REGULATIONS GOVERNING

ON-SITE SEWAGE DISPOSAL SYSTEMS

OF THE

WILLIAMSON COUNTY

DEPARTMENT OF SEWAGE DISPOSAL MANAGEMENT

AS OPERATED UNDER THE AUSPICES
OF THE
WILLIAMSON COUNTY BOARD OF HEALTH

WILLIAMSON COUNTY, TENNESSEE

ADOPTED MAY 16, 2000

Effective September 1, 2000
Revised Effective Date: October 1, 2000

CERTIFICATION OF ADOPTION

Williamson County

Board of Health

The Board of Health of Williamson County, Tennessee formally adopted the "Regulations Governing On-Site Sewage Disposal Systems of the Williamson County Department of Sewage Disposal Management" by unanimous vote on the 16th day of May, 2000, which shall become effective and implemented on September 1, 2000.

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Clint Callicott
County Executive
Chairman of the Board of Health
Williamson County, Tennessee

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Date	**Section/Appendix**	**Topic**
September 19, 2000	Title Page	Revised the effective date of the regulations.
September 19, 2000	List of Amendments	Added this page in the front of the regulations.
September 19, 2000	Section 2	Added *Subsection J* regarding vested interests in approved documents.
September 19, 2000	Section 8	Edited *Subsection A, Part 1* regarding area identification and sequence of use.
September 19, 2000	Section 19	Revised reference noted in *Subsection C, Part 2, Subpart (b)(2)(iii)* regarding vested plats and lots.
September 19, 2000	Section 26	Edited typographical error in *Subsection C, Part4, Subpart (a).*
September 19, 2000	Section 26	Deleted *Subsection F* regarding vested plats and lots.
September 19, 2000	Appendix 5	Revised references noted in *Subsection C, Part 4* regarding vested plats and lots.
September 19, 2000	Appendix 5	Edited typographical error in *Subsection C, Part 4* resulting in positioning shifts to the remainder of the appendix.
February 19, 2002	Section 24	Deleted *Subsection B, Part 4* in its entirety and replaced with revised language effectively eliminating the requirement for an executed agreement.
June 1, 2005	Section 3	Added definition for “bedroom” which thus, resulted in positioning shifts and re-numbering of the remainder of the section.

SECTION 1

INTRODUCTION

A. Purpose

The Williamson County Board of Health finds and declares that the installation of septic tank systems and other types of sanitary subsurface sewage disposal systems in a faulty or improper manner and in areas where unsuitable soil and population density adversely affect the efficiency and functioning of these systems, has a detrimental effect on the public health and environment through contamination of land, groundwater and surface waters. Recognizing, however, that sewage can be rendered ecologically safe and the public health protected if methods of on-site and subsurface sewage collection, treatment and disposal are properly regulated and recognizing that sanitary sewage collection, treatment and disposal will continue to be necessary to meet the needs of an expanding population, the Williamson County Board of Health intends to ensure the regulation of on-site and subsurface sewage collection, treatment and disposal systems so that these systems may continue to be used, where appropriate, without jeopardizing the public health and well being.

Thus, the purpose of these regulations is to establish requirements regarding the permitting, approval, design, installation and use of on-site and subsurface sewage treatment and disposal systems; to establish requirements for persons engaged in septic tank manufacturing, installing and in sewage tank pumping; to regulate the development of subdivisions that shall require the use of on-site subsurface sewage disposal systems (i.e. outside of areas served by public or municipal sewer treatment systems), to the extent necessary for the protection of the public health and well being through the submittal and approval of required reports, legal documents, plans and specifications, test reports, technical data and any other required documents as deemed necessary by the Williamson County Department of Sewage Disposal Management to ensure compliance with all applicable sewage treatment and disposal, laws and regulations of Williamson County and by the State of Tennessee.

B. Commentary

Throughout these regulations, paragraphs or sections labeled “Important Note”, “for example”, “i.e.”, “Note” or “e.g.” are included to ensure a complete understanding of the purpose and reasoning of the Williamson County Board of Health in adopting that particular paragraph or section of the Regulations. Each commentary is intended as an official statement of legislative finding or purposes, and shall serve as a guide to the administrative and judicial interpretation of the Regulations. The commentaries have been legislatively adopted together with the more formal text of the Regulations and shall be treated in the same manner as other aspects of legislative history.

SECTION 2

STATUTORY AUTHORIZATIONS AND ENFORCEMENT

A. Statement of Authority

The Department of Sewage Disposal Management of Williamson County is empowered to regulate subsurface sewage disposal in accordance with Tennessee Code Annotated Title Sixty-Eight, Chapter Two Hundred Twenty One, Part Four, which reads in part:

(a) It is the duty of the commissioner to:

(10) Enter into an agreement or contract with county health departments whereby the departments would implement the provisions of this part of its equivalent in their respective areas or jurisdiction.

In conjunction with the *Tennessee Code Annotated*, Williamson County chose to enter into such agreement and did in fact execute such agreement in January of 1993.

In accordance with *Tennessee Code Annotated Title Sixty-Eight, Chapter Two*, the Department of Sewage Disposal Management is governed by the Board of Health of Williamson County, who in turn, has the power to promulgate all regulations, rules, and policies of the Department of Sewage Disposal Management, which includes any power to grant a variation of such rules if deemed necessary by the Board of Health.

Pursuant to *Tennessee Code Annotated Title Sixty-Eight, Chapter Two Hundred Twenty-One, Section Four Hundred Eleven*, in the event that any local regulations or rules or any private acts governing subsurface sewage disposal are more stringent than those rules or regulations promulgated under this Section, then the regulations or rules that are more stringent and better protect the health, safety, and welfare of the citizens control and are binding.

B. Jurisdiction

Williamson County Government has jurisdiction over all proposed or existing septic system installations within the boundaries of Williamson County. In addition to the lands governed by the County, this jurisdiction also includes all land areas contained within the boundaries of the incorporated cities and towns which lie within the county. Thus, the Department of Sewage Disposal Management is the agency charged with the implementation, interpretation, and enforcement of the regulations set forth within this document within the aforementioned geographical area.

C. Severability

If any provision or application of any provision of these rules/regulations is held invalid, that invalidity shall not affect other provisions or applications of these rules/regulations.

D. No Implied Guarantee

Issuance of a permit to construct or permit to repair for an onsite sewage disposal system, and subsequent approval of same by representatives of the Department shall not be construed as a guarantee or warranty that such systems will function satisfactorily for any given period of time. Due to variables influencing system function which are beyond the scope of these Regulations said representatives do not assume any liability for damages which are caused or which may be caused, by malfunction of such system.

E. Variances

The Board of Health shall be empowered to grant variances to the requirements of these Regulations in situations when the strict application of such requirements would create a unique or unfair burden upon those affected. Variances may be authorized only when it can be reasonably demonstrated that no hazard to public health and safety, no nuisance, and no degradation of the natural environment will result.

1. Procedure For Variances

(a) Application

An application from any property owner, including a tenant, or by a governmental officer, department, board, or bureau, shall be filed with the Director and reviewed by the Board of Health.

(b) Filing

(1) The Director or designee shall inform an applicant, or interested party, of the procedure to apply for a variance.

(2) The applicant shall complete the required forms, providing all information requested by the form, and any additional information that is reasonably necessary as requested by the Director.

(3) The Director shall transmit the completed application form, along with all Department documents on the matter, to the Board of Health.

(c) Fee

Each application for a variance from the Regulations shall be accompanied by a fee payment, as set by the Board of Health, to cover the cost of the procedure.

(d) Public Hearings

(1) The Board of Health shall hold a public hearing as provided in this Subsection. The Board of Health shall fix a reasonable time for the hearing of an application and shall give the following notice: at least ten (10) days notice shall be given of the time, place, and purpose of such hearing in a newspaper of general circulation of the County.

(2) At the Hearing, any party may appear, in person or by agent or attorney.

(e) Stay of Proceedings

An application for a variance shall stay all proceedings furthering enforcement of any sections of the Regulations from which the applicant is requesting a variation, unless the Director certified to the Board of Health, after notice of application shall have been filed with the Director, that by reason of facts stated in the certificate, a stay would, in the Director's opinion, cause imminent peril to life or property. In such case, proceedings shall not be stayed otherwise than by restraining order which may be granted by the Board of Health or by a court of record, on application, after notice to the Director and on due cause shown.

(f) Board of Health's Decision

The Board of Health shall issue a report containing a finding of facts and a decision either granting or denying the variation.

(g) Repeated Applications

If an application is disapproved by the Board of Health, thereafter the Board of Health shall not be required to consider another application for substantially the same proposal, on the same premises, until after one (1) year from the date of the disapproval.

If, upon reapplication, the Board of Health's original decision is modified or reversed, the Board of Health shall provide a written record of its findings of fact indicating the reasons for modification or reversal.

2. General Standards for Variances

(a) General

Where by reason of the site, soil, topographic conditions or other extraordinary situation or special condition of such parcel of land in question, the literal enforcement of the requirements of these regulations would make it exceptionally difficult, if not impossible, to comply with the exact provisions of these regulations and would cause unwarranted hardship and injustice, unnecessary to carry out the purpose and intent of these Regulations, the Board of Health shall have the power upon appeal, filed as provided in *Section 25* to authorize such variance from the terms of these regulations as will not be contrary to the public interest and will relieve such hardship, so that the purpose and intent of these regulations shall be observed and substantial justice done.

(1) No variance in the provisions or requirements of these regulations shall be authorized by the Board of Health unless it finds, by clear and convincing evidence, that all the following facts and conditions exist:

(i) There are exceptional or extraordinary circumstances or special conditions applying only to the property in question.

By virtue of unique or special conditions, it is impossible to place a use on the property. If these conditions apply generally to other properties in the same circumstances, then a special condition does not exist.

(ii) Substantial property rights enjoyed by other property owners in the same circumstances and in the same vicinity cannot be enjoyed by the applicant.

(iii) The authorization of a variance will not be of substantial detriment to adjacent property and will not be contrary to the health, safety, and welfare of the citizens of this County or contrary to the purpose of these regulations.

(2) No grant of a variance shall be authorized unless the Board of Health specifically finds that the condition or situation of the specific piece of property for which a variance is sought--one or the other, or in combination--is not of so general or recurrent a nature as to make reasonably practicable the formulation of a general regulation for such conditions or situations, to be adopted by the Board as an amendment to these regulations.

(b) Conditions of Approval

In authorizing a variance, the Board of Health may attach thereto such conditions regarding the location, character, and other features of the proposed system or use as it may deem necessary in the interest of furthering the purposes of these regulations and in the public interest. In authorizing a variance, with attached conditions, the Board of Health shall require such evidence and guarantee or bond as it may deem necessary to ensure compliance with the attached conditions.

(c) Limited Effect of a Variance

Where the Board of Health approves a variance under these regulations, such approval shall give the property or system any status other than that which it may already have had. Granting of a variance shall neither qualify any adjacent property for any special treatment such as a variance, nor shall there be another substantial change of the system or its use without approval of the Board of Health.

F. Amendments to Regulations

1. The approval of an amendment to these regulations by the Board of Health shall be preceded by a finding that a change meets one of the following required tests and is needed for one of the following reasons:

(a) Amendments are needed to achieve the desired objectives of the regulations; or

(b) The health, safety and welfare of the citizens of Williamson County require the amendment.

2. The procedure for amendments shall be as follows:

(a) Any Board of Health member may propose a change or an amendment or a supplement to these regulations by a motion to amend. An approval by a majority vote of the quorum of the Board of Health is required to amend these regulations.

(b) Such change, amendment or supplement and any data or information in support of such change, amendment or supplement shall be provided to the public fifteen (15) days prior to consideration by the Board of Health by public notice.

(c) Any member of the Board of Health may request information or comment from the staff of the Department of Sewage Disposal Management on the amendment.

(d) A public hearing shall be conducted at the Board of Health meeting wherein a motion to amend shall be considered.

G. Revocation of Approval

When any lot has been approved, such approval may be revoked when:

1. In the sole opinion of the Board of Health, conditions of any lot have so changed, or in the actual use of on-site waste disposal system on other lots in vicinity of subject lot has shown that the use of on-site sewage systems on such lot would become an menace to the public's health.

2. The subject lot is not being developed in accordance with provisions of these Regulations or conditions of approval.

3. Information submitted for approval was falsified by the applicant or submitting professional.

4. New information is discovered showing the site to be unsuitable for on-site sewage disposal.

5. An on-site sewage disposal system is not being or has not been installed as approved by the Board of Health.

H. Additional Conditions

The Board of Health, or its delegate, may require compliance with requirements other than those contained herein, when such requirements are deemed essential by the Board to maintain safe and sanitary conditions. The Board may approve the use of new or innovative technologies, when deemed appropriate, and set such conditions for their use as may be necessary.

I. Violations and Penalties

1. In order to minimize the possibility of endangering the health and welfare of the public and/or the development of esthetically offensive conditions, subsurface sewage disposal systems shall be so located, constructed and maintained that wastes discharged to or from such systems:

   (a) Do not contaminate any drinking water supply;

   (b) Are not accessible to rodents, insects or other potential carriers of disease;

   (c) Do not pollute or contaminate surface or ground water;

   (d) Are not a health hazard by being accessible to the general public;

   (e) Do not cause a nuisance due to odor or unsightly appearance; and

   (f) Will not violate any other laws or regulations governing water pollution or sewage disposal.

   Tenn. Code Annotated § 68-221-401.

2. It is unlawful for any person to:

   (a) Begin construction or construct any house or establishment, mobile or permanent, to be served by a subsurface sewage disposal system prior to approval of plans for the proposed location of the house or establishment and location of disposal system on the lot and approval of the specific lot as to its suitability for construction of the subsurface sewage system by the Department;

   (b) Begin construction or construct any house or establishment, mobile or permanent, in a subdivision until the subdivision plans have been approved by the Department;

   (c) Construct, alter, extend or repair subsurface sewage disposal systems prior to securing a permit from the Department;

   (d) Construct, alter, extend or repair subsurface sewage disposal systems in violation of the provisions of the permit;

   (e) Engage in the business of removing accumulated wastes from subsurface sewage disposal systems unless a permit has been secured from the Department;

(f) Engage in the business of removing wastes from subsurface sewage disposal systems and dispose of such wastes in any place and manner that do not meet the approval of the Department;

(g) Dispose of sewage of effluent from subsurface sewage disposal system into any existing or abandoned well or well dug or drilled for that purpose, caves, sinkholes, ditches, streams or surface of the ground; or

(h) Engage in the business of constructing, altering, extending or repairing subsurface sewage disposal systems prior to securing a permit for such business from the Department.

Tenn. Code Annotated § 68-221-406.

3. The Board of Health or its delegate may cause the enforcement of any standards, policies, general or special orders, rules or regulations issued by it to control subsurface sewerage systems.

   Such suit or suits as may be necessary to effectually carry out the provisions of this part may be instituted, brought and prosecuted, in any court of competent jurisdiction.

   The district attorney general in whose jurisdiction a violation of this part occurs or the attorney general and reporter, either or both as indicated, shall institute and prosecute such suits when necessity therefor has been shown by those herein clothed with power of investigation.

4. Any person violating any of the provisions of this part, or failing, neglecting or refusing to comply with any order of the department lawfully issued, commits a Class C misdemeanor. Each day of continued violation after conviction constitutes a separate offense.

   Tenn. Code Annotated § 68-221-107.

J. Vested Interests in Approved Documents

All final plats recorded in the Williamson County Register of Deeds office as of the effective date of these regulations shall be governed by the subsurface sewage disposal system regulations in effect as of the date of recordation of the plat. All preliminary plats approved by the Williamson County Regional Planning Commission shall be governed by the subsurface sewage disposal system regulations in effect as of the date of approval by said Planning Commission. If a sketch plan contains a section with a preliminary plat approval by the Williamson County Regional Planning Commission, that sketch plan shall be governed by the regulations in effect as of said Planning Commission's approval date. All other sketch plans shall be governed in their entirety by these regulations.

Any amendment to a preliminary plat that has been approved by the Williamson County Regional Planning Commission or any amendment to a final plat that has been recorded in the Williamson County Register of Deeds office which creates any additional lots on that plat, then those lots affected in any way by the amendment shall automatically forfeit this vested interest and shall be subject to and governed in their entirety by these regulations.

All plans and related documents governing installation of a specific subsurface sewage disposal system shall be governed by the subsurface sewage disposal system regulations in effect on the date of approval of those plans by the Department.

All permits and related documents governing installation of a specific subsurface sewage disposal system shall be governed by the subsurface sewage disposal system regulations in effect on the date of issuance of the permit for that system.

Any amendments to approved plans or renewals of permits shall void any grant of vested interest, and such amended plans or renewed permit shall be governed in their entirety by the subsurface sewage disposal system regulations in effect as of the date of approval of the amendment or renewal of the permit.

SECTION 3

DEFINITIONS

(1) ***AASHTO*** - the American Association of State Highway and Transportation Officials.

(2) ***Absorption Field*** - see Disposal Field.

(3) ***Accessible Community Sewer*** - a public sewer system not limited for use because of physical or other features as determined by the Williamson County Board of Health.

(4) ***Affidavit*** - a written declaration made under oath before an official such as a notary public.

(5) ***Alternating Valve*** - a device utilized to direct effluent flow to either of two or more separate sections/cells of a conventional system absorption field. Alternating valves require periodic rotation by the homeowner in order to direct effluent from one section of the absorption field to the other. The use of said device is to allow for periodic resting/drying cycles for whichever field is not in use, thereby promoting longevity of the absorption fields.

(6) ***Alternative Methods of Disposal*** - a subsurface sewage disposal system, the construction, installation and operation of which varies from that of a conventional subsurface sewage disposal system. See *Section 19.*

(7) ***Alternative System*** - a general term used to describe either the Low Pressure Pipe (LPP) system or the Mound system, both of which are considered to be alternative means of sewage disposal.

(8) ***ANSI*** - the American National Standards Institute.

(9) ***Areal*** - pertaining to an area (i.e. an area of land).

(10) ***As-Built*** - documentation prepared by a licensed installer upon an official Department form, which illustrates the configuration, placement and dimensions of the installed system components, denotes and verifies the type and source of the materials and/or components utilized in the system construction and provides proof of the completion of the required electrical inspection (where applicable).

(11) ***ASME*** - the American Society of Mechanical Engineers.

(12) ***ASTM*** - the American Society for Testing and Materials.

(13) ***Backup Area(s)*** - see Duplicate Area(s).

(14) ***Bedroom*** – Bedroom for the purposes of determining the size of a subsurface sewage disposal system shall mean a room with certain features characteristic of bedrooms generally, which could include but are not limited to the following: reasonable access to a full bathroom on the same floor or within half a floor, if the house has a split level, adequate privacy to close off the room, and a minimum of 70 square feet in size. The presence or absence of a closet shall not be determinative of whether a room is to be deemed a bedroom. In the absence of evidence that conclusively establishes that a room is not a bedroom, the room in question may be deemed a bedroom. Any proposed future rooms that possess the characteristics of a bedroom set forth above must be included for purposes of determining the size of a subsurface sewage disposal system. The decision of the Department of Sewage Disposal Management regarding whether a room shall be deemed a bedroom shall be final and dispositive.

(15) ***Boundary Survey*** - a map with lines delineating the boundaries of the proposed area or parcel of land, drawn to a scale and degree of accuracy acceptable to the Department. This document must be prepared by a surveyor licensed by the State of Tennessee.

(16) ***Buffer Zone*** - the distance between subsurface sewage disposal systems or subsystems required to alleviate the impact of hydraulic overloading.

(17) ***Chemically Treated Sewage*** - sewage or waste containing human or animal excreta, in suspension or solution which has been treated by the addition of chemicals (solvents, caustic compounds, olfactory modifiers, etc in order to break down the fecal matter, liquefy solids content and mask odors). This applies but is not limited to waste generated from recreational vehicles, travel trailers, portable toilets, mobile comfort stations, and any other toilet facilities which rely on chemicals for their treatment methodology. Chemically treated sewage shall not be approved for treatment via subsurface sewage disposal system methodology.

(18) ***Construction Permit*** - a written authorization issued by the Department allowing one of the following: the construction, alteration, extension, or repair of a subsurface sewage disposal system.

(19) ***Controlled Distribution*** - a means by which, through the use of a device (e.g. a distribution box, pressure distribution manifold, etc.), equal volumes of effluent are allocated and apportioned to individual sewage disposal trenches or lateral lines of a subsurface sewage disposal system.

(20) ***Conventional Subsubsurface Sewage Disposal System*** - a system that pretreats sewage by use of a septic tank and applies effluent to the soil for disposal as described in *Section 15.*

(21) ***County*** - Williamson County, Tennessee and/or the Government thereof.

(22) ***Crossover Line*** - a closed pipe (non-perforated) laid on an undisturbed section of ground that conveys septic tank effluent from one trench of higher elevation to a subsequent trench at a lower elevation.

(23) ***Crown*** - an engineering term used to describe the top of a circular conduit or pipe.

(24) ***Crown*** (i.e., to crown with soil) - the configuration of the final grade over a subsurface sewage disposal field area into a convex shape to provide positive surface drainage in all directions away from said absorption field thus, preventing ponding or accumulation of surface waters. As such, the final grade shall be shaped (i.e., crowned) so that the area will shed, rather than accumulate surface water.

(25) ***Cut Soils*** - soils in which some portion of the soil profile has been mechanically removed (i.e. typically with a bulldozer) in such a manner that the subsoil is now exposed to the ground surface. Soils that have been cut are generally unsuited for the installation of subsurface sewage disposal systems. See *Cut Areas*, in *Appendix 1*.

(26) ***Department*** - the Williamson County Department of Sewage Disposal Management.

(27) ***Device*** - an apparatus constructed to serve a particular purpose. The Department use of this term is generally used to describe distribution boxes, pressure distribution manifolds, etc.

(28) ***Director*** - the Director of the Williamson County Department of Sewage Disposal Management, his duly authorized representative; and in the event of his absence or a vacancy in the office of the Director, the Deputy Director.

(29) ***Disposal Field*** - that portion of a subsurface sewage disposal system (either Conventional or Alternative) that directly distributes the septic tank effluent into the soil for absorption and treatment; the actual disposal field contains a trench system utilizing pipe and gravel to distribute the effluent to the soil beneath the ground surface; the disposal field area(s) may be either platted or unplatted.

(30) ***Disposal Field Trench*** - a trench, excavated to specified dimensions and filled with a specified amount of porous media (i.e. gravel) around a perforated pipe, in which sewage/effluent, from a septic tank or pump tank, is conducted for dispersion, absorption, filtration and disposal. This term is used to describe the disposal field component of a conventional septic system.

(31) ***Distribution Box*** - a box-shaped device designed and utilized to separate and distribute effluent flows in order to provide equalized dosing of individual absorption field trenches; it has an inlet hole, and several (3 or more) outlet holes. The inlet hole is situated such that its invert is set at a specified elevation in the box and the inverts of the outlet holes are all equally set at a lower specified elevation. With the device setting upon a level plane, the predetermined hole arrangement allows for the introduction of effluent into the box through the inlet hole and, as the liquid level rises, the subsequent equal dispersion of effluent through each individual outlet hole.

(32) ***Domestic Septage*** - either liquid or solid material located within or removed from a septic tank, cesspool, non-chemically treated portable toilet or treatment works facility that receive only domestic sewage. Domestic septage does not include liquid or solid material removed from a septic tank, cesspool, or similar treatment works that receives either commercial wastewater or industrial wastewater and does not include grease removed from any grease trap. Effluent (liquid or solid material) received from holding tanks, discharged from recreational vehicles or boats, or removed from chemically treated portable toilets is not considered to be domestic septage. See *Section 30.*

(33) ***Domestic Sewage*** - human excreta, all water carried wastes and normal household wastes generated from residences, offices, or other structures; domestic sewage does not include those waste waters containing chemicals, heavy metals, excessive grease, paints, solvents, pesticides, oils, or other harmful or hazardous non-biodegradable substances and materials.

(34) ***Domestic Wastewater*** - see domestic sewage.

(35) ***Drainage Improvement Practice*** - see Soil Drainage Improvement Practices.

(36) ***Duplicate Area(s)*** - the designated (either platted, or designated by the Department) area or areas platted or designated for subsurface sewage disposal that shall be utilized for future septic system repair installations for that property. Duplicate areas shall not be utilized for the initial septic system installation on any property. Duplicate areas are sometimes referred to as *backup areas* or *secondary areas*.

(37) ***Dwelling*** - any building utilized as a place for human inhabitation or as a place of residence requiring the use of subsurface sewage disposal system methodologies; examples of such buildings may include houses, apartments, etc.

(38) ***Easement*** - a right, as a right of way, afforded a person to make limited use of another's real property.

(39) ***Effluent*** - see Sewage/effluent.

