 130A-18.

History Note: Authority G.S. 130A-335(e);
Eff. July 1, 1982;

15A NCAC 18A .1968 PENALTIES
A person who violates any rule of this Section is subject to the penalty provisions contained in G.S. 130A-22(c) (Administrative Penalties), 130A-23 (Suspension and Revocation of Permits), and 130A-25 (Criminal Penalties).
15A NCAC 18A .1969 APPROVAL AND PERMITTING OF ON-SITE SUBSURFACE WASTEWATER SYSTEMS, TECHNOLOGIES, COMPONENTS, OR DEVICES

Experimental, controlled demonstration, innovative, and accepted wastewater systems (hereinafter referred to as E & I systems) are any wastewater systems, system components, or devices that are not specifically described in Rules .1955, .1956, .1957, or .1958 of this Section, including any system for which reductions are proposed in the minimum horizontal or vertical separation requirements or increases are proposed to the maximum long-term acceptance rates of this Section; or any E & I systems as defined by G.S. 130A-343(a) and approved pursuant to applicable Laws and this Rule. This Rule shall provide for the approval and permitting of E & I systems.

(1) An application shall be submitted in writing to the State for an E & I system. The application shall include the information required by G.S. 130A-343(e), (f), and (g), and the following, as applicable:

(a) specification of the type of approval requested as either innovative, controlled demonstration, experimental, accepted or a combination;
(b) description of the system, including materials used in construction, and its proposed use;
(c) summary of pertinent literature, published research, and previous experience and performance with the system;
(d) results of any available testing, research or monitoring of pilot systems or full-scale operational systems conducted by a third party research or testing organization;
(e) identity and qualifications of any proposed research or testing organization and the principal investigators, and an affidavit certifying that the organization and principal investigators have no conflict of interest and do not stand to gain financially from the sale of the E & I system;
(f) objectives, methodology, and duration of any proposed research or testing;
(g) specification of the number of systems proposed to be installed, the criteria for site selection, and system monitoring and reporting procedures;
(h) operation and maintenance procedures, system classification, proposed management entity and system operator;
(i) procedure to address system malfunction and replacement or premature termination of any proposed research or testing;
(j) notification of any proprietary or trade secret information, system, component, or device; and
(k) Fee payment as required by G.S. 130A-343(k), by corporate check, money order or cashier's check made payable to: North Carolina On-Site Wastewater System Account or NC OSWW System Account, and mailed to the On-Site Wastewater Section, 1642 Mail Service Center, Raleigh, NC 27699-1642 or hand delivered to Rm. 1A-245, Parker Lincoln Building, 2728 Capital Blvd., Raleigh, NC.

(2) The State shall review all applications submitted and evaluate at least the following:

(a) the completeness of the application, and whether additional information is needed to continue the review;
(b) whether the system meets the standards of an innovative system under G.S. 130A-343(a)(5), G.S. 130A-343, and Item (3) of this Rule, or whether the
INNOVATIVE SYSTEMS: Innovative systems, technologies, components, or devices shall be reviewed and approved by the State, and the local health department shall permit innovative systems in accordance with the following:

(a) The State shall approve the system as an innovative system if the following standards have been met:

(i) The system shall have been demonstrated to perform equal or superior to a system, which is described in Rules .1955, .1956, .1957, or .1958, of this Section, based upon controlled pilot-scale research studies or statistically-valid monitoring of full-scale operational systems.

(ii) Materials used in construction shall be equal or superior in physical properties and chemical durability, compared to materials used for similar proposed systems, specifically described in Rules .1955, .1956, .1957, or .1958 of this Section.

(b) When a system is approved as innovative by the State, the applicant shall be notified in writing. Such notice shall include any conditions for permitting, siting, installation, use, monitoring, and operation.

(c) A local health department shall issue an Improvement Permit and a Construction Authorization for any innovative system approved by the State upon a finding that the provisions of this Section including any conditions of the approval are met. Use of an innovative system and any conditions shall be described on the Improvement Permit, Construction Authorization, or Operation Permit.

