

Kentucky On-Site Sewage Disposal Systems Regulation

902 KAR 10:085

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Kentucky On-site Sewage Disposal Systems

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902 KAR 10:085. Kentucky on-site sewage disposal systems.

RELATES TO: KRS 194A.050(2), 211.015, 211.350-211.380, 211.990(2), Chapter 322

STATUTORY AUTHORITY: KRS 194A.050(1), 211.090(3), 211.180(1)(d), 211.350, 211.351

NECESSITY, FUNCTION, AND CONFORMITY: KRS 211.180(1)(d) requires the cabinet to regulate the construction, installation, or alteration of any on-site sewage disposal system, except for a system with a surface discharge, regulated by KRS 224.10-100(19). This administrative regulation establishes uniform standards for on-site sewage disposal systems to assure that the construction, installation, or alteration of an on-site sewage disposal system is performed in such a manner as to protect public health and the environment.

Section 1. Definitions.

(1) "Alter" means to make a physical change in the original design, sizing, layout, components, location, or method of operation, individually or in combination, of an existing on-site sewage disposal system, as a result of necessary repair or change in wasteload volume or characteristics.

(2) "Approved" means acceptable to the cabinet for the proposed use.

(3) "Area subject to flooding damage" means an area:

(a) Subject to surface ponding of rainfall runoff one (1) or more times each year for more than seven (7) consecutive days;

(b) In a floodplain or drainageway with visible evidence of stream scouring, pot-holing, or gully or ravine formation; or

(c) Within a karst depression subject to backwater flooding from a subsurface conduit.

(4) "Artificial drainage system" means:

(a) A manmade system of surface ditching or berming to divert surface water run-off;

(b) A curtain or vertical drain for interception and diversion of lateral groundwater flow; or

(c) Underdrain for lowering the level of a high water table.

(5) "Blackwater" means wastewater containing liquid or solid waste generated through use of a urinal, water closet, garbage disposal, or a similar sanitary fixture.

(6) "BOD-5" means five (5) day biochemical oxygen demand.

(7) "Cabinet" is defined by KRS 211.015(1)(a).

(8) "Certified inspector" means an individual certified under the provisions of KRS 211.360.

(9) "Certified installer" means an individual certified under the provisions of KRS 211.357.

(10) "Clay" means a mineral soil separate consisting of particles less than 0.002 mm in equivalent diameter.

(11) "Cluster system" means a system designed to:

(a) Accept effluent from more than one (1) structure's or facility's sewage pretreatment unit; and

(b) Transport the collected effluent through a sewer system to one (1) or more common subsurface soil treatment and dispersal system of conventional, modified, or alternative design.

(12) "Effluent" means the liquid discharge of a septic tank or other sewage pretreatment unit.

(13) "FOG" means fats, oils, and grease.

(14) "Gravelless pipe" means large diameter perforated piping encased in a synthetic filter material and designed for use in a lateral field trench without trench rock or gravel fill material.

(15) "Grease" is defined by KRS 211.970(3).

(16) "Grease trap" is defined by KRS 211.970(4).

(17) "Greywater" or "graywater":

(a) Means wastewater generated by hygiene activities including wastewater from laundry, lavatory sinks, showers, bath tubs, and laundry tubs, but excluding kitchen sinks and food preparation sinks; and

(b) Does not mean or include blackwater.

(18) "Karst" means a type of topography formed over limestone, dolomite, or other soluble rock, by dissolving or solution, and characterized by sinkholes, caves, and underground drainage. Groundwater flow in karst occurs principally in conduits and is turbulent.

(19) "Landscape position" means the location of an area on a site being evaluated for the proposed installation of an on-site sewage disposal system relative to the surrounding topographic relief of the land surface. Landscape positions are defined as:

(a) Hill or ridge top: the relatively level area occupying the summit of a hill or ridge;

(b) Shoulder slope: the transitional area immediately adjacent to the hill or ridge top where the slope begins to increase downward;

(c) Side slope: the slightly to steeply sloping portion of a hillside lying between the shoulder and foot slopes;

(d) Foot slope: the slightly to steeply sloping portion of a hillside near the base or lowest point of elevation;

(e) Toe slope: the lowest point of elevation at the base of a hillside; generally concave in cross-sectional profile;

(f) Terrace, natural: a naturally occurring elevated shelf of level to slightly sloping character adjacent to current or former streams and drainageways;

(g) Terrace, artificial: a manmade elevated shelf or bench created by excavating into a slope or placing fill along the contour;

(h) Flood plain: level to slightly sloping areas adjacent to streams or other bodies of water subject to flooding for extended periods, or other flood-prone areas such as sinkholes or other surface depressions;

(i) Depressions: sinkholes or other areas with a concave or cupped cross-sectional profile and lacking surface drainage outlets;

(j) Drainageway: an area in the landscape with slight to steeply sloping sides that causes accumulation of surface and groundwater and channels it to surface or subsurface drainage outlets;

(k) Convex slope: a sloping area with a humped or upwardly bowed cross-sectional profile that promotes dispersal of surface and groundwater; and

(l) Concave slope: a sloping area with a cupped or downwardly bowed cross-sectional profile that causes accumulation of surface and groundwater.

(20) "Lateral field" means that portion of an on-site sewage treatment and dispersal system that consists of subsurface trenches or beds containing materials, components, or devices for maintaining exposed soil surfaces and a means to distribute effluent to those surfaces.

(21) "Leaching chamber" means a specially designed component for use in lateral fields, which forms an open bottomed chamber or conduit over the soil absorption surface.

(22) "Low pressure pipe system" or "LPP system" means an on-site sewage disposal system consisting of a sewage pretreatment unit, a dosing tank with pump or siphon, a pressurized supply line, manifold, lateral field, and necessary control devices and appurtenances.

(23) "Mottling" means spots or blotches of different colors or hues interspersed with the dominant color of a soil, created by the following three (3) basic processes:

(a) Groundwater saturation of the soil for varying periods of time, causing reducing conditions to occur that chemically bleach or fade soil colorants evidenced by soft concretions or soil color of chroma two (2) or less by Munsell notation;

(b) Parent material weathering evidenced by relic fragments of more durable parent material encapsulated within a mottle of weathering mineral material; or

(c) Mechanical disturbance of soils by cutting, filling, soil compaction, landslide, or other means evidenced in commingling of soil types and destruction of original internal drainage pathways.

(24) "On-site sewage disposal system" or "on-site sewage system" or "on-site system" means a system installed on a parcel of land, under the control or ownership of a person, that accepts sewage for treatment and ultimate disposal under the surface of the ground, including:

(a) A conventional system consisting of a sewage pretreatment unit, distribution devices, and lateral piping within rock-filled trenches or beds;

(b) A modified system consisting of a conventional system enhanced by shallow trench or bed placement, artificial drainage systems, dosing, alternating lateral fields, fill soil over the lateral field, or other necessary modifications to the site, system, or wasteload to overcome site limitations;

(c) An alternative system consisting of a sewage pretreatment unit, necessary site modifications, wasteload modifications, and a subsurface soil treatment and dispersal system using methods and technologies other than a conventional or modified system to overcome site limitations;

(d) A cluster system; and

(e) A holding tank that provides limited pretreatment and storage for off-site disposal where site limitations preclude immediate installation of a subsurface soil treatment and dispersal system or connection to a municipal sewer.

(25) "Overflow piping" means a system composed of a supported, vertically-oriented tee connected to a nonperforated gravity flow plastic pipe that conducts overflow to distribution boxes of the lateral field.

(26) "Parent material" means weathering fragments of bedrock underlying a soil, colluvial or alluvial deposits, loess deposits, or glacial tills from which the soil is being formed.

(27) "Perched water table" means a saturated zone as identified by free water, soft concretions, or soil color of chroma 2 or less overlying an impermeable horizon and generally above the permanent water table.

(28) "Permanent water table" means the zone of soil and parent material saturation by groundwater that remains relatively constant unless acted upon by artificial means of drainage or severe weather conditions. This zone is evidenced by free water or soil colors of black (due to high organic content), grays, blues, or olive greens.

(29) "Permeability test" means a scientific procedure using lysimeters and other instrumentation to determine the saturated hydraulic conductivity of site specific soil horizons.

(30) "Person" is defined by KRS 211.970(6).

(31) "Plastic limit" means the moisture content at which a soil changes from a semisolid to plastic.

(32) "Professional engineer" means an engineer licensed under the provisions of KRS Chapter 322.

(33) "Puddling" means the creation of a thin restrictive horizon atop and within an exposed soil surface by deposition of waterborne silt or clay-sized soil particles.

(34) "Repair area" means an area, either in its natural state or capable of being modified consistent with this administrative regulation, which is reserved for the installation of an additional lateral field and is not covered with permanent structures or impervious materials, consistent with this administrative regulation.

(35) (a) "Residential septic tank effluent" means the liquid discharge having the constituency and strength typical of liquid discharges from a domestic household septic tank pretreatment unit that is generally considered to have waste strength values equal to or less than the following monthly averages:

1. Twenty (20) mg/l of FOG;

2. 250 mg/l of BOD-5; and

3. 155 mg/l of TSS.

(b) Monthly average is equal to the sum of measurements taken over thirty (30) consecutive days, with at least six (6) measurements occurring on six (6) separate days, divided by the number of measurements taken during the thirty (30) day period.

(36) "Restrictive horizon" means a soil horizon relatively impervious to the movement of groundwater or effluent and includes:

(a) Mineralogically-cemented soil aggregates such as fragipans or iron pans;

(b) Naturally-formed structureless soils (massive structural grade);

(c) Naturally-formed horizontally structured soil (platy structure);

(d) Claypan, a compact, slowly permeable layer in the subsoil having a much higher clay content than the overlying material from which it is separated by a sharply-defined boundary. Clay pans are

usually hard when dry and plastic and sticky when wet; or

(e) Structurally destroyed soils in which mechanical compression forces the plastic limit of the soil to be exceeded, such as traffic pans, plow plans, and compacted fill.

(37) "Rock" means the consolidated or partially consolidated mineral matter or aggregate, including weathered rock not exhibiting soil properties, and exposed at the surface or overlain by soil.

(38) "Sand" means a mineral soil separate consisting of particles between two (2) and 0.05 mm in diameter.

(39) "Seasonal high water table" means the upper level of a zone of soil and parent material saturation over restrictive horizons or the permanent water table.

(40) "Sewage" means blackwater, greywater, or a combination of blackwater and greywater wastes generated in a residential, commercial, institutional, or recreational facility.

(41) "Sewage pretreatment unit" is defined by KRS 211.970(9).

(42) "Silt" means a mineral soil separate consisting of particles between 0.05 mm and 0.002 mm in diameter.

(43) "Sinkhole" means a naturally occurring depression in soil or bedrock:

(a) Formed in a karst area by the removal of earth material from below the land surface;

(b) Circumscribed by a closed topographic contour; and

(c) Lacking a surface drainage outlet.

(44) "Sinkhole sideslope midpoint" means the line of equal elevation along the midpoint between the footslope and the shoulder slope.

(45) "Sinkhole throat" means an outlet for a sinkhole allowing runoff from the drainage basin of the sinkhole to flow directly into the ground.

(46) "Site" means an area or parcel of land, under the control of any person, on which an on-site sewage disposal system serving any structures or facilities is to be located.

(47) "Slope" means the deviation of the surface of the land from true horizontal, measured as the rise or fall in feet and inches from a fixed point to another point 100 feet distant, expressed as a percentage of slope.

(48) "Soil" means the naturally occurring unconsolidated mineral and organic material of the land surface consisting of:

(a) Sand, silt, and clay minerals;

(b) Variable amounts of organic materials; and

(c) Void areas between mineral and organic matter particles.

(49) "Soil absorption" means the movement of effluent into and through interconnected voids within the soil.

(50) "Soil compaction" means permanent damage to, or destruction of, natural soil structural features by mechanical compression or puddling that restricts or prevents natural air and water movement through the soil.

(51) "Soil horizon" means a layer of soil, soil material, rock fragments, and other unconsolidated material approximately parallel to the land surface and differing from adjacent genetically related layers in:

(a) Physical, chemical, and biological properties; or

(b) Characteristics such as:

1. Color;
2. Structure;
3. Texture;
4. Consistence; and
5. pH.

(52) "Soil map" means a map showing the distribution of soil series or other soil mapping units in relation to the prominent physical and cultural features of the earth's surface.

(53) "Soil morphology" means the physical constitution, particularly the structural properties, of a soil profile as exhibited by the:

(a) Kinds, thickness, and the arrangement of the horizons in the profile; and

(b) Texture, structure, uniformity, and internal soil drainage of each horizon.

(54) "Soil series" means a basic unit of soil classification, consisting of soils that are essentially alike in all major profile characteristics.

(55) "Soil structure" means the combination or arrangement of individual soil particles into definable aggregates, or peds, which are characterized and classified on the basis of size, shape, and degree of distinctness.

(56) "Soil survey" means the systematic examination, description, classification, and mapping of soils in an area.

(57) "Soil tests" means tests and evaluations of soil morphology and land features required to complete a site evaluation for a proposed site.