(40) ***Effluent Brake*** - a device, constructed of PVC piping and fittings, placed between the end of a supply line and the inlet to first disposal field trench. The device is designed to reduce the energy or impact of the pumped effluent from the supply line before it enters the sewage disposal trench. See *Appendix 14.*

(41) ***Electrically Assisted System (EAS)*** - a term used to describe any type of subsurface sewage disposal system, in which a pump tank and a sewage/effluent pump are integral components of the septic system. See *Section 16.*

(42) ***Elevated Sand/Soil Filter*** - that component of a Mound system which receives and treats the effluent from the pump tank. This component acts in a manner similar to the disposal field of a conventional (field line trenches) or LPP (lateral lines) system.

(43) ***Emergency Relief Measures*** - temporary corrective measures, which can only be conducted by the property owner in an emergency situation as defined in *Section 24, Part A, Subpart 7(a) and (b)*. Such corrective measures are limited to clearing of obstructed piping, removal of tank access covers to alleviate sewage from backing up or other minimal attentions.

(44) ***Estimated Absorption Rate*** - the rate of soil permeability as assigned, to areas of soil assessed for potential usage for subsurface sewage disposal system installations, by an approved soil consultant. See *Appendix 1.*

(45) ***Experimental System*** - any type of subsurface sewage disposal system not specified within the context of these regulations. See *Section 5*.

(46) ***Fall*** - negative slope (i.e., downward) from horizontal level.

(47) ***Failing Septic System*** - a case where any type of septic system is malfunctioning, regardless of the cause, and/or sewage/effluent is being discharged upon the ground surface.

(48) ***Fill*** - excavated earth materials (i.e. soil and rock) transported (by any means, any amount of distance) and deposited upon the earth's surface through mechanical means.

(49) ***Filter Fabric*** - a man-made material, of natural or synthetic fibers, used to cover the gravel media in a disposal field trench. The fabric is utilized as a barrier to prevent soil material from settling into the void spaces of the gravel media.

(50) ***Grade*** - the rate of fall or rise of a pipeline or of the ground surface in reference to the horizontal plane.

(51) ***Grade Board*** - one (1") inch x six (6") inch lumber boards, installed and properly supported on edge in the bottom center of conventional subsurface sewage disposal system trenches to serve as both an aid in keeping the corrugated drain pipe level, and as a spacer to keep the pipe six (6") inches off of the trench bottom.

(52) ***Gravity (GF) Flow*** - the natural movement of water (i.e. via gravity) from a position of higher elevation to a position of lower elevation throughout the entire system.

(53) ***Gravity Flow System*** - a conventional subsurface sewage disposal system which relies upon gravity flow as a means of effluent dispersal throughout the entire system. See *Section 15, Subsection D*.

(54) ***Grease*** - animal fats or vegetable oils which are discharged to a sewage disposal system or accumulated in collection devices or traps that are associated with sewage disposal systems, conduits, sewers, plumbing fixtures, and attachments. However, this definition shall exclude petroleum products, lubricants, silicones and greases of mineral or synthetic origin.

(55) ***Grease Trap*** - a pre-treatment device designed to intercept and retain grease present in sewage or other wastewater.

(56) ***Holding Tank*** - an appropriately sized and constructed receptacle which is designed to receive and retain raw sewage prior to disposal, when a disposal site is not accessible. May also be referred to as a Storage Facility.

(57) ***Impermeable Material*** - any material which restricts the free movement of water, air, etc; (e.g., the plastic barrier placed along the downslope trench wall of a curtain or interceptor drain).

(58) ***Impervious Surface*** - any surface which restricts the free movement of water, air, etc and encroaches upon or is in such proximity to a subsurface sewage disposal system so as to adversely affect its proper function. In the context of these regulations this shall include, but shall not be limited to, gravel, compacted soil or clay, concrete, pavement, structures/buildings, parking areas, artificial turf, etc. that will potentially interfere with the natural treatment processes occurring within the subsurface sewage disposal system.

(59) ***Individual Lot Assessment*** - a land assessment service provided by the Department. The Department staff will attempt to locate a site on a parcel of land that will meet all provisions of these regulations to allow the permitting and installation of a conventional subsurface sewage disposal system. See *Section 27* and *Appendix 6*.

(60) ***Inlet*** - a conduit (e.g. crossover line) or circular opening (e.g. hole in a septic tank or distribution box) providing a means of entrance for sewage or effluent.

(61) ***Installation Restrictive Characteristics*** - those land features which could potentially hinder or negatively impact the proper installation of subsurface sewage disposal systems as described within the context of these regulations; such examples may consist of, but not be limited to: topographical considerations, landscape features and soil properties.

(62) ***Installer of Subsurface Sewage Disposal Systems*** - a person who installs, constructs, repairs, alters or extends a subsurface sewage disposal system. This person shall be licensed in accordance with *Section 24.*

(63) ***Invert*** - an engineering term used to describe the bottom of a circular conduit or pipe.

(64) ***Knockout*** - a potential access hole which is a thin section of concrete preformed in a septic tank which can be removed to allow insertion of a four to six inch diameter pipe.

(65) ***Land Assessment*** - the processes, practices and techniques utilized to evaluate the soils present on a parcel of land to determine whether or not those soils will support the installation of a subsurface sewage disposal system. This term is not to be confused with the term *Individual Lot Assessment (see definition)*.

(66) ***Lateral Line*** - a trench, excavated to specified dimensions and filled with a specified amount of porous media (i.e. gravel) around a small diameter PVC pipe (perforated at predetermined intervals), in which sewage/effluent, from a pump tank, is conducted for dispersion, absorption, filtration and disposal. This term is used to describe the disposal field component of a LPP septic system; as well as the disposal bed component of a mound system.

(67) ***Legend*** - a systemized identification list, required on all plats and soils maps, describing pertinent symbols and their related meanings.

(68) ***Level*** - (as in a trench) where by the elevation of the trench bottom at the inlet end, the trench bottom elevation at the outlet end and the elevation of the trench bottom at all points in-between are exactly the same; level as in flat or even along a horizontal plane; containing no rise or fall from one end to another or at all points in between.

(69) ***License*** - written authorization issued by the Department to individuals approved by the Department to engage in such businesses as stated, but not limited to the following: removal, disposal and treatment of accumulated wastes from subsurface sewage disposal systems, or those individuals engaged in the construction, alteration, extension, or repair of a subsurface sewage disposal system.

(70) ***Liquid Capacity*** - the actual or real holding capacity of a septic tank or pump tank and being measured as the volume of the tank, setting upon a level plain, being equal to the level of the invert of the tank outlet. The portion of the total tank volume, which exists above the invert of the outlet (i.e. the air-space of the tank), shall not be considered as being a portion of the liquid capacity of a tank.

(71) ***Lot*** - a part of a subdivision or a parcel of land intended for the building of a single house, building, or other development, as defined in the context of these regulations, where subsurface sewage disposal systems are proposed to be used.

(72) ***LPP System*** - a Low Pressure Pipe septic system; an alternative method of subsurface sewage disposal which pretreats sewage by use of a septic tank and applies effluent to the soil as described in *Appendix 3.*

(73) ***Manifold*** (pressure rated) - that portion of a pump-reliant subsurface sewage disposal system which receives effluent from the supply line and equally conveys it to all field or lateral lines for distribution throughout the absorption field trenches.

(74) ***Media*** - a substance (i.e. the gravel in a disposal field trench, lateral line or the sand and soil in a mound system) through which sewage/effluent is transmitted or carried.

(75) ***MLPP System*** - a Modified Low Pressure Pipe septic system; an alternative method of subsurface sewage disposal which utilizes low pressure pipe system technology in addition to requiring the importation and incorporation of compatible soil fill material to the absorption field as described in *Appendix 3*.

(76) ***Mound System*** – a Mound septic system; an alternative method of subsurface sewage disposal which pretreats sewage by use of a septic tank and applies effluent to the soil as described *Appendix 4*.

(77) ***NEC*** - the National Electrical Code (sponsored by the NFPA).

(78) ***NEMA*** - the National Electrical Manufacturer's Association.

(79) ***NFPA*** - the National Fire Protection Association.

(80) ***NRCS*** - the Natural Resource Conservation Service; a branch of the United States Department of Agriculture.

(81) ***NSF*** - the National Sanitation Foundation.

(82) ***Non-domestic Sewage*** - human excreta, all water carried wastes, and any other wastes generated from structures, which as a result of their operation, contain chemicals, heavy metals, greases, paints, solvents, salts, pesticides, herbicides, or other harmful or hazardous non-biodegradable substances; non-domestic sewage cannot be treated by subsurface sewage disposal system methodologies.

(83) ***Outlet*** - a conduit (e.g. crossover line) or circular opening (e.g. hole in a septic tank or distribution box) providing a means of exit for sewage or effluent.

(84) ***Oversized Bathing Fixtures*** - bathing fixtures (i.e. Jacuzzi tubs, garden tubs, whirlpool tubs, spa tubs, etc...) which exceed standard capacity (i.e. greater than 30 US gallons measured to the overflow drain or the maximum capacity) shall be considered oversized.

(85) ***Percolation*** - the movement, generally in a downward direction, of water through soil.

(86) ***Percolation Rate*** - the rate at which water moves into the soil as determined by a percolation test. See *Appendix 2.*

(87) ***Percolation Test*** - a method of determining the suitability of an area, proposed for subsurface sewage disposal use, by testing for the rate at which the undisturbed soil, utilizing a series of test holes, will absorb water per unit of surface area. See *Appendix 2.*

(88) ***Perforated Pipe*** - in reference to corrugated polyethylene pipe; pipe containing holes or slots/slits arranged in a uniform pattern throughout the pipe's entirety for the infiltration or exfiltration of water or wastewater; typical applications of this type of pipe, within the context of these regulations, include conventional system field line pipe and drainage pipe; See *Appendix 12*.

(89) ***Permit*** - see Construction Permit.

(90) ***Person*** - any and all persons, including individuals, firms, partnerships, associations, public or private institutions, municipalities, or political subdivisions, or officers thereof, departments, agencies, or instrumentalities, or public or private corporation or officers thereof, organized or existing under the laws of this or any other county, state or country.

(91) ***Pit Privy*** - a structure and/or excavation for the disposal of human excreta by non-water carriage methods.

(92) ***Plans*** - any documents required by the Department utilized in the process of carrying out these regulations. Plans may include, but not be limited to: affidavits, applications, boundary surveys, engineering designs, plats, site plans, soil maps and topographic maps.

(93) ***Plat*** - a map or other graphic representation drawn to a scale acceptable by the Department, of a piece of land subdivided into lots, showing, but not limited to: streets, waterlines, lot lines, sewage disposal areas, etc.

(94) ***Positive Drainage Outlet*** - the point at which the discharge from a drain will flow continuously away from the drain and shall not be impeded by natural, surrounding gradients or by any artificial means. This may necessitate the procurement of an off-site drainage easement in order to achieve the desired results.

(95) ***Positive Drainage Plan*** - a plan which shows how all free water, both surface and subsurface, is removed from an area (e.g. lot, subdivision, etc.) by gravity (even acquiring off-site easements where necessary).

(96) ***Pressure Distribution Manifold*** - a device constructed of PVC pipe, PVC pipe fittings and metal gate-valves, that will provide equally apportioned amounts of effluent to each individual conventional disposal field trench when the effluent is being pumped under pressure into the device.

(97) ***Primary Area*** - the actual physical land area, (either platted, or designated by the Department) that, on every property permitted for the installation of a subsurface sewage disposal system, shall be utilized for the initial septic system installation for said property.

(98) ***Projected Daily Wastewater Flow*** - the expected total daily volume sewage flow, expressed in gallons per day (gpd), discharged from any and all structures; this figure shall be used as the design flow rate for all system designs; See *Appendix 7*.

(99) ***Public Sewerage System*** - the conduits, sewers, and all devices and appurtenances by which sewage is collected, pumped, treated and disposed of all of which are owned and operated by a homeowners' association, municipality, utility district or other legally constituted agency of government.

(100) ***Pump (P) System*** - a term used to describe a conventional subsurface sewage disposal system, in which a pump tank and a sewage/effluent pump is an integral component of the septic system. Pump systems are utilized when the elevation of any portion of the designated conventional subsurface sewage disposal system area is located at a higher elevation than the invert of the septic tank outlet. See also *Electrically Assisted Systems.* See *Section 15, Subsection 8, Part (b)*.

(101) ***Pump Tank*** - an appropriately sized watertight receptacle which houses a sewage/effluent pump and stores sewage/effluent from a septic tank until it is pumped to a disposal field.

(102) ***PVC*** - a type of plastic made of polyvinyl chloride which is smooth, lightweight, resistant to corrosion, and chemically inert. The term is also used to describe the type of plastic products (i.e. piping, fittings, etc.) that are to be utilized in the construction of septic systems in Williamson County.

(103) ***Raw Sewage*** - all water-carried waste and excreta, the origin of which may be household, human or otherwise, in addition with any such ground or surface water as may be present which has not been properly treated and disinfected to such a degree which shall render it harmless, so as to pose no threat or danger to the health and well being of persons and/or the environment.

(104) ***Recertification*** - a service provided by the Department, for a specified fee, in which a representative of the Department makes an actual on-site investigation of a property having a structure being served by an on-site subsurface sewage disposal system (of any type) in order to determine whether or not the existing septic system is failing and if any portion of the system and its related duplicate areas has been encroached upon by any unauthorized structures or property improvements.

(105) ***Recertification Letter*** - a written report, in the format specified by the Department, containing the findings from a recertification investigation.

(106) ***Restriction*** - limiting conditions or constraints placed upon the use of a parcel of land where a subsurface sewage disposal system is proposed; said restrictions are required as a condition of Department approval.

(107) ***Restrictive Covenant*** - that document which restricts the use of a parcel of property(ies) by its owner and specifies the obligations and responsibility of the owner regarding said property. Said restrictive covenants run with the land.

(108) ***Rise*** - positive slope (i.e., upward) from horizontal level.

(109) ***SSPMA*** - the Sump and Sewage Pump Manufacturer's Association.

(110) ***Secondary Area(s)*** - see Duplicate Area(s).

(111) ***Septage*** - a combination of organic sludge, liquid and scum which accumulates in septic tanks.

(112) ***Septic System*** - another term for subsurface sewage disposal system.

(113) ***Septic Tank*** - an appropriately sized and constructed watertight receptacle which receives the discharge of sewage. Additionally, septic tanks shall be designed and constructed so as to permit the settling of solids from the liquid, digestion of organic matter by detention while retaining the floating solids, and discharging of the liquid portion.

(114) ***Septic Tank Effluent*** - see Sewage/effluent.

(115) ***Septic Tank Pumping Contractor*** - any person engaged in the business of removing or disposing of the sludge and liquid contents of septic tanks or holding tanks.

(116) ***Sewage*** - human excreta, all water carried wastes, and household wastes from residences, buildings, or commercial and industrial establishments. This includes, but is not limited to, domestic septage, raw untreated sewage and chemically treated sewage.

(117) ***Sewage/effluent*** - the partially treated liquid portion of the sewage which is discharged from a septic tank.

(118) ***Sinkhole*** - a closed depression in the land surface, generally in a region underlain by carbonate rock (typically limestone), connecting with subterranean passages developed by the solution of the joints and bedding planes in the bedrock.

(119) ***Sleeve*** - a section of PVC pipe of a larger diameter used to protect or encase another section PVC pipe of a smaller diameter; example: when a 2” PVC supply line is crossing under a driveway, it will be sleeved with a Section of 3” PVC.

(120) ***Slope*** - the rate of fall or rise of the ground surface in reference to the horizontal plane.

(121) ***Soil*** - a natural, three-dimensional body at the earth’s surface capable of supporting plants. It has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

(122) ***Soil Buffer Zone*** - term used to describe the additional soil area which surrounds the actual soil area utilized for the installation of the disposal field; the purpose of this additional soil area is to reduce the potential for hydraulic overloading to the soil within the confines/limits of the actual disposal field by providing a safety zone of permeable soil around said area.

(123) ***Soil Drainage Improvement Practices*** - synonymous with soil improvement practice. The Department use of this term is specifically used to describe soil improvement practices that specifically address and remediate soil drainage problems.

(124) ***Soil Improvement Practices*** - corrective techniques, within specified limits, to soil area(s) designed to overcome naturally occurring soil characteristic deficiencies in order to allow the successful utilization of said soils for subsurface sewage disposal system purposes; See *Appendix 1*.

(125) ***Soil Injection*** - the injection of domestic septage below the surface of the soil.

(126) ***Soil Incorporation*** - the disking or plowing of the soil at a domestic septage disposal site, within six (6) hours of land application of domestic septage, so that no domestic septage is present on the surface of the soil.

(127) ***Soil Map*** - a graphical representation showing the distribution and delineation of soils, on a parcel of land, in relation to the physical and cultural features of the earth’s surface. See *Appendix 1* for detailed information regarding the types of maps which are acceptable for use by the Department.

(128) ***Soil Mapping*** - the systematic examination of soils in the field, their description and classification, the mapping of the kinds of soils or miscellaneous areas showing the distribution of soils in relation to the physical, cultural and special features of the earth's surface and the interpretation of the soils and site characteristics for their suitability for subsurface sewage disposal or to determine if the areas are eligible for percolation tests. See *Appendix 1* for detailed information regarding the types of maps which are acceptable for use by the Department.

(129) ***Soil Modification*** - the addition of compatible soil fill material (i.e. soil materials that have the same textural components as the existing soil in the area designated for subsurface sewage disposal system use), a minimum and maximum of 6 inches, over the area to be utilized for subsurface sewage disposal system use, in order to create an appropriate soil profile depth. This practice is restricted for use with alternative sewage disposal systems only.

(130) ***Soil Remediation*** - corrective measures, within specified limits, to remedy man-made soil deficiencies in order to allow the successful utilization of said soils for subsurface sewage disposal system purposes; examples of such measures include, but are not limited to, subsoiling compacted soils or removing fill material; See *Appendix 1*.

(131) ***Soil Series*** - a group of soils that have characteristics that are almost alike, except for differences in texture of the surface layer or of the underlying material. All the soil of a series have horizons that are similar in composition, thickness and arrangement.

(132) ***Soil Variant*** - a soil having properties sufficiently different from those of other known soils to justify a new series name, but occurring in such a limited geographic area that creation of a new series is not justified. Soil variants will generally require a different and/or specific interpretation for subsurface sewage disposal system use. See *Appendix 1* for detailed information regarding the types of maps which are acceptable for use by the Department.

(133) ***Standing Permit*** - a permit that has been prepared by the Department and obtained by the recipient (i.e. signed by the recipient), thus being considered as the permit issued to allow the installation of a subsurface sewage disposal system on the recipient's property.

(134) ***Storage Facility*** - see Holding Tank.

(135) ***Structure*** - within the context of these regulations: any building utilized for non-residential dwelling requiring subsurface sewage disposal system usage; examples of such buildings may include barns, sheds, out-buildings, commercial facilities, etc.

(136) ***Subdivision*** - a tract or parcel of land divided into two (2) or more lots, sites or other division for the purpose of immediate or future building of dwellings, buildings or other mobile or permanent structures where subsurface sewage disposal systems are to be used. Subdivision does not include a division of any tract or parcel of land into two (2) or more tracts or parcels when such parts are five (5) acres or larger in size.

(137) ***Subsurface Sewage Disposal System (SSDS)*** - a system (private, public and/or community) which receives sewage and relies upon on-site domestic wastewater treatment technologies for disposal of said sewage. Included within the scope of this definition, but not limited to, are the following: septic tank absorption systems, privies, non-chemical type toilets and other similar systems. However, a subsurface sewage disposal system does not include a sewerage system regulated under *Part 1 of T.C.A. Title 68, Chapter 221, and T.C.A. Title 69, Chapter 3*.

(138) ***Supply Line*** (pressure rated) - that portion of a pump-reliant subsurface sewage disposal system which conveys effluent from the pump tank to the manifold for subsequent distribution to the disposal field trenches.

(139) ***Swelling*** - a condition caused by the intrusion of water into the individual clay particles.

(140) ***Switch Valve*** - see Alternating Valve.

(141) ***System*** - a popular generalized term used to describe any type of subsurface sewage disposal system, and all of its related components, in any context.

(142) ***T.C.A.*** - Tennessee Code Annotated.

(143) ***Tight Line*** - that portion of non-pressurized piping which conveys water or effluent from one point to another via gravity flow; for example: pipe from the septic tank to the absorption field in a conventional gravity flow system or pipe from a curtain drain (or other similar drain) to its point of discharge.

(144) ***Topographic Map*** - a map which shows the actual physical features of the landscape with contour lines at sufficient intervals to permit determination of proposed grades and drainage.

(145) ***USDA*** - the United States Department of Agriculture.

(146) ***UL*** - the Underwriter's Laboratories.

(147) ***Utility*** - a service providing system, either public, private or cooperatively owned, which delivers life-style supporting necessities including, but not limited to: water, electrical power, sanitary sewer or sewage treatment, drainage and/or storm sewers, steam power, gas, telephone, telegraph, or cable television service through a system of pipes, conduit, cables, or wires, devoted to the delivery of said necessities; this definition shall include all portions, features, and appurtenances of such a system; within the context of this definition for these regulations, subsurface sewage disposal systems and their related components shall be considered as a utility.

(148) ***Vicinity Map*** - a small generalized map, which may or may not be to scale, placed on a larger map to show the location of the parcel of land in question. The vicinity map indicates the region near or about that parcel of land and its proximity to prominent and established landmarks.

(149) ***Void*** - to render invalid and useless with no legal effectiveness.

(150) ***Wastewater Characterization Data*** - analytical information regarding a wastewater stream necessary for Departmental evaluation in order to ascertain its appropriate treatment methodologies; such data may include, but not be limited to: average daily flows, flow variations, wastewater strength (i.e. pollutant concentrations), presence and quantities of foreign constituents (i.e. grease, fiber, chemicals, hair, salts, soaps, etc.) or any other potentially detrimental characteristics rendering it unsuitable for subsurface sewage disposal treatment.

SECTION 4

USE OF SUBSURFACE SEWAGE DISPOSAL SYSTEMS

The information in this section describes what a subsurface sewage disposal system is and the circumstances in which the use of such shall be required.

A. What Constitutes a Subsurface Sewage Disposal System

A subsurface sewage disposal system, as defined in *Section 3*, is a system (private, public and/or community) which receives sewage and relies upon on-site domestic wastewater treatment technologies for disposal of said sewage. Included within the scope of this definition, but not limited to, are the following: septic tank absorption systems, privies, non-chemical type toilets and other similar systems. However, a subsurface sewage disposal system does not include a sewerage system regulated under *Part 1 of T.C.A. Title 68, Chapter 221, and T.C.A. Title 69, Chapter 3*.

Septic tank absorption systems, conventional or alternative, shall be considered as a utility within the context of these regulations, as outlined in *Section 3*. As such they shall include all portions, features, and appurtenances of the system.

A subsurface sewage disposal system includes, but is not limited to,

- The designated/platted disposal field areas;
- The tank(s) and components contained therein;
- All sewage/effluent-carrying piping and/or associated distribution devices;
- All disposal field trench components;
- All required electrical components;
- All required soil drainage improvement practices.

B. When and Where Septic Systems are Required

1. The use of individual subsurface sewage disposal systems is required where public sewerage services, provided by municipality, county or other governmental entity, or a public or private utility, is not available to serve a parcel of land.

   (a) Where a land parcel lies within the boundaries of an incorporated city or town in Williamson County, and where that government entity provides public sewerage services, the Department shall require that any structures proposed to be constructed on such properties be connected to the public sewer system at the expense of the property owner.

   (b) The Department will not begin the septic system permit application process for any property owner until that individual has provided proof, in writing, from the city or town government that their property cannot be physically served, due to a valid technical reason, by the sewer system. Furthermore, this letter is to be authored and/or signed by the official or officials that direct or administer the sewer system for that city or town.

   (c) The Department shall not consider the monetary cost, that a property owner would incur, involved in connecting to a sewer system to be a valid technical reason as to why a structure on a property cannot be connected to that system.

   (d) The Williamson County government does not, at present, own or operate any type of public sewerage collection and treatment facility, therefore the use of septic systems in the unincorporated portions of the county is required, unless a neighboring sewer system is available.

2. The Department shall require that each individual structure constructed on a parcel of land, being served with running water, be served with its own septic system. A septic system is designed to accommodate a single structure only, and it is a violation of these regulations for two or more structures to be connected to a single septic system.

3. The use and configurations of structures, that are either proposed or exist at this present time, vary. Additionally, the type, size, necessary components and configuration of any subsurface sewage disposal system will be directly affected by the type of structure that is intended to be served by said system. Therefore, the Department shall have the authority to assess a proposed or existing structure to make a determination as to:

(a) Whether or not the structure shall require the use of a septic system.

(b) How many septic systems shall be required to serve a structure.

(c) What type of septic system shall be necessary to properly serve a structure.

(d) The type of additional components (e.g. grease traps, distribution boxes, etc.) that would be required to ensure the proper functioning of a septic system.