EXPERIMENTAL AND CONTROLLED DEMONSTRATION SYSTEMS: A system may be approved for use as an experimental or controlled demonstration system as part of a research or testing program which has been approved by the State. The research or testing program shall be conducted by a third party research or testing organization which has knowledge and experience relevant to the proposed research or testing and has no conflict of interest and does not stand to gain financially from the sale of the proposed system.

(a) To be approved by the State, the proposed research or testing program shall include the following:

(i) The research program shall be designed such that, if the objectives were met, the system would satisfy the standards for approval as an innovative system under Item (3) of this Rule.

(ii) Research design and testing methodology shall have a reasonable likelihood of meeting the objectives.

(b) The State shall notify the applicant and the applicable local health departments when the proposed research or testing program has been approved for an experimental or controlled demonstration system. Such notice shall include, but not be limited to, conditions for permitting, siting, operation, monitoring and maintenance, and number of systems which can be installed.

(c) A local health department shall issue an Improvement Permit and Construction Authorization for an experimental or controlled demonstration system when the following conditions are met:
(i) There is an application for an Improvement Permit in accordance with Rule .1937(c) of this Section, with the proposed use of an experimental system specified.

(ii) The proposed site is included as part of an approved research or testing program and any conditions specified for use of the system have been met.

(iii) When an experimental or controlled demonstration system is proposed to serve a residence, place of business or place of public assembly, there shall be a repair area using a non-experimental or non-controlled demonstration backup system in accordance with the provisions of Rule .1945(b) or an accepted system of this Rule, except:
   (A) When an existing and properly functioning wastewater system is available for immediate use, including connection to a public or community wastewater system; or
   (B) When the experimental or controlled demonstration system is used as a repair to an existing malfunctioning system; or
   (C) When for a controlled demonstration system sufficient available space shall be reserved for the installation of a replacement system at least equal to the initial controlled demonstration system, or the State or Local Health Department otherwise determines that the manufacturer can provide an acceptable alternative method for collection, treatment, and disposal of the wastewater.

(iv) When an experimental or controlled demonstration system is proposed to serve a residence, place of business or place of public assembly, there shall be a repair system in accordance with the provisions of Rule .1945(b) or an innovative or accepted system of this Rule, except:
   (A) When an existing and properly functioning wastewater system is available for immediate use, including connection to a public or community wastewater system; or
   (B) When the experimental or controlled demonstration system is used as a repair to an existing malfunctioning system when there are no other approved or accepted repair options; or
   (C) As provided in G.S. 130A-343(f) for Controlled Demonstration Systems.

(iv) When an experimental or controlled demonstration system is proposed which shall not serve a residence, place of business, or place of public assembly, a repair area or backup system shall not be required.

(v) The application for an experimental system shall include statements that the property owner is aware of its experimental nature, that the local health department and State do not guarantee or warrant that these systems will function in a satisfactory manner for any period of time, and that use of the system may need to be discontinued if the system malfunctions and is found to be non-repairable, or if the proposed research or testing program is prematurely terminated. Such statements shall be signed by the owner.
(vi) The owner of the site on which an experimental system is proposed shall execute an easement granting rights of access to the system at reasonable hours for monitoring and evaluation to the research or testing organization. This easement shall specify that it is granted for the purposes of researching and testing an experimental wastewater system and shall remain valid as long as the system is to be part of the proposed research or testing program. The easement shall be recorded with the county register of deeds.

(vii) Provisions shall be made for operation and maintenance of the system.

(viii) Any special conditions required for the installation of the experimental or controlled demonstration system shall be specified in the Improvement Permit and the Construction Authorization. Use of an experimental or controlled demonstration system and any conditions shall be described on the Improvement Permit, Construction Authorization and any subsequent operation permits, with provisions for a repair area and backup system specified. A condition of the Improvement Permit and Construction Authorization shall be that the installation be under the direct field supervision of the research or testing organization.

(ix) The proposed Improvement Permit, Construction Authorization and any subsequent operation permits for experimental or controlled demonstration systems shall be reviewed by the State and found to be consistent with the approved research or testing program prior to issuance by the local health department.