(58) "Soil texture" means the relative proportions of sand, silt, and clay in a soil and may include particles greater than two (2) mm in diameter, such as gravel, cobblestones, flagstones, and chert.

(59) "Subdivision" means the separation of a parcel or tract of land into two (2) or more parcels or tracts for the purpose of development into residential, commercial, or public building sites.

(60) "Subsoil" means that part of the soil below the A horizon.

(61) "Subsurface soil treatment and dispersal system" means the portion of an on-site sewage disposal system that accepts effluent from a sewage pretreatment unit for further treatment by microbial, plant, and animal life within the soil, as well as treatment by filtration, chemical decomposition, and bonding within the soil, and consists of:

(a) Devices, components, and piping to:

1. Transport effluent under pressure or by gravity flow; and
2. Distribute the effluent to the soil absorption surfaces;

(b) Trenches, beds, chambers, mounds, lagoons, artificial marshes, separately or in combination, that form or enclose the soil absorption surfaces; and

(c) Rock, gravel, or other fill materials required within the system, including barrier materials, and fill soil within or over the system.

(62) "System replacement area" means a parcel of land under the control of an on-site system owner and reserved for system alteration, expansion, or replacement.

(63) "Textural class" means soil groupings based upon a specified range in texture.

(64) "Topsoil" means the A or Ap horizon as defined in the Soil Survey Manual, 1993, Soil Survey Division Staff, USDA Handbook No. 18, located at the Web site: nrcs.usda.gov/Internet/FSEDOCUMENTS/nrcs142p2050993.

(65) "TSS" means total suspended solids or a measure of solid material, including organic and inorganic, that are suspended or dissolved in wastewater, effluent, or water bodies and related to both specific conductance and turbidity.

(66) "Variance" means a waiver of certain specified requirements of this administrative regulation granted by the cabinet.

Section 2. Site Approval Procedures.

(1) Individual site approval procedures.

(a) A person seeking approval of an individual site for the installation of an on-site sewage disposal system or alteration of an existing lateral field shall submit:

1. The required fee; and
2. A completed application including a basic site plan drawing showing the:
 - a. Specific address or location of the site;
 - b. Site boundary lines and dimensions of the site;
 - c. Location of:
 - (i) Existing structures;
 - (ii) Sewage disposal systems;
 - (iii) Wells;
 - (iv) Ponds;
 - (v) Streams;
 - (vi) Easements;
 - (vii) Roads; and
 - (viii) Drives; and
 - d. Proposed or existing location of the structure to be served by the system and proposed system location.

(b) A person seeking approval shall establish an appointment time and date for the site evaluation if the person desires to be present during the evaluation.

(c) Property boundaries shall be clearly identified.

(d) If the site evaluation reveals that the applicable requirements of this administrative regulation are met, the area designated for system installation shall be clearly marked by the certified inspector or professional engineer using flags or other suitable, readily observable markers.

(e) The location of the designated area shall be recorded on a property drawing by showing distances to existing set points.

(f) The person seeking approval shall receive a copy of the:

1. Site Evaluation Form including the overall evaluation rating;
2. Drawing showing the location of the designated lateral field area; and
3. Written requirements relative to site limitations.

(g) After the site evaluation has been conducted, a permit to construct, install, or alter an on-site sewage disposal system shall be obtained prior to construction of any portion of that system.

(h) An application for a construction permit shall be submitted and accompanied by a detailed drawing of the proposed system or alteration, including all necessary specifications, and required permit fees.

(i) A permit shall be issued only by a certified inspector and only to a certified installer or homeowner as provided in 902 KAR 10:110 and shall expire one (1) year from date of issuance unless an extension is granted by the cabinet.

(2) Subdivision approval procedures.

(a) A person seeking approval for a subdivision and for all existing subdivisions of record shall follow the procedures for approval established in subsection (1)(a), (b), and (c) of this section. Each individual lot or site shall be evaluated individually.

(b) If a site evaluation reveals that an individual on-site sewage disposal system is unapprovable due to site characteristics, the applicant shall be advised as to alternatives if available.

(c) If a cluster system is proposed, legal documents relative to ownership, operation, and maintenance of the system in perpetuity shall be submitted.

(d) A local health department may adopt more specific requirements for subdivision approval within its jurisdiction if not in conflict with this administrative regulation.

Section 3. Site Evaluation Standards.

(1) A certified inspector or professional engineer shall evaluate each proposed site. Pursuant to subsections

(2) through (9) of this section, an official site evaluation form shall be completed classifying each factor as:

- (a) SUITABLE (S);
- (b) PROVISIONALLY SUITABLE (PS); or
- (c) UNSUITABLE (U).

(2) Topography.

(a) Uniform slopes fifteen (15) percent or less shall be considered SUITABLE with respect to topography.

(b) Uniform slopes greater than fifteen (15) percent and up to and including thirty (30) percent shall be considered PROVISIONALLY SUITABLE with respect to topography.

1. Slopes within this range may require installation of curtain drains, vertical drains, or other approved drainage methods upslope from the lateral field.

2. Usable areas larger than normally required may be needed in this slope range.

(c) Slopes greater than thirty (30) percent shall be considered UNSUITABLE except slopes greater than thirty (30) percent may be classified as PROVISIONALLY SUITABLE if:

1. The soil characteristics are classified as either SUITABLE or PROVISIONALLY SUITABLE to a depth of at least thirty (30) inches;

2. Surface water run-off is diverted around the lateral field;

3. Groundwater or perched water table flow is intercepted and diverted through:

a. Curtain drains;

b. Vertical drains; or

c. Other approved drainage methods; and

4. There is sufficient ground area available to install the on-site sewage disposal system with approved modification.

(d) Complex slope patterns and slopes dissected by gullies and ravines shall be considered UNSUITABLE with respect to topography.

(3) Landscape position.

(a) Convex hill or ridge tops, shoulder slopes, and side slopes shall be considered SUITABLE with respect to landscape position.

(b) Convex foot slopes and natural terraces shall be considered PROVISIONALLY SUITABLE with respect to landscape position.

(c) Concave hill or ridge tops, shoulder, side, foot, and toe slopes, drainageways, depressions, and terraces may be considered PROVISIONALLY SUITABLE if:

1. The soil characteristics are classified as either SUITABLE or PROVISIONALLY SUITABLE;

2. Surface water run-off is diverted around the lateral field; and

3. Groundwater flow is intercepted and diverted through curtain or vertical drains.

(d) If the provisions in paragraph (c) of this subsection cannot be met, the landscape position shall be classified UNSUITABLE.

(e) An area closer than seventy (70) feet to an open sinkhole throat, downslope from the sinkhole sideslope midpoint, or an area subject to flooding damage shall be considered UNSUITABLE with respect to landscape position.

(4) Soil characteristics or morphology.

(a) Backhoe pits may be required for site evaluation.

1. If backhoe pits are not required, at least four (4) soil borings shall be taken in the area to be used for lateral fields.

2. Backhoe pits or borings shall be excavated to a depth of forty-two (42) inches or as required to determine the soil characteristics.

(b) Each excavated test hole or pit shall be backfilled to grade upon completion of the soil evaluation.

(c) Soil boring cores or exposed soil horizons in backhoe pits shall be evaluated and a determination made as to the suitability of the soil to treat and disperse effluent. Evaluation of soil characteristics shall be performed according to procedures established by the Soil Survey Manual, 1993, Soil Survey Division Staff, USDA Handbook No. 18, as follows:

1. Texture. The texture of the different horizons of soils may be classified into four (4) general groups:

a. SOIL GROUP I - sandy texture soils containing more than seventy (70) percent sand-sized particles in the soil mass. These soils are usually without sufficient clay to be cohesive. The sandy group includes the sand and loamy sand soil textural classes and shall generally be considered SUITABLE with respect to texture.

b. SOIL GROUP II - coarse loamy texture soils containing no more than twenty-seven (27) percent clay-sized particles in the soil mass. They exhibit slight or no stickiness. The coarse loamy group includes sandy loam and loam soil textural classes and shall generally be considered SUITABLE with respect to texture.

c. SOIL GROUP III - fine loamy texture soils containing less than forty (40) percent clay-sized particles in a soil mass. They exhibit slight to moderate stickiness. The fine loamy group includes sandy clay loam, silt, silt loam, clay loam, and silty clay loam textural classes and shall generally be considered PROVISIONALLY SUITABLE with respect to texture.

d. SOIL GROUP IV - clayey texture soils contain forty (40) percent or more clay-sized particles and include sandy clay, silty clay, and clay.

(i) Soil materials with 1:1 kaolinitic or mixed mineralogy clays shall generally be considered PROVISIONALLY SUITABLE as to texture.

(ii) Soil materials with 2:1 clays and montmorillonitic mineralogy shall generally be considered UNSUITABLE as to texture.

(iii) Soil mineralogy information may be obtained from proper soil classification and correlation of the site by soil mapping or by laboratory tests listed in the Soil Survey Laboratory Methods Manual, 1996, National Soil Survey Center, NRCS-USDA, Soil Survey Investigations Report No. 42, located at the Web site:
nrcs.usda.gov/Internet/FSEDOCUMENTS/stelprdb1253872.

e. The soil texture shall be estimated by field testing. Laboratory estimation of texture by particle-size analysis may be substituted for field testing if conducted in

accordance with approved standard procedures such as those listed in the Soil Survey Laboratory Methods Manual, 1996, National Soil Survey Center, NRCS-USDA, Soil Survey Investigations Report No. 42, at the property owner's expense;

2. Structure. The four (4) kinds of soil structure most significant in movement of sewage effluent through soils are:

a. Block-like soil structure - block-like soil structure shall be considered PROVISIONALLY SUITABLE. Some rocks even though weathered, such as shales or creviced or fractured rocks, exhibit block-like structure. Rock shall be considered UNSUITABLE as to structure;

b. Prismatic soil structure - prismatic soil structure is generally considered PROVISIONALLY SUITABLE unless it is associated with fragipans, which shall be considered UNSUITABLE;

c. Platy soil structure - if Group II, III, and IV soils fall out into plate-like sheets, then the soil would have platy structure which shall be considered UNSUITABLE; and

d. Absence of soil structure - soils that are massive or single grain and exhibit no structural aggregates shall be considered UNSUITABLE.

(5) Internal soil drainage.

(a) Internal soil drainage characteristics shall be determined by comparison of moist soil samples collected throughout the soil profile to a minimum depth of forty-two (42) inches to standard Munsell notation soil color charts to establish color hue, value, and chroma with:

1. Observation of soil profile for evidence of chroma 2 or less, with or without mottling, characterized as to abundance and contrast; or

2. Observation of freestanding water table.

(b) Soils exhibiting colors or mottling of greater than chroma 2 with no freestanding water table to a depth of forty-two (42) inches shall be considered SUITABLE with respect to internal drainage if soil texture and structure are classified as either SUITABLE or PROVISIONALLY SUITABLE.

(c) Soils exhibiting colors or mottling of chroma 2 or less or freestanding water table starting at a depth of less than forty-two (42) inches but greater than or equal to twenty-four (24) inches shall be considered PROVISIONALLY SUITABLE with respect to internal drainage if soil texture and structure are classified SUITABLE or PROVISIONALLY SUITABLE.

(d) Soils exhibiting colors or mottling of chroma 2 or less or freestanding water table at a depth of less than twenty-four (24) inches may be classified as PROVISIONALLY SUITABLE, if:

1. Soil texture and structure are classified SUITABLE or PROVISIONALLY SUITABLE; and

2. Curtain drains, vertical drains, or other approved methods are installed to intercept lateral water movement, or to lower and maintain the freestanding water table level to a depth of greater than twenty-four (24) inches.

(e) Soils exhibiting colors or mottling of chroma 2 or less or freestanding water table at a depth of less than twenty-four (24) inches that cannot meet the criteria listed in paragraph (d)1. of this subsection shall be considered UNSUITABLE.

(6) Soil depth.

(a) Presence of bedrock or large flagstones, also known as floaters, shall be determined by probing the site and through direct observation of the soil profile. Soil depth shall be considered the vertical distance from the existing ground surface to:

1. Solid, fractured, or rippable bedrock;
2. Weathered parent material; or
3. Large flagstones that occupy more than thirty (30) percent of the exposed soil profile.

(b) Soil depths forty-two (42) inches or greater shall be considered SUITABLE as to depth.

(c) Soil depths less than forty-two (42) inches, but at least twenty-four (24) inches, shall be considered PROVISIONALLY SUITABLE as to depth.

(d) Soil depths less than twenty-four (24) inches shall be classified UNSUITABLE as to depth.

(e) If special system design and installation modifications can be made to provide at least eighteen (18) inches of undisturbed naturally occurring soil between the bottom of the lateral field, the soils may be reclassified PROVISIONALLY SUITABLE as to depth.

(7) Restrictive horizons.

(a) Soils in which restrictive horizons are at forty-two (42) inches in depth or greater shall be considered SUITABLE.

(b) Soils in which restrictive horizons are at depths less than forty-two (42) inches, but at least twenty-four (24) inches, shall be considered PROVISIONALLY SUITABLE.

(c) Soils in which restrictive horizons are at depths less than twenty-four (24) inches may be classified PROVISIONALLY SUITABLE if special system design and installation modifications can be made to provide at least eighteen (18) inches of undisturbed naturally occurring soil between the bottom of the lateral field and the restrictive horizon.