(e) What type of land assessment procedure shall be utilized for a particular parcel of land.

C. Structures Requiring the Use of Septic Systems

1. The Department shall require that a septic system be constructed to serve any type of structure (e.g. house, barn, shop, pool house, etc.), containing any type of plumbing fixtures (e.g. toilet, sink, shower, etc.), that is served by running water, regardless of the water source (e.g. utility district, well, spring, etc.).

   (a) Additionally, structures that contain any type of water collection and/or piping system to remove used water or any water-carried waste (i.e. waste water generated from sources other than from typical restroom-type plumbing fixtures) from that structure (e.g. floor drain system in a garage, horse washing stall in a barn, dog kennel, etc.) creating a point-source discharge, shall be required to have a septic system to dispose of such wastewater.

   (b) The Department shall make the final determination as to whether or not the wastewater from the aforementioned type of collection system, in a particular structure, will necessitate the use of a separate septic system for disposal.

2. Any structure utilized as a dwelling for human occupants, which is considered by the Department to have more than one living area (e.g. a duplex, a house containing an apartment, apartment building, etc.) shall be required to have a separate, individual septic system installed to serve each living area.

   (a) The number of living areas contained in one structure shall be determined by the number of kitchen facilities contained within said structure.

   (b) Should the actual number of living areas in a structure be unclear, the Department reserves the right to require that the property owner provide to the Department, an assessment of such in writing, from the Williamson County Building and Codes Department, as to the number of living areas a structure contains.

   (c) The methodology used in prescribing the septic system requirements for an additional living area shall be the same as in the assessment process used for a structure containing one living area (i.e. a single-family dwelling).

3. Any structure utilized as a shelter for animals and also containing a dwelling, office, restroom, any combination of aforementioned factors or any other wastewater generating facility for human occupants (e.g. a barn containing an apartment, a horse barn with a wash stall and a restroom facility, etc.) shall be required to have separate, individual septic systems installed. One septic system shall serve to dispose of all human generated wastewater and the other septic system shall serve to disposal of all wastewater generated from the processes of animal care.

D. Location of a Septic System

The location and/or placement of a subsurface sewage disposal system (i.e. septic tank, disposal field, any other required components, etc.) shall be entirely upon the same land parcel as is the structure for which it is designated to serve, in accordance with all provisions of these regulations. A septic system shall not be located or placed, wholly or in part, upon another parcel of land. However, should circumstances necessitate that the placement of a proposed septic system be located upon a different parcel of land, no Construction Permit shall be issued until such time that a property owner has submitted, to the Department, an accurately prepared (i.e. surveyed, described and platted), properly approved (i.e. approved by the Department of Sewage Disposal Management and the Williamson County Planning Department, where applicable) and legally implemented/executed easement document which allows the placement of said septic system upon the nearby or neighboring property.

Additionally, once a septic system has been permitted, constructed and approved by the Department, on a parcel of land, it shall be unlawful to separate said system from its initial parcel of land (i.e. the land parcel upon which the septic system was permitted, constructed and approved) by the placement or creation of a property line between the system and the structure it serves, unless a proper easement (as described above) is implemented.

SECTION 5

TYPES OF SUBSURFACE SEWAGE DISPOSAL SYSTEMS AUTHORIZED FOR USE

The Williamson County Department of Sewage Disposal Management and the Williamson County Board of Health, provides that the types of subsurface sewage disposal systems outlined in this section may be utilized for the purposes of on-site sewage disposal. The Department shall have the authority to designate which type of subsurface sewage disposal system is appropriate for any property within the boundaries of Williamson County.

A. Types of Systems Authorized for Use

The only types of subsurface sewage disposal systems that shall be considered for enacting repairs of subsurface sewage disposal systems, for use with new construction, or for use with the placement of new structures (i.e. manufactured structures, buildings, homes, etc.), are:

1. Conventional systems - See *Section 15*

2. Low Pressure Pipe systems - See *Appendix 3*

   (a) Standard LPP (LPP) system - not requiring soil modification

   (b) Modified LPP (MLPP) systems - requiring soil modification

3. Mound systems - See *Appendix 4*

The Department shall not permit nor allow the use of any other type of subsurface sewage disposal system.

B. Experimental Systems

1. Use of Experimental Systems

   The use of experimental subsurface sewage disposal systems is restricted to use on properties for repair purposes only, where existing structures, buildings or homes, have non-functioning or non-existent subsurface sewage disposal systems, and there does not exist, on said properties, the proper soils conditions to allow for an installation of a subsurface sewage disposal system so as to be in accordance with the provisions of these regulations.

   At present, the only types of experimental subsurface sewage disposal systems allowed for use, under the aforementioned conditions, are:

   (a) Modified Wisconsin Mound systems - See *Appendix 4*

   (b) MLPP systems with Extra Modification (MLPP/EM) - See *Appendix 3*

2. Legal Requirements

   In cases where an experimental sewage disposal system is necessary to bring a property within compliance of these regulations, this Department shall require the implementation of a legal agreement between the property owner and the County, and the implementation of a Restrictive Covenant. The Restrictive Covenant shall be attached to the deed of property in question. The restrictive covenant is implemented to identify the fact that the property is being served by an experimental sewage disposal system, which is a non-standard means of on-site sewage disposal.

   In addition to the aforementioned requirements, the use of the experimental system must also be approved by the Williamson County Board of Health. Board approval shall be given prior to the issuance of a permit by the Department allowing the construction of the experimental system on a property.

SECTION 6

PIT PRIVIES AND COMPOSTING TOILETS

The approved use of pit privies and/or composting toilets shall be subject to approval by the Williamson County Board of Health and shall require the proper implementation of a restrictive covenant, deed restriction and/or agreement by the property owner.

A. Pit Privies

1. A pit privy shall not be approved or permitted, as a primary means of sewage or human waste disposal, for any structure or facility where said structure or facility is supplied with running water, via any type of plumbing system, regardless of the water source (i.e. well, spring, cistern, public utility, etc.). See *Section 4*.

2. The use of pit privies shall be restricted to:

   (a) Parcels of land in excess of ten (10.01+) acres in size.

   (b) Parcels of land where no habitable or permanent structures are present (i.e. structures subject to permanent human habitation).

   (c) Parcels of land where if any type of permanent structures exist, said structures do not:

      (1) Have a permanent source of electricity from an electric utility provider.

      (2) Have or contain any type of interior plumbing systems.

      (3) Have a source of running water (potable or non-potable).

      (4) Serve as a place of human habitation for more than thirty (30) continuous days in a calendar year.

   (d) Pit privies may be considered for approval by the Department, for use on parcels of land supporting agricultural business activities. The use of a pit privy is to be limited to day-use of farm workers or employees. When the use of a pit privy is requested for such properties, the Department shall assess the proposed site to see that the following criteria are meet:

      (1) The property subject to said agricultural business use, is in excess of twenty-five (25.01+) acres in size.

      (2) The pit privy shall be placed in a location that is a minimum of two hundred-fifty (250) feet or more away from any structure containing a restroom facility.

3. Pit privies, when and where specifically approved for use by the Department, shall be constructed:

   (a) At a site designated by the Department.

      (1) There shall be a minimum of five (5) feet of soil depth at the proposed pit privy site.

      (2) There shall be no indications (i.e. soil characteristics) of a water table, permanent or seasonal, in said soil at the proposed pit privy site.

   (b) In accordance with all specifications (i.e. specified pit dimensions, construction materials, etc.) outlined and documented by the Department.

   (c) At a distance of seventy-five (75) feet or more from a water supply (i.e. a well, spring, cistern, etc.).

   (d) At a distance of fifty (50) feet or more from a property line.

   (e) At a distance of twenty-five (25) feet or more from surface stream/drainway or water course of any type. The Department Soil Scientist shall determine if a greater distance of separation will be required between a privy location and a surface stream/drainway or water course.

   (f) At a distance of twenty-five (25) feet or more from any structure other than that as described in *Part 2, Subpart (d)(2), of this Subsection*.

B. Composting Toilets

1. A composting toilet shall not be approved or permitted, as a primary means of sewage or human waste disposal, for any structure or facility where said structure or facility is supplied with running water, via any type of plumbing system, regardless of the water source (i.e. well, spring, cistern, public utility, etc.). See *Section 4*.

2. Any property, where the use of a composting toilet is proposed, shall meet all criteria for the installation and construction of an approved type of subsurface sewage disposal system in accordance with all provisions of these regulations.

3. Composting toilets must be certified by the National Sanitation Foundation (NSF) to be in compliance with NSF Standard 41, and be published in their *Listing of Certified Wastewater Recycle/Reuse and Water Conservation Devices* before they may be considered for disposal of human excreta by non-water carriage methods.

SECTION 7

PERMITS

A. Construction Permit

No person shall construct, alter, extend, modify or repair, either alternative or conventional subsurface sewage disposal systems, within Williamson County, unless he/she holds a valid Construction Permit issued by the Department. The recipient of a permit for construction of a subsurface sewage disposal system shall be responsible for adhering to the construction requirements of these regulations.

1. Stipulations of the Construction Permit

   All specific conditions as prescribed on the permit and any related documentation (engineered design plans, written reports by Department personnel, etc.) are vital to the protection of the public health and welfare. As a recipient of the permit, said recipient agrees to have the system constructed in accordance with provisions and conditions of the permit and the rules, regulations and polices governing the installation of all subsurface sewage disposal systems.

2. Issuance of Construction Permits in Incorporated Cities or Towns

   The Department shall refuse to grant a permit for the construction of a subsurface sewage disposal system where there exists an accessible public sewerage system. Where a public sewerage system is in place and could potentially provide service to the property in question, the property owner shall provide a written statement of sewer ineligibility from the utility entity to the Department, prior to making application for a subsurface sewage disposal permit. See *Section 4*, *Subsection B*.

3. Aspects of the Application of a Construction Permit

   Due to the fact that Williamson County possesses a wide and diverse range of soils, geologic and topographical conditions, each parcel of land shall be carefully assessed on a site specific, individual basis. The final determination for the proposed usage of all subsurface sewage disposal systems shall rest solely with the Williamson County Department of Sewage Disposal Management with all factual information being taken into careful consideration before any approval is given.

   The Williamson County Department of Sewage Disposal Management retains the right to place specific restrictions, require additional information, specify and determine the size and site location of all dwellings and facilities and their related appendages where the usage of subsurface sewage disposal systems are proposed.

   Williamson County has an established community development (i.e. Zoning, Planning, & Building Codes) and county-wide building permit program. No proposed usage of a subsurface sewage disposal system shall be permitted without the applicant first demonstrating compliance with the rules and regulations of other branches of Williamson County Government governing the proposed construction.

   See *Appendix 6* for the standardized Construction Permit application procedure. There may exist cases where the actual procedure may vary. Such determinations shall be made by the Department upon a staff review of the specific site and soil conditions on a parcel of land where an application for a Construction Permit has been made.

4. Construction Permits for Temporary (Un-certifiable) Repairs

   A Construction Permit issued by the Department for a temporary repair shall only be construed as a means of providing temporary relief of the failing condition of the system and shall be duly noted as such on said repair Construction Permit. See *Section 34*, *Subsection D*.

5. Terms of the Issued Construction Permit

   The permit issued by the Department shall be construed as an agreement between the permit recipient and Williamson County. As such, the recipient (i.e. the individual who has placed their signature upon said permit to accept the permit) of the permit is acknowledging the contents and stipulations placed upon the permit document by the Department.

Once a permit is obtained (i.e. signed) by the recipient, the permit document information (including all contents, stipulations, and requirements pertaining to the subsurface sewage disposal system installation) shall stand as issued and shall represent the specific subsurface sewage disposal system requirements, for the permitted property, to be fulfilled by said recipient in accordance with the provisions of this *Subsection*.

6. Changing a Standing Construction Permit

A Standing Permit shall be defined as a construction permit that has been prepared by the Department and obtained by the recipient (i.e. signed by the recipient), thus being considered as the permit issued to allow the installation of a subsurface sewage disposal system on the recipient's property. The provisions of this Subsection shall apply each and every time there is a proposed change to a standing permit.

(a) Individuals Authorized to Request a Permit Change

Only the permit recipient shall be allowed to request a permit change from the Department. Such requests shall not be accepted from any other individuals (i.e. design engineers, septic system installers, etc.)

(b) Request to Change the Standing Permit

Should any permit recipient wish to request a change in the standing permit, such requests shall be made in writing. The request shall state the specific reasons for the proposed change.

(c) Conditions Under Which a Change Will be Considered

(1) Said written requests shall only be considered where the permit recipient has presented a valid technical justification, as determined by the Department, for changing said standing permit. Any reasons pertaining to the cost of installing a permitted system shall not be considered as valid technical justification.

(2) Said written requests shall only be considered for properties where the construction of the permitted subsurface sewage disposal system has not been started (i.e. not one septic system part or component has been constructed or any excavations for any septic system part or component has been made).

(d) Department Procedure

The Department shall review the recipient's written request (i.e. make a field review of the permitted site and review all file documentation). The Department shall have the authority to either approve or deny such requests.

(1) Request Denied

Where the Department has reviewed said request for a change of a standing permit and cannot determine that there exists a valid technical justification, said request shall be denied, and the conditions of the standing permit shall be implemented in full.

The request shall automatically be denied should the Department find that any construction, or evidence of construction, of any portion or part of a septic system has been started on the permitted site or property.

(2) Request Approved

Prior to the Department preparing a new Construction Permit for issuance, the individual that has requested the permit change shall have had any and all required documentation (i.e. required plat revisions, alternative system designs, revised alternative system designs, percolation test documentation, soil mapping documentation, etc.) as specified by the Department, prepared, completed and submitted for Department review and approval prior to completing the following procedures:

(i) Where the Department has reviewed said request for a change of a standing permit, the Department shall prepare another set of permit documents for the site or property.

(ii) The permit recipient shall be required to bring his/her originally obtained permit documents to the Department offices, and turn in said documents to the office staff. Those documents will be marked and denoted as *Void*.

(iii) The individual shall be required to pay the appropriate permit fees (i.e. the required fees for the type of septic system permit they are to receive) for the newly prepared permit documents.

No credit shall be allowed for any previously paid permit fees. The individual obtaining the changed permit shall be required to pay the current fee, in full, for the type of permit that is being obtained.

(iv) Once the permit fee is paid to the Department, the individual will sign the new permit form, and any other required permit documentation (e.g. affidavits, etc.) associated with the permit, thus becoming the recipient of the new permit.

(e) Subsequent Requirement of the Use of Sewage/Effluent Pumps

In cases where the use of a sewage/effluent pump has become necessary to complete the installation of a conventional subsurface sewage disposal system, the permit recipient shall be required to obtain the required State electrical permit, and submit a copy of said permit to the Department. Other than a copy of this electrical permit, no written request for this type of permit change will be required. Once the permit recipient has the proper electrical permit, said recipient shall be required to fulfill all requirements as outlined in *Part 6, subpart (d) (2), of this Subsection*.

7. Persons Authorized to be the Recipient of a Construction Permit

The Construction Permit for any parcel of land (i.e. platted lots or unplatted lots) shall only be issued to the property owner, land developer, building contractor or a legally designated or appointed representative or agent of any of the aforementioned persons.

The Department reserves the right to require that the person seeking to obtain a Construction Permit provide proof of property ownership or proof that said person has the legal authority to act on behalf of said property owner.

8. Denial of Construction Permit Issuance

The Department shall have the authority to deny the issuance of a Construction Permit for a parcel of land. Where the Department, upon reviewing all land assessment documentation (i.e. soil maps, percolation tests, etc.), has determined that the site and/or soil conditions (or any other pertinate criteria/conditions) upon a parcel, do not meet the standards/provisions of these regulations, a permit shall not be issued to the applicant of said permit.

9. Expiration of Construction Permits

The Construction Permit shall have an expiration date effective three (3) years from the date of issuance. All Construction Permits issued prior to February 4, 1990 expired on June 30, 1996 pursuant to *State of Tennessee Regulations to Govern Subsurface Sewage Disposal Systems, 1200-1-6-.05 (4)*.

B. Permit to Install

No licensed installer shall construct, alter, extend, modify or repair, either alternative or conventional subsurface sewage disposal systems, unless he/she holds a separate and valid Permit to Install for each and every individual system for which they are contracted to install. This permit shall be issued by the Department and shall be obtained personally by said licensed installer.

1. Stipulations of the Permit to Install

The recipient of the Permit to Install, he/she agrees to construct the system in accordance with provisions and conditions of the valid Construction Permit, its supporting documentation, and the rules, regulations and polices governing the installation of all subsurface sewage disposal systems described herein.

2. Terms of the Issued Permit to Install

The permit issued by the Department shall be construed as an agreement between the licensed installer and Williamson County. As such, the recipient (i.e. the licensed installer who has placed their signature upon said permit to accept the permit) of the permit is acknowledging the contents and stipulations placed upon the related Construction Permit document by the Department.

3. Persons Authorized to be the Recipient of a Permit to Install

   The Permit to Install, for any Construction Permit, shall only be issued to the licensed installer contracted by the actual property owner, land developer, building contractor or a legally designated or appointed representative or agent of any of the aforementioned persons to construct the subsurface sewage disposal system pertaining to said property.

   The Department reserves the right to require that the licensed installer, present in the Department offices, intending or attempting to obtain a Permit to Install, provide proof of a contractual agreement with the valid Construction Permit holder or legally designated or appointed authority acting on the behalf of Construction Permit holder.

4. Denial of Issuance of a Permit to Install

   The Department shall have the authority to deny the issuance of a Permit to Install:

   (a) to an individual not licensed to install subsurface sewage disposal systems in Williamson County in accordance with the provisions outlined in these regulations;

   (b) to an installer whose license has expired;

   (c) to an installer whose license has been suspended;

   (d) to an installer whose license has been revoked.

5. Terms of Validity of the Permit to Install

   (a) The Permit to Install shall become void if a Layout Inspection request is not made within forty-five (45) days of its issuance. Under such circumstances the licensed installer shall be required to obtain a new Permit to Install prior to receiving a Layout Inspection.

   (b) Upon the completion of the Layout Inspection, the Permit to Install shall remain valid until such time that the subsurface sewage disposal system installation receives a final inspection approval by the Department.

   (c) The Permit to Install shall become void at any such time that the contractual agreement between the Construction Permit recipient and the Permit to Install recipient is nullified.

SECTION 8

INSTALLATION OF SEPTIC SYSTEMS ON PLATTED PARCELS OF LAND

As an attribute of being a platted parcel of land, all stipulations regarding the subsurface sewage disposal system installation for said parcel have been predetermined and specifically outlined during the platting process.

A. Plat Information

The information placed upon the plat, regarding the use of the platted subsurface sewage disposal system disposal field areas, shall indicate:

1. The identification of the subsurface sewage disposal system areas.

   This identification methodology shall conform to the provisions outlined in *Section 26, Subsection C, Part 6(b)(2)*. The disposal field area use sequence shall be determined either at the design plan stage for all alternative systems [refer to *Section 19, Subsection 2, Part (b)(2)*] or at the construction permit application stage, for all conventional systems (Refer to *Appendix 6*). Once permitted, the installation sequence indicated shall not be changed for any reason.

2. The type of subsurface sewage disposal system that shall be required for use upon the platted land parcel.

   There shall be information, placed upon the plat, which shall indicate the type of subsurface sewage disposal system to be utilized on the platted land parcel. The area shall be designated for the utilization of a specific type of subsurface sewage disposal system during the platting process, and as such, the use of the indicated type of system shall not be changed or altered, for any reason, after a Construction Permit has been issued for said platted parcel.

   Should any changes to any platted features (i.e. building envelopes, disposal field areas, property lines, easements, etc.) shown upon a platted land parcel be proposed, said requests shall be made solely by the Construction Permit recipient, and all provisions of *Section 7, Subsection A, Part 6.* shall be followed.

3. Restrictions regarding the use and/or size of the structure that may be placed upon the platted parcel. Restrictions include, but shall not be limited to, the following:

   (a) Number of bedrooms a dwelling may contain.

   (b) Whether or not the platted parcel is approved for the use of any type of oversized bathing fixtures, within a structure or dwelling.

   (c) Restrictions pertaining to use of the platted land parcel (e.g. commercial, industrial, etc.)

B. Issuance of Construction Permits for Platted Parcels of Land

Prior to the issuance of a Construction Permit for a platted parcel of land, the following tasks shall have been completed:

1. All vegetative conditions shall be in accordance with the provisions of *Section 28* (e.g. mowed, bush-hogged, etc.).

2. All lot corners, subsurface sewage disposal system disposal field areas, building envelopes and any type of easements located upon said platted land parcel shall have been clearly field-staked and identified in accordance with the provisions of *Section 29*.

3. All platted subsurface sewage disposal system disposal field areas shall be fenced, cordoned-off and protected in accordance with the provisions of *Appendix 10.*

   Additionally, no Construction Permit shall be issued where any plat revisions are pending on previously platted land parcels. All plat revisions shall have been completed, approved by all appropriate County Departments, recorded, and the required recorded plat copies submitted to the Department, prior to the issuance of a permit.

C. Septic System Installations on Platted Parcels of Land

1. Conventional Systems

   All conventional subsurface sewage disposal system installations upon platted land parcels shall conform to all applicable provisions of these regulations. See *Section 15.*

2. Alternative Systems

   All alternative subsurface sewage disposal system installations upon platted land parcels shall conform to all applicable provisions of these regulations. Further, said installation of any alternative system shall be in strict accordance with the approved alternative system design plan (See *Section 19*) upon which the issued Construction Permit is based. There shall be no deviation from the approved alternative system design plans. No alternative subsurface sewage disposal system shall be approved by the Department where its installation is found to have any deviations from said approved design plans.

D. Requirements for the Placement of Soil Modification on Platted Parcels of Land Utilizing MLPP Systems

The following requirements shall apply to platted land parcels that have been designated and specified for the use of MLPP systems.

1. Disposal Field Areas to be Modified

   Under the following conditions or situations, both disposal field areas shall be modified at the time of the initial subsurface sewage disposal system installation:

   (a) Where MLPP disposal field areas are platted in any manner or configuration so as to adjoin, abut or touch, both platted disposal field areas shall be modified in accordance with all Department specifications.

   (b) Where MLPP disposal field areas are platted in any manner or configuration so as to be within twenty-five (25) feet of each other, both platted disposal field areas shall be modified in accordance with all Department specifications.

   (c) Where a duplicate MLPP disposal field area has been designated so as to be located in the rear portion of the platted property, said duplicate disposal field area shall also be modified in accordance with all Department specifications.

2. Extent of the Modification Placement

   Regardless of the extent of the soils that require the practice of modification within a platted subsurface sewage disposal system disposal field area, the entire extent of the platted disposal field area shall be modified in accordance with all Department specifications. This shall also include any required buffer areas as specified by the Department.

3. Specifications for Disposal Field Area Modification

   A Department Soil Scientist shall have the authority to specify the depth and extent of soil that shall be placed upon a MLPP disposal field area. Further, said Soil Scientist shall have the authority to mandate the extent to which soil modification shall be placed upon a site for buffer purposes in accordance with the provisions specified in *Section A of Chapter 7 of Appendix 3*.

E. Persons Authorized to Install Subsurface Sewage Disposal Systems

Any type of subsurface sewage disposal system, conventional, alternative, or otherwise shall be installed (i.e. constructed) by a contractor specifically licensed to construct septic systems in Williamson County. No unlicensed individual (e.g. property owner, renter, tenant, etc), company or corporation shall be authorized to install, construct, alter, modify or repair any type of subsurface sewage disposal systems in Williamson County. The contractor licensed to install conventional and/or alternative subsurface sewage disposal systems shall hold a valid license and shall have been licensed in accordance with all provisions of *Section 24.*

SECTION 9

SEPTIC SYSTEMS AND UNPLATTED PARCELS OF LAND

The information in this section outlines the provisions which shall apply to all unplatted parcels of land of any size.

A. Department Jurisdiction

For any existing land parcel, proposed land parcel (i.e. a newly defined parcel created by the subdivision of a larger parcel, which is not subject to the platting requirements of this Department or the Planning Department), lot or building sites which are not part of any subdivision as defined or referred to in these regulations, the Department shall have the authority to determine site suitability for the use of subsurface sewage disposal systems, prior to the issuance of a Construction Permit.

B. Required Information and Data

The information and data subject to verification by the Department for the process of determining the suitability of a proposed building site shall include, but is not limited to the following:

1. The presence of acceptable soil conditions on the parcel for the purposes of subsurface sewage disposal system use;

2. The presence of soils having acceptable soil absorption rates for the purposes of subsurface sewage disposal system use;

3. Freedom from groundwater interference of a proposed subsurface sewage disposal system disposal field area;

4. The nature of any impervious strata which may lie below the level of the proposed subsurface sewage disposal system disposal field area; and

5. The general site characteristics on and surrounding the proposed subsurface sewage disposal system disposal field area, for the type of system to be specified for use by the Department, are in accordance with the provisions of these regulations.