(d) Upon completion of the installation and prior to use, an Experimental or Controlled Demonstration System Operation Permit (ESOP or CDSOP) shall be issued by the local health department. The ESOP (CDSOP) shall be valid for a specified period of time not to exceed five years. Special maintenance, monitoring and testing requirements shall be specified as permit conditions, in accordance with the approved research or testing program. Failure to carry out these conditions shall be grounds for permit suspension or revocation.

(e) Prior to expiration of the ESOP (CDSOP) and based upon satisfactory system performance as determined during the research or testing program, the local health department shall issue an Operation Permit. Premature termination of the research or testing program shall be grounds for ESOP (CDSOP) suspension or revocation.

(f) Upon completion of monitoring, research and testing, the research or testing organization shall prepare a final report including recommendations on future use of the system. If the State determines that the results indicate that the standards of Item (3) of this Rule are met, the State shall approve the use as an innovative system.

(g) Any proposed changes or modifications in the E & I system shall be submitted for review and approval by the State.

(5) The State may modify, suspend or revoke the approval of an E & I system as provided for in G.S. 130A-343(c).

(a) The E & I system approval shall be modified as necessary to comply with subsequent changes in Laws or Rules which affect their approval.

(b) The approval of an E & I system may be modified, suspended or revoked upon a finding as follows:
(i) subsequent experience with the system results in altered conclusions about system performance, reliability, or design;
(ii) the system or component fails to perform in compliance with performance standards established for the system; or
(iii) the system or component or the E & I system applicant fails to comply with wastewater system Laws, Rules or conditions of the approval.

(6) Modification, suspension or revocation of an E & I System approval shall not affect systems previously installed pursuant to the approval.

(7) Reductions in total nitrification trench length allowed for E & I systems, as compared to the system sizing requirements delineated in Rule .1955 of this Section for conventional systems based upon excavated trench width, apply only to drainfields receiving septic tank effluent of domestic strength or better quality. The system may be used for facilities producing higher strength wastewater with nitrification trench length and trench bottom area determined based upon excavated trench width equal to what is required by Rule .1955 of this Section for a conventional gravel trench system, with no reduction or application of an equivalency factor. However, reductions up to 25 percent when allowed for approved innovative or accepted system models may be applied for facilities producing higher strength wastewater following a specifically approved pretreatment system designed to assure effluent strength equal to or better than domestic septic tank effluent, with a BOD less than 150 mg/l, TSS less than 100 mg/l and FOG less than 30 mg/l.

(8) A Performance Warranty shall be provided by the manufacturer of any approved innovative or accepted wastewater system (warranty system) handling untreated septic tank effluent which allows for a reduction in the total nitrification trench length of more than 25% as compared to the total nitrification trench length required for a 36-inch wide conventional wastewater system, pursuant to G.S. 130A-343(j). The Department shall approve the warranty when found in compliance with the applicable Laws and these Rules. When a warranty system is proposed to serve a residence, place of business, or place of public assembly, the site shall include a repair or replacement area in accordance with Rule .1945(b) of this Section or an innovative or accepted system approved under this Rule with no more than a 25 percent reduction in excavated trench bottom area.

(a) The Manufacturer shall provide the approved Performance Warranty in effect on the date of the Operation Permit issuance to the owner or purchaser of the system. The warranty shall be valid for a minimum of five-years from the date the warranty system is placed into operation.

(b) The Manufacturer shall issue the Performance Warranty to the property owner through its authorized installer who shall sign the Performance Warranty indicating the system has been installed in accordance with the manufacturer's specifications, any conditions of the system approval granted by the Department, and all conditions of the Authorization to Construct a Wastewater System by the local health department. The installer or contractor shall promptly return a copy of the signed Performance Warranty to the Manufacturer indicating the physical address or location of the facility served by the warranty system, date the system was installed or placed into use, and type and model of system installed.

(c) The Performance Warranty shall provide that the manufacturer furnishes all materials and labor necessary to repair or replace a malfunctioning warranty system as defined in Rule .1961(a) of this Section or a warranty system that
failed to meet any performance conditions of the approval with a fully functional wastewater system at no cost to the Owner, in accordance with this Section and applicable Laws.

