

# SECTION 19

## ALTERNATIVE METHODS OF SUBSURFACE SEWAGE DISPOSAL

### A. Use of Alternative Systems

Alternative subsurface sewage disposal systems may be considered, at the discretion of the Department, on a site-specific basis on properties that have sites and soils suited for such use (See *Appendices 1, 3 and 4*).

***IMPORTANT NOTE:** Upon any and all alternative subsurface sewage disposal system installation sites, the use of a soil drainage improvement practice, as specified by the Department, shall be required, unless it is determined by a licensed soil scientist (either Department staff soil scientist or private licensed soil scientist) that said alternative system will not be adversely impacted by surface or subsurface waters due to the specific soil and site (i.e., landscape position, topography, etc.) conditions present on the property. Said determination shall be justified in writing on an individual case-by-case basis.*

### B. Alternative Systems Approved for Use

There are only ~~two (2)~~ three (3) methods of alternative subsurface sewage disposal approved by the Department: the Low Pressure Pipe (LPP) system, ~~and~~ the Mound system, ~~and the Drip system~~.

#### 1. Low Pressure Pipe Systems

A low pressure pipe system consists of a properly designed, one-piece, two compartment septic tank (in accordance with the provisions of *Sections 10 and 14*) and a pump tank (in accordance with the provisions of *Sections 10 and 18*), in conjunction with a network of small diameter perforated pipes, (1 to 2 inch Schedule 40 PVC), to be placed in natural soil at shallow depths in narrow trenches not less than six (6) inches wide. The system must be designed to fit the site in question. The design of each LPP system shall comply with the design and installation criteria as established by these regulations (in accordance with the provisions of *Appendix 3*) and any additional specifications as established by the Williamson County Department of Sewage Disposal Management and/or the Williamson County Board of Health.

#### 2. Mound Systems

A Mound system consists of a properly designed, one-piece, two compartment septic tank (in accordance with the provisions of *Sections 10 and 14*) and a pump tank (in accordance with the provisions of *Sections 10 and 18*), in conjunction with a network of small diameter perforated pipes, (one [1] to two [2] inch Schedule 40 PVC), placed in a seepage bed whose components consist of a mound of selected, imported sand and soils, placed upon the plowed layer of natural soil, in conjunction with a rock filtration bed for dispersal of sewage/effluent. The system must be designed to fit the site in question.

The design of each Mound system shall comply with the design and installation criteria as established by these regulations (in accordance with the provisions of *Appendix 4*) and any additional specifications as established by the Williamson County Department of Sewage Disposal Management and/or the Williamson County Board of Health.

#### 3. Drip Systems

A Subsurface Drip Disposal (SDD or Drip) System is a subsurface sewage disposal system, which utilizes pressurized drip irrigation line for the uniform application of treated wastewater throughout the disposal field. SDD systems are designed and installed to utilize the upper profiles of a suitable soils area through the uniform distribution of effluent, dosing and resting cycles, and shallow installation of the disposal line. The drip tubing is typically plowed (or knifed) into the natural soil profile at the proper depth; with no gravel surrounding the tubing. In addition to a properly designed, one-piece, two compartment septic tank (in accordance with the provisions of *Sections 10 and 14*) and a pump tank (in accordance with the provisions of *Sections 10 and 18*), SDD systems are preceded by an advanced treatment system (ATS) device (in accordance with the provisions of *Section 38*) capable of achieving secondary effluent treatment standards.

The design of each Drip system shall comply with the design and installation criteria as established by these regulations (in accordance with the provisions of *Section 39*) and any additional specifications as established by the Williamson County Department of Sewage Disposal Management and/or the Williamson County Board of Health.

## C. Design of Alternative Systems

1. The Department shall require that all alternative subsurface sewage disposal systems be designed by an engineer licensed in the State of Tennessee. Said engineer shall be licensed and registered in accordance with the provisions as set forth in *Tennessee Code Annotated, Title 62, Chapter 2*.
2. Alternative Systems Design Format

Any engineer preparing alternative system design plans for submission to the Department shall present said plans in the following format:

### (a) Part 1

The first page of the design plan shall consist of a cover sheet. The information presented on the cover sheet shall include, but shall not be limited to, the following:

- (1) The type of alternative system design plan being presented (e.g., LPP, MLPP, Mound or Drip System, etc.).
- (2) The location of the site where the alternative system design plan is proposed to be utilized. Denote any and all specific site location information.
  - (i) Subdivision Lot (i.e. platted lot).

Name of the platted subdivision, subdivision section number (where applicable) and the lot number.
  - (ii) Individual Tract of land (i.e. unplatted lot).