C. Method of Assessing the Land Parcel

The Department shall have the authority to specify what type of land assessment procedure shall be utilized on any land parcel. Should an unapproved method of land assessment be utilized, said information or data shall not be accepted by the Department. Further, should the assessment of said parcel be conducted in a manner which is not in accordance with the methodologies required by these regulations, said information or data shall not be accepted by the Department.

The methods utilized for assessing the soils and site characteristics of a land parcel are described in *Section 27.*

D. Subsequent Requirements for Subsurface Sewage Disposal System Use

Based upon the Department's assessment and interpretation of the specific information and data regarding the site and soil characteristics of the proposed subsurface sewage disposal system disposal field area on a parcel of land, the Department shall have the authority to specify and/or require:

1. The type (i.e. conventional or alternative system) of subsurface sewage disposal system that shall be utilized upon said parcel;

2. The size of subsurface sewage disposal system disposal field area(s) upon said parcel;

3. The site upon which the initial subsurface sewage disposal system shall be constructed;

4. The site, or sites, that shall be designated as duplicate subsurface sewage disposal system areas;

5. Any restrictions upon the size, type and usage of any proposed structure to be place upon said parcel; and

6. That any type of supplemental/additional information or data necessary to make an adequate determination as to the suitability of said parcel to properly support the installation of a subsurface sewage disposal system be provided to the Department.

E. Designation of Subsurface Sewage Disposal System Areas

The subsurface sewage disposal system areas on unplatted parcels of land shall be designated in accordance with the provisions outlined in *Subsection C, Part 6 of Section 26*. Upon the establishment, designation and approval of a site, or sites, on an unplatted land parcel for subsurface sewage disposal system use by the Department, said areas shall be subject to the same provisions of these regulations with regards to their protection and use as subsurface sewage disposal system areas on a platted parcels of land (e.g. subdivision lot).

F. Approval Status of a Land Parcel

The Department shall not make any statements regarding whether or not a parcel can be approved for the use of a subsurface sewage disposal system (i.e. its approval status) nor shall the Department issue any subsurface sewage disposal system installation permits until all provisions of this Section have been satisfied.

Where any individual chooses to abandon the proposed use of the established, designated, approved or permitted subsurface sewage disposal system site upon a land parcel for any reason, said parcel shall revert to an unapproved status. Should a parcel then be deemed as having an unapproved status, any type of previous approvals (i.e. letters, permits, alternative system design plans, etc.) shall be voided. Thus, the parcel shall be subject to the beginning of a new process of assessment.

G. Persons Authorized to Install Subsurface Sewage Disposal Systems

Any type of subsurface sewage disposal system, conventional, alternative, or otherwise, shall be installed (i.e. constructed) by a contractor specifically licensed to construct septic systems in Williamson County. No unlicensed individual (e.g. property owner, renter, tenant, etc), company or corporation shall be authorized to install, construct, alter, modify or repair any type of subsurface sewage disposal systems in Williamson County. The contractor licensed to install conventional and/or alternative subsurface sewage disposal systems shall hold a valid license and shall have been licensed in accordance with all provisions of *Section 24.*

SECTION 10

DESIGN AND CONSTRUCTION OF TANKS

This section outlines the requirements for the design and construction of septic tanks and pump tanks.

NOTE: The use of the term “tank(s)” in this section refers to both septic tanks and pump tanks

A. Tank Requirements

All tanks shall be watertight, structurally sound and not subject to excessive corrosion or decay. Septic tanks shall be of two-compartment design. The inlet compartment of a two-compartment septic tank shall be between two-thirds and three-fourths of the total tank capacity. Pump tanks shall be of single-compartment design.

B. Tank Design and Construction

Minimum standards of design and construction of pre-cast reinforced concrete tanks are as follows:

1. The liquid depth may range from thirty (30) to sixty (60) inches for tanks of less than three thousand (3000) gallons capacity and may not exceed seventy-eight (78) inches for tanks with a capacity of three thousand (3000) gallons or greater.

2. Septic tanks shall be manufactured with a partition so that the tank contains two compartments. The partition shall be located at a point not less than two-thirds (⅔) nor more than three-fourths (¾) the length of the tank from the inlet end. All tank wall thickness shall be no less than two and one half (2½) inches thick throughout the tank except for knockouts or the groove for a slide-in partition. The groove for the slide in partition (where applicable) shall leave a concrete thickness of not less than two and one-fourth (2¼) inches in the tank walls. The partition (where applicable) shall have a minimum thickness of two and one-half (2½) inches and shall be structurally sound and shall not be subject to excessive corrosion or decay.

3. There shall be three knockouts in the inlet compartment (i.e., one on the tank end and one on each side-wall), a knockout in the partition (where applicable) and a knockout in the outlet end of the tank. The knockouts for these openings shall leave a concrete thickness of not less than one (1) inch in the tank wall. The knockouts shall be made for a minimum of four-inch pipe or a maximum of six-inch pipe. In lieu of the partition wall knockout, a four (4) to six (6) inch slot extending at least half way across the width of the septic tank may be used. The top of the slot shall be located no closer than twelve (12) inches to the liquid level of the septic tank and the bottom of the slot shall be no lower than four (4) inches below the midpoint of the liquid depth of the septic tank. A four (4) inch diameter, or equivalent, air passage opening in the partition shall be provided above the liquid level of the septic tank.

4. The tees or baffles shall be a minimum diameter of either three (3) inch cast iron soil pipe tee branch, three (3) inch cast iron sanitary tee branch, three (3) inch cast-in-place baffle or three (3) inch PVC tee branch or equivalent in durability and performance as determined by the Department.

5. The inlet invert shall enter the tank at least three (3) inches above the liquid level of the tank.

6. An inlet tee or baffle shall be provided to divert the incoming sewage downward and extend at least twelve (12) inches below the liquid level.

7. The partition tees or baffles and outlet tee or baffle shall extend eighteen (18) inches or one-third (⅓) the liquid depth, whichever is the lesser, below the liquid level of the tank. A tee or baffle shall be provided on the first compartment side of the partition at the same elevation as the outlet tee or baffle unless an inter-compartmental connecting slot is utilized as described in *Part 3 of this Subsection*.

8. Air space equal to at least twenty (20) percent of the liquid depth shall be provided between the top of the tank and the liquid level.

9. Adequate access openings above each tee or baffle shall be provided in the tank top. Access shall be provided for cleaning or rodding out of the inlet pipe and the interconnecting tees or baffles in the partition, for inserting the suction hose for tank pumping, and for entrance of a person if internal repairs are needed after pumping.

    (a) If the knockouts on the inlet compartment sides of the tank are to be used, access to these tees or baffles shall also be provided for cleaning and rodding of the inlet pipe. To accomplish this, it may be necessary to extend the tee so it will be located under an access port or, a clean-out must be provided on the inlet line immediately outside the septic tank.

(b) A manhole opening shall be provided to each compartment with each having a minimum opening of eighteen (18) inches by eighteen (18) inches as the opening cuts the plane of the bottom side of the top of the tank.

(c) All circular shaped manholes shall have a minimum diameter of twenty (20) inches as the opening cuts the plane of the bottom side of the top of the tank.

(d) The manhole covers shall be beveled on all sides in such manner so as to accommodate a uniform load of one hundred fifty (150) pounds per square foot without damage to the cover or the top of the tank.

(e) Manhole covers and/or opening covers shall have a handle of steel or other corrosion resistant material equivalent in strength to a No. 3 reinforcing rod (rebar).

10. Tanks of Multi-slab construction shall have all joints properly sealed to ensure watertightness. The sealing materials and methodology utilized must be approved by the Department.

11. The tank shall be properly vibrated and rodded prior to curing to eliminate any type of honeycomb effect in the concrete.

12. The top, bottom, ends, sides and slide-in partitions (where applicable) of the tank must have a minimum thickness of two and one-half (2½) inches except for knockouts or the slide-in partition groove.

13. After curing, tanks manufactured in two (2) sections shall be joined and sealed at the joint by the manufacturer by using a mastic sealant and/or pliable sealant that is both waterproof and corrosion resistant.

14. Tank Labeling

    Pre-cast tanks shall be provided with a suitable legend, cast or etched in the wall at the outlet end and within six (6) inches of the top of the tank, identifying the manufacturer by name and address or registered trademark and indicating the liquid capacity of the tank, in US gallons.

15. Tank Testing

    At the discretion of the Department, all tanks may be subject to testing for structural integrity and watertightness.

    (a) Structural integrity

    The verification of this item may require load testing or documented certification that said tank meets or exceeds the structural design requirements as outlined in ASTM C1227. Additionally, tanks shall be undamaged and free of stress cracks, holes, etc.

    (b) Watertightness

    The verification of this item shall be from either vacuum testing or water-pressure testing in accordance with the specifications as outlined in ASTM C1227.

C. Additional Tank Design Requirements

Plans for prefabricated tanks, other than those for manufactured pre-cast reinforced concrete tanks, shall be approved by the Department on an individual basis. Said design information, furnished to the Department by the designer, shall indicate that the tank will provide equivalent effectiveness as those designed in accordance with the provisions of *Subsection B of this Section*.

D. Cast-In-Place Tanks

Tanks other than approved prefabricated tanks shall be constructed consistent with the provisions of Subsection B of this Section, except as follows:

1. Cast-in-place concrete tanks shall have a minimum wall thickness of six (6) inches.

2. Cast-in-place concrete tanks of 1000 US gallons or smaller shall have a minimum top and bottom thickness of four (4) inches.

3. Cast-in-place concrete tanks with a capacity of greater than 1000 US gallons shall have a minimum top and bottom thickness of six (6) inches.

SECTION 11

GREASE TRAPS

The Department shall have the authority to specify the use of grease traps on a subsurface sewage disposal system.

A. Use of Grease Traps

1. The use of grease traps shall be required for any and all types of structures, establishments or facilities from which there is expected a relatively high volume of grease in the wastewater.

2. The waste lines or plumbing stub-out pipes, from the building, shall be separated such that all potential grease containing discharges are routed directly to a grease trap. Subsequently, all effluent exiting the grease trap outlet shall be routed to the approved septic tank for further treatment. All remaining waste lines or plumbing stub-out pipes, from the building, shall be routed directly to the septic tank.

3. Wastes from garbage grinders (i.e. those devices which are typically placed on kitchen sink outlets to grind food wastes) shall not pass through any grease trap before being discharged to a septic tank.

4. Grease trap effluent shall not be discharged directly into a subsurface sewage disposal system disposal field.

5. Categories of structures, facilities or establishments that shall be required to utilize grease traps, include, but is not limited to the following:

   (a) Commercial Buildings

   This category includes commercial establishments (e.g. hotels or motels of any size, bed and breakfast establishments, restaurants, convenience stores or markets, etc.) where food preparation and service activities are a part of the business use of a structure.

   (b) Institutional Buildings

   This category includes institutional facilities (e.g. hospitals, schools, miscellaneous government buildings, etc.) where food preparation and service activities are a part of the use of a structure.

   (c) Other Buildings

   This category would include any other miscellaneous establishments or facilities (e.g. barns containing wash stalls, animal hospitals, auto mechanic shop, churches, etc.) where there may exist the need for the use of grease traps, to protect and ensure the proper functioning of the subsurface sewage disposal system, due to the nature of the effluent discharge.

B. Sizing of the Grease Trap

Proper sizing of the grease trap shall be based on efficiency ratings and flow capacities. This data, whether prepared by a grease trap manufacturer or prepared by a licensed engineer, shall be submitted to the Department for review. The final approval of a suitable grease trap, intended to serve a particular establishment or facility, shall be made by the Department.

C. Design, Construction and Installation of the Grease Trap

1. Design

   (a) Grease traps shall be designed to insure that both the inlet and outlet are properly submerged to trap grease, and that the distance between inlet and outlet is sufficient to allow separation of the grease so that grease solids will not escape through the outlet. Additionally, grease traps shall be appropriately vented so they will not become air-bound. A ground-level access cover shall be provided and located to allow convenient accessibility for servicing, cleaning and maintenance. The cover shall be designed to prevent odor and exclude insects and vermin.

   (b) In any case where an engineer is to design a grease trap to be utilized for an establishment or facility, said engineer shall refer to the grease trap design formulas in the EPA Design Manual 625/1-80-012, *On-Site Wastewater Treatment And Disposal Systems (Oct. 1980)*. The prepared designs shall be submitted to the Department for review and approval.

2. Construction

   (a) Any grease trap to be built on a site, shall be constructed in accordance with a design plan that has been prepared by a licensed engineer, reviewed and approved by the Department.

   (b) The use a pre-manufactured type of grease trap may be considered by the Department; however, all supporting documentation (i.e. design specifications, efficiency ratings, flow capacities, etc.) regarding the grease trap shall be submitted to the Department for review. The final approval of a pre-manufactured grease trap, intended to serve a particular establishment or facility, shall be made by the Department.

3. Installation

   (a) The installation of a grease trap is subject to the provisions of these regulations, as they relate to the installation and setup (i.e. setting of grease trap, piping requirements, etc.) of septic tanks and pump tanks.

   (b) Should an unapproved grease trap be installed on a site, whether it was built on the site or a pre-manufactured type, it shall be removed at the direction of the Department.

D. Maintenance of the Grease Trap

1. The Department shall require that all grease traps be pumped on a regular basis.

2. Any operator and/or owner of a commercial establishment, institutional facility or any other user of a grease trap, shall submit to the Department on an annual basis (or when any contract changes are made), a copy of a Grease Trap Pumping Contract, between said grease trap user and a properly licensed or approved grease trap pumper.

3. Any operator and/or owner of a structure requiring the use of a grease trap, as a part of the permitted subsurface sewage disposal system, shall be required to submit a maintenance schedule to the Department. The maintenance schedule information shall include the following:

   (a) The name, address and telephone number of the licensed or approved grease trap pumper.

   (b) A copy of the grease trap pumpers license or approval from the appropriate regulatory entity.

   (c) The designated interval that a grease trap is to be pumped.

SECTION 12

USE OF EFFLUENT TREATMENT AND PRE-TREATMENT DEVICES AND METHODS

Septic tank and/or pump tank filters, sand filters and gravel filters shall not be utilized in Williamson County.

SECTION 13

MINIMUM SETBACK RESTRICTIONS FOR SEPTIC SYSTEM COMPONENTS

The location of septic tank, pump tank, drainage improvement practices (i.e. curtain drains, drawdown drains, interceptor drains, terraces, vee-ditches, etc.) and platted or designated disposal field (conventional or alternative) installation areas shall be designed and/or selected in accordance with the minimum setback distances in Table S13-1.

Table S13-1 *NOTE: All distances refer to the amount of horizontal distance of separation*.

Physical Features (Natural, Cultural or Man-made)	Platted or Designated SSDS Area	Septic Tank and/or Pump Tank	House, Dwelling, or Structure	Solid PVC Piping [5]	Drainage Improvement Practice
Curtain or Interceptor Drain [3]	15 feet	5 feet	10 feet	5 feet [11]	---------
Dedicated/Platted Road R.O.W.	25 feet	25 feet	---------	5 feet	---------
Drainageway or Ditch (natural or man-made) [3]	25 feet	25 feet	---------	25 feet [6]	---------
Drawdown Drain [3]	25 feet	25 feet	10 feet	5 feet [11]	---------
Excavated Area (>12") [2, 3]	25 feet	10 feet	---------	---------	---------
Existing Agricultural Field Drain	25 feet	25 feet	---------	25 feet [6]	---------
Existing At-grade Driveways, Turnarounds, Parking Areas	10 feet	5 feet	---------	5 feet [7]	5 feet [7]
Driveways, Turnarounds and Parking Areas (>18") [4]	25 feet	5 feet	---------	5 feet [7]	5 feet [7]
Driveways, Turnarounds and Parking Areas (<18") [4]	10 feet	5 feet	---------	5 feet [7]	5 feet [7]
Drop-outs or Soil Pipes [3]	25 feet	25 feet	---------	---------	5 feet
Embankments or Escarpments (natural or man-made) [3]	25 feet	25 feet	---------	25 feet [6]	---------
Gullies or Ravines [3]	25 feet	25 feet	---------	25 feet [6]	---------
Existing House or Structure	25 feet	10 feet	---------	10 feet	10 feet
Overhead Power Lines [1]	25 feet	25 feet	---------	25 feet [8]	10 feet
Platted Building Envelope	25 feet	---------	---------	---------	10 feet
Platted Drainage Easement	25 feet	10 feet	---------	5 feet	---------
Porches, Decks and Patios	10 feet	10 feet	---------	5 feet	5 feet
Property Line	20 feet	20 feet	---------	10 feet	---------
Pump Tank	10 feet	---------	10 feet	---------	10 feet
Retaining Walls [3]	25 feet	25 feet	---------	25 feet [6]	--------
Roadside Ditch [3]	25 feet	25 feet	---------	25 feet [6]	--------
Septic Tank	10 feet	---------	10 feet	---------	10 feet
Sidewalks (<12") [4]	5 feet	5 feet	---------	5 feet [7]	5 feet [7]
Sidewalks (12"-18") [4]	10 feet	10 feet	---------	5 feet [7]	5 feet [7]
Sidewalks (>18") [4]	25 feet	25 feet	---------	5 feet [7]	5 feet [7]
Sinkholes (any type) [3]	25 feet	25 feet	---------	25 feet	5 feet
Stream Bank [3]	25 feet	25 feet	---------	25 feet [6]	--------
Swimming Pools; In-ground [4]	25 feet	15 feet	---------	15 feet	10 feet
Swimming Pools; Above-ground [4] (where any excavation is required)	25 feet	25 feet	---------	5 feet	10 feet
Swimming Pools; Above-ground (where no excavation is required)	15 feet	15 feet	---------	5 feet	5 feet
Underground Utilities: Main & Service Lines (gas, water, electric, etc.) [1 & 9]	10 feet	10 feet	---------	5 feet	5 feet
Well, Spring or Cistern	50 feet	50 feet	---------	50 feet [10]	25 feet

NOTES:

1) Utility easements, overhead and underground, vary in width. Check with the appropriate utility company to verify the width of a particular easement. This task shall be the responsibility of the property owner, builder or installer.

2) Areas of excavation, regardless of the purpose of the excavation.

3) These setback distances may increase or decrease as site and soil conditions may warrant. Such decisions in these matters shall be made by a Department Soil Scientist.

4) These setback distances refer to the actual limits of the excavations (i.e. buffer distance required from the edge of the excavation) for the construction of these features as said excavations relate to the location of the platted or designated subsurface sewage disposal system areas.

5) The term *Solid PVC Piping* refers to all of the solid PVC piping components of any type of subsurface sewage disposal system. Said components include, but are not limited to: tight lines (i.e. piping leading from a septic tank to a disposal field), supply lines (i.e. piping from a pump to a disposal field or a controlled distribution device), pipe lines leading from distribution boxes to disposal field lines, etc.

6) These setback distances may be decreased to not less than five (5) feet, with the Department's prior written approval, if the solid pipe line is sleeved with a larger diameter pipe (in accordance with the provisions outlined in *Appendix 12*, pertaining to pipe sleeving), along the length of piping that is proposed to be less than twenty-five (25) feet from this feature.

7) These setback distances may be decreased or waived, with the Department's prior written approval, if the solid pipe line is sleeved with a larger diameter pipe (in accordance with the provisions outlined in *Appendix 12*, pertaining to pipe sleeving), along the length of piping that is proposed to be less than five (5) feet or directly under, in any manner, one of these man-made landscape features.

8) These setback distances may be decreased or waived, with the Department's prior written approval, if the solid pipe line is sleeved with a larger diameter pipe (in accordance with the provisions outlined in *Appendix 12*, pertaining to pipe sleeving), along the length of piping that is proposed to be less than twenty-five (25) feet from this type of utility line. Additionally, where the Department has approved such proposals and granted this specific waiver, the entire extent of the pipe line subject to this sleeving requirement, shall be buried a minimum of forty-two (42) inches deep in a trench which is not to exceed eight-teen (18) inches in width.

9) There shall always be a minimum of a five (5) foot separation between subsurface sewage disposal system solid PVC piping components and any type of water line with no provision for any type of distance decrease or waiver. Should there exist the necessity to cross a water line with a solid PVC piping component, said crossing shall be in accordance with the provisions outlined in *Section 15, Subsection F, Part 33*.

10) This setback distance shall always apply to springs with no provision for any type of distance decrease or waiver. The setback distances may be decreased, for wells and cisterns, to not less than fifteen (15) feet, with the Department's prior written approval, if the solid pipe line is sleeved with a larger diameter pipe (in accordance with the provisions outlined in *Appendix 12*, pertaining to pipe sleeving), along the length of piping that is proposed to be less than fifty (50) feet from this feature. In any case involving a well, said well shall be permanently plugged and abandoned, and its use permanently discontinued, in accordance with the provisions outlined in *Appendix 17.*

11) This setback distance shall be used where solid PVC piping is routed parallel to these subsurface sewage disposal system components. Where said piping is to cross said components, the crossing shall be constructed in accordance with the provisions outlined in *Section 15, Subsection D, Part 23*.

ADDITIONAL SETBACK RESTRICTION INFORMATION:

Where a property has an existing subsurface sewage disposal system, there shall be no encroachments upon said existing system with any additions to a structure, with the placement of additional structures or with the replacement of structures (i.e. the setting of a new permanent dwelling, modular home, mobile home, etc. that is intended to replace another, older or destroyed dwelling) so as to be in violation of the aforementioned setback restrictions. The setback restrictions shall apply to any and all properties where a septic system is to be, or is proposed to be, utilized.

The aforementioned setback restrictions, regarding houses, dwellings and structures, shall apply to those structures, and their associated perimeters and/or excavations, that are permanently affixed to the land surface via any type of foundation (e.g. continuous concrete slab and block foundation, patterned concrete slabs and block pillar foundation, large continuous concrete slab, etc.) or other types of construction methods (e.g. the setting of structural posts into the ground intended to support a structure such as a deck, shed, barn, etc.) used to setup and support a permanent structure.

SECTION 14

MINIMUM SEPTIC TANK CAPACITY

The information in this section covers Septic Tank Capacity only. The provisions outlining Minimum Pump Tank Capacity are presented in *Section 18*. All septic tanks shall be sized in accordance with the minimum standards as outlined in the following Subsections.

A. General Septic Tank Sizing Information

1. The minimum hydraulic detention time, for any size tank, shall be one and one-half (1½) days or thirty-six (36) hours based on projected daily wastewater flows. In no case shall a septic tank's effective liquid holding capacity be less than 750 US gallons.

2. The actual effective liquid holding capacity of a tank to be utilized as a septic tank shall be considered that volume of liquid capacity that occupies the interior space of said tank to the level of the invert of the pre-cast outlet port of that tank (i.e. the liquid level being the actual level to the invert of the outlet port of a tank set upon a level plane). Therefore, the air-space that lies above the actual surface of the liquid level of a tank shall not be considered as part of a septic tank's effective liquid holding capacity.

B. Septic Tank Sizing Requirements for Single-Family Dwellings

The septic tank sizing requirements for single-family dwellings are divided into two (2) categories. The first category (*Category One*) outlines the septic tank sizing requirements for those single-family dwellings utilizing only standardized plumbing fixtures and containing no oversized bathing fixtures. The second category (*Category Two*) outlines the septic tank sizing requirements for those single-family dwellings utilizing or containing any type of oversized bathing fixtures (i.e. any type of bathing fixture, regardless of its moniker, that will physically hold an amount of water exceeding 30 US gallons, either to the level of the fixture's overflow drain or as its maximum capacity).

1. Septic Tank Sizing - *Category One*

   (a) The effective liquid holding capacity of a septic tank to be installed to serve a single-family dwelling, containing no oversized bathing fixtures, shall be based solely on the number of bedrooms proposed or that can be anticipated for said dwelling and shall as a minimum comply with the provisions outlined in Table S14-1.

Table S14-1

Number of Bedrooms	Capacity of Septic Tank (gallons)
2 (or less)	750
3	900
4*	1000

∗ For each additional bedroom over four (4), add 250 gallons per bedroom.

   (b) The aforementioned septic tank capacities provide for a single system to accept and treat the combined household wastes from standard plumbing fixtures and appliances commonly used in single-family dwellings. The various types of plumbing fixtures include garbage grinders, dishwashers, showers, standard bathing fixtures and automatic clothes-washing machines. They do not serve single-family dwellings containing or utilizing oversized bathing fixtures.