(d) Performance Warranty repairs such as full replacement of the nitrification system, extension of the nitrification system or other repairs shall be completed pursuant to a repair Authorization to Construct that is issued by the local health department in accordance with this Section.

(e) The Performance Warranty shall be attached to the Operation Permit issued by the Health Department for the wastewater system. The Performance Warranty remains in effect, notwithstanding change in ownership, to the end of the five-year warranty period.

(10) Manufacturers of proprietary systems approved under this Rule shall provide a list of manufacturer's authorized installers to the Department and applicable local health departments, and update this list whenever there are additions or deletions. No Operation Permit shall be issued for a proprietary system installed by a person not authorized by the Manufacturer, unless the Manufacturer of the proprietary system specifically approves the installation in writing.

History Note: Authority G. S. 130A-335(e),(f); 130A-343; Eff. April 1, 1993; Temporary Amendment Eff. June 24, 2003; February 1, 2003; Amended Eff. May 1, 2004.

15A NCAC 18A.1970 SYSTEMS DESIGNED BY A PROFESSIONAL ENGINEER

(a) A North Carolina registered professional engineer, in accordance with G.S.89C shall design any wastewater system, which meets one or more of the following conditions:

(1) The system is designed to handle over 2000 gallons per day.

(2) The system is designed for the collection, treatment and disposal of industrial process wastewater, except under the following circumstances:

(A) The State has determined that the wastewater generated by the proposed facility has a pollutant strength which is lower than or equal to domestic sewage, and does not require specialized pretreatment or management, or

(B) An approved predesigned pretreatment system or process and management method proposed by the facility owner which shall enable the industrial process wastewater to have a pollutant strength which is lower than or equal to domestic sewage.

(3) Any other wastewater system designated by the LHD.

(b) The State shall review and approve the system layout on a site plan or plat, plans and specifications for all systems serving a design unit with a design flow greater than 3,000 (5,000 Group I soils) gallons per day, as determined in Rule .1949(a) or (b) of this Section, except:

(1) where the wastewater system is limited to an individual ground absorption wastewater system serving an individual dwelling unit or several individual ground absorption wastewater systems, each serving an individual dwelling unit, or

(2) where the system consists of individual wastewater systems, each serving an individual facility, and which meets all of the following criteria:

(A) each individual system's design flow does not exceed 2500 gallons per day, as determined in Rule .1949(a) or (b) of this Section, and

(B) the site for the nitrification field and reserve area for each individual system is at least 20 feet from any other individual system site.
(c) The State shall also review and approve, for any design daily flow, plans and specifications for any industrial process wastewater system required by this Section to be designed by a registered professional engineer.

(d) State approval shall be required prior to the LHD issuing a permit(s) on the following schedule:

(1) A system Improvement Permit shall be issued after the site plan or plat and system layout are approved by the State and LHD.

(2) A Construction Authorization shall be issued after the Engineering Design submittal is approved.

(3) Prior to issuance of the operation permit for a system required to be designed by a North Carolina registered professional engineer, the owner shall submit to the LHD a certification signed by a North Carolina registered professional engineer stating that construction is complete and in accordance with approved plans and specifications and approved modifications.

(A) Periodic observations of construction and a final inspection for design compliance by the certifying registered professional engineer or his representative shall be required for this certification.

(B) The statement shall be affixed with the registered professional engineer's seal.

(e) Plans and specifications required to be prepared by a registered professional engineer shall contain the information necessary for construction of the system in accordance with applicable rules and laws and shall include the following, determined to be applicable by the LHD or the State:

(1) the seal, signature, and the date on all plans and the first sheet of specifications; specifications and reports prepared by the design engineer and licensed or registered professionals who contributed to the plans, specifications, or reports;

(2) a description of the facilities served and the calculations and basis for the design daily flow and peak flows proposed;

(3) a site plan based on a surveyed plat showing all system components, public water supply sources within 500 feet, private water supplies and surface water supplies within 200 feet, water lines serving the project and within 10 feet of all components, building foundations, basements, property lines, embankments or cuts of two feet or more in vertical height, swimming pools, storm sewers, interceptor drains, surface drainage ditches, and adjacent nitrification fields;