The Tax Map Number and the Parcel Number, and the Proper E 911 address.
- (3) The name, mailing address and telephone number (daytime) of the person for which the alternative system design plans have been prepared.
- (4) The name, mailing address and telephone number (daytime) of the design engineer (and the engineering firm, where applicable) who prepared the alternative system design plans.
- (5) The name of the person(s) who drafts the design and/or prepares the design and/or the engineer responsible for reviewing and certifying the design plans, if the system design was prepared by an individual other than an engineer licensed in the State of Tennessee (e.g. designed by someone under the direct supervision of a Tennessee licensed engineer).
- (6) The date the design was completed by the engineer, or the date that the design was reviewed and approved by an engineer licensed in the State of Tennessee. This date shall be considered by the Department to be the *prepared date*.
- (7) The seal/stamp and dated signature of the licensed engineer who designed or reviewed/certified the alternative system plans.

### (b) Part 2

This page of each plan shall consist of a drawing of the lot boundaries, based on recent boundary surveys, to a scale of one inch equals one-hundred feet (1" = 100'). Additionally, other details and items to be shown on this drawing shall include, but shall not be limited to, the following:

- (1) The platted building envelope, where applicable; otherwise, the house/structure location (proposed or existing).
- (2) The designated or platted subsurface sewage disposal system area.
  - (i) On platted lots, the design engineer shall choose and designate which platted disposal field areas are to be used for the primary and secondary system installations.
  - (ii) On unplatted parcels of land, the primary and secondary areas shall be chosen, designated and denoted in accordance with the provisions outlined in Subsection C, Part 6 of *Section 26*.
  - (iii) On vested plats and lots (refer to *Subsection J of Section 2*), the primary (#1) and secondary (#2) areas shall be denoted in accordance with the approved, vested plat information.

(3) Any other information that may be deemed necessary by the Department staff.

(c) Part 3

This page of each plan shall consist of a one inch equals one-hundred feet (1" = 100') scaled detail drawing of the lot. In addition to the property boundaries and all items outlined in the above *subpart (b)*, other details and items to be shown on this drawing shall include, but shall not be limited to, the following:

- (1) Actual location of the septic tank and pump tank.
- (2) Actual location of the supply line and manifold.
- (3) Effluent distribution network (*i.e.*, all lateral line locations for a LPP/MLPP or Drip system; or the limits of the Mound's basal area and its effluent distribution network) and all associated system details as being consistent with all shown elevations so as to fit within the boundaries of the aforementioned areas.
- (4) Any and all required soil drainage improvement practice(s) (*i.e.* interceptor, curtain or drawdown drains, etc.); said soil drainage improvement practice(s) shall be shown in accordance with and consistent with the approved plat. On vested plats/lots (refer to *Subsection J of Section 2*) or unplatted lots, the required soil drainage improvement practice information shall be presented as outlined in *Section 26, Subsection A, Part 3 (g)*.
- (5) Any other pertinent information regarding the system.

(d) Part 4

This page shall consist of a one inch equals thirty feet (1" = 30') to one inch equals fifty feet (1" = 50') scaled detail drawing of the lot. In addition to the property boundaries and all items outlined in the above *subparts (b) and (c)*, other details and items to be shown on this drawing shall include, but shall not be limited to, the following:

- (1) House/structure location (proposed or existing), within the designated or platted building envelope where applicable.
- (2) Driveways, proposed or existing.
- (3) Location of any existing overhead or underground utilities.
- (4) Proposed routing of any overhead or underground utilities.
- (5) Actual, field run, ground surface elevation contours of the design site, shown at a minimum contour interval of two (2) feet. At the Department's discretion, lesser contour intervals may be required to adequately define the topography associated with said design site.

- (i) On platted land parcels being two (2.00 ac) acres, or less, in size:

The graphically represented, actual ground contours shall encompass the entire extent of the platted land parcel.

- (ii) On platted land parcels being greater than two (*i.e.* 2.01+ ac) acres in size:

As a minimum, the graphically represented, actual ground contours shall:

- a. encompass and extend twenty-five (25) feet beyond the limits of the entire platted alternative subsurface sewage disposal system areas;
- b. encompass the entire land area to be allocated for the soil drainage improvement practice (*e.g.* curtain drain, etc.);
- c. encompass and extend thirty (30) feet beyond the limits of the entire house or structure site;
- d. encompass a twenty (20) foot wide corridor in which the entire supply line is to be routed regardless of the distance of separation.

(iii) On unplatted land parcels:

As a minimum, the graphically represented, actual ground contours shall be the same as outlined in the above *subpart (d)(5)(ii)*.