2. Septic Tank Sizing - *Category Two*

   (a) Septic tanks serving those single-family dwellings utilizing oversized bathing fixtures shall be sized to accommodate the additional projected sewage discharge they produce. The effective liquid holding capacity of septic tanks serving such dwellings shall be based, not only on the number of proposed (or anticipated) bedrooms at 250 US gallons per bedroom (gal/bdr), but also on the additional projected daily wastewater flow produced by said fixtures. The following formula shall be used to calculate the necessary minimum effective liquid holding capacity of the septic tank:

$$V = [(OSBFC - 30) \times (NBDR)] + NPDF$$

Where:

V = Minimum Required Effective Liquid Holding Capacity (US gal.)
OSBFC = Oversized Bathing Fixture Capacity (US gal.)
30 = Standard Bathing Fixture Capacity (US gal.)
NBDR = Number of Bedrooms in dwelling
NPDF = Normal Projected Daily Flow @ 250 gal/bdr (US gal.) or (NBDR x 250 (US gal.) = NPDF)

Note: Where a single-family dwelling contains more than one (1) oversized bathing fixture, the projected sewage discharge produced from each such fixture shall be calculated and provided for.

(b) *Example:*

The minimum effective liquid holding capacity calculation for a septic tank serving a four (4) bedroom single-family dwelling containing one 80 US gal. oversized bathing fixture and one 75 US gal. oversized bathing fixture is as follows:

V = [{ (OSBFC - 30) + (OSBFC - 30) } x (NBDR)] + NPDF
V = [{ (80 - 30) + (75 - 30) } x (4)] + (4 x 250)
V = [{ (50) + (45) } x (4)] + (1000)
V = [(95) x (4)] + (1000)
V = 380 + 1000
V = 1380 US gallons (minimum)

Therefore, the dwelling in this example would require a septic tank with a minimum effective liquid holding capacity of 1380 US gallons. Since commercially available tanks are only produced in 250 US gallon increments, a standard 1500 US gallon tank would suffice.

C. Septic Tank Sizing for Other Types of Structures or Facilities

1. For any type of structure or facility, other than single-family dwellings, the net volume or effective liquid capacity, below the liquid level of a septic tank, for flows up to 500 gallons per day shall be at least 750 gallons.

2. For any type of structure or facility, other than single-family dwellings, with flows between 500 and 1500 gallons per day, the effective liquid holding capacity of the tank shall be equal to at least one and one-half (1½) days liquid sewage flow.

3. For flows greater than 1500 gallons per day, the minimum effective liquid holding capacity shall equal 1125 gallons plus 75 percent of the daily wastewater flow or:

   V = 1125 + 0.75Q

   Where:

   V = Minimum Required Effective Liquid Holding Capacity (US gal.)
   Q = projected daily wastewater flow (US gal.)

4. Where unknown and/or unusual wastewater discharge characteristics are expected from a facility, projected normal sewage flow shall be determined from the information presented in *Appendix 7* or from actual known water usage data (i.e. information from water utility company for a comparable existing facility) may be used if available. Upon the completion of a review of a proposed facility's projected daily flow calculations, additional septic tank volume may be required by the Department.

   Appendix 7 contains Table A7-1 which shows the projected daily wastewater flows from various type of facilities and establishments that shall be utilized by the Department for determining wastewater discharge amounts for the calculation of necessary septic tank size.

SECTION 15

CONVENTIONAL SUBSURFACE SEWAGE DISPOSAL SYSTEMS

A. Site/Soil Conditions, Assessment Methodology and Criteria for Conventional System Disposal Fields

<u>IMPORTANT NOTE:</u> The provisions and requirements outlined in this Subsection shall not be solely limited to conventional subsurface sewage disposal systems. The contents of this Subsection shall also pertain to alternative subsurface sewage disposal systems where the Department determines that any of the following provisions or requirements are applicable to said systems or their installation sites.

For the purposes of ascertaining site/soil area suited for subsurface sewage disposal system use, a land parcel is assessed as a *whole*, not just where a proposed subsurface sewage disposal system is to be located. Though a proposed dwelling (or other structure) will physically occupy only a small portion of a land area, the characteristics of the entire land parcel must be investigated (or in the case of a very large tract of land, the immediate five to ten acres in the vicinity of a proposed structure location) to determine the potential of said land parcel to support, in accordance with the provisions of these regulations, the installation of a subsurface sewage disposal system to serve the proposed dwelling.

In order to delineate and subsequently designate an appropriate area upon a land parcel for the placement of the disposal field trenches of a conventional system, the site and soils criteria outlined in this *Subsection* shall be utilized in combination with all other applicable provisions in these regulations. Thus, the methods and criteria utilized by the Department to assess a site location upon a parcel of land includes, but shall not be limited to, the following:

1. Soil Absorption Characteristics or MPI Rates

   (a) The MPI rate of the soil, for a proposed subsurface sewage disposal system site, shall be determined by conducting a detailed field examination of the actual soil characteristics and properties (i.e. soil structure, texture, drainage classification, etc.).

   (b) The soil series and soil rating criteria, as established by the Department (See *Appendix 1*), shall be utilized in establishing the appropriate soil absorption rate for said site.

   (c) Soils which are determined to have estimated or actual (i.e. determined via a percolation test) soil absorption rate of <15MPI (i.e. between 1MPI and 14MPI) shall not be utilized for subsurface sewage disposal system installations.

   (d) Soils which are determined to have estimated soil absorption rates of 15MPI, 30MPI, 45MPI, 60MPI and 75MPI may be utilized for conventional system use where said soil sites are in accordance with the provisions outlined in *Subsection B and C of this Section*.

   (e) Soils which are determined to have estimated soil absorption rates in excess of 75MPI shall not be approved for conventional system use. However, where such soils are encountered, such sites may be assessed via percolation testing, in accordance with the provisions outlined in *Appendix 2*, in order to establish the actual percolation rate (i.e. water absorption rate) of said site where the Department has specifically approved the use of this method of land assessment.

   (f) Upon sites that have been assessed via percolation testing, soil absorption rates of between 76MPI and 105MPI may be utilized for conventional system use where said soil sites are in accordance with the provisions outlined in *Subsection B and C of this Section*.

   (g) Upon sites that have been assessed via percolation testing and where the soil absorption rate is established to be in excess of 105MPI, said sites shall not be approved for conventional subsurface sewage disposal system use.

2. Soil Drainage Characteristics and Associated Soil Drainage Improvement Practices

   Soil drainage characteristics of a proposed subsurface sewage disposal system site include the manner in which water is moving internally through the soil (i.e. subsurface drainage) and the manner in which water moves upon the ground surface (i.e. surface drainage) of said site. See *Appendix 1* and/or *Appendix 5*.

   (a) Soils which are determined to be within the drainage classification of Somewhat Poorly Drained, Poorly Drained or Very Poorly Drained shall not be approved nor utilized for subsurface sewage disposal system installations.

(b) Soils/sites which are determined to have acceptable soil absorption rates but require the implementation of a soil drainage improvement practice, as determined by the Department, shall have available *positive outlet(s)* to allow for the proper discharge of all waters collected and conducted by the said method of drainage improvement. See *Appendix 5*

(c) Upon any land parcel proposed for subsurface sewage disposal system use requiring a soil drainage improvement practice and where the availability of a proper positive drainage outlet(s) is questionable, proof of such shall be demonstrated in a manner indicated by the Department (i.e. additional surveying and/or engineering work, etc.). See *Appendix 5*

3. Soil Depth Characteristics

These characteristics pertain to the soil depth to either rock (i.e. solid bedrock) or non-rock type of restrictive layer or horizon within the soil (i.e. fragipans, clay horizons, Cr horizons, water tables, etc.). See *Appendix 1, Chapter 3, Section D, Part (7)*.

(a) There shall exist a minimum of thirty-six (36) inches of natural soil over any layer(s) of bed rock or the upper limits of any type of water table.

(b) Where the minimum soil depth may be present but the soil contains a non-rock restrictive horizon, there shall exist a minimum depth of twenty-four (24) inches of unencumbered soil over said restrictive horizon.

4. Physical Site Conditions

(a) A site shall contain an amount of land space which is in accordance with the provisions outlined in Subsections B and C of this Section and said site shall be free of *Installation Restrictive Characteristics.* See definition in *Section 3*.

(b) A site shall contain an amount of land space which is in accordance with the provisions outlined in Subsections B and C of this Section and said site shall be located so as to be separated, by the specified distances from any of the encumbrances outlined in *Section 13*.

(c) A site shall not be located upon any land surface which has a natural slope in excess of twenty-five (25) percent.

(d) A site shall consist of natural soils which have not been disturbed in any manner. Subsurface sewage disposal systems shall not be placed in fill material, disturbed soils, compacted soils, etc.

5. Land Parcel Size

A land parcel shall be a minimum of one (1.00) acre in size to be considered for the use of conventional subsurface sewage disposal systems.

6. Method of Land Assessment

The methods which may be utilized to assess a parcel of land (i.e. determine whether or not the land parcel meets the provisions and criteria of this Subsection), including the conditions under which they may be used, are prescribed in *Section 27*.

B. Sizing of the Conventional System Disposal Field

Where an appropriate soil absorption rate has been established by the Department, or by an approved soil consultant (i.e. via conducting a Extra High-Intensity soil mapping procedure, the results of which have been verified by the Department), the said soil absorption rate shall dictate the size (i.e. linear footage requirements and the total disposal field area requirement) of the subsurface sewage disposal system.

The actual amount of land surface area required for a system installation, and its mandatory duplicate area, shall be in accordance with applicable provisions of *Appendix 7, Appendix 8 and/*or *Appendix 9*. Therefore, dependent upon the type of structure or facility the conventional subsurface sewage disposal system is intended to serve, the Department shall determine which Appendix (i.e. *Appendix 7,8 and/or 9*) shall apply to properties being assessed.

Where percolation tests are conducted, the size of a subsurface sewage disposal system and its duplicate area, dependent upon the type of structure or facility the conventional subsurface sewage disposal system is intended to serve, shall be determined by the Department in accordance with the provisions outlined in *Appendix 7* and *Appendix 9*.

<u>IMPORTANT NOTE:</u> Where any site(s) have been assessed via percolation testing, regardless of the actual results of said test (i.e. percolation rates that are calculated to be between 15MPI and 74MPI), the minimum soil absorption rate that shall be utilized for the purposes of designing a conventional system shall be 75MPI (or 405 Square Feet of Trench Bottom Area per Bedroom - See Appendix 9).

C. Duplication Areas on Unplatted Land Parcels

Where conventional subsurface sewage disposal systems are installed, sufficient additional area shall be available for the complete replacement of the disposal field, in an area of undisturbed, acceptable soil area large enough to install a system (i.e. being in accordance with requirements and characteristics of the particular area of soil designated for said duplicate area use) as a secondary disposal field as required by these regulations. The initial installation area, and its duplicate area (i.e. the Total Disposal Field Area Requirement) shall be in accordance with the provisions of *Appendix 8* where soil permeability rates (i.e. MPI ratings) are determined by the Department to be between 30MPI and 60MPI. For sites where soil permeability rates (i.e. MPI ratings) are determined by the Department to be between 75MPI and 105MPI, the Total Disposal Field Area Requirement shall be calculated and determined in accordance with the provisions outlined in *Appendix 9, Subsection A*.

D. Disposal Field Designs and Configurations

Design of the disposal field shall be of the recirculating (for level lots), serial distribution type or a controlled distribution type as determined by the Department, based upon site and soil conditions.

1. Recirculating Disposal Field Design

   Where the maximum elevation difference, from the highest elevation point to the lowest elevation point, contained within the entire area which has been designated or platted for the subsurface sewage disposal system disposal field, does not exceed four (4) inches of declination within a prescribed length of one hundred (100) feet, migrating in a direction away from the proposed septic tank installation, the recirculating system design is preferred. A recirculating design provides equal distribution of the effluent throughout the entire system by connecting successive trenches on both ends and thus, maintaining an established elevation (such that every point of the trench bottom surface, within the entire extent of disposal field, maintains that same established elevation and so as none of the trenches exceed the twenty-four inch maximum trench depth) of the bottom of every disposal field trench. In summary, the recirculating system design requires that all trench bottoms contain zero elevation change (i.e. shall be level).

2. Serial Distribution Disposal Field Design

   Where the maximum elevation difference, from the highest elevation point to the lowest elevation point, contained within the entire area which has been designated for the subsurface sewage disposal system absorption field installation, exceeds four (4) inches of declination within a prescribed length of one hundred (100) feet, migrating in a direction away from the proposed septic tank installation, a serial distribution system shall be required. In serial distribution, distribution of the effluent is reliant upon each successive trench being connected in such a manner so as to provide portage from the discharge end of the previous trench into the inlet end of the successive trench. The aforementioned connection is provided by a closed pipe laid upon an undisturbed section of ground so as to provide an arrangement whereby all effluent is discharged to the first trench until it is entirely filled with liquid. Upon filling, the excess effluent is then carried by the closed line (i.e. crossover line or crossover) to the inlet end of the next trench. In this manner each portion of the subsurface sewage disposal system is used in succession while providing for maximum absorption capabilities of any given trench.

3. Controlled Distribution Systems

   The design of a controlled distribution system differs from the aforementioned systems in that the serial and recirculating systems (by virtue of their arrangement on the landscape) rely upon the trench configuration as a vehicle for dispersing the effluent; whereas in controlled distribution, the effluent is apportioned by a device which simultaneously allocates equal amounts of effluent directly into each and every disposal field trench served by the controlled distribution device (i.e. Distribution Box or Pressure Distribution Manifold).

In addition to providing equal distribution of effluent to each trench, these systems shall be constructed to prevent hydraulic overloading of any individual trench. Thus, this type of system requires that all disposal field trenches be of equal length.

Controlled Distribution Systems shall be required on:

(a) Any site or property where the established soil absorption rating of the proposed subsurface sewage disposal area is 61MPI to 105MPI (whether the rate is determined by the Department, an approved soil consultant, or by an actual percolation test, accepted by the Department), or

(b) A site-specific basis on any site or property where the established soil absorption rating of the proposed, platted or designated subsurface sewage disposal area is 20MPI to 60MPI (whether the rate is determined by the Department or an approved soil consultant) and the site characteristics are favorable for said use as determined by the Department.

The factors used in the determination of favorable site characteristics consist of, but are not limited to:

(1) Site topography,

(2) Soil properties (i.e. properties other than soil absorption ratings) and

(3) Sewage flow rates (i.e. flows from the structure generating the sewage) which necessitate the equal distribution of effluent to all sewage disposal trenches.

4. Controlled Distribution Devices

There are two (2) types of effluent distribution controlling devices utilized in the setup of Controlled Distribution Systems. The types of devices used to provide controlled distribution shall be limited to the Distribution Box or the Pressure Distribution Manifold (See *Appendix 11*). The design and proposed usage of either device shall be approved by the Department prior to installation.

IMPORTANT NOTE: *Where the use of controlled distribution devices are required by the Department, all disposal field trenches of the constructed subsurface sewage disposal system shall be of equal length.*

(a) Distribution Box (D-Box)

The D-Box shall be in accordance with the specifications presented in *Appendix 11*. Controlled Distribution Systems utilizing a distribution box as the device for ensuring equal distribution of effluent shall require that the box be installed between the septic tank and the proposed area platted or designated for the construction of the subsurface sewage disposal field. The distribution box shall be secure and level in order to maintain proper apportionment of the effluent. The distribution box has one inlet, to accept effluent from the septic tank, and multiple outlets. The distribution box is then connected, via the outlets, with a conduit to the individual trenches which receive effluent from the device.

(b) Pressure Distribution Manifold (PDM)

Where the Department has determined that the site characteristics are favorable, as outlined in Subpart (b), of Part 3, of this Subsection, and where a conventional subsurface sewage disposal system installation requires the use of a sewage/effluent pump (i.e. a pump is necessary to transport the effluent to the disposal field site), a Pressure Distribution Manifold shall be required. Any Pressure Distribution Manifold shall be constructed in the same manner as a LPP manifold (See *Appendix 3*).

The same materials, methods of assembly, construction techniques and pressure testing inspection shall be utilized. See typical design detail shown in *Appendix 11*. Controlled Distribution Systems utilizing a Pressure Distribution Manifold as the device for ensuring equal distribution of effluent shall require that the device be installed between the pump tank and the proposed area platted or designated for the subsurface sewage disposal field. The Pressure Distribution Manifold and its control valves are then connected, via the outlets from the valves, with a conduit to the individual trenches which receive effluent from the device.

5. Effluent Brake Device (EBD)

The Effluent Brake is a device, constructed of PVC piping and fittings, placed between the end of a supply line and the inlet to a D-Box or the first disposal field trench. The purpose of the device is to reduce the energy or impact of the pumped effluent from the supply line before it enters the D-Box or the sewage disposal trench. See typical design detail shown in *Appendix 14.*

A *Splash Box* is another type of effluent brake device which may be utilized. Where a splash box is used in lieu of a PVC pipe device, all specifications regarding the box to be used and all aspects of its installation shall be subject to the approval of the Department.

The effluent brake device shall be required, as a part of the system installation, on any subsurface sewage disposal system utilizing a sewage/effluent pump where the use of a pressure distribution manifold is not required. The Department shall have the authority to specify when and where these devices are to be utilized on a subsurface sewage disposal system installation.

<u>IMPORTANT NOTE:</u> *Where the use of an EDB device is required by the Department, the use of a check valve in the pump tank setup shall be required regardless of the supply line length.*

6. Alternating Valves

Where alternating valves are required for use by the Department, said valve shall be of a type constructed from Schedule 40 PVC plastic. The valve shall have one inlet port and two outlet ports. Said valve shall have an internally operating valve device. The valve shall be operated externally by the use of a hand-held key device.

The use of alternating valves shall be restricted to sites where the Department has determined that the use of any of the aforementioned Controlled Distribution system setups will not be appropriate for a specific conventional subsurface sewage disposal system installation.

The alternating valve, where its installation is specifically required, shall always be located at the highest elevation, upslope from the highest or first disposal field trench, placed at a minimum of five feet from said trench and that the valve base is at a level above the top of the gravel media of the first disposal field trench. The piping to the valve inlet and the piping leading from each outlet port, shall not be less than three (3) inches in diameter (inside measurement) and shall be Schedule 40 PVC. The valve and all of its associated piping network, shall be bedded upon firm earth or gravel so as ensure that the valve and all piping has consistent slope (i.e. no sagging pipes) to its destination. There shall be attached to the valve, in a vertical position, a four inch diameter PVC portion of pipe to serve as the access riser to the ground surface. The initial portion of pipe shall be of a sufficient length so as to ensure that said pipe stands well above any final grading elevation. At the ground surface, there shall be attached to the vertical pipe an end-cap fitting with a screw-in plug. After the final grading of the installation site, the vertical access pipe shall stand a minimum of six (6) inches above the finished grade.

Where an alternating valve is required on a new subsurface sewage disposal system installation, the total required linear footage of the disposal field shall be equally divided and installed as two separate cells. Each separate valve outlet shall serve to apportion effluent to its respective cell. The maximum difference in field line footage from one cell to the other shall be twenty (20) feet. See *Appendix 14* for diagram of the alternating valve setup.

7. Large Conventional Systems

Large conventional systems are those systems exceeding 1500 square feet of disposal field trench bottom area.

(a) Where any disposal field exceeds 1500 square feet of trench bottom area in a single system, a controlled distribution system shall be required.

(b) When the design daily flow from a single source exceeds 2000 gallons per day, pump tanks, sewage/effluent pumps and Pressure Distribution Manifold devices shall be used to equally apportion effluent to cells or zones of individual disposal field trenches. The manner (i.e. system design, required system components, system configuration, etc.) in which the equal distribution of effluent shall be accomplished shall be specified by the Department on a site specific basis.

    Plans for subsurface sewage disposal systems in this classification shall be prepared by an engineer licensed in the State of Tennessee. Said plans shall be submitted for review and approval by the Department. Each set (i.e. cell or zone) of individual disposal field trenches shall not exceed a design capacity of 2000 gallons per day flow.

(c) Large conventional systems shall be designed to maximize the distribution of the effluent throughout the system.

(d) Soil buffer zones shall be required at a frequency and size as determined by a Department Soil Scientist after conducting a detailed soil and site evaluation.

8. Configurations of Systems and Components

In *Parts 1 through 6 of this Subsection*, the various types of subsurface sewage disposal system designs, components, devices and general requirements have been presented. Utilizing the aforementioned information, there are seven (7) possible configurations or arrangement setups of conventional subsurface sewage disposal systems.

<u>NOTE:</u> The placement of Curtain Drains, or any other type of soil drainage improvement practice, may be required by the Department on any of the types of subsurface sewage disposal system configurations presented.

The following information outlines the various configurations under their appropriate categories:

(a) Gravity Flow (GF) Systems

Where the appropriate soil and/or site conditions exist, the appropriate gravity flow system shall be specified by the Department. Each of the following descriptions of the system setup is in sequential order of the path of the sewage and sewage/effluent as it flows to the disposal field.

(1) GF System - Serial Distribution

This configuration consists of the septic tank, tight line and the disposal field trenches setup for serial distribution.

(2) GF System - Recirculating Distribution

This configuration consists of the septic tank, tight line and the disposal field trenches setup for recirculating distribution.

(3) GF System - Controlled Distribution - D-Box

This configuration consists of the septic tank, tight line, D-Box and the disposal field trenches. The controlled distribution setup requires that each individual field line is to be of equal length and dosed with effluent via the distribution box.

(b) Pump (P) Systems

When the soil and/or site conditions mandate the use of a sewage/effluent pump, the appropriate pump system shall be specified by the Department. Each of the following descriptions, of the system setup, is in sequential order of the path of the sewage and sewage/effluent as it flows to the disposal field.

(1) P System - Serial Distribution

This configuration consists of the septic tank, a pump tank containing an appropriately sized sewage effluent pump tank, supply line from pump, effluent brake and the disposal field trenches setup for serial distribution.

(2) P System - Recirculating Distribution

This configuration consists of the septic tank, supply line from pump, effluent brake and the disposal field trenches setup for recirculating distribution.

(3) P System - Controlled Distribution - D-Box

This configuration consists of the septic tank, supply line from pump, effluent brake, D-Box and the disposal field trenches. The controlled distribution setup requires that each individual field line is to be of equal length and dosed with effluent via the distribution box.

(4) P System - Controlled Distribution - PDM

This configuration consists of the septic tank, supply line from pump, PDM and the disposal field trenches. The controlled distribution setup requires that each individual field line is to be of equal length and dosed with effluent via the pressure distribution manifold.

The Department shall use the criteria presented in this Section, in conjunction with the information obtained during the course of a site investigation and assessment, and make the determination as to what type of system configuration will be specified for a property to be permitted for the installation of a subsurface sewage disposal system.

E. Prior to the Construction of a Conventional System

Conventional systems shall only be installed by persons specifically licensed to install said subsurface sewage disposal systems in Williamson County. The licensed, approved installer shall have in his/her possession the *Permit to Install* packet prior beginning the installation of the conventional system. The packet will include the Permit to Install, a copy of the actual *Permit for Construction of a Subsurface Sewage Disposal System (i.e. the Construction Permit)* issued for the lot and any other pertinent supporting documentation. The installer shall be required to obtain this information prior to contacting the inspector for a Layout Inspection. Only after the inspector has approved the Layout Inspection with the installer, will the installer be able to begin the construction of the conventional system. See *Section 20* of these regulations for specific requirements and procedures in the installation and inspection process.

F. Construction of the Conventional System

The information in this Subsection covers the specifications, dimensions, tolerances, materials, components and methods for the construction of any type of conventional subsurface sewage disposal system.

1. For any portion of any type of subsurface sewage disposal system, where the sewage/effluent flows by gravity (e.g. the tight line from the septic tank to the disposal field, piping from a D-Box or Alternating Valve to field lines, etc.), the minimum pipe size shall not be less than three (3) inches in diameter (inside measurement) and shall be Schedule 40 PVC. The only exception being the solid pipe extending from a valve in a pressure distribution manifold to a disposal field trench; that pipe shall be of the same diameter as the required valve size. All gravity flow piping shall be bedded upon firm earth or gravel so as to prevent sagging, crushing or breakage. Additionally, all gravity flow piping (i.e. Schedule 40 PVC piping) connections made to corrugated field line piping, shall be in accordance with the provisions outlined in *Appendix 12*.

2. Where a sewage/effluent pump is utilized, the pipe size from the septic tank to the pump tank shall not be less than three (3) inches in diameter (inside measurement), shall be Schedule 40 PVC and shall be firmly bedded to prevent sagging, crushing or breakage. In order to provide bedding support for said pipe, the void space in the septic tank hole and the pump tank hole (i.e. the space between the septic tank and the pump tank, and side-wall of the excavated hole) shall be filled to the level of the invert of the inlet and outlet holes of each tank with gravel. The pipe from the pump tank to the disposal field shall be appropriately sized in order to achieve minimum scour velocity of 2.5 feet per second.

3. When a pump system is to be utilized, all pump specifications shall be in accordance with the provisions outlined in *Section 16.*

4. Materials and components used in the construction of subsurface sewage disposal systems shall be in accordance with the provisions outlined in *Appendix 12*.

5. The piping connections between the structure and the septic tank, regarding the utilization and placement of cleanouts and the minimum pipe size (i.e. pipe diameter), shall be in accordance with all applicable Williamson County building/plumbing codes.