(d) Soils in which restrictive horizons are at depths less than twenty-four (24) inches, which cannot meet the provisions in paragraph (c) of this subsection, shall be considered UNSUITABLE.

(8) Available space.

(a) Sites that have two (2) times the usable land area required to permit the installation of an approved on-site sewage disposal system, in addition to the land area to be occupied by existing or proposed structures or other natural or manmade features of the site that are not compatible with system installation shall be classified SUITABLE as to available space.

(b) Sites that have the usable land area required to permit the installation of an approved on-site sewage disposal system and the usable land area required to permit the installation of an equivalent approved system, in addition to the land area to be occupied by existing or proposed structures or other natural or manmade features of the site that are not compatible with system installation, shall be classified PROVISIONALLY SUITABLE as to available space.

(c) All other sites shall be classified UNSUITABLE as to available space.

(9) Determination of overall site suitability. The criteria in subsections (2) through (8) of this section shall be SUITABLE, PROVISIONALLY SUITABLE, or UNSUITABLE as indicated. If all criteria are classified the

same, that classification shall prevail. If there is a variation in classification of the several criteria, the lowest classification shall determine the overall site classification.

(a) Topography classified as UNSUITABLE may be reclassified PROVISIONALLY SUITABLE under the provisions of subsection (2) of this section.

(b) If the landscape position, soil texture, soil structure, internal drainage, or depth to restrictive horizon is classified as UNSUITABLE and cannot be reclassified as PROVISIONALLY SUITABLE through modification, the overall classification shall be UNSUITABLE regardless of the other criteria unless the provisions of Section 4(6) of this administrative regulation are met.

(c) Soil depth classified as UNSUITABLE may be reclassified as PROVISIONALLY SUITABLE under the provisions of subsection (6)(e) of this section.

Section 4. Site Classification and System Restrictions.

(1) Restrictions shall be placed upon on-site sewage systems approved for use due to site limitations or daily waste load volume. The restrictions shall be determined by the conditions established in subsections (2) through (7) of this section, and the modified or alternative system listed shall be considered as the minimum acceptable.

(2) A site with an overall evaluation rating of SUITABLE, a conventional subsurface soil treatment, and dispersal system twenty four (24) inches deep shall not be permitted without the approval of the local health department or the Department for Public Health.

(3) A site with an overall rating of PROVISIONALLY SUITABLE due to:

(a) Depth to rock, water table, or restrictive horizon.

1. Twenty-four (24) inches but less than forty-two (42) inches - a six (6) to twenty-three (23) inch deep modified conventional trench, or other approved system with a minimum separation distance of eighteen (18) inches between trench bottoms and rock, water table, or restrictive horizon. A minimum separation distance of twelve (12) to eighteen (18) inches between trench bottoms and rock, water table, or restrictive horizon may be considered with additional approved treatment technology.

2. Eighteen (18) inches to less than twenty-four (24) inches:

a. A mound system;

b. Other approved system that maintains a minimum separation distance of eighteen (18) inches between trench bottoms and rock, water table, or restrictive horizon; or

c. Sufficient filling of the area with suitable soil to allow installation of a modified or alternative system after a one (1) year settling period.

3. A minimum separation distance of twelve (12) to eighteen (18) inches between trench bottoms and rock, water table, or restrictive horizon may be considered with additional approved treatment technology such as:

a. Peat filter systems;

b. Sand filter systems;

c. Aerobic units;

d. Drip irrigation systems;

e. Two (2) tanks in a series;

- f. Dual compartment septic tanks;
- g. Approved effluent filters; or
- h. Constructed wetlands cells.

4. Less than eighteen (18) inches - filling of the area with suitable soil to sufficient depth to allow modified or alternative system installation after a one (1) year settling period. A minimum separation distance of eighteen (18) inches between trench bottoms and rock, water table, or restrictive horizon shall be maintained on a fill and wait system.

(b) Soil texture or structure.

1. Soil Group III - any approved system.

2. Soil Group IV - a conventional trench system modified by the use of additional pretreatment as established in Section 6(2) of this administrative regulation.

a. The system may be required to be modified by:

- (i) The use of alternating lateral fields;
- (ii) Dosing tank and pump or siphon;
- (iii) Dosed alternating lateral fields;
- (iv) Dosed automatic alternating lateral fields;
- (v) The use of an LPP system;
- (iv) By a lagoon and lateral field system; or
- (vii) Other systems approved by the cabinet for use in Group IV textured soil.

b. Gravity flow distribution systems in this soil group shall use equal flow distribution boxes only.

(4) If available space for the installation of an approved system is inadequate:

(a) Installation of permanent one and six-tenths (1.6) gallon or less low-volume flush water closets or nonwater carriage toilet devices shall be required; and

(b) As much lateral footage of the most space efficient approved system, but no less than fifty (50) percent of the required minimum lateral footage for that system, discharging into a holding tank that is at least equal in capacity to the required pretreatment unit shall be required.

(5) If a PROVISIONALLY SUITABLE rating was obtained, which may be affected by a combination of site limitations, the on-site system, whether conventional, modified, or alternative, which shall overcome all limitations involved shall be installed.

(6) A site classified as UNSUITABLE may be used for on-site sewage disposal systems if engineering, hydrogeologic, and soil studies indicate to the cabinet that a suitable on-site sewage disposal system can reasonably be expected to function satisfactorily. The site may be reclassified as PROVISIONALLY SUITABLE upon submission to the cabinet of adequate substantiating data to indicate that:

(a) An on-site sewage disposal system may be installed so that the effluent shall receive adequate treatment and proper disposal;

(b) The effluent shall not contaminate any drinking water supply, groundwater, perched water, or surface water;

(c) The effluent shall not be exposed on the ground surface.

(7) A site originally classified as UNSUITABLE due to soils that have been structurally damaged may be upgraded to PROVISIONALLY SUITABLE if:

- (a) Structural damage shall be limited to a maximum depth of six (6) inches from the original ground surface;
- (b) Trench depth at least six (6) inches deeper than the damaged layer;
- (c) Required vertical separation distances to rock, water table, or other restrictive horizons shall be maintained;
- (d) Soil rectification shall be performed using one (1) of the following methods:
 - 1. Mechanical renovation with a chisel plow or other similar device if damaged soil is adequately improved by lifting from two (2) inches below the damaged layer; or
 - 2. Removal of damaged soil and replacement with a Group III or better soil with a SUITABLE or PROVISIONALLY SUITABLE structure; and
- (e) A certified inspector reevaluates following soil rectification and prior to system installation.

Section 5. Approval of Consultants.

(1) The cabinet may grant limited approval to an eligible individual to perform tentative site evaluations only for proposed subdivisions for which on-site sewage disposal systems are intended.

(a) Individuals eligible for approval as consultants shall include:

- 1. Professional engineers;
- 2. Registered architects;
- 3. Soil scientists;
- 4. Professional geologists; and
- 5. Certified inspectors whose certifications have not been suspended or revoked.

(b) The cabinet may require attendance at training seminars and competency testing as a condition of maintaining approved status.

(2) To be eligible for approval as a consultant, the individual shall possess a valid professional registration, license, certificate, or other similar document, issued by the respective profession's registration, licensure, or certification board, agency, committee, or other body recognized by the state of Kentucky.

(3) If suspension or revocation proceedings are initiated by the cabinet in accordance with KRS 211.360(3), the certified individual may request a hearing before the cabinet in accordance with KRS 211.360(4) to present evidence on his behalf as to why the intended action should not be taken.

(4) If the cabinet has suspended or revoked certification for cause, the cabinet shall provide notification to the appropriate professional body with which the person affected is registered, licensed, or certified.

Section 6. System Sizing Standards.

(1) Design waste flows. Daily waste flow volumes for system design and sizing purposes shall be computed for each residential unit, business or commercial facility, or other public facility based upon the design flow per designated flow unit listed in Table 1 multiplied by the number of flow units involved.

(a) If approved permanent nonwater carriage water closet type devices, such as composting, incinerator, or oil carriage toilets, are installed exclusively in a residence, the daily design waste flow unit for that specific residence may be reduced to the amount in Table 1, Column B.

(b) If an approved greywater system is installed so that all greywater is separated from the onsite sewage disposal system and no other greywater type wastes are created, the daily design waste flow for the onsite sewage disposal system for that specific residence may be reduced to the amount in Table 1, Column B.

(c) If a residence meets the criteria of paragraphs (a) and (b) of this subsection, the design daily waste flow for onsite sewage disposal system for that residence may be reduced to the amount in Table 1, Column C.

(d) A daily waste flow unit reduction shall not be granted for installation of nonpermanent flow reduction devices, such as showerheads, showerhead or faucet inserts, suds-saver type automatic washing machines, or other similar devices. Use of water saving devices, such as low-volume flush water closets, may be required by the cabinet if necessary due to site limitations.

(e) An on-site sewage system that receives a design daily waste flow of 2,000 gallons or more shall be designed to provide dosing of the lateral field through the use of dosing tanks and pumps or siphons, or through the installation of an LPP system.

(f) An applicant proposing to use an on-site sewage disposal system for a nonresidential source of sewage shall provide the following information to the cabinet:

1. Data to show the sewage does not contain industrial wastewater;
2. Data to establish the potential sewage strength and to identify chemicals found in the sewage that are not typically found in residential sewage; and
3. A design to provide pretreatment of the sewage to at least residential septic tank effluent quality.

(g) The following businesses or facilities shall not be approved for disposal of waste waters into an on-site sewage disposal system due to the nature of the wastes generated or the high volume of wastewater created:

1. Laundromats, except on an experimental basis as provided under subsection (16) of this section;
2. Car washes;
3. Kill room wastes from livestock slaughterhouses;
4. Embalming wastes from funeral parlors or mortuaries; and
5. Industrial or process wastes from factories.

		Gallons/Unit/Day		
Source of Sewage Dwelling Units	Units	Standard	Column B	Column C
Single family residences	Each bedroom	110	83	55
Hotels or motels	Each room	90		
Apartments/condominiums/townhouses	Each bedroom	110		
Rooming houses	Each bedroom	110		
Mobile home parks	Space	270		

Commercial/industrial:				
Retail stores	Each toilet room	180		
Malls, shopping centers	Each 1000 sq. ft.	180		
Offices and tattoo studios	Employee	15		
Medical offices (with laboratories)	Employee	45		
Dental offices (with water rinse units)	Exam chair	225		
Dental offices (with suction units)	Exam chair	45		
Veterinary office (add for animal grooming) (add for animal boarding)	Clinic per animal per animal	225 10 10		
Dog kennels	per dog	5		
Industrial buildings (Add for showers)	Employee/shift (does not include process water or cafeteria) Employee/shift	15 10		
Construction site	Employee/shift	15		
Visitor center	Visitor	4		
Barber shops	Chair	65		
Beauty shops	Chair	115		
Laundromats: (experimental only)	Machine	300		
Eating and drinking establishments:				
Restaurant (does not include bar or lounge)	Meal/seat	15		
Bar or lounge	Seat	15		
Drive-in (no public restrooms)	Establishment	450		
Drive-in (with public restrooms)	Car stall	15		
Food markets:				
Prepackaged/Catering	Store or establishment	225		
Food processing/Retail/Manufacturing: (with eat-in delicatessen) (with carryout delicatessen)	Store Meal/seat Store	900 15 Additional 225		
Rabbit or fish processors (with solid waste separation)	Employee/shift per animal or fish processed	15 0.5		
Institutional (includes food service):				
Hospitals and surgical centers	Each bed	270		
Mental	Each bed	90		
Prison or jail	Each inmate bed	90		
Nursing home, rest home	Each resident bed	90		
Schools and Churches (includes food service):				
Elementary, day care, kindergarten	Student	20		
High school	Student	30		
College	Student	30		
Boarding school	Student	55		

Churches: (without kitchen facilities)	Average attendance/person	3		
(with kitchen facilities)	Average attendance/person	4		
Recreational:				
Recreational vehicle park (sewer hook-ups to each space)	Space	115		
(with central bath only)	Space	65		
Dump station only	Space	20		
Day camp (no meals)	Person	15		
Residential camp (includes cafeteria)	Person	55		
Resorts/housekeeping cabin	Bedroom	110	83	55
Tent camping areas w/central bath	Space	65		
Country clubs (does not include food service)	Member	10		
Golf courses	Average attendance/person	8		
Swimming pools	Design capacity/person	8		
Picnic parks, sports facilities, ball parks:				
(with toilet only)	Average attendance/person	4		
(with food service)	Average attendance/person	7		
Movie theaters	Seat	4		
Drive-in theaters (includes food service)	Space	12		
Skating rink/dance hall	Person (based on rated capacity)	8		
Bowling alley	Lane	90		
Transportation:				
Airport, bus or rail depot	Passenger	4		
Auto service station	Each water closet or urinal	225		

(2) Residential pretreatment units. A septic tank in a single-family residence on-site sewage disposal system shall meet the minimum working liquid capacities in paragraphs (a) to (c) of this subsection, based on the number of bedrooms involved. An aerobic or other type of approved pretreatment unit shall be sized according to its rated treatment capacity in gallons per day, based upon the design daily waste flow per design unit given in Table 1.