(iv) In lieu of the graphically represented minimum ground surface elevation contours required in the above *subpart (d)(5)(i)-(iii)*, the following information may be considered satisfactory:

- a. a table containing an elevation schedule of the house or structure site, the tank locations, the highest and lowest point of the supply line, and each and every lateral line location; each of these points must be field staked/flagged and labeled so as to correspond to the provided elevation schedule table;
- b. a graphical elevation profile of the entire soil drainage improvement practice route (e.g. curtain drain route, etc.); elevation points shall be obtained at regular intervals sufficient to adequately define the profile and ensure a positive flow discharge outlet is provided according to the required minimum depth; each of these points must be field staked/flagged and labeled so as to correspond to the provided elevation profile;
- c. a graphical elevation profile of the entire supply line route from the pump tank outlet to the manifold; elevation points shall be obtained at regular intervals sufficient to adequately define the profile with regards to the highest and lowest points and the extremes of any undulating topography; each of these points must be field staked/flagged and labeled so as to correspond to the provided elevation profile.

***IMPORTANT NOTE:** Site specific slope configurations (e.g. sites composed of complex/compound slope configurations or extremely flat/level land parcels, etc.) may necessitate extensive topographical evaluation to properly define the area. Thus, the design engineer shall be required to take as many elevation shots as necessary to adequately define the slope or slopes associated with the design site. Upon the completion of a field review, should the Department staff deem that an insufficient number of elevation points were measured, the design shall be returned to the design engineer for correction of said deficiency.*

All topographical data shall be either based upon an assumed datum, relative to a known point on the site (e.g. established lot corner) or based upon the data from an actual USGS benchmark, where present.

***IMPORTANT NOTE:** The use of any previously prepared or pre-existing topographic data (i.e. topographic maps, site plan elevations or contours, drainage plan elevations or contours, grading plan elevations or contours, etc.) shall not be acceptable for this purpose.*

- (6) Any additional existing items of concern regarding the installation must be illustrated and noted (e.g., surface drainage ways, unsuitable soil areas, fill material areas, or soil remediation/improvement practices required by the soils map or the Department, etc.).

(e) Part 5

This page(s) shall consist of a work sheet showing all design calculations for the primary area, including but not limited to:

- (1) Daily flow projections.
- (2) Soil load rates (from the appropriate tables in these regulations).
- (3) Installation area requirements (square footage requirements, LPP, **Drip** or Mounds).
- (4) Linear footage requirements (for LPP **or Drip** systems).
- (5) Gravel requirements (i.e., amount, type, and size of gravel).
- (6) Sand specifications and requirements (i.e., for Mound systems).
- (7) Septic tank and pump tank sizes.
- (8) Dosing and distribution requirements.

- (9) Pump specifications (*i.e.*, pressure head, friction head, elevation head, total head, etc.).
- (10) Pump selection.
- (11) Dosing volume.
- (12) Float switch settings.
- (13) Check valve calculations and requirements.
- (14) Any other pertinent calculations necessary for a properly engineered alternative subsurface sewage disposal system design.

When tabulated information is used during the calculation process, the exact reference of where this information was obtained must be noted.

(f) Part 6

This page(s) shall consist of a work sheet showing all design calculations for the secondary system. The information in this part shall be consistent with the provisions outlined in the above *subpart (e)* regarding the design calculations work sheet for the primary system.

(g) Part 7

This page(s) shall contain a complete and detailed summary of all design calculations and specifications for both the primary and the secondary systems. This part sheet may be in the form of a consolidated answer sheet from all calculations and specifications required for a properly engineered alternative subsurface sewage disposal system design.

(h) Part 8

This page(s) shall consist of a copy of the soils map of the design site, shown on a scale of one inch equals one-hundred feet (1" = 100').

Where soil pit profile descriptions are utilized for a Drip system design, this part shall also consist of a copy of the approved soil pedon description documentation, in addition to the soil map.

Where percolation test data is utilized for an alternative system design, this part shall consist of a copy of the approved percolation test documentation, in lieu of the soil map. The approved percolation test documentation includes: a copy of the Department form – *Report of Soil Absorption Test*, the 1"=100' plat showing exact location of the percolation test site and the associated report from a Department Soil Scientist.