6. The disposal field trenches shall follow the natural, existing ground surface contours of the designated sewage disposal system area.

7. A minimum of six (6) feet of undisturbed earth between adjacent trench walls shall be required. Refer to Figure A14-10, in *Appendix 14*.

8. Adjacent trenches in a serial distribution system shall be connected with a crossover line in such a manner that each trench is completely filled with septic tank effluent to the full depth of the gravel media before effluent flows to a succeeding trench.

9. In constructing crossover lines, the installer shall insure that an undisturbed block of earth remains between trenches. The trench for the crossover pipe, where it connects with the preceding absorption trench, shall not be excavated deeper than the top of the media. The crossover line shall rest on undisturbed earth and the backfill material shall be carefully tamped. This section pertains primarily to a serial distribution system. Pipe for crossover lines shall have no perforations, shall have a minimum inside diameter of three (3) inches and shall be constructed of Schedule 40 PVC pipe and fittings. See *Appendix 14* for construction details. The lengths of pipe used for crossover lines shall not be considered part of the required absorption area.

10. The incoming and outgoing crossover lines of each individual trench shall be separated by a minimum distance which is equal to eighty percent (80%) of the total length of said disposal field trench (e.g. the incoming and outgoing crossovers of a one-hundred foot long disposal field trench shall be separated by a minimum distance of eighty feet).

11. The invert of the highest point in the PVC pipe of the first crossover line shall be a minimum of four (4) inches lower than the invert of the septic tank outlet. See *Appendix 14* for construction details. Subsequently, the inverts of the high-points of the successive crossover pipes shall be at the same elevation as that (i.e. invert) of the first crossover pipe or lower.

12. Trenches shall not be excavated when the soil is wet enough to smear or compact easily. These soil conditions shall be determined by a Department Soil Scientist.

13. Media for the disposal fields shall consist of suitable materials as approved by the department. See Materials Specifications for Conventional Systems in *Appendix 12*.

14. Media for the disposal fields shall extend from a minimum of two (2) inches above the top of the perforated field line pipe to a minimum of six (6) inches below the bottom of the perforated field line pipe (thus, a minimum of twelve (12) inches total). This depth shall be maintained across the entire width and along the total length of the field line trench.

15. The top of the disposal field media shall be a minimum of four (4) inches below the invert of the tank outlet.

16. The media for the disposal fields shall be covered with untreated building paper, a layer of straw at least four (4) inches thick or other comparable filter fabric determined to be equivalent by the Department.

17. Soil material excavated from trenches shall be used in backfilling. The excess soil material shall be spread in such a manner so as to crown the entire disposal field area, in order to prevent ponding of any surface water, until initial settling has taken place. The disposal field site shall be shaped to shed water and be free of low spots.

18. There shall be a maximum of twelve (12) inches of soil material (i.e. the soil material excavated from the trenches on that site) cover over the disposal field media. The remaining excavated soil material, from that site, shall be utilized in accordance with *Part 17 of this Subsection*.

19. The bottoms of the sewage disposal trenches shall be constructed as level as possible, but in no case shall the fall in a single trench bottom exceed one-half (½) inch in twenty-five (25) feet (the fall providing for the directional flow of the effluent to migrate from the inlet to the outlet of a single trench). The amount of fall shall be determined by an engineering/surveying level instrument. Thus, in a 100 foot sewage disposal trench (this being the maximum allowable length, per *Part 30 of this Subsection*) the maximum total fall shall not exceed two (2) inches. Under no circumstances shall the bottom of the sewage disposal trench, or portion thereof, contain rise from the inlet end to the outlet end of said trench.

20. The width of the sewage disposal trench shall be thirty-six (36) inches.

21. The depth of the sewage disposal trench shall be twenty-four (24) inches.

22. All non-perforated piping under pavement (e.g. gravel, concrete, asphalt, etc.) or paved areas (e.g. driveways, sidewalks, etc.) shall be sleeved with a continuous section of Schedule 80 (minimum) PVC pipe or equivalent, of the next largest nominal pipe size. The sleeving pipe shall extend a minimum of ten (10) feet to either side of the pavement or paved area.

23. All non-perforated piping which breeches, crosses or traverses any size stream or man-made water course shall be constructed in accordance with the documentation (i.e. the supporting documentation pertaining to the Construction Permit) provided by the Department. The Department shall assess any proposed crossing of this type on a case-by-case basis and determine the specific requirements for said crossing (i.e. the methodology, construction materials, crossing location, etc.) for each site.

24. All non-perforated (i.e. solid PVC lines) piping which breeches, crosses or transverses a constructed drain (i.e. curtain drain, drawdown drain, etc.) shall be sleeved with a continuous section of Schedule 80 (minimum) PVC pipe or equivalent, of the next largest nominal pipe size. The sleeving pipe shall extend a minimum of five (5) feet to either side of the constructed drain. Where these crossings are made, they shall be routed in the direction that is perpendicular to the course of the constructed drain. Thus, aforementioned piping will be at a ninety (90) degree angle to the route of the constructed drain.

25. The lengths of pipe used for supply lines, manifolds or tight lines shall not be considered as part of the required absorption area.

26. The pipe used in the disposal field trenches shall be corrugated polyethylene, shall have a diameter of four (4) inches and shall be perforated with one-half (½) inch holes. The invert of said pipe shall be have a vertical separation of six (6) inches above the disposal field trench bottom.

27. All conventional subsurface sewage disposal systems shall require the placement of 1"x 6" grade boards in the disposal field trenches. Said grade boards shall support the four (4) inch corrugated piping. The one-by-six (1"x 6") lumber boards shall be installed on edge in a vertical orientation (i.e. not tilting in any manner) and supported by the placement of vertical supports consisting of wooden stakes, sections of metal pipe or metal reinforcement rod (rebar). The vertical supports shall be placed, as a minimum, at the end of individual section of lumber. The placement of intermediate vertical supports may be required by the Department. In lieu of the vertical type of support, horizontal supports constructed of lumber may be utilized. Horizontal supports shall be positioned in the same manner (i.e. spacing) as the vertical supports. The grade board shall be securely attached to the method of support utilized. The grade board shall be placed in the disposal field trench so as to be centered in said trench (i.e. the grade board being eighteen inches from each sidewall of the disposal field trench). The four (4) inch corrugated piping shall be secured to the grade board utilizing gutter spikes or an equivalent sized metal nail. The maximum spacing of said spikes or nails shall be five (5) feet. The placement of intermediate spikes or nails, in order to effectively secure the corrugated pipe, may be required by the Department. See *Appendix 14*.

28. Prior to the beginning of construction on a parcel of land, having platted or designated areas for subsurface sewage disposal, fencing shall be erected, in accordance with the provisions outlined in *Appendix 10*, so as to protect said areas from disturbance or damages to the soils from construction practices and vehicular traffic or vehicular parking. Bull dozers, trucks and other heavy vehicles shall not be allowed to run over the designated subsurface sewage disposal areas.

29. After the installation of the subsurface sewage disposal system, all protective fencing shall be reestablished and shall remain in place for the duration of all construction activities on the parcel of land. The area of the disposal field shall not be used for vehicular traffic or vehicular parking. Bull dozers, trucks and other heavy vehicles shall not be allowed to traverse over the septic tank, disposal field trenches, other parts of the system or upon any duplicate disposal field areas.

30. The maximum length of a single sewage disposal trench shall not exceed 100 feet. The minimum length of a single sewage disposal trench shall be forty (40) feet. Should an installer request to construct sewage disposal trenches longer than 100 feet in length, an advanced written request to the Department is required. The Department will review the request on a site specific basis. Written approval from this Department is required prior to this type of installation. Requests to install trenches less than forty (40) feet in length will not be granted by the Department.

31. A septic tank shall not be bypassed by any direct line (laundry, grease, or other gray-water, etc.) to the sewage disposal field.

32. Down-spouts shall not be connected to the subsurface sewage disposal system. Down-spouts or other surface water shall be diverted away from the subsurface sewage disposal system.

33. Water lines shall under no circumstances, cross, pass through, go under or come within ten (10) feet of the platted or designated subsurface sewage disposal field area(s), or any of its related components (i.e. septic tank, tight line, curtain drain, etc.)

    IMPORTANT NOTE: Should an installer encounter a situation where there is the need to cross a tight line, supply line or soil drainage improvement practice pipe line with a water line, an advanced written request to the Department shall be required. Such requests shall be made by the Construction Permit recipient. This request shall be accompanied by a set of detailed construction drawings, which show the proposed crossing site on the subject property. The Department will review the request and construction drawings on a site specific basis. Written approval from this Department is required prior to this type of installation.

34. All subsurface sewage disposal systems and their related components shall be installed in accordance with the setbacks, buffer zones and minimum distance boundaries as set forth in *Section 13.*

35. Should an installer propose to utilize a Rock Slide® for a system installation, the installer shall contact a Department inspector prior to the Layout inspection to advise the inspector of this intent. During the Layout inspection, the installer shall discuss and plan the proposed use of the device (i.e. the methods of setting the device, how the device will exit the disposal field trenches, etc.) for that particular site. Where a Rock Slide® is utilized, conformance to Part 27 of this Subsection may be waived.

36. The initial subsurface sewage disposal system installation shall be in the primary area as designated on the valid Construction Permit. The duplicate areas shall be held in protected reserve for future repair purposes. The unauthorized installation of a system in an area other than the designated primary area shall be grounds for the immediate revocation of the installer's license.

G. Inspection of the Conventional System Installation

No subsurface sewage disposal system or its related components shall be covered without an approved final inspection and written authorization from the Department. See *Section 20*.

SECTION 16

UTILIZATION OF SEWAGE/EFFLUENT PUMPS

The information outlined in this section shall be utilized in the design and assembly of all conventional subsurface sewage disposal systems which require the utilization of sewage/effluent pumps, related controls and alarm system, pump tanks and all piping components. Additionally, the methodology prescribed for the assembly of all aforementioned items and components, shall also apply in the construction of LPP, MLPP and Mound Systems.

A. Pump Tank

1. The pump tank, access riser and riser cover shall be watertight, structurally sound and not subject to excessive corrosion or decay.

    (a) The pump tank shall be of a single (i.e. one) compartment design. Pump tanks shall be constructed in accordance with the specifications outlined in *Section 10*.

    (b) The pump tank shall be appropriately placed so as to provide ground-level access, and the riser cover shall be visibly exposed at the ground surface.

    (c) The access riser shall have a minimum diameter of twenty-four (24) inches and extend to the finished grade or above so as to provide visible identification of said access.

    (d) The access riser shall be located at the outlet end of the tank, directly above the pump, supply line, switches and any other component or fixtures.

2. The pump tank volume shall be sized in accordance with the specifications in *Section 18*.

B. Pump

1. Pump Sizing Requirements

    (a) The minimum flow, in gallons per minute (gpm), and the proper pipe size for a pump system, shall be calculated in order to achieve a minimum scour velocity of 2.5 feet per second, in accordance with Table A13-1 in *Appendix 13*.

    (b) The total dynamic head (TDH) must be correctly calculated to ensure the proper pump selection for a particular site. The Department shall review and verify all TDH calculations for any subsurface sewage disposal system requiring the use of a pump. Since the calculations for the TDH on a site utilizing an Alternative System are made by the design engineer, they will automatically be reviewed by the Department during the Alternative System design review process.

    Where conventional systems require the use of a pump, the installer may request the Department to determine the TDH of a site, or if the installer chooses to determine the TDH for a site, they shall submit the calculations to the Department for review and approval prior to the system installation. This submitted documentation must also include the appropriate topographical information.

    (c) The TDH shall be calculated using the following information:

        (1) Elevation head (EH) is the difference in elevation from the pump and to the highest ground elevation of the disposal field area. Remember that the pump will be four (4) or five (5) feet below ground level in the pump tank.

        (2) Friction head (FH) is the loss of pressure due to friction as the effluent moves through the pipes and shall be determined using Table A13-2 in *Appendix 13* of these regulations. When estimating pipe friction, use the total length of supply line (and manifold line where applicable), but not the field lines. Add twenty (20) percent to this estimate to account for friction loss in all joints and fittings. Note that friction loss varies with pumping rate as well as with pipe length and diameter.

        (3) Pressure head (PH) is the amount of pressure desired at the distribution network and shall be a minimum of five (5) feet.

(4) A *Safety factor (SF)*, as described below, shall be added to the sum of EH plus FH plus PH. This factor of safety shall be based upon the potential elevation head (EH) and shall be dependent upon two factors:

(i) The accuracy and exactness of the location of the proposed house and its related tanks and pump; and

(ii) The extreme potential elevation difference across the house site or building envelope.

The minimum safety factor (SF) shall be two (2) feet. If locations of the house, tanks and/or pump are exact and accurate, or if the house site or building envelope is relatively flat or level (i.e., extreme elevation change across the house site or building envelope is less than or equal to two [2] feet based on required topographical information), then the assigned SF shall be that of the minimum required (i.e., a safety factor equal to two [2] feet).

If however, the house, tank(s) and/or pump locations are only general in nature and not exact, then the SF shall be equivalent to the worst case scenario of where the pump/tank could be located, plus the minimum required safety factor. Thus, for such a case, the total safety factor shall be equal to the greatest potential elevation change across the house site or building envelope (based on the required topographical information), plus an additional two (2) feet.

(5) Thus, the TDH is determined by the following formula:

TDH = EH + FH + PH + SF

<u>IMPORTANT NOTE:</u> *The minimum assigned total dynamic head shall be ten (10) feet*

2. Pump Selection

(a) The submersible pump shall be of a type that has been specifically designed for use and application in the septic tank/sewage environment, and shall be of sufficient quality so as not to be corroded by sewage. No other type of pumps (e.g. sump pumps, water pumps, grinder pumps, well pumps, etc.) shall be approved nor allowed for this use. The pump shall be located in the pump tank.

(b) The pump shall be of sufficient size so as to meet and/or exceed the design capacity (i.e. the flow requirement and the total dynamic head requirement) stipulated for the specific system and site it is intended to serve.

(c) The Department retains the authority to mandate the use of a different pump (i.e. regarding size, horsepower, pumping capacity, etc.), for a site/installation, in lieu of any previously specified or installed pump, as deemed necessary.

<u>IMPORTANT NOTE:</u> *The pump shall meet all provisions outlined in Appendix 12.*

C. Pump Controls

1. All float switches shall be of a sufficient quality and material so as to perform under turbulent conditions and be resistant to the corrosive nature of the effluent.

2. The controls shall be sealed to prevent the entry of corrosive and explosive gases from the effluent, and shall have NEMA (National Electrical Manufacturing Association) approval.

3. The pump controls shall be either sealed mercury float switches or sealed, self-contained mechanically-activated float switches.

(a) Mercury switches are activated by a sealed float which contains a tube of mercury in contact with power leads.

(b) The only approved mechanically-activated type switches shall be of the same design principle as that of the mercury-type switches. In lieu of a tube of mercury, the mechanical switches employ a steel ball to activate the electrical contacts.

(c) Diaphragm-type switches or vertically rising mechanical-type float switches are not acceptable and shall not be utilized.

4. The pump control system may employ either a single float switch or a dual float switch arrangement, operating in series, to control pump operation.

D. Alarm System

1. A high water alarm system shall be required on all pump installations.

2. The alarm system shall emit an audible and visual signal.

3. The alarm system shall be located in the electrical control panel in accordance with the specifications outlined in Subsection F.

4. The alarm float control shall be placed so as to be activated when the pump tank water level rises above the *pump on* float control.

E. Piping and All Related Components (Excluding Electrical Components)

1. All piping materials (i.e. pipe, fittings, etc.) shall be pressure-rated Schedule 40 PVC and shall conform to the provisions as set forth in *Appendix 12*.

2. All PVC fittings shall be pressure-rated and shall conform to the provisions as set forth in *Appendix 12*.

3. All check valves shall be constructed of either PVC, brass or bronze and shall conform to the provisions as set forth in *Appendix 12*.

4. All threaded unions shall be PVC and shall conform to the provisions as set forth in *Appendix 12*. In lieu of PVC threaded unions, other similar connecting devices may be utilized, as approved by the Department on an individual basis.

5. All gate or ball valve(s), where a Pressure Distribution Manifold is being utilized, or in any other instance where the Department has determined that such valve(s) are required, shall be brass or bronze and shall conform to the provisions as set forth in *Appendix 12*.

F. Electrical Components

This Subsection shall address all Department requirements regarding the proper setup and connection of the electrical components associated with the use of sewage/effluent pumps. Thus, since all alternative systems (i.e. LPP systems, MLPP systems and Mound systems) require the use of sewage/effluent pumps, as do a percentage of conventional systems, those particular types of septic systems shall be considered as *Electrically Assisted Systems* (*EAS*). Therefore, the provisions of this *Subsection* shall apply to all subsurface sewage disposal systems which employ the use of sewage/effluent pumps.

IMPORTANT NOTE: All electrical installations shall be installed to meet the current wiring methods of the current edition of the National Electric Code (NEC).

1. Permitting of EAS Subsurface Sewage Disposal Systems

   Where the Department has specified that a property shall require the use of an EAS, the Department shall refuse to issue a Construction Permit for that property until the permit applicant has first procured a separate electrical permit for the inspection of the electrical service and its related components for the EAS.

2. Obtaining the Required EAS Electrical Permit

   Such permits are to be procured in conjunction with the office of the State of Tennessee Deputy Electrical Inspector. In Williamson County these permits may be obtained at:

   Williamson County Rescue Squad
   508 West Main Street
   Franklin, TN 37064
   Phone 790-5821

   IMPORTANT NOTE: The electrical wiring permit, for a structure, does not include the permit for the wiring of an EAS. Separate permits for an EAS are required and the Williamson County Department of Sewage Disposal Management shall not issue any Construction Permit for an EAS in the absence of proof of a proper electrical wiring permit for said system.

Additionally, the Department shall refuse to sign any *Certificate of Occupancy*, nor will the department grant final approval to any EAS where the electrical inspector has found deficiencies and has not granted approval to the EAS electrical service and its related components. Valid proof of the EAS electrical service approval and serviceability from the electrical inspectors office shall be required before final installation approvals shall be granted or before any *Certificate of Occupancy* will be released.

3. Control Panel and Electrical Requirements

(a) Securing Control Panel

(1) Where the electrical control panel is mounted on the pump tank the following specifications shall apply:

(i) It shall be mounted via a two (2) inch diameter galvanized steel standpipe permanently affixed to the top of the pump tank. A pass-through hole (2 inch minimum diameter) shall be bored through the tank top to allow for passage of the pump wiring and controls. The stand-pipe shall be anchored to the tank top via a permanently affixed flange centered over the pass-through hole to allow the wiring to exit the tank and enter the control panel through the stand pipe. Explosion proof seals (with approved seal compound) shall be required at the tank/stand-pipe connection and the stand-pipe/control panel connection in order to prevent gases from exiting the pump tank and entering the electrical control panel.

(ii) There shall be no splices of any wiring between the pump and the control panel.

(iii) There shall be a Ground Fault Interrupt (GFI) receptacle installed at the control panel if the distance from said control panel to the house or structure is more than twenty-five (25) feet.

(iv) All wiring conduit and associated strapping connectors shall be of the rigid type, in accordance with the NEC requirements.

(v) Two (2) inch conduit shall have plastic bushings, with the appropriate lock nut, in accordance with the NEC.

(vi) All materials exposed to the sewage/effluent/wastewater and/or its related gases, shall have inherent corrosion protection.

(vii) All exterior steel surfaces shall be suitably protected against corrosion.

(viii) The electrical control panel shall be mounted a minimum of two (2) feet above the finished grade of the ground surface.

(ix) The panel front shall be oriented so that it can be observed from the pump access portal of the pump tank.

(2) Where the electrical control panel is mounted immediately adjacent to the pump tank the following specifications shall apply:

(i) The panel shall be mounted on a pressure treated post (pressure treated post grade shall be specified as meeting the .40 retention, Ground Contact Application standard) having the dimensions of six (6) inches by six (6) inches.

(ii) The post shall be installed a minimum of thirty-six (36) inches deep into undisturbed earth; a lesser minimum depth of eighteen (18) inches may be permitted, provided it is reinforced with concrete.

(iii) The post shall be located within two (2) feet of the front of the pump tank.

(iv) The control panel front shall be oriented so that it may be observed from the pump access portal of the pump tank.

(v) The electrical control panel shall be mounted a minimum of two (2) feet above the finished grade of the ground surface.

(vi) The electrical control panel shall be firmly affixed to the six (6) inch by six (6) inch post with screws specifically approved for use with electrical installations.

(vii) A two (2) inch minimum diameter pass-through hole shall be bored through the side of the pump tank (i.e. on the same end of the tank as the pump) to provide for passage of the pump wiring and controls. Said pass-through hole shall be located so as to be centered within the required tank air-space (i.e. air-space as in accordance with the provisions in *Section 10*).

(viii) A two (2) inch minimum diameter conduit shall be permanently affixed over the pass-through hole to allow the wiring to exit the tank and enter the control panel through the conduit.

(ix) Explosion proof seals (with approved seal compound) shall be required at the tank/conduit connection and at the conduit/electrical control panel connection in order to prevent gases from exiting the pump tank and entering the electrical control panel.

(x) There shall be no splices of any wiring between the pump and the control panel.

(3) Where the electrical control panel and electrical disconnect switch is mounted on an outside wall of the house or structure, the following specifications shall be met:

(i) All wiring splices shall be housed within a NEMA 4X, UL listed junction box located within and affixed to the pump tank access riser located directly above the pump.

(ii) Explosion proof seals, with approved seal compound, shall be installed at the conduit entrance and exit of the junction box and additionally at the conduit entrance to the pump electrical control panel in order to prevent gases from exiting the pump tank and entering the electrical control panel.

(iii) The electrical wiring leaving the junction box (located within the pump tank access riser) shall be encased in its entirety in one and one-half (1½) inch minimum diameter conduit from the exit of the junction box to the entrance of the electrical control panel (located on the outside wall of the structure). At the installers discretion, the electrical wiring between the junction box and the electrical control panel may be housed in separate conduits. Where separate conduits are utilized, one half (½) inch minimum diameter conduit shall be required. All conduit and related connections shall be watertight.

(Iv) All electrical wiring from the electrical service equipment panel of the house or structure to the pump electrical control panel shall be encased in one and one-half (1½) inch minimum diameter conduit. Said conduit shall extend between the electrical service equipment panel of the house or structure and the electrical disconnect switch (which must be housed in a lockable NEMA 4X watertight enclosure) located on the outside wall of the house or structure. Said conduit shall also extend between the electrical disconnect switch housing and the pump electrical control panel (also located on the outside wall of the house or structure).

(v) All wiring (both pump electrical service and controls) shall meet the minimum rating for conductor size and amp capacity rating as established by the current edition of the National Electrical Code.

(vi) The conduit housing the electrical service wiring from the pump electrical control panel (located on the outside wall of the house or structure) to the NEMA 4X junction box (located within the pump tank access riser) shall be buried in accordance with the following conduit-type use:

a. A minimum of six (6) inches below what will be the finish graded ground surface level, where Intermediate Metal Conduit (IMC) or rigid conduit is utilized.

b. A minimum of eighteen (18) inches below what will be the finished graded ground surface level, where PVC conduit is utilized.

(vii) All grounding apparatus and methodology shall be in accordance with the NEC, in addition to any local electrical codes that may apply.

IMPORTANT NOTE: All electrical work shall be inspected prior to back-filling tank hole and all associated ditches containing electrical conduits.

(b) Electrical Control Panel Requirements

Any and all electrical control panels utilized on subsurface sewage disposal systems shall contain, but shall not be limited to, the following features:

(1) Shall be Underwriters Laboratory (UL®) listed.

(2) Shall be National Electric Manufacturers Association (NEMA) 4X watertight enclosure with lockable hasp.

(3) Shall contain an alarm horn (83-85 decibel rating).

(4) Shall contain a top-mounted, visual, red-lighted beacon providing for a 360° visual check of the alarm condition.

(5) Shall contain an exterior horn silence switch.

(6) Shall contain an exterior alarm test switch.

(7) Shall contain an exterior green pump run indicator light.

(8) Shall contain a Hands Off and Auto (HOA) switch for manual pump operation.

(9) Shall contain a terminal strip, mounted in the box, clearly marked for easy identification and installation of alarm, pump and pump control wiring.

(10) Shall contain a circuit breaker.

(11) Shall contain a wiring diagram integral within the electrical control panel.

(12) Shall have a lockable hasp on the panel door.

(13) Shall be fastened with proper screws, specifically approved for use with electrical installations.

(14) Conductors shall be sized to NEC requirements for electrical and breakers.

(c) Additional Requirements for EAS

The following procedures shall apply to all of the electrical components starting from the house or structure electrical service panel to the pump electrical control panel.