(a) On a Soil Group IV site, additional pretreatment shall be provided by use of one (1) of the following methods:

1. Installation of multiple septic tanks in series. The first tank receiving raw sewage from the residence shall be of the required minimum capacity in Table 2. Additional tanks shall be installed in series as needed to provide a total capacity equal to the required minimum plus an additional fifty (50) percent;

2. Installation of an aerobic pretreatment unit. An aerobic unit that does not include an integral trash or primary settling chamber in its construction shall be provided by the series installation of a minimum 1,000 gallon septic tank to receive raw sewage, with effluent discharging into the aerobic unit;

3. Installation of multiple compartment septic tanks. The first compartment receiving raw sewage from the residence shall be of the required minimum capacity in Table 2. The second compartment shall have a total capacity equal to at least fifty (50) percent of the first compartment; or

4. Permanent installation of effluent filters. The effluent filter shall be a maximum screen size of one-sixteenth (1/16) inch and shall be installed either inside or following a properly-sized septic tank. Access to filters shall be provided to finished grade.

(b) Subsurface flow constructed wetlands on-site sewage disposal systems shall include one (1) of the following pretreatment options:

1. Two (2) septic tanks in series and an approved commercial-sized filter located at the outlet end of the second tank;

2. A two (2) compartment septic tank and an approved commercial-sized filter located at the outlet end of the second compartment; or

3. An aerobic unit and an approved commercial-sized filter installed internally or externally on the outlet pipe.

(c) A pretreatment unit for subsurface flow constructed wetlands shall be sized the same as a pretreatment unit for Group IV textured soil.

(d) If required minimum tank capacities for residential systems exceed 1,000 gallons and larger capacity tanks are unavailable, serial installation of multiple tanks is permitted to obtain the necessary capacity. The first tank in series shall have a minimum capacity of 1,000 gallons.

Number of Bedrooms	Gallon Capacity (Without Garbage Disposal)	Gallon Capacity (With Garbage Disposal)
3 or less	1,000	1,250
4	1,250	1,500
5	1,500	1,750
Each Additional	250	250

(3) Commercial and public facility pretreatment units.

(a) Minimum working liquid capacities for a septic tank for a commercial or public facility on-site sewage disposal system shall be determined by multiplying the daily design waste flow per unit times the total number of units, plus an additional fifty (50) percent of that figure for solids storage: (Gallons/unit/day X Number of Units) + 50% = MINIMUM CAPACITY REQUIRED.

(b) Commercial facility system installation shall be subject to procedures and requirements established in subsection (2) of this section relative to:

1. Sites with soils in Soil Group IV;

2. Subsurface flow constructed wetlands;

3. Aerobic and other types of pretreatment units; and
4. Use of multiple tanks in series to obtain required capacity.

(c) An establishment with food preparation or food processing facilities shall install adequately designed and approved pretreatment units to reduce FOG, BOD-5, and TSS to a level typically found in residential septic tank effluent. The applicant shall be required to submit data from comparable facilities to determine the establishment's potential effluent strength.

- (d)
1. A commercial or public facility engaged in the manufacture, processing, preparation, or service of food or food products shall use an approved grease trap.
 2. Wastewater drain piping from food processing equipment; sinks for washing of food, equipment and utensils; dishwashers; and floor drains in food preparation and processing areas shall be separated from other wastewater piping and shall discharge into a grease trap prior to entrance into an on-site sewage disposal system.
 3. Grease trap capacity shall be a minimum of 500 gallons for daily waste flows of 6,000 gallons or less and 1,000 gallons for daily waste flows greater than 6,000 gallons.
 4. A grease trap shall be placed outside of the structure and shall be located as close as practicable to the source of the wastewater to prevent separation of grease prior to entry into the grease trap.

(4) Sizing of gravity distribution lateral fields. Gravity distribution lateral fields for an on-site sewage disposal system shall be sized based upon the design daily waste flow for the residence, commercial or public facility involved, as determined from Table 1. The total daily waste flow multiplied by the linear footage requirement per gallon found in Table 3 for the specific site soil characteristics shall determine the minimum linear footage of lateral trench required.

Soil Group	Soil Texture Classes	Application Rate Gal/Sq. Ft./Day	Linear Ft. Per Gallon
I Sands	Sand	1.2	.42
	Loamy Sand	.9	.56
II Coarse loams	Sandy Loam	.7	.72
IIIa. Fine loams (with suitable structure)	Sandy Clay Loam	.5	1.0
	Silt Loam		
	Silt		
	Clay Loam		
IIIb. Fine loams (with provisionally suitable structure)	Silty Clay Loam	.37	1.35
	Sandy Clay Loam		
	Silt Loam		
	Silt		

IV Clays (Kaolinitic or mixed mineralogy with provisionally suitable structure)	Sandy Clay	.27	1.85
	Silty Clay		
	Clay		

(5) Sizing of LPP distribution lateral fields. LPP distribution lateral fields for on-site sewage disposal systems shall be sized based upon the calculated total design daily waste flow for the residence, commercial, or public facility involved, as determined from Table 1. The total daily waste flow divided by the allowable daily loading rate found in Table 4, for the specific site soil characteristics, shall determine the minimum square footage of absorption area required.

Soil Group	Texture	Soil Texture Classes	Rate Gal/Sq.Ft./Day
I Sands		Sand	0.5
		Loamy Sand	
II Coarse Loams		Sandy Loam	0.4
		Loam	
IIIa. Fine Loams (with suitable structure)		Sandy Clay Loam	0.3
		Silt Loam	
		Silt	
		Clay Loam	
		Silty Clay Loam	
IIIb. Fine Loams (with provisionally suitable structure)		Sandy Clay Loam	0.1714
		Silt Loam	
		Silt	
		Clay Loam	
		Silty Clay Loam	
IV Clays (Kaolinitic or mixed mineralogy with provisionally suitable structure)		Sandy Clay	0.1
		Silty Clay	
		Clay	

(6) Sizing of gravelless pipe systems.

(a) Gravelless pipe in eight (8) and ten (10) inch internal diameter sizes may be used in lieu of standard lateral trenches for conventional and modified conventional lateral field applications.

(b) Linear footage requirements listed in Table 3 shall apply to gravelless pipe.

(c) Gravelless pipe shall not be permitted in Group IV textured soils.

(7) Sizing of gravity distribution lateral beds. If lateral beds are permitted in lieu of standard two (2) foot wide lateral trenches, the required total length of standard lateral trench shall be calculated from Tables 1 and 3 information. That figure shall be multiplied by the percentage shown on Table 5 for the bed width intended for use. The number of linear feet resulting shall be the amount required for installation for that particular bed width.

Table 5 Lateral Bed Length Requirements for Gravity Distribution Systems Based on Bed Width	
Bed Width	Multiply Total Linear Footage of Two (2) Foot Wide Trench Required By:
3'	70%
4'	55%
5'	45%
6'	40%
7'	35%
8'	32%
9'	30%
10'	28%
11'	27%
12' or wider	26%

(8) Sizing of leaching chamber systems. Leaching chamber systems may be used in lieu of standard lateral trenches. Linear footage requirements for chambers shall be based on nominal internal chamber width as follows:

(a) In trench configuration – for nominal widths of:

1. Fifteen (15) to twenty-one (21) inches, 100 percent of Table 3;
2. Twenty-two (22) to twenty-seven (27) inches, seventy (70) percent of Table 3;
3. Twenty-eight (28) to thirty (30) inches, sixty (60) percent of Table 3;
4. Thirty-one (31) to thirty-six (36) inches, fifty-five (55) percent of Table 3;
5. Thirty-seven (37) to forty-one (41) inches, fifty (50) percent of Table 3; and
6. Forty-two (42) to forty-four (44) inches, forty-five (45) percent of Table 3;

(b) In bed configuration - for chamber widths eighty-five (85) percent of Table 5 linear footage requirements based on total bed width to nearest foot; and

(c) Other chamber designs including those with nominal widths outside the ranges listed in paragraph (a) of this subsection shall be sized on a case-by-case basis to allow for technological advancements.

(9) Sizing of gravity distribution alternate lateral fields or beds. If alternate gravity distribution lateral fields or beds are used, the individual alternate lateral fields or beds shall each contain one-half (1/2) of the total linear footage required for the system and shall be alternated in use on a yearly basis by use of an approved alternating valve or device.

(10) Sizing of dosed gravity distribution automatic alternating lateral fields or beds.

(a) If dosed automatic alternating lateral fields or beds are used, the individual alternating lateral fields or beds shall each contain one-half (1/2) of the total linear footage required for the system.

(b) Dosed automatic alternating lateral field or bed systems shall be designed and operated so as to alternate between lateral fields or beds with doses of effluent, by two (2) or more dosing siphons or pumps controlled by an automatic alternating device or by simultaneous dosing.

(11) Sizing of combination evaporation-absorption lagoon and lateral field systems.

(a) On sites with Group IV soils where a conventional lateral field system or alternative system cannot be installed due to heavy clay soils with poor or no structure conditions, a combination evaporation-absorption lagoon and shallow lateral field system may be considered for installation.

(b) Total daily waste flow shall be determined by using Table 1 and the total square footage of lagoon waste surface area shall be calculated by multiplying the total gallons of waste flow per day by five (5) square feet per gallon.

(c) Effluent entering the lagoon shall have passed through a properly sized pretreatment unit according to the provisions of Table 2 and subsection (3)(a) of this section.

(d) The overflow from the lagoon shall be directed to an approved lateral field according to the provisions of Section 4 of this administrative regulation. Lagoon overflow lateral field size for two (2) foot wide gravel field trenches shall be calculated by multiplying the total daily waste flow in gallons by one-tenth (.10) linear feet per gallon.

(12) Sizing of mound systems.

(a) Mound systems shall be designed and sized based upon the information and criteria given in the United States Environmental Protection Agency publication EPA 625/1-80-012 Design Manual, "On-site Wastewater Treatment and Disposal Systems," Chapter 7.2.4 on Mound Systems, located at the Web site: nepis.epa.gov/Exe/ZyPDF.cgi/300043XO.PDF?Dockey=300043XO.PDF, and may require soil permeability testing if necessary.

(b) All mound systems shall use pressure distribution of effluent in the absorption area.

(c) Mound fill material shall be coarse ASTM C-33 sand that meets the following criteria:

1. Less than twenty (20) percent, by weight, greater than two (2) mm in diameter; and
2. Less than five (5) percent, by weight, less than 0.053 mm in diameter.

(d) The design loading or filtration rate shall be one (1.0) gpd/sq.ft. for residential septic tank effluent.

(e) The sand fill material shall not be included in the measurement of the vertical separation distance between the absorption area and a:

1. Restrictive horizon;
2. Rock; or
3. Water table.

(13) Sizing of subsurface flow constructed wetlands systems.

(a) Constructed wetlands cells shall contain a minimum of one and three-tenths (1.3) cubic feet of fill material for each one (1) gallon of total daily waste flow.

(b) Total interior square footage shall be based on one and three-tenths (1.3) cubic feet per one (1) gallon of total daily design wasteflow; if twelve (12) inches of fill material is used, then the square footage equals the cubic footage.

(c) The length to width ratio of the cell shall range between three (3) to one (1) and five (5) to one (1) for gravity flow.

(d) The length to width ratio for pressure distribution shall be determined based on system size and available installation area.

(e) The overflow lateral field footage shall be calculated by using fifty (50) percent of the standard sizing for the chosen type of system, and all approved lateral field types shall be acceptable.

(14) Sizing of drip treatment and disposal systems. Drip treatment and disposal systems shall be:

(a) Designed and sized based upon the information contained in Drip Irrigation Treatment and Disposal System Design Standards;

(b) Installed in a location in which the county or district board of health has adopted an Operation and Maintenance Ordinance; and

(c) Approved for inspection upon receipt of a Declaration of Covenants, Conditions, and Restrictions form completed by the prospective owner and incorporated into the property deed in order to inform future owners.

(15) Sizing of residential greywater waste systems. If greywater is to be separated from the blackwater sewer, the separation shall be accomplished as established in paragraphs (a) through (e) of this subsection.

(a) Greywater shall be separated from the main house sewer.

(b) A residential greywater waste system shall be installed according to the results of the site evaluation of the greywater installation area and:

1. A septic tank is not required for a greywater waste system;

2. A distribution device is not required for the greywater waste system;

3. A twelve (12) inch separation from the bottom of the greywater absorption system to rock, water table, or restrictive horizon is allowed;

4. Cover over the greywater absorption waste system shall prevent ponding or surfacing of greywater;

5. A valve shall be installed to divert greywater back into the onsite sewage disposal system, except in a laundry greywater system;

6. The system shall have 100 percent system replacement area available;

7. The minimum setback distances listed in Table 7 shall apply to the greywater absorption area;

8. The system shall accept domestic type flows with the consistency and strength typical of greywater from domestic households, the source being:

- a. Bathing;
- b. Showering;
- c. Washing clothes; or
- d. Laundry sinks;

9. The system shall not contain water used to wash materials soiled with:

- a. Human excreta;
- b. Infectious substances;
- c. Cleaning chemicals other than soap;
- d. Water softener backwash; or
- e. A hazardous household product; and

10. Greywater shall not be applied directly to the surface of the ground or above grade without receiving written approval from the Energy and Environment Cabinet.