(4) specifications describing all components and materials to be used, methods of construction, means for assuring the quality and integrity of the finished product, and operation and maintenance procedures addressing requirements for the system operator, inspection schedules, residuals management provisions, process and performance monitoring schedules, and provisions for maintaining mechanical components and nitrification field vegetative cover;

(5) plan and profile drawings for collection sewers, force mains and supply lines, showing pipe diameter, depth of cover, cleanout and manhole locations, invert and ground surface elevations, valves and other appurtenances, lateral connections, proximity to utilities and pertinent features such as wells, water lines, storm drains, surface waters, structures, underground tanks, aboveground tanks, roads, and other trafficked areas;

(6) plans for all tanks, showing capacity, invert and ground elevations, access manholes, inlet and outlet details, and plans for built-in-place or nonstate-approved, precast tanks, also showing dimensions, reinforcement details, liquid depth, and other pertinent construction features;

(7) calculations for pump or siphon sizing, pump curves, and plan and profile drawings for lift stations and effluent dosing tanks, showing anti-buoyancy provisions, pump or siphon locations, discharge piping, valves, vents, pump controls, pump removal...
system, electrical connection details, and activation levels for pumps or siphons and high-water alarms;
(8) calculations for flow equalization design;
(9) plan and profile drawings for wastewater treatment plants and other pretreatment systems, including cross-section views of all relevant system components, and data and contact lists from comparable facilities for any non-standard systems;
(10) plans for nitrification field and reserve area, based on an evaluation and report prepared by a person licensed or registered to practice soil science, if required in G.S. 89F showing the following:
(A) field locations with existing and final relative contour lines based on field measurements at intervals not exceeding two feet or spot elevations if field areas are essentially flat or of uniform grade;
(B) field layout, pipe sizes, length, spacing, connection and clean out details, invert elevations of flow distribution devices and laterals, valves, and appurtenances;
(C) trench plan and profile drawings and flow distribution device details; and
(D) location and design of associated surface and groundwater drainage systems;
(11) any other information required by the LHD or the State.
(12) User discharge compliance agreements including flow limits, wastewater strength and prohibited discharges.
(13) A Water Table Separation Analysis, shall be completed for sites serving systems designed to handle over 3,000 gallons per day, as determined in Rule .1949 (a) or (b) of this Section, which include one or more nitrification fields with a design flow of greater than 2500 gallons per day. The analysis shall predict the height of the water table mound that will develop beneath the field (level sites) and the rate of lateral and vertical flow away from the nitrification trenches (sloping sites). The site shall be considered UNSUITABLE if the analysis indicates that the groundwater mound which will develop beneath the site cannot be maintained two feet or more below the bottom of the nitrification trenches, or it is determined that effluent is likely to become exposed on the ground surface within, or adjacent to, the nitrification field, or that groundwater standards are likely to be exceeded at the groundwater compliance boundary.
(A) For systems less than 10,000 gallons per day, with an long-term acceptance rate less than 10% of the measured Ksat for the most restrictive horizon within six feet of the ground surface, and with a water table surface more than 48 inches from ground surface, a simplistic analysis may be provided. The simplistic analysis uses estimated saturated hydraulic conductivity without calibration, and shall be performed until steady-state conditions are reached or for 10 years of loading. Support data shall include at a minimum soil borings to depths greater than 48 inches, test wells to a depth of 20 feet or refusal, permeability and Ksat measurements with no less than five readings across the proposed disposal site, surveyed elevations, and other information determined to be necessary by the LHD or the State. The contaminant path shall be predicted using the site map and groundwater flow direction, and shall be used to designate groundwater monitoring well locations.
(B) For all other systems, a calibrated mounding analysis shall be submitted. Calibration will be made by comparing the pre-loading water table surface as modeled with the measured water levels surveyed on site under steady state conditions. Support data shall include soil borings to depths greater
than 48 inches, two test wells to a depth of 20 feet or refusal, water table aquifer test, transmissivity, permeability and Ksat measurements, no less than five water level readings across the proposed nitrification fields and reserve site surveyed elevations), and other information determined to be necessary by the LHD or the State. The calibrated analysis shall be performed for steady state conditions. The loading flow model of the designed disposal shall be made using regional rainfall patterns over a two year period (at a minimum) beginning with the calibrated model. Water table control structures, pumping wells, and other sources of recharge shall be included in the loading model. The analysis shall also predict the concentration of contaminants at the compliance boundary.