*NOTE: The Department strongly recommends that the design engineer procure all pertinent soil information from their client or the responsible soil consultant. The design engineer may review the Department's soil information (*i.e.*, soil map, percolation test documentation, etc.) at the Department's offices during normal business hours, however, none of the aforementioned information shall leave the Department's offices nor be loaned. Furthermore, photocopied, faxed or other such duplicated soil information shall not be considered valid for design purposes; original soil information shall be the only type considered valid by the Department.*

(i) Part 9

This page(s) shall contain the pump specifications with a copy of the pump capacity performance curve for the particular pump specified. The actual pump design criteria (total flow and total dynamic head) shall be plotted on the pump performance curve to demonstrate adequate pump sizing.

(j) Part 10

This page(s) shall consist of typical effluent distribution network detail drawings, which includes, but is not limited to: drawings of the manifold line to lateral line connections, drawings of the valve arrangement and drawings of the lateral line turn-up, etc.

(k) Part 11

(1) LPP and Drip Systems

This page(s) shall contain all lateral line trench detail drawings and related notes. Additionally, any site specific restrictions, notes, or existing items of concern regarding the lateral line trenches or their installation shall be noted here.

(2) Mound Systems

This page(s) shall contain detail drawings of the mound cross-sectional view and the mound plan view (showing all pertinent dimensions) and all related notes. Additionally, any site specific restrictions, notes or existing items of concern regarding the mound and its installation shall be noted here.

(l) Part 12

This page(s) shall contain all soil drainage improvement practice (i.e. interceptor, curtain or drawdown drains, etc.) detail drawings and related notes. Additionally, any site specific restrictions, notes or existing items of concern regarding the soil drainage improvement practice or its installation shall be noted here.

(m) Part 13

This page shall consist of cross-section and detail drawings of pump tank set-up.

(n) Part 14

This page(s) shall consist of general notes regarding installation and construction techniques, site preparation, and any site specific restrictions or notes concerning the proposed system.

(o) Part 15

This page(s) shall consist of a complete materials supply list, specifying the exact type, size, quantity and description of all required parts, supplies and materials required for the construction of the alternative system being designed.

#### **D. Department Review of Alternative System Designs**

All alternative system design plans submitted to the Department shall be reviewed by the Department's Design Reviewer-Director. Once this review has been completed, the design plans shall be either approved or disapproved. The design engineer will be notified accordingly.

#### **E. Correction of Submitted Design Deficiencies**

For any alternative system designs that have been disapproved by the Design Review Director-Department and found to have any type of deficiencies, the design engineer shall be contacted and advised of the need for corrections. The design reviewer shall denote all discovered design deficiencies in order to aid the system designer in the correction of said deficiencies.

Once any and all deficiencies have been corrected, the alternative system designer shall re-submit a complete set of revised design plans (i.e., in their entirety). The re-submitted design plans shall then start at the beginning of the review process in accordance with *Subsection D of this Section*.

#### **F. Design Engineer's Responsibilities Regarding the Implementation of an Alternative System Design**

Once an alternative system design has been approved by the Department, that design plan shall be followed exactly by the system installer. Due to the fact that some design plans require exacting attention to detail in their implementation, the Department may require that the engineer provide on-site construction supervision and/or inspection of the installation. Should such actions be deemed necessary, the design engineer shall be notified by the Department.

The Department shall outline the particular aspects of the design that will require the engineer's supervision and/or inspection. The Department may require, as it deems necessary, that the engineer provide written documentation outlining his/her observations, findings and/or recommendations.

## **G. Validity and Expiration of Approved Alternative System Design Plans**

1. All alternative subsurface sewage disposal system design plans, whether approved or unapproved by the Department, either on file in the Department offices or in the possession of private individuals, that were prepared prior to January 1, 1993 shall be considered null and void.
2. All alternative subsurface sewage disposal system design plans, whether approved or unapproved by the Department, either on file in the Department offices or in the possession of private individuals, that were completed between January 1, 1993 and *the effective date of the adoption of these regulations*, shall be considered invalid until said design plans have been reassessed and approved for use by the Department. Where any said design plans are found to be deficient, those plans shall be deemed invalid and new design plans shall be prepared and submitted to the Department in accordance with all provisions of this section and these regulations.
3. *After the effective date of the adoption of these regulations*, all alternative subsurface sewage disposal system design plans, whether approved or unapproved by the Department, either on file in the Department offices or in the possession of private individuals shall have an expiration date effective three (3) years from their *prepared date* (i.e., the date indicated by the design engineer as per *Subsection C, Part 2, Subpart (a)(6) of this Section*). Design plans with mature expiration dates shall be considered null and void. For any site or property affected by expired design plans, new design plans shall be prepared and submitted to the Department for review and approval. All newly prepared designs shall be prepared in accordance with these regulations.

**IMPORTANT NOTE:** *The Department shall have the authority to require the reassessment of any alternative system design plans where the Department deems such verification necessary.*