(c) Sizing of the absorption area shall be based on fifty-five (55) gallons per day per bedroom and the Application Rate in Table 3 to calculate the total area of the bottom of the absorption designs except in a laundry greywater system.

(d) For only a laundry greywater system, the sizing shall be based on fifteen (15) percent of total daily waste flow and the Application Rate in Table 3 to calculate the total area of the bottom of the subsurface absorption designs.

(e) On a new system installation permitting laundry wasteflow separation:

- 1. For Soil Groups I to III, a fifteen (15) percent reduction in the primary system lateral field requirement shall be allowed; and
- 2. For Soil Group IV, a system size reduction shall not be allowed.

(16) The cabinet shall size an experimental or alternative system not covered by this administrative regulation, based upon:

- (a) Site characteristics;
- (b) Effluent characteristics;
- (c) Pretreatment processes;
- (d) Technology used; and
- (e) Other demonstrable factors.

(17) Sizing of dosing tanks. Dosing tanks shall be of sufficient capacity to hold:

- (a) Two (2) times the total design daily waste flow calculated from Table 1; or
- (b) One (1) times the total design daily waste flow calculated from Table 1 with the requirements established in subparagraphs 1. through 3. of this paragraph
 - 1. Dual alternating pumps shall be utilized and the pumps automatically alternate each pump cycle.
 - 2. Dual pumps shall be controlled with an automatic override so that in the event one (1) pump fails, the other shall automatically take over until the failed pump can be replaced.

3. A pump failure alarm shall be installed so that in the event one (1) pump fails, the alarm is activated and the failed pump shall be replaced as soon as possible.

(18) Use of holding tanks.

(a) A holding tank shall be permitted only:

1. If written official verification is submitted to the cabinet that a municipal sewer system shall be available within a two (2) year period;
2. If a commercial or public facility has a daily wasteflow of less than 200 gallons per day;
3. During a one (1) year waiting period for soil to settle in an area that has been filled with topsoil, in accordance with Section 7(5) of this administrative regulation;
4. To repair an existing septic system if no other means of repair is available;
5. To expand an existing system for a single family residence if no other means of expanding the system is available; or
6. In accordance with Section 4(4)(b) of this administrative regulation.

(b) If a holding tank is permitted:

1. Water closets with flush volume of one and six-tenths (1.6) gallons or less shall be installed;
2. An audible and visible alarm system shall be installed:
 - a. Within the structure served; or
 - b. In a high pedestrian traffic area within sight of the structure served;
3. The applicant shall submit with the permit application a copy of a contract with a licensed septic tank cleaning company or other management entity for servicing the holding tank and shall thereafter maintain servicing records available for cabinet inspection; and
4. The local health department may require the owner to post a cash performance bond.

(19) Sizing of holding tanks. Holding tanks shall be sized as established in paragraphs (a) and (b) of this subsection.

(a) Holding tanks installed to repair an existing system, as an addition to a new system, or added to expand an existing system shall be sized the same as the required pretreatment unit.

(b) All other holding tanks shall be sized to hold a minimum seven (7) days wasteflow for the structure served.

Section 7. System Installation Standards.

(1) System layout standards.

- (a) 1. A system shall be designed, laid out, and installed in the designated area set aside during the site evaluation, and installation of the system in any other area is prohibited without the written consent of the local health department certified inspector.

2. If the markers used to designate the system area cannot be identified, the certified inspector or professional engineer who conducted the site evaluation shall revisit the property to reestablish the original designated area and confirm that it has not been altered.
 3. Layout of the system on the site by the certified installer shall be accomplished by using suitable stakes or markers to locate excavation sites for system components, and shooting of surface grades to establish necessary excavation depths to assure proper elevation "fall" in the system.
 4. Lateral trenches or beds shall be laid out to follow parallel to the surface contour lines of the site.
- (b)
1. Maximum length for individual lateral trenches or beds for gravity distribution systems shall be no more than 200 feet.
 2. Maximum length for individual lateral trenches in LPP systems shall be seventy (70) feet.
- (c) Individual lateral lines or beds receiving effluent from an equal flow distribution box shall be of equivalent size within ten (10) percent of the longest line or bed.
- (d)
1. Lateral trenches, and leaching chambers two (2) feet wide or less, for gravity distribution systems shall be spaced a minimum of eight (8) feet on centers;
 2. Lateral trenches for LPP systems shall be spaced a minimum of five (5) feet on centers;
 3. Lateral beds, and leaching chambers greater than two (2) feet wide, for gravity distribution systems shall be spaced a minimum of eight (8) feet from side wall to side wall;
 4. Spacing shall be increased two (2) feet on all sites with slopes greater than fifteen (15) percent and up to and including twenty (20) percent; and
 5. On slopes greater than twenty (20) percent, each five (5) percent increase in slope, or fraction thereof, shall require an additional spacing of two (2) feet for lateral trenches.
- (e) Lateral line spacing in gravity distribution bed systems shall be as established in subparagraphs 1. through 3. of this paragraph.
1. For beds of four (4) to six (6) feet in width, one (1) lateral line shall be placed on the centerline of the bed.
 2. For beds of seven (7) to ten (10) feet in width, two (2) lateral lines shall be spaced two and one-half (2 1/2) feet from the side walls.
 3. For beds eleven (11) feet and wider, the two (2) lateral lines shall be spaced two and one-half (2 1/2) feet from the side walls, and additional lateral lines shall be installed five (5) feet on centers, or fraction thereof, from the side wall laterals.

(2) Excavation standards.

- (a) Only equipment necessary to the installation of an on-site sewage disposal system shall be permitted in the designated area set aside for that system. Equipment shall be operated so as to minimize travel over and soil compaction of the system area.
- (b) Excavation of the lateral field, bed, or other subsurface soil absorption system portion of the total system area shall be restricted by the soil moisture conditions of that portion of the area at the intended depth of excavation for all soil texture classes.

1. Soil moisture conditions shall be determined by test excavation to the intended depth of the lateral trenches or beds.

2. A small portion of soil excavated from that depth shall be rolled between the thumb and fingers. If the soil can be rolled into a "wire" shaped form which does not easily crumble, the soil is too wet to work and will compact and seal absorption surfaces. If a "wire" form cannot be rolled and the soil crumbles, excavation can proceed.

(c) Excavation for septic tanks or other pretreatment units, distribution boxes, alternating valves or devices, and all nonperforated piping used to conduct effluent to other components through gravity flow means shall be done only after shooting of grades to assure a positive gradient from the outlet of the pretreatment unit through all components to the distribution box or device. The determinations of grade shall take into account the intended excavation depth from grade of lateral trenches or beds.

(d) 1. Excavations for placement of all components shall be made to the necessary depth for installation and shall be dug level in undisturbed earth.

2. If filling is required to level or raise components to the proper grade, except for lateral trenches or beds, tamped gravel, sand, or compacted soil shall be used for bedding purposes.

3. If installation occurs in stony areas, large stones, flagstones, and boulders shall be removed from the component placement excavations to prevent component damage and the cavities created by their removal shall be filled with tamped gravel, sand, or compacted soil if they are located on the bottom surface of the excavation.

(e) 1. Excavations for lateral trenches or beds shall be made to the depth specified by the site evaluation results.

2. Maximum trench or bed depth from grade for an on-site sewage treatment and dispersal system shall be twenty-four (24) inches.

3. Minimum trench or bed depth for modified gravity and dosed gravity distribution systems shall be six (6) inches from grade.

4. Minimum trench depth for LPP systems shall be six (6) inches from grade.

5. Trench width for LPP systems shall be a minimum of twelve (12) inches.

6. Minimum trench width for gravelless pipe shall be eighteen (18) inches to a maximum of twenty-four (24) inches.

7. Minimum or maximum trench width shall be as per manufacturer's specifications for leaching chambers, but in no instance shall the trench width exceed the chamber width by more than eight (8) inches.

(f) Lateral trench and bed bottom grades shall be as established in Table 6:

Distribution Method	Type	Maximum Grade inches/200 feet
Hillside or drop box	Trench	2"

Equal Flow Box	Trench	4"
	Bed	Level to 1" in all directions from center
Gravelless Pipe	Trench	Level
Low Pressure Pipe	Trench	Level
	Bed (Mound)	Level
Leaching Chambers (using any of the above methods except low pressure) (using low pressure pipe)	Trench layout	4"
	Bed Layout	Level
	Trench	Level

- (g)
1. Excavations for curtain drains or vertical drains to intercept or lower groundwater tables shall be made to the depth determined by the site evaluation.
 2. Curtain drain excavations shall maintain the required depth in all parts up grade from the lowest lateral line and then be graded to drain to the surface or to a pumped catchment basin.
 3. Vertical drain excavations shall encircle the entire soil absorption field area.
 4. Pretreatment units may be included within the curtain drained or vertical drained area.
- (h)
1. Excavations for distribution leaders or nonperforated pipe from a distribution box on gravity distribution systems shall be made so as to provide a "benched" distribution corridor above the trench or bed bottom.
 2. This "benched" corridor shall be bedded in undisturbed earth, and shall be excavated so as to provide a "bench" height of six (6) inches above the elevations of the trench or bed bottoms.
 3. Benching of the distribution corridor shall be used to reduce the possibility of "short circuiting" of effluent and effluent ponding around distribution boxes.
- (i)
1. Excavation of evaporation/absorption lagoons shall be made to provide uniformly level lagoon bottoms and to provide a wastewater depth below the overflow outlet of four and one-half (4 1/2) feet and a freeboard of two (2) feet.
 2. Containment berming, dikes, dams, and liners shall be of Group IV soil texture and installed so as to provide a minimum of eighteen (18) inch separation from the inside wall and bottom of the lagoon to rock and shall be "keyed" into the original soil at least one (1) foot deep and two (2) feet wide at the base.
 3. Berms, dikes, or dams shall be constructed on a two (2) feet vertical to one (1) foot horizontal slope.
 4. To prevent entrance by unauthorized persons, a lagoon shall be enclosed within a minimum six (6) foot high chain-link fence or equivalent (no climb) open weave designed fence with a locked gate.
- (j)
1. Constructed wetlands cell bottoms shall be excavated uniformly level and prepared so that no coarse materials are exposed.

2. Soil berming used for constructed wetlands shall be constructed so that the berming is stable and soil sloughing does not occur.
3. The outside walls shall have a slope of one (1) foot vertical to three (3) feet horizontal.
4. The inside walls shall have a minimum slope of one (1) foot vertical to two (2) feet horizontal.
5. Vegetation shall be established on berming as soon as possible.

(3) Component installation standards.

- (a)
 1. Septic tanks and other pretreatment units, dosing tanks, and holding tanks shall be installed level.
 2. Connections to the unit that conduct sewage or effluent and unit joints or seams shall be watertight.
 3. Manufacturer's instructions on installation and piping and electrical connections to the unit, shall be followed by the installer.
 4. A unit showing structural damage on delivery or damaged in placement shall be replaced with an undamaged unit.
 5. Patching of minor damage that does not affect the structural integrity, watertightness, or function of the unit shall be done under the supervision of the certified inspector.
- (b)
 1. The certified installer shall provide access to finished grade above the outlet end manhole on each septic tank through the use of suitable manhole risers of a minimum eighteen (18) inches internal dimension to allow removal of the tank manhole lid.
 2. The manhole risers shall be provided with tamper-resistant lids or covers. Lids or covers of precast concrete, cast iron, or steel shall be considered tamper-resistant if weighing sixty (60) pounds or more and require a vertical lift for removal.
 3. Lids or covers of sheet metal, plastic, or fiberglass shall be attached by bolts or other suitable fastener requiring a tool for removal.
- (c) An approved distribution device shall be used in a gravity flow system.
- (d)
 1. Distribution boxes and alternating valves or devices shall be installed level, and each piping connection shall be rendered watertight.
 2. A component showing structural damage on delivery or damaged in placement shall be replaced with an undamaged component.
- (e)
 1. An equal flow distribution box shall be installed on a stable base to prevent settling.
 2. A plastic or fiberglass equal flow or level box shall be securely anchored to a poured concrete base a minimum of four (4) inches thick and extending on all sides of the box side walls at least four (4) inches.
- (f) Outlet piping of an equal flow box shall be extended past the inside side wall of the box at least three-fourths (3/4) of an inch but no greater than one (1) inch to allow attachment of water leveling devices.

(g) 1. Approved nonperforated pipe shall be used as leader piping to connect an outlet in a distribution box to each perforated lateral line in the gravity distribution system and shall extend two (2) feet into all trenches or beds before connection to perforated lateral line.

2. The leader piping excavation shall be manually filled with tightly tamped soil.

(h) Leader piping connected to equal flow boxes shall be installed at no greater than one-eighth (1/8) inch per foot slope for the first five (5) feet of run from the box to restrict the flow velocity of effluent.

(i) Lateral lines for conventional gravity distribution trenches or beds shall be laid as established in subparagraphs 1. through 4. of this paragraph.