(f) Subsurface Wastewater System Area Location In addition to the requirements of .1950 (a), subsurface disposal areas for design units with flows over 3,000 gallons per day, as determined in Rule .1949 (a) or (b) of this Section, which include one or more nitrification fields with individual capacities of greater than 2,500 gallons per day, shall be located at least the minimum horizontal distance from the following:

<table>
<thead>
<tr>
<th>Feature, structure, water source, etc.</th>
<th>Setback in feet</th>
<th>comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class I or II reservoir</td>
<td>500</td>
<td>any</td>
</tr>
<tr>
<td>Public water supply</td>
<td>500</td>
<td>If shallow groundwater aquifer, under 50 ft</td>
</tr>
<tr>
<td>Public water supply</td>
<td>400</td>
<td>Unless utilizes a confined aquifer</td>
</tr>
<tr>
<td>Private water supply, &lt;13 connections or &lt;25 people</td>
<td>500</td>
<td></td>
</tr>
<tr>
<td>Well serving a single family residence</td>
<td></td>
<td></td>
</tr>
<tr>
<td>WS-I waters</td>
<td>200</td>
<td>Surface waters</td>
</tr>
<tr>
<td>WS-II, WS-III, B, or SB waters</td>
<td>100</td>
<td>Surface waters</td>
</tr>
<tr>
<td>SA waters</td>
<td>200</td>
<td>Mean high water mark</td>
</tr>
<tr>
<td>Property lines</td>
<td>25</td>
<td>All</td>
</tr>
</tbody>
</table>

(g) Any wastewater system serving a facility that generates Industrial Process Wastewater and has a design daily flow greater than 1500 gallons per day shall have service openings or manways (manhole rings and covers) that extend at least to finished grade and be designed and maintained to prevent surface water infiltration. The manways or service openings shall be sized to allow proper inspection and maintenance. Inspection ports for individual user discharge monitoring may be required.

(5) For systems discharging at long-term acceptance rates at or below the rates of Rule .1948(a) the treatment system effluent shall meet the following minimum standards:

<table>
<thead>
<tr>
<th>Feature</th>
<th>Monthly Average</th>
<th>Daily Peak</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biochemical Oxygen Demand (5 day)</td>
<td>170 mg/l</td>
<td>300 mg/l</td>
</tr>
<tr>
<td>Total Suspended Solids</td>
<td>60 mg/l</td>
<td>150 mg/l</td>
</tr>
<tr>
<td>Total Nitrogen</td>
<td>75 mg/l</td>
<td>150 mg/l</td>
</tr>
<tr>
<td>Fats, Oils &amp; Greases</td>
<td>25 mg/l</td>
<td>50 mg/l</td>
</tr>
</tbody>
</table>
(1) For systems discharging at long-term acceptance rates greater than the rates of Rule 1948(a), the treatment system effluent shall meet the following minimum standards:

<table>
<thead>
<tr>
<th></th>
<th>Monthly Average</th>
<th>Daily Peak</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Biochemical Oxygen Demand (5 day)</strong></td>
<td>30 mg/l</td>
<td>60 mg/l</td>
</tr>
<tr>
<td><strong>Total Suspended Solids</strong></td>
<td>30 mg/l</td>
<td>45 mg/l</td>
</tr>
<tr>
<td><strong>Fecal Coliform</strong></td>
<td></td>
<td>10,000 cfu/100 ml</td>
</tr>
<tr>
<td><strong>Fats, Oils &amp; Greases</strong></td>
<td>10 mg/l</td>
<td>20 mg/l</td>
</tr>
<tr>
<td><strong>Total Nitrogen</strong></td>
<td>30 mg/l</td>
<td>75 mg/l</td>
</tr>
</tbody>
</table>

(i) Industrial Waste Survey. LHD shall complete an Industrial Waste Survey at least once every five years to identify industrial process wastewater dischargers to subsurface disposal systems.