(1) The electrical service line to the pump electrical control panel shall be on a separately dedicated and clearly identified circuit. That section of the pump electrical control panel which controls the alarm shall require a separate wire feed. This wire shall be connected to a commonly used household circuit breaker which is located in the house or structure electrical service panel. This is required so as to provide notice to the homeowner when the alarm has been tripped.

(2) All electrical service wiring and related conduits and appurtenances shall be in accordance with the NEC, in addition to any local codes that apply.

(3) The electrical service wiring shall be encased in one and one-half (1½) inch minimum diameter conduit from the house or structure to the pump electrical control panel. The conduit shall be water-tight.

(4) A suitable disconnect, in accordance with the NEC, shall be installed on either the pressure treated post (where applicable) or the pump electrical control panel stand-pipe to provide for power shut off independent of the house or structure electrical service panel.

(5) The disconnect shall be housed in a NEMA 4X water-tight enclosure with lockable hasp.

(6) The disconnect shall be connected to the pump electrical control panel via conduit. Explosion proof seals (with approved seal compound) shall be installed over the conduit entrance into the pump electrical control panel.

(7) All grounding apparatus and methodology shall be in accordance with the NEC, in addition to any local electrical codes that may apply.

(8) The conduit housing the electrical service wiring from the house or structure to the pump electrical control panel shall be buried, in accordance with the following conduit-type use:

(i) A minimum of six (6) inches below what will be the finished graded ground surface level, where Intermediate Metal Conduit (IMC) or rigid conduit is utilized.

(ii) A minimum of eighteen (18) inches below what will be the finished graded ground surface level, where PVC conduit is utilized.

(9) At the installers discretion, the electrical wiring between the pump electrical control panel and the junction box may be housed in separate conduits. Where separate conduits are utilized, one half (½) inch minimum diameter conduit shall be required. All other requirements pertaining to explosion proof seals, connectors and conduit usage shall apply as specified in these regulations.

IMPORTANT NOTE: *ALL ELECTRICAL WORK SHALL BE INSPECTED PRIOR TO BACKFILLING TANK HOLE AND ALL ASSOCIATED DITCHES CONTAINING ELECTRICAL CONDUITS.*

G. Assembly and Setup of Components

1. Assembly

(a) The pump tank shall be set in such a manner so that the inlet to the pump tank is a minimum of four (4) inches lower in elevation than the outlet of the septic tank.

(b) The pump tank shall have all of its additional components assembled in order to meet all provisions of Subsection A of this Section.

(c) The pump shall be placed at the end opposite of the pump tank inlet.

(d) The pump shall be set to ensure that the intake is a minimum of eight (8) inches above the bottom of the pump tank. A solid base or platform shall be provided for the pump to set upon. An acceptable practice is to utilize standard eight (8) inch concrete blocks (typically two blocks placed side by side for stability). See *Appendix 14* design detail.

(e) All electrical control cables (i.e. wiring of any type) shall be routed through conduit installed through the tank in accordance with the provisions of *Subsection F of this Section*.

(f) The controls and conduit (i.e. the end of the conduit inside the tank) shall be sealed in accordance with the provisions of *Subsection F of this Section*.

(g) The conduit/tank interface shall be constructed in accordance with the provisions of *Subsection F of this Section*.

(h) The controls shall be adjustable and properly secured to the stand pipe by plastic cable ties.

(i) The cable tie shall be arranged around the stand pipe in such a manner so as to ensure against slippage, up or down the pipe. See *Appendix 14* for design detail.

(j) The pump outlet pipe shall be connected to the supply line with a threaded union, or similar device, to allow for easy and quick removal of the pump. See *Appendix 14* design detail.

(k) A gate valve shall be installed in the supply line, on the outlet side of the union or similar disconnecting device (i.e. between the union and where the discharge pipe exits the pump tank), to allow pipe shutoff for pump removal/replacement. See *Appendix 14* for design detail.

(l) Where a check valve is required, it shall be installed with threaded fittings in the pump tank, between the gate valve and the union, to provide easy access for maintenance.

(m) The supply line shall be designed and installed so as to drain after each use, unless system design requires a check valve. Should a check valve be required, See *Part 2, subpart (c) "Pumping Uphill", of this Subsection*.

(n) Where the use of a check valve has been specified by the Department, a supply line pipe shall be buried a minimum of twelve (12) inches below the existing ground surface. Thus, the supply line trench shall be excavated to sufficient depth so as to ensure that the crown of said pipe lies twelve (12) inches below the ground surface throughout the entire length of the supply line to prevent freezing of the effluent held in said supply line.

<u>*NOTE:*</u> Where any impediment, in attaining this minimum depth, is encountered during the excavation of the supply line trench (e.g. encountering bedrock, etc.) and the specified depth cannot be maintained, those portions of the trench being less than the required depth shall be bedded with a minimum of six (6) inches of an approved (i.e. by the Department) insulating material (e.g. clay, saw-dust, crushed disposal field gravel media, etc.) on which the supply line pipe shall rest. The remaining depth of backfill or cover shall consist of imported soil fill material. This material shall be of sufficient depth so as to provide the minimum of twelve (12) inches of cover, and said depth shall extend to a distance of eighteen (18) inches to either side of the pipe.

(o) <u>*IMPORTANT:*</u> A check valve shall always be installed on any conventional subsurface sewage disposal system, utilizing a sewage/effluent pump setup, where the installation of an Effluent Brake Device has been specified by the Department. Thus, the provisions outlined in *Part 2, subpart (c) "Pumping Uphill", of this Subsection* do not apply in this situation.

(p) All PVC connections shall be primed with purple PVC primer and glued with PVC solvent cement. See *Appendix 12.*

(q) As a means to remove the pump from the pump tank, a material of sufficient strength and durability (i.e. a non-corrodible material) shall be secured to the pump, pump outlet pipe and access riser. An acceptable practice is to utilize nylon rope or a heavy-duty plastic chain capable of supporting the weight of the pump and pipe. See *Appendix 14* design detail.

(r) All line connections to the pressure distribution manifold shall be accomplished via PVC tees and/or crosses. No screw-in or tapping arrangements into the pressure distribution manifold shall be allowed. See *Appendix 11* for design detail on Pressure Distribution Manifold Construction.

2. Setup

(a) Dosing Volume

The dosing volume shall be between one-fourth and one-half daily flow, except in those situations where the minimum dose exceeds one-half daily flow, then the calculated minimum dose shall be the dosing volume.

(b) Float Controls

(1) The pump control shall be positioned so the <u>*pump off*</u> switch is slightly above the top of the pump and the <u>*pump on*</u> switch is at the desired dosing depth. The <u>*pump off*</u> switch for pumps specifically designed to operate with the pump motor casing exposed to air, may be located at a lower elevation provided an adequate depth of wastewater is maintained above the pump intake to insure that the pump intake will not draw in air. See *Appendix 14* design detail.

<u>*Note:*</u> *Care shall be taken to ensure that the floats are properly secured to prevent them from becoming fouled or entangled by other components such as the electrical power cord to the pump or the pump lifting rope.*

(2) It may be necessary for the system installer to make adjustments to the float controls after a system has been installed and in use. Should this be necessary, the installer shall notify the Department and provide information on where such work was required, the date it was completed and the reason for the adjustment.

(c) Pumping Uphill

When pumping uphill, a check valve shall be utilized if the volume of effluent which will flow back into the tank exceeds one-fourth of the daily flow.

When a check valve is utilized, a vent hole shall be drilled in the discharge pipe below the check valve, inside the pump tank, to purge the pump of trapped air (*This practice is also recommended by the Sump & Sewage Pump Manufacturers Association - SSPMA*).

(1) The vent hole size shall be in accordance with the pump installation instructions provided by the pump manufacturer.

(2) An extra two (2) gallons per minute (gpm) shall be added to the pumping rate to compensate for flow through the vent hole.

Example:
For a system with 36 gpm flow rate and a vent hole.
Total flow rate = 36 gpm + 2 gpm = 38 gpm

(d) Pumping Downhill

For systems where the absorption field is at a lower elevation than the pump, a 1/4-inch siphon-breaker hole must be drilled in the supply line inside the pump tank. This hole will prevent inadvertent siphoning of the contents of the pump tank into the field. An extra two (2) gallons per minute (gpm) must be added to the pumping rate to compensate for flow through the siphon-breaker hole.

Example:
For a system with 36 gpm flow rate and a siphon-breaker hole.
Total flow rate = 36 gpm + 2 gpm = 38 gpm

SECTION 17

INSTALLATION OF SEPTIC TANKS AND PUMP TANKS

The information in this section pertains to the actual practices to be utilized in the placement into the ground and connections of septic tanks and pump tanks.

NOTE: The use of the term "tank" in this section refers to both septic tanks and pump tanks.

A. Location of Tanks

1. Conventional Systems

   The actual tank installation site on any parcel of land shall, as a minimum, be in accordance with the provisions set forth in *Section 13* of these regulations.

2. Alternative Systems

   The actual tank installation site involved in an alternative subsurface sewage disposal system is an integral part of the engineering design of that system. Therefore, the tanks are to be placed in the location, as it relates to the location of the structure, as specified by the approved alternative system design plans and be in accordance with the provisions set forth in *Section 13* of these regulations.

B. Excavation for Tank Placement

The appropriate methods and techniques to be utilized for excavating tank holes is left to the discretion of the installer. The site conditions (i.e. presence of deep soils, soils having shallow depths to bedrock, etc.) will undoubtedly determine what type of excavation methods will be employed.

C. Placement of Tanks in Prepared Excavation

1. All tanks shall be level.

   (a) Tank Hole(s) Being Entirely Within Soil

   The bottom of the tank hole(s) shall be level and the tank shall be set upon firm, undisturbed soil/earth in the excavation prepared for said tank.

   (1) The bottom or base of the excavation prepared for the placement of the tank shall be level.

   (2) If the excavation prepared for the placement of the tank is not level, loose soil material shall not be replaced into said excavation to create a level pad on which the tank will set.

   To create a level pad on which the tank will sit, either:

   (i) more soil material shall be removed from the bottom of the excavation,

   (ii) a layer (i.e. not to exceed four inches in depth) of thoroughly compacted crusher-run type gravel (i.e. gravel containing fines so as to allow for complete compaction) shall be placed on the bottom of the excavation, or

   (iii) a level concrete pad, of not less than three (3) inches in thickness, shall be poured in the bottom of the excavation.

   (3) Where a tank hole was excavated to a deeper depth than intended, loose soil material shall not be replaced into said excavation to raise the elevation of the hole bottom.

   To raise the elevation of the base upon which the tank will sit, either:

   (i) a layer of thoroughly compacted crusher-run type gravel (i.e. placed in four inch lifts, each lift being compacted before the placement of another lift) shall be placed on the bottom of the excavation, or

   (ii) a level concrete pad, of not less than three (3) inches in thickness, shall be poured in the bottom of the excavation.

(b) Tank Hole(s) Being Partially or Entirely Within Rock

(1) Rock being present in the side-walls of the tank hole(s).

Where rock is present in the side-walls of the tank hole, there shall be a minimum clearance of six (6) inches between said rock and the set tank.

(2) Rock being present in the bottom or base of the tank hole(s).

The tank(s) shall not be set directly upon any rock present in the bottom of a tank hole.

A level layer (i.e. not to exceed four inches in depth) of thoroughly compacted crusher-run type gravel (i.e. gravel containing fines so as to allow for complete compaction) shall be placed on the bottom of the excavation to provide an even base for the tank to be set upon.

(3) Leveling or raising the base of a tank hole.

The same procedures shall be utilized as outlined in *subpart (a)(2) and (a)(3) of the Part 1 of this Subsection*.

2. A pump tank shall be set in such a manner so that its inlet port is at a lower elevation than the elevation of the outlet port of the septic tank.

3. Filling the tank(s) with water after said tank is set.

(a) This task may be required at the Department's discretion in order to verify that the tank is watertight. Refer to *Section 20*.

(b) This task may be necessary should there be a danger (e.g. impending rain storm, etc.) of the tank floating. Under this scenario, the decision as to whether or not to fill the tank(s) with water will be left to the installer.

D. Piping Associated With Tanks

1. Pipe Components

(a) From Structure to the Septic Tank

The piping connections between the structure and the septic tank, regarding the utilization and placement of clean-outs and the minimum pipe size (i.e. pipe diameter), shall be in accordance with all applicable Williamson County building/plumbing codes.

(b) Gravity Flow Systems

Piping shall be in accordance with the provisions outlined in *Appendix 12, Subsections A and G* and shall be properly bedded and supported as outlined in *Section 15, Subsection F, Part 1*.

(c) Pump Systems

Piping shall be in accordance with the provisions outlined in *Appendix 12, Subsections A and G* and shall be properly bedded and supported as outlined in *Section 15, Subsection F, Part 2*.

2. Pipe Connections to Tank(s)

All pipe-to-tank connections shall be in accordance with the provisions as outlined in *Appendix 12, Subsection G, Part 5.*

3. Pipe to Pipe Connections – Gravity Flow and Pump Systems

All pipe to pipe connections shall be in accordance with the provisions as outlined in *Appendix 12, Subsection G, Parts 2, 3 and 4*.

E. Tank Risers and Ground Level Access

There shall be a ground-level access riser installed on each manhole opening of the tank(s). The riser-to-tank connection shall be made watertight.

Said riser shall be in accordance with the provisions outlined in *Appendix 12, Subsection G, Part 6*.

F. Preparation for the Backfilling of Set Tank(s)

1. Where the space between any tank piping and the side-wall of the tank hole is in excess of thirty (30) inches, there shall be provided bedding support for said pipe. The void space in the tank hole shall be filled to the level of the invert of the inlet and outlet holes of said tank with gravel.

2. The tank hole shall be cleared of all construction debris (i.e. wood, plastic buckets, etc.) and trash prior to backfilling.

G. Miscellaneous Circumstances

Should there exist a site where the aforementioned methodologies/techniques cannot readily be adhered to, the installer shall follow the procedures outlined in *Section 20, Subsection A, Part 13 (Construction Related Problems)*.

SECTION 18

MINIMUM PUMP TANK CAPACITY

The information in this section covers Pump Tank Capacity only. The provisions outlining Minimum Septic Tank Capacity are presented in *Section 14*.

Where any subsurface sewage disposal system requires the use of a pump tank, said pump tank shall be sized in accordance with the minimum standards as follows:

- The minimum effluent storage capacity, within a pump tank, shall be a minimum of twice the volume of the normal projected daily wastewater flow so as to provide for a minimum of one (1) day of emergency storage.

- The actual or real storage capacity of a tank to be utilized as a pump tank shall be considered that volume of liquid capacity that occupies the interior space of said tank to the level of the invert of the pre-cast outlet port of that tank (i.e. the liquid level being the actual level to the invert of the outlet port of a tank set upon a level plane). Therefore, the air-space that lies above the actual surface of the liquid level of a tank shall not be considered as part of the pump tank's storage capacity.

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*).

<u>*IMPORTANT NOTE:*</u> *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.*

B. Alternative Systems Approved for Use

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

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) <u>Part 1</u>

   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 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 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) <u>Part 4</u>

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.

<u>IMPORTANT NOTE:</u> 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.

<u>IMPORTANT NOTE</u>: 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) <u>Part 5</u>

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 or Mounds).

(4) Linear footage requirements (for LPP 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) <u>Part 6</u>

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 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 I"=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 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 Review 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 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.

SECTION 20

INSPECTION OF SUBSURFACE SEWAGE DISPOSAL SYSTEM INSTALLATIONS

All subsurface sewage disposal system installations shall be inspected, during the process of their construction, by the Department. The outlined Standard Inspection Procedure shall be followed for the specific type of subsurface sewage disposal system being installed. No subsurface sewage disposal system, or portion thereof, shall be covered or backfilled, partially or in whole, prior to being inspected and approved by the Department. The Department shall have the authority to require that any portion of a subsurface sewage disposal system that has been covered or backfilled without Department authorization, be completely and thoroughly uncovered of all soil material (i.e. removal of all soil backfill material) by the responsible installer of said system for proper inspection.

A. Types of Inspections

The installation of the various types of subsurface sewage disposal systems utilized in Williamson County necessitate the use of different types and specific sequences of field inspections. This Subsection outlines and identifies the types of inspections that shall be utilized by the Department.

It shall be the responsibility of the installer to contact the Department and request the appropriate inspection at the appropriate point in the subsurface sewage disposal system installation process. Failure of the installer to comply with the provisions outlined in this Section will result in the issuance of either a Yellow or Red Flag on the subsurface sewage disposal system installation.

1. Soil Check

The soil check inspection is a generalized type of inspection used where there is a need for an assessment of soil properties or conditions on a site that is to be utilized for a subsurface sewage disposal system installation. This type of inspection shall be conducted by a Department Soil Scientist.

The types of soil checks consist of, but are not limited to, the following:

(a) Soil Disturbances

A soil check inspection is conducted in order to assess a designated or platted subsurface sewage disposal system area for disturbances (cutting, compaction, filling, etc.) of the soil.

The need for this inspection shall be left to the discretion of the Department inspector. During the course of the Layout Inspection, should the inspector suspect or observe evidence that any type of soil disturbances have occurred near or on a designated or platted subsurface sewage disposal system area, he/she shall halt that inspection, notify a Department Soil Scientist and schedule a Soil Check Inspection.

IMPORTANT NOTE: *Once the Department Soil Scientist has been called in by the inspector to assess soil disturbances, said Soil Scientist shall have the authority to determine whether or not the installation of any type of subsurface sewage disposal system shall be allowed to proceed. If an installation is halted, the Soil Scientist shall have the authority to decide when said soil conditions are suitable (i.e. all required soil remediation practices have been properly completed) to allow the beginning or continuance of a system installation.*

(b) Soil Moisture Conditions

A soil check inspection is conducted in order to determine whether or not the soil moisture conditions of a designated or platted subsurface sewage disposal system area are suitable to proceed with a system installation. The necessity for this inspection will be directly influenced by seasonal weather conditions.

The need for this inspection shall be left to the discretion of the Department inspector, except in the case of Mound systems. Where any type of Mound system is to be constructed, this soil check inspection shall always be required before or concurrent with the Layout Inspection. During the course of the Layout Inspection, should the inspector observe or suspect that the ground and/or soils in the designated or platted subsurface sewage disposal system area are too wet to begin any type of system installation, he/she shall halt that inspection, notify a Department Soil Scientist and schedule Soil Check Inspection.

IMPORTANT NOTE: *Once the Department Soil Scientist has been called in by the inspector to assess soil moisture conditions, said Soil Scientist shall have the authority to determine whether or not the installation of any type of subsurface sewage disposal system shall be allowed to proceed. If an installation is halted, the Soil Scientist shall have the authority to decide when said soil conditions are suitable to allow the beginning or continuance of a system installation.*

(c) Soil Remediation Activities

Where any soil remediation activities are required for a designated or platted subsurface sewage disposal system installation site, a soil check inspection shall be conducted to verify that those soil remediation activities (e.g. subsoiling, chisel plowing, etc.) have been properly implemented and executed.

IMPORTANT NOTE: *Once the Department Soil Scientist has been called in by the inspector to assess the completion of any soil remediation practices, said Soil Scientist shall have the authority to determine whether or not the installation of any type of subsurface sewage disposal system shall be allowed to proceed. If an installation is halted, the Soil Scientist shall have the authority to decide when said soil conditions are suitable to allow the beginning or continuance of a system installation.*

(d) Soil Modification Practices

When soil modification practices are required for a subsurface sewage disposal system installation, a soil check inspection is to be conducted to determine the following:

(i) Site to be Modified

A soil check inspection is conducted on the site where the modification practices are to be utilized where there does not exist any proper soil mapping information. This assessment is required to provide a basis for the determination of soil compatibility with the imported soil fill material proposed to be incorporated on said site.

Where the Department Soil Scientist has proper soil mapping information (e.g. subdivision soil maps), this type of soil check may or may not be necessary. This matter shall be left to the discretion of a Department Soil Scientist.

(ii) Source of Modification Soil Materials

This soil check inspection shall always be conducted to assess the proposed source of soil fill material to be utilized for modification practices. During this inspection, the physical properties of the soil materials are assessed at the proposed source prior to its removal.

This assessment is required to provide a basis for the determination of the soil fill material's compatibility with the natural soil properties existing at the site requiring the modification practices.

IMPORTANT NOTE: *Department personnel shall not travel beyond the boundaries of Williamson County to assess any sources of soil modification materials.*

2. Layout Inspection

IMPORTANT NOTE: *The installer shall be required to obtain a Permit to Install prior to requesting a Layout Inspection. In any instance where the installer has not obtained said permit, said installer shall not receive a Layout Inspection and shall not begin the installation of any type of subsurface sewage disposal system. See Section 7, Subsection B.*

A Layout inspection shall be required prior to beginning the construction of any subsurface sewage disposal system. During the Layout inspection the inspector shall verify that, depending upon the type of subsurface sewage disposal system to be constructed, all preparatory tasks have been completed. The specific tasks associated with the type of subsurface sewage disposal system, which the inspector shall verify, are outlined in the Subsection pertaining to that system. Once a system has received an approved Layout Inspection, the installer of said system shall commence the installation within ten (10) working days after receiving the layout approval. Should the installer fail to commence construction of the system within this time frame, the installer shall contact the Department's Inspector with justification for the construction delay. The Inspector may require another Layout Inspection prior to beginning said installation.

3. Site Preparation Inspection

   A Site Preparation Inspection shall be required on all sites where an MLPP or Mound system is to be utilized. During the Site Preparation Inspection the inspector shall verify that, depending upon the type of subsurface sewage disposal system to be constructed, all preparatory tasks for the designated or platted subsurface sewage disposal system site have been completed. The tasks that the inspector shall verify are outlined in the Subsection pertaining to that system.

4. Modification Placement and Incorporation Inspection

   The Modification Placement and Incorporation Inspection shall be required on all sites where an MLPP system is to be utilized. During the Modification Placement and Incorporation Inspection the inspector shall verify that all preparatory tasks for the designated or platted subsurface sewage disposal system site have been completed.

   The tasks that the inspector shall verify include, but are not limited to, the following:

   (a) Utilization of the Approved Soil Fill Material

      Verification that the imported soil fill material is the same soil fill material that was approved during the Soil Check Inspection. *The inspector may seek an assessment and confirmation by a Department Soil Scientist.*

   (b) Proper Placement of the Soil Fill Material

      Verification that the imported fill material has been placed to the proper depth, as indicated by the grade stakes, over the designated or platted MLPP area, including its required buffers. Further, verification that the imported soil fill material has been properly shaped in accordance with the provisions outlined in *Appendix 3* (and *Appendix 4* where applicable).

   (c) Compaction Status of the Soil Fill Material

      Verification that the imported soil fill material has not been compacted. *The inspector may seek an assessment and confirmation by a Department Soil Scientist.*

5. Imported Fill Inspection

   The Imported Fill Inspection shall be required during the construction of Mound systems. During the Imported Fill Inspection, the inspector shall verify that the proper materials (i.e. the sand utilized for the Mound) have been utilized, that those materials have been placed, configured and prepared (i.e. for the next sequence of construction steps) in accordance with the approved Mound design plans.

6. Mound Distribution Network Inspection

   The Mound Distribution Network Inspection shall be required during the construction of Mound systems. During the Mound Distribution Network Inspection, the inspector shall verify that the proper materials have been utilized and that those materials have been placed, configured and prepared in accordance with the approved Mound design plans. The tasks that the inspector shall verify are outlined in the Subsection pertaining to that system.

7. Pressure Head Verification

   The Pressure Head Verification Inspection shall be required during the construction of Conventional systems utilizing a Controlled Distribution Device (i.e., the pressure distribution manifold), LPP systems, MLPP systems and Mound systems. During the Pressure Head Verification Inspection, the inspector shall verify that the head pressure on a pressurized distribution network or device has been properly balanced and set so as to meet the specifications of the approved design plans and any additional specifications as outlined in these regulations. The tasks that the inspector shall verify are outlined in the Subsection pertaining to that system.

   The installer shall have all pertinent site and system components fully prepared and ready for this inspection (i.e. pump tank filled with water, appropriate electrical supply, etc.) prior to requesting this inspection. Failure to have accomplished all required tasks will result in the issuance of a Yellow Flag (deficient installation).

8. Clay Cap Inspection

   The Clay Cap Inspection shall be required during the construction of Mound systems. During the Clay Cap Inspection, the inspector shall verify that the proper materials have been utilized and that those materials have been placed and configured in accordance with the approved Mound design plans.

9. LPP Open Trench Inspection

The LPP Open Trench Inspection is the first of a sequence of three (3) inspections that shall be utilized during the actual construction process for LPP and MLPP systems (this sequence does not include the Drain inspections). During the LPP Open Trench Inspection, the inspector shall verify that all preparatory tasks leading to this inspection have been completed. The specific components and items associated with this inspection, which the inspector shall verify, are outlined in the Subsection pertaining to that system.