1. A six (6) inch deep layer of approved trench rock or other fill material shall be carefully placed in the trench or bed to prevent sealing of absorption surfaces from fill impact, and leveled.

2. Lateral piping shall be placed and leveled on the trench fill material in the center of the trench (or properly spaced in beds) and retained in place to prevent movement, while additional trench fill material is added to a point two (2) inches above the top of the top of the lateral piping, for a total of twelve (12) inches of trench fill material.

3. A four (4) inch layer of approved barrier material, whole straw, or a single layer of synthetic filter fabric shall then be placed over the trench fill material to prevent entry of backfill soil fines.

4. Other methods of lateral piping and trench rock placement may be approved by the cabinet upon demonstration of equivalent compliance.

(j) Lateral lines for LPP systems shall be laid as established in subparagraphs 1. through 6. of this paragraph.

1. At the beginning of each trench and at twenty (20) foot intervals thereafter, barrier walls of undisturbed earth or compacted earthfill at least one (1) foot thick shall be placed from sidewall to sidewall of the trench to the level at which lateral piping is to be installed.

2. Six (6) inches of pea gravel or approved alternate trench rock shall be placed in the trench and leveled.

3. Lateral piping shall be laid in place and assembled, or may be preassembled, and leveled.

4. Trench earth barrier walls shall be completed to ground surface and additional pea gravel or other trench fill material carefully placed over the laterals to a height of two (2) inches over the top of the piping.

5. A two (2) inch layer of approved barrier material, whole straw, or a single layer of synthetic filter fabric shall be placed over the pea gravel to prevent entry of backfill soil fines.

6. Other methods of lateral piping and trench rock or pea gravel placement shall be approved by the cabinet upon demonstration of equivalent compliance.

(k) Lateral lines for gravelless pipe systems shall be installed as established in subparagraphs 1. through 7. of this paragraph.

1. Plastic shipping and storage bags shall be removed from pipe, but filter wrap shall not be removed.
2. Gravelless pipe with the top stripe up shall be laid out. Filter wrap shall be rolled back from ends of each section of pipe to allow proper connection of pipe sections and reducer connectors or end caps.
3. Pipe sections shall be joined together with approved connectors, making sure top stripes shall be in direct alignment on both sections to be joined. Joints shall be taped with plastic tape supplied by the pipe manufacturer to seal the joints. Filter wrap ends shall be pulled back over joints and shall tape them together.
4. Offset reducer connectors shall be fitted of size four (4) by eight (8) inches or four (4) by ten (10) inches, to inlet ends of joined pipe sections and located at the four (4) inch inlet at the top of pipe in alignment with top stripes. Joints shall be taped to seal. Filter wrap shall be left loose at this time.
5. End caps shall be fitted on the other end of joined pipe sections. Joints shall be sealed with tape. Filter wrap shall be pulled over the end joint and taped in place.
6. Joined lateral pipe sections shall be laid into trenches with the top stripe directly up. Solid smooth wall header piping shall be connected from distribution box outlets to four (4) inch inlet on offset reducer connector. Header pipe shall be inserted four (4) inches into the connector, and joints shall be sealed with tape. Filter wrap shall be pulled over the end of the reducer cap and around four (4) inches of header piping and shall be taped in place.
7. Each pipe section shall be centered and supported with handfilled soil.

(l) Installation of constructed wetland components shall be as established in subparagraphs 1. through 18. of this paragraph.

1. Cell framing shall be structurally supported by spiking, mortaring, bolting, or other approved means.
2. A liner shall be installed in each cell and shall be watertight after installation.
3.
 - a. A manufactured liner shall be installed to conform to the shape of the cell, and wrinkles shall be smoothed prior to the placement of fill material.
 - b. The certified installer shall inspect the installed liner for holes or cuts.
 - c. If the liner requires perforation to allow piping to pass through, the liner shall be watertight after the piping is installed.
 - d. A liner shall be protected from sunlight before and after installation.
4.
 - a. A clay liner may be installed in a second cell application for residential use only if naturally-occurring Group IV textured soil is present.
 - b. The berming of the clay liner shall be keyed into the original soil by six (6) to twelve (12) inches.
 - c. The clay liner shall be compacted.

5. Cell fill material shall be installed level, at a uniform depth ranging between twelve (12) and eighteen (18) inches, based on the plant species selected.
6. The cell shall be constructed to provide a water depth equal to the cell fill material depth.
7. Two (2) inches of approved cover material shall be placed over the cell fill material;
8. Inlet and outlet headers shall be located at the bottom, center, or top of the fill material.
9. Inlet and outlet headers shall be located within one (1) foot from the cell end walls for gravity flow.
10. Inlet headers shall be located within three (3) feet from the cell end walls for pressure distribution.
11. If a header is located at an elevation that may cause siphoning of the effluent from a cell, approved antisiphon methods shall be used.
12. If perforated horizontal header piping is used, the header pipe shall be installed level with the holes located one (1) inch from the pipe bottom at the same elevation..
13. If perforated horizontal inlet header piping is used, access to cover material grade shall be provided for clean out.
14. Each header shall be covered with two (2) to four (4) inches of approved cover material.
15. Water level control devices may be installed at the ends of the cells with the design of these devices in compliance with the construction standards of 902 KAR 10:081.
16.
 - a. At least two (2) access ports of at least four (4) inch diameter pipe shall be installed in each cell.
 - b. At least one (1) access port shall be located one-third (1/3) of the distance from the inlet end wall to outlet end wall.
 - c. At least one (1) access port shall be located within six (6) inches of the outlet header.
 - d. If water level control devices are not used, at least one (1) of the access ports in each cell shall be at least six (6) inches in diameter.
 - e. Access ports shall have holes located at the same depth as the cell fill material to allow the effluent to enter the access port.
 - f. Access ports shall be equipped with removable lids or caps.
17. Plants shall be installed and spaced as required for the specific plant species. The permit holder shall be responsible for the installation of suitable wetland plants with hydrophilic plants preferred.
18. The overflow lateral field shall be installed as required for lateral trenches, beds, and components. Required vertical separation distances between overflow lateral trench or bed bottoms and any restrictive horizon, water table, or bedrock, as determined by the site evaluation results, shall be maintained.

(m) Leaching chambers shall be installed according to manufacturer's specification unless the specifications are less restrictive or conflict with 902 KAR Chapter 10, in which case the administrative regulations shall take precedence, except that reduced backfill cover of six (6) inches or more over the leaching chamber shall be allowed.

(n) Effluent piping to an evaporation/absorption lagoon and overflow piping to the lateral field system shall be installed as established in subparagraphs 1. through 3. of this paragraph.

1. Nonperforated gravity flow or pressurized piping shall be laid in an excavated trench into the lagoon and anchored to a poured concrete, three (3) foot square, four (4) inch thick apron. The inlet shall be a tee laid on its side.

2. For overflow piping, the overflow shall be located at the point within the lagoon farthest from the inlet apron. The upper leg of the tee shall be screened, and the lower leg shall extend downward to within three and one-half (3 1/2) feet of the lagoon bottom.

3. Submerged piping into and out of a lagoon shall be provided with suitable water stops or leak collars with a minimum extension of twelve (12) inches on all sides of the pipe.

(4) Curtain and vertical drain installation standards.

(a) Curtain and vertical drains shall be installed as established in subparagraphs 1. through 3. of this paragraph.

1. After excavation and grading of drain trenches to the required depth, slotted plastic drainage pipe with slots around the entire pipe circumference shall be laid in the trench. The pipe shall be bedded in two (2) to four (4) inches of leveled trench rock fill material.

2. After bedding and grading the pipe to drain, approved trench rock fill material for trenches twelve (12) inches or wider, or pea gravel for trenches narrower than twelve (12) inches, shall be added to the trench to a point four (4) inches below grade.

3. Barrier material approved for use in lateral trenches shall be placed over the drain trench fill material.

(b) Vertical drains may be used if more permeable soil horizons exist below a restrictive horizon and shall be installed as established in subparagraphs 1. through 3. of this paragraph.

1. After excavation to the required depth the trenches shall be filled with crushed rock or pea gravel as in curtain drains, pursuant to paragraph (a)2 of this subsection, as applicable.

2. Drainage piping shall be unnecessary in vertical drains because drainage is encouraged downward through the restrictive horizon to more permeable soils.

3. Barrier material approved for use in lateral trenches shall be placed over the drain trench fill material.

(5) Filling, backfilling and finish grading standards.

(a) On a site requiring the placement of fill soil before an on-site sewage disposal system can be installed, the requirements established in subparagraphs 1. through 5. of this paragraph shall apply.

1. Surface vegetation shall be removed and the original soil surface layer shall be tilled to a depth of two (2) inches prior to placement of fill.

2. Soil fill material shall meet or exceed the textural class characteristics of Soil Group III established in Section (3)(4)(c)1. of this administrative regulation and shall not be obtained from a restrictive horizon.
 3. Soil fill material shall be placed in the area to be filled by methods acceptable to the cabinet, to prevent stratification and unnecessary soil compaction.
 4. Soil fill shall be:
 - a. Protected by establishing a fast growing ground cover;
 - b. Allowed to settle for a period of one (1) year; and
 - c. Reevaluated prior to system installation.
 5. Depth of soil fill required shall be determined by the site evaluation, based upon minimum separation distances between lateral trench bottoms and restrictive horizons, bedrock, or water tables.
- (b)
1. Backfilling around and over septic tanks and other pretreatment units, dosing tanks, holding tanks, distribution boxes, LPP manifolds, alternating valves and devices, and nonperforated effluent piping and distribution leader piping, shall be accomplished by filling and tamping by layers.
 2. During filling and tamping, care shall be taken to prevent shifting, tilting, misalignment, or damage to system components, watertight joints, seams, or connections.
 3. The location of each component shall be clearly marked by staking or flagging after backfilling and prior to final grading.
- (c)
1. If manufacturer's installation instructions require specific backfilling procedures to protect component warranties, prevent damage, or prevent flotation of the component due to ground water pressure, those procedures shall be followed.
 2. Soil for backfilling gravelless pipe trenches shall be loose and friable. Soil aggregates, clods, or clumps, used for backfill in contact with pipe and filter wrap shall be no larger than one-half (1/2) inch in any dimension. Large clods or clumps of soil for backfill shall not be used.
 3. If soil excavated from trenches is unable to meet the criteria established in this paragraph, suitable backfill soil shall be obtained elsewhere.
- (d)
1. Backfilling of lateral trenches or drainage trenches shall be accomplished with minimal compaction of soil fill, and soil fill material shall be left mounded four (4) to six (6) inches above grade over trenches to allow for settling.
 2. Backfilling over lateral beds shall be accomplished through the use of lightweight wheeled or crawler type tractors to minimize soil compaction, and soil fill material shall be left mounded four (4) to six (6) inches above grade to allow for settling.
- (e) Backfilling shall not be done until after the system has been inspected and approved to that point of construction by a certified inspector.
- (f) On sites in which additional fill soil is required over the lateral field due to shallow depth of installation, the procedures established in subparagraphs 1. through 3. of this paragraph shall apply.

1. The requirements of paragraph (a)1 through 3 of this subsection shall apply
 2. Fill shall be extended on all sides of the lateral field to a minimum distance of ten (10) feet, except on sloping sites where the fill on each end of the system shall expand outward to a minimum of fifteen (15) feet at the lowest point downslope, and the fill at the downslope side of the system shall be increased to a minimum of fifteen (15) feet beyond the system.
 3. Minimum depth of fill shall be as required by the site evaluation, but not less than ten (10) inches of settled soil over the trench rock fill material or top of the gravelless pipe (for leaching chambers six (6) inches minimum) and that depth shall extend over the entire lateral field to a point at least two (2) feet beyond the sidewall of any trench, bed, or chamber, at which point the remainder of the fill may be tapered to original grade out to the minimum distances specified in subparagraph 2 of this paragraph.
- (g)
1. Finish grading over the on-site sewage system shall be performed to minimize soil compaction through the use of lightweight equipment.
 2. Grading shall be restricted to work necessary to provide positive surface drainage away from the system, especially the lateral field.
 3. Final grading over staked or flagged system components shall be accomplished manually or with lightweight equipment, using extreme care to prevent damage to or misalignment of components.
- (h) Finish grading work that removes soil from the system area, or that results in that area being used to dispose of excess soil graded from other areas on the site, shall be prohibited.
- (i) Finish grading on other areas of the site shall be done in such a manner as to divert surface water run-off from driveways, patios, downspouts, slopes, ditches, gullies, etc., away from the area where the system is installed. If site conditions are such that normal grading procedures cannot divert the run-off, diversion ditches, swales, berms, or other diversion drainage means shall be constructed to divert run-off away from the system.

Section 8. System Setback Restrictions.

- (1) Minimum setback distances for installation of on-site sewage disposal systems from structures, water supplies, roads, streams, bodies of water, and other structural or topographic features are listed in Table 7.

Structure or Topographic Feature	Minimum Distance (Ft.) from Pretreatment Unit, Constructed Wetland Cell, or Holding Tank	Minimum Distance (Ft.) from Side wall of Lateral Trench, Bed, or Lagoon
Property lines	5	5 (50 for lagoons)
Building foundations	10	10
Basements, cemeteries	20	20

Basements (Downslope from system)	20	30 (5-15% Slope) 40 (15-25% Slope) 50 (25% and Higher)
Wells	50	70
Wells (Properly plugged/abandoned)	20	20
Cisterns	50	70
Cisterns (Upslope from system with bottom at higher elevation than system)	10	10
Natural Lakes or Impoundments (Shoreline)	25	50
Streams	25	25
Springs (Upslope from system)	25	50
(Upslope with curtain interceptor drain)	10	20
(Downslope from system)	50	70
Drainage Ditches, Cutbanks (Downslope)	10	25
Curtain or vertical drain (Upslope and Sides) (Downslope)	10	10 25
Sinkhole Throat (Open)	70	70
Buried Water Lines or Utility Lines	10	10
Utility Easements	10	10
Driveways, parking lots, or paved areas	10	5
Geothermal Vertical	50	70
Geothermal Horizontal (Downslope)	10	10 (upslope and sides) 25
Inground swimming pools	10	20
Mine Openings and Air Shafts	50	70
Livestock pens, feed lots, corrals, etc.	10	10

(2) Lagoon setback distances shall be measured from the inside berm wall at a point four and one-half (4.5) feet vertically from the lagoon bottom.

Section 9. System Installation Inspection.

(1) Every on-site sewage disposal system installed, constructed, altered, or repaired shall be inspected by a certified inspector.

(2) The inspection sequence performed shall be as established in paragraphs (a) through (g) of this subsection.

- (a)
 - 1. The certified installer shall complete an installer's affidavit for every system, recording all grade shot readings of all excavation work and certifying by the certified installer's signature that the work has been performed in compliance with this administrative regulation; or
 - 2. In lieu of the installer's affidavit, the certified installer shall request an initial inspection be performed by a certified inspector.
- (b)
 - 1. An initial inspection shall consist of shooting of grades in all excavations to determine compliance with this administrative regulation.
 - 2. For subsurface flow constructed wetland systems, an initial inspection shall be made by a certified inspector to determine compliance with excavation standards.
 - a. An installer's affidavit in lieu of the initial inspection shall not be accepted.
 - b. The liner shall be in place in the cell prior to the initial inspection unless special cell preparation is needed prior to placement of the liner.
 - 3. All components and the overflow lateral field shall be inspected.
- (c)
 - 1. The certified installer shall request an installation inspection be scheduled and completed by a certified inspector before the system is backfilled.
 - 2. To facilitate inspection of lateral fields and constructed wetland system cells, the certified installer shall provide direct access to trench, bed, or cell bottoms to allow accurate shooting of grade and elevation.
 - 3. Direct access shall be provided through the use of ports, piping, or other methods acceptable to the certified inspector and at locations within the lateral field the inspector deems necessary.
- (d) The installation inspection shall consist of:
 - 1. Examination of system components, including constructed wetland systems plants, as to type, size or capacity, approved status, materials, and connections;
 - 2. Examination of installation as to proper placement, proper grade, or level;
 - 3. Conduct "water leveling" method on equal flow distribution boxes;
 - 4. Testing of dosing devices, low pressure systems, and alarm systems;
 - 5. Shooting of trench, bed, constructed wetland cell, or lagoon bottom grade and elevation;
 - 6. Examination of installation of lateral lines, trench, and constructed wetland cell fill material depth, trench barrier material, constructed wetland cell cover material depth and placement, and water depth; and

7. Other necessary examinations and checks to determine compliance with this administrative regulation relative to all site and system modifications required.

(e) A constructed wetland system shall not be approved before it is complete, including plant installation.

(f) An approved system shall be backfilled in accordance with this administrative regulation.

1. The certified installer shall:

a. Assure proper backfilling;

b. After completion of backfilling, perform or supervise finish grading; and

c. Request a final inspection if additional fill soil is required after completion of finish grading.

2. The owner shall, during subsequent occupancy and system usage, protect the system from damage, disruption, or unnecessary surface water drainage.

(g) A system not meeting approval shall be reconstructed as needed to meet compliance requirements.

Section 10. Responsibilities.

(1) The construction, operation, and maintenance of on-site sewage disposal systems, whether conventional, modified, or alternative systems, shall be the responsibility of the owner, developer, certified installer, or user of the system as applicable in the circumstances.

(2) Actions of the cabinet and certified inspectors engaged in the evaluation and determination of measures required to effect compliance with the provisions of this administrative regulation shall in no way be taken as a guarantee that on-site sewage disposal systems approved and permitted shall function in a satisfactory manner for any given period of time, or that such agents or employees assume any liability for damages, consequential or direct, which are caused or may be caused by a malfunction of the systems.

Section 11. Prohibited Practices.

The following practices shall be prohibited and their use shall result in immediate voiding of permits or site evaluations:

(1) Use of unapproved system components in lieu of replacement with approved components;

(2) Except as provided in Section 13 of this administrative regulation, use of seepage pits, cesspools, or dry wells;

(3) Use of improperly constructed or designed systems in lieu of redesign or reconstruction;

(4) Placement of lateral field within less than twelve (12) inches of, or below, the upper limits of a restrictive horizon or water table;

(5) Placement of lateral field within less than twelve (12) inches of, or into, bedrock;

(6) Dynamiting, ripping, or otherwise removing bedrock to install a lateral field;

(7) Cutting, filling, or otherwise altering the original grade or soil characteristics of the area upon a site staked or flagged off for system installation, except if the work is a requirement of this administrative regulation;

(8) Allowing use of the area staked or flagged off for system installation as a material or soil stockpile, vehicle or heavy equipment parking area or roadway, or other unauthorized use that may damage or alter the soil or site characteristics; or

(9) Construction of evapotranspiration lagoons in Group I, Group II, or Group III textured soil.

Section 12. Variances.

(1) The owner of a site where an on-site sewage disposal system is proposed to be installed may request, in writing, to the local board of health or its designated agent, a variance to specific portions of this administrative regulation.

(2) A written request shall include:

- (a) Pertinent information about the site;
- (b) The specific portion of the administrative regulation requested for waiver;
- (c) The specific reasons for the request; and
- (d) Documented evidence justifying the granting of the variance.

(3) A request shall be acted upon by the local board of health or its designated agent as soon as practicable. A written decision, either denying the variance with reasons for denial, or granting the variance with or without stipulations or restrictions, shall be presented to the applicant within five (5) working days of the decision.

(4) An applicant for a variance may appear with counsel or expert professional witnesses or both before the local board of health or its agent for the purpose of presenting the request or to appeal a decision.

(5) If a hearing is requested, the local board of health or its agent shall:

- (a) Set a time and date for the hearing, as soon as practicable; and
- (b) Notify the applicant, in writing, within five (5) working days of receipt of the request and at least two (2) days prior to the date of hearing, of the time and date for the hearing.

(6) A decision regarding a variance shall be based upon evidence presented by:

- (a) The applicant;
- (b) The certified inspector for the site in question; and
- (c) Expert professional witnesses.

(7) A decision regarding a variance shall be influenced by:

- (a) The requirements of the On-site Sewage Systems Law, KRS 211.350 to 211.380, and related law; and
- (b) The presence or absence of reasonable assurance, derived from evidence presented, that the granting of the variance shall not result in the creation of:

1. Groundwater contamination;
2. Effluent surfacing;
3. A public health hazard; or
4. A public health nuisance.

(8) A variance shall not be granted:

- (a) To waive of site evaluation or system inspection;
- (b) To reduce required system size if a modified or alternative system is able to provide an equivalent system in the available area on the site;
- (c) If site or system modification or an alternative system can overcome a site limitation; or
- (d) For a practice prohibited by Section 11 of this administrative regulation.

(9) A variance shall be made a permanent record and filed at the local health department in the county where the site is located.

(10) A variance request shall be acted upon and a final decision made by the local board of health or its agent prior to the issuance of a permit to install the proposed on-site sewage disposal system.

Section 13. Exemption.

(1) On-site sewage systems shall be governed by the provisions of KRS 211.355(3) and this section.

(2) The repair or alteration of an on-site sewage treatment system shall be permitted if:

- (a) A municipal or public sewage treatment system is not available; and
- (b) Repair or alteration is required because of:
 1. Malfunction;
 2. Damage; or
 3. Upgrade.

(3) In the repair or alteration of an on-site sewage system utilizing a seepage pit, an owner shall be permitted to:

- (a) Clean;
- (b) Service; and
- (c) Repair, alter, reconstruct, or replace:
 1. Any system component leading to a pit, such as pipes and septic tanks;
 2. Pit rings; or
 3. Any other component repair that would not require the drilling of a new pit.

(4) With regard to a single-family dwelling only, if a municipal or public sewage treatment system is not available, a seepage pit may be installed as an on-site sewage disposal system in the development of a vacant lot, purchased on or before May 1, 1992, if bona fide construction began by December 25, 1992.

Section 14. Incorporation by Reference.

(1) The following material is incorporated by reference:

(a) "Drip Irrigation Treatment and Disposal System Design Standards", 1/2017; and

(b) Form "DFS-450, Declaration of Covenants, Conditions, and Restrictions", 1/2017.

(2) This material may be inspected, copied, or obtained, subject to applicable copyright law, at the Department for Public Health, 275 East Main Street, Frankfort, Kentucky 40621, Monday through Friday, 8 a.m. to 4:30 p.m. (11 Ky.R. 1556; eff. 5-14-1985; Am. 15 Ky.R. 628; eff. 9-21-1988; 18 Ky.R. 3239; 19 Ky.R. 53; eff. 6-24-1992; 27 Ky.R. 2083; 2618; 29 Ky.R. 441; eff. 8-12-2002; 43 Ky.R. 1462, 1736; eff. 5-5-2017.)

Drip Irrigation Treatment and Disposal System Design Standards



CABINET FOR HEALTH AND FAMILY SERVICES
DEPARTMENT FOR PUBLIC HEALTH
DIVISION OF PUBLIC HEALTH PROTECTION AND SAFETY
ENVIRONMENTAL MANAGEMENT BRANCH

HS1C-D
275 EAST MAIN STREET
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Kentucky Department for Public Health
Drip Irrigation Treatment and Disposal System Design
Standards

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Drip Irrigation Treatment and Disposal System Design Standards

I. Introduction

A drip treatment and disposal system also called drip system is an alternative subsurface on-site wastewater system which utilizes small diameter pipe with uniformly spaced emitters to discharge pretreated effluent to the soil. Some of the system components resemble those used for agricultural or horticultural drip irrigation systems, but must meet the special design requirements for management of wastewater.

Components of a drip system typically include an advanced treatment unit that achieves at least secondary quality effluent treatment, dosing tank, dosing pump and control devices, effluent filter, distribution pipe, drip emitters, and field flush lines.

Key features of a drip system include:

- Design allows for dosing and resting cycles at conservative rates
- Uniform distribution of treated effluent
- Small uniform doses throughout the day encourage aerobic conditions and promotes higher absorption rates
- Effluent that has been treated to secondary levels by an advanced treatment unit and filter or like devices
- Shallow placement of tubing in root zones
- Increased evapotranspiration and nutrient uptake by plants

Since effluent is treated to a high degree before distribution to the drip tubing, drip systems may be desirable for areas where groundwater is used as a water supply. Users in other environmentally sensitive locations, such as in areas with karst topography, may also desire the enhanced system performance which drip systems can offer.

Grey-water only systems as described in 902 KAR 10:085 are exempt from these drip system requirements.

II. Design

1. Drip disposal systems may be a proprietary system where all components are selected and designed to work together and are offered as a complete package by the manufacturer and has been approved for general use in Kentucky, or
2. Drip disposal systems may be designed by a Professional Engineer, licensed in the state of Kentucky, in accordance with these regulations.

III. Advanced Treatment Quality

1. An approved primary treatment unit shall be required to treat the effluent to a minimum secondary quality effluent standard

2. The treatment type and quality must conform to the drip tubing manufacturers specifications
3. All treatment units must meet the minimum requirements of 902 KAR 10:081 and be approved for use in Kentucky
4. Any treatment process that uses air compressors, motors, or pumps must use an approved alarm device in the event of a malfunction

IV. Dosing Chambers

1. Dosing chambers shall meet all applicable requirements of 902 KAR 10:081 and 902 KAR 10:085

V. Pump Specifications

1. The pump shall be constructed of corrosion resistant materials and rated for sewage effluent use.
2. The pump shall be sized and designed to meet the manufacturer's design requirements for the drip tubing. This shall include maintaining the required pressure ranges of the tubing, maintaining flushing velocities throughout the system, and other hydraulic requirements.
3. Only timed-dosing of effluent shall be permitted. On-demand dosing will not be permitted.
4. The pumping system shall be capable of dosing the drip system a minimum of six (6) equally spaced doses over a 24-hour period. Each dose volume cannot exceed the daily wasteflow divided by the total number of doses. An example of this would be a total wasteflow of 360 gallons per day/6 timed doses = 60 gallons per timed dose.
5. Devices capable of accurate, consistent operation shall be used to provide the following:
 - a. A means of measuring cumulative flow of effluent to the drip system.
 - b. A means of counting and maintaining a cumulative log of high water level alarm events.
 - c. A means of counting and maintaining a cumulative log of timer override events or peak flow events.
 - d. Automatic flushing of drip tubing not less than once every 100 pump cycles. A flow velocity of a minimum of two (2) feet per second must be maintained.
6. All pumps and assemblies shall be installed according to the onsite regulations and shall meet the requirements of the National Electrical Code.
7. An electrician shall perform all electrical work, which shall meet the requirements of the National Electrical Code.
8. All electrical work shall be inspected and approved by the state electrical inspector having jurisdiction.
9. The pump shall be installed with a low water cutoff to prevent damage to the pump during low water conditions.

VI. Filter Specifications

1. All drip disposal systems shall incorporate a method of filtering the effluent after the secondary quality treatment process and before the drip tubing.

2. The filtering method shall be capable of filtering the effluent to 1/5 the size of the drip tubing orifice size or at least 100 microns, whichever is more restrictive
3. The filter shall remove solids from the effluent according to the drip tubing manufacturers specifications
4. The filter shall achieve the required filtration at a rate equal to or greater than the peak discharge rate, including filter and system backwash
5. The filter performance shall be certified by the filter manufacturer
6. The filter shall be made of material that is resistant to the corrosive effects of sewage effluent and rated for this use
7. The filter shall be readily accessible for inspection and service
8. The filter back flush volume and velocity must be maintained to the manufacturer's specifications or a minimum of two (2) feet per second
9. The filter shall be automatically backwashed each pump cycle and the residual material returned to the drip field dosing tank(s)

VII. General Specifications

1. The minimum installation depth of the drip tubing shall be six (6) inches and the maximum shall be twelve (12) inches
2. In all instances, a minimum of twelve (12) inches of vertical separation distance shall be maintained between the drip tubing and restrictive horizons, water tables, and rock.
3. The drip tubing shall be installed using a trenching machine or an approved plowing method.
4. The drip tubing shall not be installed using methods that utilize pulling or stretching of the tubing
5. The drip tubing shall contain pressure-compensating devices or regulators as needed to ensure equal distribution from all emitters at +/- 10% of the design discharge rate.
6. Drip tubing shall be installed parallel to the natural ground contours.
7. Drip tubing shall have not more than four (4) inches of elevation difference per one-hundred (100) feet of length.
8. The maximum length of an individual run of drip tubing shall not exceed the manufacturer's requirements
9. Elevation differences between individual lines and multiple fields or zones shall not exceed the manufacturer's requirements.
10. Vacuum breakers or air release valves shall be installed as required by the manufacturer's specifications or at least one per drip field or zone, to be located at the highest elevation in each given drip field or zone.
11. All valves shall be located in an enclosed valve box
12. All materials shall meet applicable ASTM standards and be resistant to common household chemicals.
13. Drip tubing must be certified by the manufacturer as designed and manufactured for the disposal of wastewater and be color coded for wastewater application.

14. Separation of drip lines shall meet manufacturer specifications or shall be at least 1.5 feet on centers.
15. All equipment or components susceptible to freezing shall be adequately protected
16. A means of automatically flushing the drip lines to prevent build-up of solids must be incorporated with the discharge returning to the drip field dosing tank(s)
17. The entire system must be capable of achieving a flushing velocity of a minimum of two (2) feet per second.
18. Automatic flushing of the system shall occur at a minimum of every 100 pump cycles or at the manufacturer specifications, whichever is more restrictive.
19. Drip system placement and setback requirements shall be in accordance with the Onsite Sewage Disposal Systems Regulations, 902 KAR 10:085
20. An area for replacement of 100% of the drip disposal field shall be available on the property.

VIII. System Sizing

1. Drip disposal systems shall be sized using the site evaluation standards as required by 902 KAR 10:085 and the following sizing table. Drip tubing linear footage is calculated by dividing the Total Daily Wasteflow (TDW) by the application rate and then dividing by 1.5 feet. An example would be as follows:
 - a. 360 gallons per day / 0.30 gallons per sq. ft. = 1,200 sq. ft.
 - b. 1,200 sq. ft. / 1.5 feet = 800 linear feet

LOADING RATE SIZING TABLE

TEXTURE	GPD / SQ. FT.
GROUP I sand loamy sand	0.50
GROUP II sandy loam loam	0.40
GROUP III sandy clay loam silt loam clay loam silty clay loam	0.30
GROUP IV sandy clay silty clay clay	0.10

2. Drip tubing emitters shall be spaced a minimum one (1) foot apart in the drip tubing or to meet manufacturer's specifications.

IX. Property Deed Attachment

1. The property owner shall incorporate the "Declaration of Covenants, Conditions, and Restrictions" form (DFS-450) into the property deed.

X. Training Requirements

1. All designers, certified installers, certified inspectors, and operators wishing to utilize drip disposal systems must be trained by approved manufacturers of drip systems. These individuals must be certified by the manufacturer as to meeting the minimum training qualifications to design, installation, regulation, and operation and maintenance.
2. Training shall include an instructional manual for each person as provided by the approved manufacturer that covers all aspects of the approved system. Such information shall include but not be limited to:
 - a. How the system works
 - b. Sizing and design
 - c. Construction and installation
 - d. Inspection procedures
 - e. Operation and maintenance requirements
 - f. Schematics of all system components
 - g. Schematics of typical system layout showing all components
 - h. Warranty information
3. A list of training class attendees who completed the certification class shall be supplied to Department for Public Health Environmental Management Branch (DPH EMB) after each class is completed

XI. Responsibilities and Permitting Procedures

1. The manufacturer shall provide a two (2) year limited warranty to the owner from the date of installation covering all parts and materials
2. The owner of the system shall be responsible for establishing an Operation and Maintenance contract with a certified operator. Operation and Maintenance shall include, but may not be limited to, adjustment and servicing of mechanical, electrical, and other applicable components to ensure proper function and shall maintain a log with the following minimum information:
 - a. Owner's name, address, and location of the system
 - b. Percent flow variation observed
 - c. Cause of flow variation
 - d. Duration of flow variation
 - e. Dose volume
 - f. High water alarm counts

- g. Timer override counts
 - h. Total water usage since previous service
 - i. Description of any malfunctions observed and corrective actions taken
 - j. Condition of lateral line area
3. The owner of the system shall ensure a management entity or certified operator is the responsible party for operating and maintaining the drip system according to the approved design, these standards, applicable statutes and regulations, and the manufacturer's specifications.
 4. The system owner may become certified to operate and maintain their own system provided they are trained and certified by the approved manufacturer. Proof of the certification must be submitted to the local county health department. The Operation and Maintenance shall include all items listed in item two (2) of this section.
 5. Drip system permitting shall be done by the local county health department based upon their satisfactory site evaluation and review of plans and specifications prepared in accordance with the manufacturer's specifications or engineer design, state statutes and regulations, and relevant local ordinances.
 6. The local health department shall inspect the entire system as to design and components along with an authorized manufacturer's representative or design engineer's representative. If the system is acceptable, a final approval shall be issued. An "as-built" final drawing shall be supplied by the certified installer at the time of the final inspection.
 7. It shall be system owner's responsibility to protect the system from physical damage after installation. This would include but not be limited to restricting vehicular traffic over the system, restricting building construction or pool construction, preventing freezing, eliminating excessive water use, providing an adequate grass cover or other adequate cover over the system, and providing for subsurface and surface water diversion away from the system.
 8. The local county health department shall be notified prior to the replacement or repair of any components of a drip system.
 9. Should a manufacturer's drip system fail to perform to the satisfaction of the DPH, the DPH may rescind or modify their approval. Prior to taking such action, the DPH shall notify the manufacturer in writing of the nature of the problem and the action the DPH intends to take.

PLAN SUBMISSION CHECKLIST FOR DRIP SYSTEMS

Project Name _____
 Address _____
 City/Zip _____
 County _____

Contact _____
 Phone _____
 Email _____

If an item is acceptable, place \checkmark in the box. If an item is **not** acceptable, place **X** in the box.

<u>ITEM</u>		<u>COMMENTS</u>
<u>ADVANCED TREATMENT</u>		
1. Treatment Unit	<input type="checkbox"/>	_____
2. Effluent Quality < 30 mg/l BOD & TSS	<input type="checkbox"/>	_____
3. Alarm	<input type="checkbox"/>	_____
<u>DOSING CHAMBERS</u>		
1. Construction & Design	<input type="checkbox"/>	_____
2. Watertight	<input type="checkbox"/>	_____
3. Sizing :		
Minimum 2 x TDW,	<input type="checkbox"/>	_____
OR		
Minimum 1 x TDW with		
Duplex Pump Setup	<input type="checkbox"/>	_____
4. Manhole Riser:		
Minimum 18" Diameter	<input type="checkbox"/>	_____
Extends Above Final Grade	<input type="checkbox"/>	_____
Tamper Resistant Lid	<input type="checkbox"/>	_____
Watertight	<input type="checkbox"/>	_____
Protected from Water Intrusion	<input type="checkbox"/>	_____
<u>PUMP</u>		
1. Effluent Use	<input type="checkbox"/>	_____
2. Corrosion Resistant	<input type="checkbox"/>	_____
3. Size & Design Maintains:		
Pressure Ranges of Drip Tubing	<input type="checkbox"/>	_____
Flushing Velocities	<input type="checkbox"/>	_____
Other Hydraulic Requirements	<input type="checkbox"/>	_____
4. Time Dosing	<input type="checkbox"/>	_____
5. Minimum 6 Doses/Day	<input type="checkbox"/>	_____

- 6. Doses Equally Spaced _____
- 7. Maximum Dose Volume: _____
 \leq TDW/ No. Doses
- 8. Flow Meter or Similar Device _____
- 9. High Water Alarm Events Recorded _____
- 10. Peak Flow Events Recorded _____
- 11. Low Water Cut-off _____
- 12. Verification of Electrician (NEC) _____

FILTER

- 1. Location _____
- 2. Solids Removal _____
- 3. Filtration Rate \geq Peak Discharge Rate _____
- 4. Performance Certified _____
- 5. Rated for Sewage Use _____
- 6. Corrosion Resistant _____
- 7. Readily Accessible _____
- 8. Backflush Velocity Minimum 2 ft/sec _____
- 9. Backwashed each Pump Cycle _____
- 10. Residuals Returned to Drip _____
 Field Dosing Tank(s)

INSTALLATION OF DRIP TUBING

- 1. 6" – 12" Depth _____
- 2. Minimum 12" vertical Separation _____
- 3. Pulling/Stretching Avoided _____
- 4. Pressure Compensating Devices _____
- 5. Lines: _____
 On Contour _____
 \leq 4" Elevation Difference/100 ft
 for Pressure Compensating _____
 Length \leq Manufacturer Requirement _____

 Elevation Difference Between Lines/
 Fields \leq Manufacturer Requirement _____

 Spacing: _____
 \geq 1.5 ft on Centers

- 6. Vacuum Breakers/Air Release Valves:
 - Minimum 1 per Drip Field _____
 - Located at Highest Elevation _____
- 7. Valves:
 - Enclosed Valve Box with Lid _____
- 8. Drip Tubing:
 - Orifice size stated _____
 - Certified for Wastewater Disposal _____
 - Color Coded for Wastewater _____
- 9. Drainback to Lower Lines Prevented _____
- 10. Components Protected from Freezing _____
- 11. Drip Flushing:
 - Automatic _____
 - Incorporated into Return Discharge _____
 - to Drip Field Dosing Tank(s) _____
 - Velocity \geq 2 ft/sec _____
 - Minimum of Once/100 Pump Cycles _____
- 12. Required Setbacks are Met _____
- 13. 100% Replacement Area _____

SIZING

- 1. Loading Rate (GPD/sq.ft.) _____
- 2. Linear Footage = (TDW/Loading Rate)/1.5 _____

PROPERTY DEED ATTACHMENT _____

TRAINING REQUIREMENTS

- 1. Instruction Manual _____
- 2. Class Composition List to DPH _____
- 3. Certified Persons Present at Installation _____
- 4. Certified Installer Name and Number _____

RESPONSIBILITIES AND PERMITTING PROCEDURES

- 1. Operation and Maintenance Contract:
 - Certified Operator, or _____
 - Responsible Management Entity, or _____
 - *Homeowner(*proof of training to LHD) _____
- 2. Log Information _____

OPERATION AND MAINTENANCE

- 1. Field Inspections _____
- 2. Log Information _____

MANUFACTURER RESPONSIBILITIES

- 1. Limited Warranty _____
- 2. Training _____
- 3. Service I.D. Label on Alarm _____

INSTALLATION CHECKLIST

DOCUMENTATION

- 1. Deed Restriction Attachment DFS-450 _____
- 2. Spec-type House Prohibited _____

LHD RESPONSIBILITIES

- 1. Site Evaluation _____
- 2. Plan Review _____
- 3. Permit Issuance _____
- 4. Inspections _____
- 5. Installer As Built Drawing at Final _____

OWNER RESPONSIBILITIES

- 1. Operation and Maintenance Contract _____
- 2. Log Information _____
- 3. Property Deed Attachment DFS-450 _____
- 4. Maintain System per Design _____
- 5. Protect System from Damage _____
- 6. Notify LHD Prior to System Repair _____
- 7. Certified to Operate w/ Proof of Training _____