10. Drain Inspection

A Drain Inspection shall be required for any subsurface sewage disposal system requiring the use of a soil drainage improvement practice (Interceptor Drains, Curtain Drains, Drawdown Drains, etc.). All drain types shall be constructed in accordance with the provisions outlined in *Appendix 5*, and in accordance with any other associated supporting documentation (i.e. subsurface sewage disposal system permit, soil map, approved design plans, plat, etc.).

Each and every Drain Inspection shall require two (2) separate field inspections. The inspections are discussed in sequence order and the tasks that the inspector shall verify include, but are not limited to, the following:

(a) Open Ditch (No Gravel)

Verification that the drain ditch has been excavated in accordance with the Layout Inspection, with *Appendix 5* of these regulations and with any other associated supporting documentation (i.e., permit, soil map, approved design plans, plat, etc.) as to its specified location, configuration, depth, and width, and that the proper plastic and/or piping materials have been appropriately placed and arranged in said ditch. *There shall be NO gravel in the drain ditch prior to this inspection.*

(b) Final (With Gravel)

Verification that the proper crushed gravel media has been placed in the drain ditch and has been properly finished (i.e. raked and smoothed).

11. Trench Inspection - *Conventional Systems Only*

The Trench Inspection is the <u>only</u> *optional* inspection that an installer may request. This inspection shall be utilized for conventional subsurface sewage disposal systems only. After an installer has completed the Layout Inspection, and has begun the construction of the disposal field trenches, a Trench Inspection may be requested in order to have the completed disposal field trenches inspected. The entire disposal field, and all related components (i.e. distribution box or boxes & all related piping, all required cross-overs, PDM & all related piping, effluent brake, etc.), shall have been fully completed in accordance with the provisions of *Section 15* prior to requesting this inspection. Thus, the Trench Inspection is different from a Final Inspection in the respect that a Trench Inspection <u>only</u> covers the disposal field aspects of the system (does not include tanks, etc.).

12. Final Inspection

A Final Inspection shall be required for each and every subsurface sewage disposal system installation. This is the last inspection, in the inspection sequence, for any type of system installation. Prior to requesting a Final Inspection, the installer shall have completed the as-built documentation requirements as outlined in *Subsection M of this Section*. During the Final Inspection the inspector shall verify that, depending upon the type of subsurface sewage disposal system to be constructed, all construction procedures for that system have been fully completed, and that the system has been constructed in accordance with all provisions of the *Regulations Governing On-Site Sewage Disposal Systems of the Williamson County Department of Sewage Disposal Management*. The tasks that the inspector shall verify are outlined in the Subsection pertaining to that system.

13. Construction Related Problems

Should an installer, during the course of any type of subsurface sewage disposal system construction, encounter unforeseen problems or questionable situations or soil conditions not specified on either the permit or its related supporting documentation said installer shall cease construction immediately and contact the Department for an assessment of the problem. The Department shall schedule, as soon as possible, an *Assessment Investigation* of the problem.

This investigation may require a joint, on-site meeting with the installer, Departmental staff and/or others. Unforeseen problems that have not been scheduled for an Assessment Investigation by the Department shall not constitute an acceptable excuse for deviation from the approved system layout, permit specifications and any other pertinent information contained on the supporting documentation.

B. Inspection Request Procedure - Initial System Inspection

The following procedural outline shall be followed when a licensed installer requests an inspection for a subsurface sewage disposal system installation.

1. All inspection requests shall be made through the Department office staff. Inspection requests shall not be made to any member of the Departmental technical staff.

2. When a licensed installer contacts the Department for any type of inspection, the following information from the *Construction Permit* form shall be provided:

    (a) Name and address of individual to whom the permit is issued.

    (b) Subdivision name and lot number (or tract name and number) for which the permit is issued.

3. The information in *part two (2) of this Subsection* shall be complete and accurate. Failure to provide the required information shall result in denial of the inspection request.

4. Requests for any type of inspection shall be accepted only from the licensed installer to which the *Permit to Install* was issued for a particular system. Requests for inspections by any other person (i.e. homeowners, builders, etc.) shall not be accepted.

5. When an installer has installed more than one subsurface sewage disposal system and requests that each of the installations be inspected, the inspection request shall apply to each system individually. The request, by the installer, for a group of system inspections shall not be considered as one inspection request. Therefore, an installer shall make separate, individual inspection requests for each individual system; as such, requests received for a group of systems shall be treated separately and individually.

6. Inspection requests will be fulfilled on a first-come, first-serve basis. In order to minimize travel time and maximize efficiency, inspection requests may be grouped by geographical areas. Inclement weather conditions, as well as peak demand for inspections, may hamper the Department's ability to conduct inspections in this time-frame. As a result, the Department reserves the right to initiate the field inspection process within a reasonable time period from the date which the proper inspection request was made.

7. Re-inspections shall be subject to the provisions outlined in *Subsection K and L*.

C. Procedures, Components and Items Subject to Inspection

The inspection of any type of subsurface sewage disposal system shall ensure that the construction of said system meets all provisions set forth in these regulations. In addition to these requirements, all subsurface sewage disposal systems shall have been installed in accordance with any and all supporting documentation relating to that particular system and installation site (i.e. permits, design plans, plats, soil maps, soil/site remediation requirements, restrictive covenants, etc.). Each component, item and all aspects of every subsurface sewage disposal system shall be carefully inspected, during the required type of inspection, so as to ensure that said procedures, components and items meet all construction standards.

The standard inspection sequence is presented as the types of inspections necessary to ensure the proper construction of a subsurface sewage disposal system. The installer shall follow the sequence designated for each type of system being installed. Where and when an installer makes a inspection request and the associated tasks for that inspection have not been completed, resulting in a finding of deficiencies by the inspector, the inspector shall issue a Yellow Flag for that particular inspection to the installer.

D. Inspection of Conventional Systems

1. Inspection Sequence

    The following information outlines the standard inspection sequence for conventional subsurface sewage disposal systems. However, where a particular site necessitates a variation from the standard inspection sequence (i.e. where a site has been determined by the Department as having unusual site characteristics that may adversely affect a system's installation), the Department shall provide written documentation that will outline any additional inspection requirements.

    The installer shall be responsible for contacting the Department and requesting the appropriate and/or specified inspection in the required sequence. Failure to complete the inspection sequence in the required order shall result in a Red Flag for the installation in question and will be considered by the Department as grounds for suspension of an installer's license.

The standard inspection sequence is as follows:

(a) Layout

(b) Soil Check

(c) Trench - See *Subsection A, Part 11, of this Section*.

(d) Drain - Open Ditch (where applicable)

(e) Drain - Final (may be requested along with the Final)

(f) Pressure Head Verification (where a PDM is installed)

(g) Final

<u>Note</u>*:* A Construction Related Problems Inspection shall be required in accordance with the information outlined in *Subsection A, Part 13, of this Section*.

2. Items and Components Subject to Verification

The items and components of conventional systems that shall be subject to verification during the inspection procedure shall include, but shall not be limited to, the following:

(a) During the Layout Inspection

(1) The vegetative cover of the platted or designated conventional system installation area, including all associated buffer zones, has been properly removed.

(i) The grass has been mowed to within three (3) inches of the ground surface.

(ii) Any and all trees, bushes, or any other types of vegetation has been cut so as to be level with the ground surface.

(iii) All cut vegetation has been completely removed from the platted or designated conventional system installation area.

(2) The designated or platted subsurface sewage disposal system areas, in addition to all other required lot staking, have been properly field-staked by a licensed Registered Land Surveyor, and the designated or platted subsurface sewage disposal system areas have been properly cordoned off to prevent any and all vehicular traffic from damaging said area. See *Appendix 6* and *Appendix 10*.

(3) The location of tank(s) (i.e. septic and pump tank where applicable), tight line or supply line from pump (where applicable), D-Box (where applicable), alternating valve (where applicable), pressure distribution manifold (where applicable), drains (where applicable), and every disposal field trench (for both the primary and secondary system), have been staked or clearly marked, in some manner (e.g. spray painted, lined out in chalk, etc.), entirely within their respective platted or designated subsurface sewage disposal system area.

(b) During the Soil Check

All tasks and/or conditions have been completed so as to be in accordance with the provisions outlined in *Subsection A, Part 1, Subparts (a), (b) and (c), of this Section*.

(c) During the Trench Inspection

All tasks and/or conditions have been completed so as to be in accordance with the provisions outlined in *Subsection A, Part 11, of this Section*, and the information described in *Subpart (g)(4)(i)-(x), of this Subsection*.

(d) During the Drain, Open-Ditch Inspection

The procedures presented in this Subpart shall pertain to any type of drain (i.e. curtain drain, drawdown drain, etc.) that is being installed as a component of the subsurface sewage disposal system.

Components to be checked and verified for proper installation during the Open-Ditch portion of the Drain Inspection includes, but shall not be limited to, the following:

(1) The drain has been excavated in accordance with the Layout Inspection, and in accordance with the provisions outlined in *Appendix 5* of these regulations and with any other associated supporting documentation (i.e., permit, soil map, approved design plans, plat, etc.).

(2) The proper buffer distance, between the drain and the disposal field trenches, has been maintained.

(3) The trench has been excavated to the specified depth and width.

(4) The trench depth has been maintained to the appropriate extent past the disposal field trenches.

(5) The trench has been excavated in a manner that will ensure the proper positive drainage outlet(s).

(6) The plastic liner meets specifications and has been properly placed in the trench.

(7) The integrity of the plastic liner has not been compromised (i.e. torn, ripped, cut, etc.)

(8) In any instance where a tight line or supply line crosses a drain, that junction shall be in place and properly installed in accordance with the provisions outlined in *Appendix 5*.

(9) The drainage pipe meets specifications and has been properly placed in the trench.

(10) The proper length and size (i.e. diameter) of Schedule 40 PVC pipe has been inserted into the outlet end(s) of the drainage pipe and secured in accordance with the provisions outlined in *Appendix 5*.

(e) During the Drain, Final Inspection

The Drain, Final inspection may be requested prior to the Final system inspection or it may be requested along with the Final inspection.

Components to be checked and verified for proper installation during the Final portion of the Drain Inspection includes, but shall not be limited to, the following:

(1) The gravel media is of the proper size classification and is washed and free of fines.

(2) The trench has been filled properly (i.e. to the required level, raked smooth, etc.) with gravel media.

(3) The associated berm has been properly located and constructed.

(f) During the Pressure Head Verification

All tasks and/or conditions have been completed so as to be in accordance with the provisions outlined in *Subsection A, Part 7, of this Section*, and the information described in *Subpart (g)(3)(ii), of this Subsection*.

(g) During the Final Inspection

(1) Septic Tank

The aspects involved in the inspection of the septic tank include, but shall not be limited to, verification of the following:

(i) Tank conforms to all provisions as set forth in *Section 10*, *Section 14* and *Section 17*.

(ii) Appropriate tank size as specified on the *Permit for Construction.*

(iii) Tank is supplied by an approved manufacturer.

(iv) Tank is structurally sound. At the Department’s discretion, the verification of this item may require load testing or documented certification that said tank meets or exceeds the structural design requirements as outlined in ASTM C1227. Additionally, tank is undamaged and is free of stress cracks, holes, etc.

(v) Tank contains two compartments, properly divided.

(vi) Tank contains proper inlet and outlet baffles.

(vii) Tank is watertight. The verification of this item may require testing at the Department's discretion. The test methods utilized by the Department may be either vacuum testing or water-pressure testing in accordance with the specifications as outlined in ASTM C1227.

(viii) Tank is equipped with above-ground-level, sealed, access risers of appropriate height.

(ix) All inlet and outlet pipes and fittings, to and from all tanks, are of the appropriate material and specified size, and are properly bedded and sealed.

(x) Tank has been installed in accordance with the provisions outlined in *Section 17*.

(2) Pump Tank (where applicable)

The aspects involved in the inspection of the pump tank include, but shall not be limited to, verification of the following:

(i) Tank conforms to all provisions as set forth in *Section 10*, *Section 18* and *Section 17*.

(ii) Appropriate tank size as specified on the *Permit for Construction*

(iii) Tank is supplied by an approved manufacturer.

(iv) Tank is structurally sound. At the Department's discretion, the verification of this item may require load testing or documented certification that said tank meets or exceeds the structural design requirements as outlined in ASTM C1227. Additionally, tank is undamaged and is free of stress cracks, holes, etc.

(v) Tank contains one compartment.

(vi) Tank contains proper inlet baffle.

(vii) Tank is watertight. The verification of this item may require testing at the Department's discretion. The test methods utilized by the Department may be either vacuum testing or water-pressure testing in accordance with the specifications as outlined in ASTM C1227.

(viii) Tank is equipped with above ground-level, sealed, access risers of appropriate height.

(ix) Tank contains the proper pump and controls, as specified on the *Permit for Construction* and any related supporting documentation. The installation of said pump, controls, and related pipes and fittings shall be in accordance with the specifications outlined in *Section 16*.

(x) All inlet and outlet pipes and fittings, to and from all tanks, are of the appropriate material and specified size, and are properly bedded and sealed.

(xi) Tank has been installed in accordance with the provisions outlined in *Section 17*.

(3) Controlled Distribution Devices, Effluent Brakes and Alternating Valves (where applicable)

The aspects involved in the inspection of controlled distribution devices (i.e. D-Boxes, and PDM's), effluent brakes, alternating valves and all related components include, but shall not be limited to, the verification of the following:

(i) D-Boxes

a. The D-Box, and all associated piping, is constructed and setup in accordance with the provisions outlined in *Section 15* and *Appendix 11*.

b. All inlet and outlet pipes and fittings, leading to the box and leading from the box to all disposal field trenches, are of the appropriate material and specified size, and are properly bedded and sealed.

c. The elevation of the invert of all outlet holes, of the box, are at a higher elevation than the upper level of the gravel media of the highest or first disposal field trench.

d. The box has been placed on very firmly tamped or compacted soil, or upon a two (2) inch thick poured concrete pad.

e. The box is absolutely level, in all directions.

f. The inverts of all outlet holes are on a level plane.

(ii) Pressure Distribution Manifolds (PDM)

a. The PDM, and all associated piping, is constructed and setup in accordance with the provisions outlined in *Section 15* and *Appendix 11.*

b. The supply line pipe enters into the manifold line at the highest elevation of the disposal field installation site.

c. All pipes, fittings and valves used in the construction of the PDM, including all piping leading from the PDM to each disposal field trench, are of the appropriate material and specified size.

d. All parts of the PDM have been properly bedded.

e. The Pressure Head Verification has been completed.

(iii) Effluent Brake

a. The effluent brake device is constructed and setup, in accordance with the provisions outlined in *Section 15* and *Appendix 14*, of the proper size (i.e. diameter) of Schedule 40 PVC pipe and fittings.

b. The effluent brake device has been located in the appropriate manner so as to properly conduct the pumped effluent into:

- the inlet end of the first disposal field trench in a serial distribution system.

- the inlet of a recirculating system.

- the inlet of a D-Box.

c. The outlet end of the effluent brake is properly connected into a disposal field trench or D-Box.

d. The supply line pipe enters into the effluent brake device at the highest elevation of the disposal field installation site.

e. All parts of the effluent brake device have been properly bedded.

(iv) Alternating Valves

a. The alternating valve, and all associated piping, is setup and constructed in accordance with the provisions outlined in *Section 15* and *Appendix 14*.

b. The elevation of the alternating valve has been placed at a higher elevation than the upper level of the gravel media of the highest or first disposal field trench.

c. The alternating valve has been located and positioned in the appropriate manner so as to properly apportion the effluent between two equally sized cells of field trenches.

d. The alternating valve is of the appropriate material and specified size, and has been properly attached (i.e., solvent welded) to the piping network.

e. The alternating valve and all connected piping has been properly bedded.

f. The alternating valve has been equipped with an appropriate ground-level access riser. Further, that said riser is constructed from four (4) inch diameter Schedule 40 PVC pipe, equipped with a Schedule 40 PVC screw-on cap.

(4) Disposal Field Components

The aspects involved in the inspection of the disposal field components include, but shall not be limited to, the verification of the following:

(i) The disposal field trenches were installed in accordance with the layout inspection (i.e. located in the proper designated/platted area, etc.).

(ii) The system was not installed or constructed under wet conditions.

(iii) The disposal field trenches are the correct length, width, depth, and distance apart.

(iv) The gravel media is of the proper size classification and free of fines.

(v) The gravel media is to the correct depth and that the pipe is at the correct level.

(vi) The grade boards are present and have been properly constructed, with regards to materials (i.e. lumber specifications, etc.) and approved installation techniques.

(vii) The pipe is the correct type, and that the holes in the pipe are turned toward the trench bottom (i.e. with the locator stripe on top, where applicable).

(viii) The gravel media of each trench has been covered with the proper material (i.e. construction paper, filter fabric, etc.).

(ix) Each crossover has been properly constructed, with regards to materials (i.e. pipe specifications, fittings, connections, etc.), and approved excavation procedures.

(x) Pertaining to the trenches, verify that:

a. The bottom of each trench has no more than one-half (½) inch of fall per each twenty-five (25) linear feet of field line trench. Under no circumstances shall the bottom of the sewage disposal trench, or portion thereof, contain rise from the inlet end to the outlet end of said trench.

b. The top of the gravel media in all field line trenches is below the invert of the septic tank outlet (for recirculating and serial distribution systems).

c. The bottom of each and every disposal field trench is at the same elevation where a recirculating system has been constructed.

d. The invert of the crossover, in the first disposal field trench (in a serial distribution type system) is at least four (4) inches lower than the invert of the septic tank outlet.

e. Each subsequent crossover (in a serial distribution type system) connecting successive disposal field trenches is not higher than the invert of the first crossover.

f. Each crossover (in a serial distribution type system) is constructed in such a manner so that each trench will be completely filled with septic tank effluent to the full depth of the gravel media before effluent will flow to a succeeding trench.

(h) Inspect any other required portion of the system to ensure that it meets construction standards. Use rock probe, level, or any other equipment, where necessary.

E. Inspection of LPP Systems

1. Inspection Sequence

The following information outlines the standard inspection sequence for LPP subsurface sewage disposal systems. However, where a particular site necessitates a variation from the standard inspection sequence (i.e. where a site has been determined by the Department as having unusual site characteristics that may adversely affect a system's installation), the Department shall provide written documentation that will outline any additional inspection requirements.

The installer shall be responsible for contacting the Department and requesting the appropriate and/or specified inspection in the required sequence. Failure to complete the inspection sequence, in its standard or required order, shall result in a Red Flag for the installation in question and will be considered as grounds for suspension of an installer's license.

The standard inspection sequence is as follows:

(a) Layout

(b) Soil Check

(c) LPP Open Trench

(d) Pressure Head Verification - This inspection shall be made immediately upon the completion of the LPP Open Trench inspection.

(e) Drain - Open Ditch

(f) Drain - Final (may be requested along with the Final)

(g) Final

NOTE: A Construction Related Problems Inspection shall be required in accordance with the information outlined in *Subsection A, Part 13, of this Section*.

2. Items and Components Subject to Verification

The items and components of LPP systems that shall be subject to verification during the inspection procedure shall include, but shall not be limited to, the following:

(a) During the Layout Inspection

(1) The vegetative cover of the platted or designated LPP installation area, including all associated buffer zones, has been properly removed and/or mowed.

(i) The grass has been mowed to within three (3) inches of the ground surface.

(ii) Any and all trees, bushes, or any other types of vegetation has been cut so as to be level with the ground surface.

(iii) All cut vegetation has been completely removed from the platted or designated LPP installation area.

(2) The designated or platted subsurface sewage disposal system areas, in addition to all other required lot staking, have been properly field-staked by a licensed Registered Land Surveyor, and the designated or platted subsurface sewage disposal system areas have been properly cordoned off to prevent any and all vehicular traffic from damaging said area. See *Appendix 6* and *Appendix 10.*

(3) The tank locations (i.e. septic and pump tank), supply line, manifold line and every lateral line, of both the primary and secondary system, has been staked or clearly marked, in some manner (e.g. spray painted, lined out in chalk, etc.) entirely within their respective platted or designated subsurface sewage disposal system area.

(b) During the Soil Check

All tasks and/or conditions have been completed so as to be in accordance with the provisions outlined in *Subsection A, Part 1, Subparts (a), (b) and (c), of this Section*.

(c) During the LPP Open Trench Inspection

The aspects involved in the inspection of the LPP disposal field components during this inspection include, but shall not be limited to, verification of the following:

(1) The LPP lateral line trenches were installed in accordance with the layout inspection (i.e. located in the proper designated/platted area, etc.).

(2) The system was not installed or constructed under wet conditions.

(3) The supply line and manifold layout is in accordance with the approved LPP design plans.

(4) The supply line and manifold is properly constructed, with regards to materials (i.e. pipe specifications, fittings, connections, etc.), and approved excavation procedures.

(5) The lateral line trenches were installed as per the layout and in accordance with the approved LPP design plans.

(6) The lateral line trenches are the correct length, width, depth, and distance apart.

(7) The bottom of each lateral line trench is level throughout its entire length.

(8) The lateral line pipe conforms to the design specifications (i.e. specified diameter) and that the holes in the pipe are correctly sized, spaced and turned toward the trench bottom.

(9) All dams within each and every lateral line trench has been properly constructed, with regards to their presence, position, dimensions and approved construction techniques.

(10) The valves are present at each and every manifold/lateral line junction, and meet the specifications outlined in these regulations and the approved design plans.

(11) Each lateral line has been properly connected to the manifold in accordance with the provisions in *Appendix 3*.

(12) The suspended and/or supported lateral line pipe is placed in order to ensure the proper spacing between the pipe and the trench bottom.

(13) The end of each and every lateral line has a properly constructed turn-up and a stand-pipe of the proper length attached to said turn-up.

(d) During the Pressure Head Verification

All tasks and/or conditions shall have been completed so as to be in accordance with the provisions outlined in *Subsection A, Part 7, of this Section*, as well as all of the items outlined in the previous *Subpart (c)*.

Head pressure shall be verified upon the conclusion of the LPP Open Trench inspection. This verification shall include, but shall not be limited to, the following:

(1) The pump tank shall be filled with clear water and a power supply shall be in place to power the pump, prior to requesting the Open-Ditch inspection.

(2) The Department inspector shall observe the head pressure adjustment process.

(3) Verify that the appropriate length stand-pipes have been connected at each and every turn-up of the system.

(4) With the pump ON, verify that the water rises into and barely overflows the top of each stand pipe.

(5) Adjust the valves at each manifold/lateral line junction so as to verify that the balance and pressure head of the distribution network is in accordance with the design specifications.

(e) During the Drain, Open-Ditch Inspection

The procedures presented in this Subpart shall pertain to any type of drain (i.e. curtain drain, drawdown drain, etc.) that is being installed as a component of the LPP subsurface sewage disposal system.

Components to be checked and verified for proper installation during the Open-Ditch portion of the Drain Inspection includes, but shall not be limited to, the following:

(1) The drain has been excavated in accordance with the Layout Inspection, with *Appendix 5* of these regulations and with any other associated supporting documentation (i.e., permit, soil map, approved design plans, plat, etc.).

(2) The proper buffer distance between the drain and the lateral line trenches has been maintained.

(3) The trench has been excavated to the specified depth and width.

(4) The trench depth has been maintained to the appropriate extent past the disposal field trenches.

(5) The trench has been excavated in a manner that ensures the proper positive drainage outlet(s).

(6) The plastic liner meets specifications and has been properly placed in the trench.

(7) The integrity of the plastic liner has not been compromised (i.e. torn, ripped, cut, etc.).

(8) The drainage pipe meets specifications and has been properly placed in the trench.

(9) The proper length and size (i.e. diameter) of Schedule 40 PVC pipe has been inserted into the outlet end(s) of the drainage pipe.

(f) During the Drain, Final Inspection

The Drain, Final inspection may be requested prior to the Final system inspection or it may be requested along with the Final system inspection.

Components to be checked and verified for proper installation during the Final portion of the Drain Inspection includes, but shall not be limited to, the following:

(1) The gravel media is of the proper size classification and free of fines.

(2) The trench has been filled properly (i.e. to the required level, raked smooth, etc.) with gravel media.

(3) The associated berm has been properly located and constructed.

(g) During the Final Inspection

(1) Septic Tank

The aspects involved in the inspection of the septic tank include, but shall not be limited to, verification of the following:

(i) Tank conforms to all provisions as set forth in *Section 10*, *Section 14* and *Section 17*.

(ii) Appropriate tank size as specified on the approved LPP design plans and/or the *Permit for Construction.*

(iii) Tank is supplied by an approved manufacturer.

(iv) Tank is structurally sound. At the Department's discretion, the verification of this item may require load testing or documented certification that said tank meets or exceeds the structural design requirements as outlined in ASTM C1227. Additionally, tank is undamaged and is free of stress cracks, holes, etc.

(v) Tank contains two compartments, properly divided.

(vi) Tank contains proper inlet and outlet baffles.

(vii) Tank is watertight. The verification of this item may require testing at the Department's discretion. The test methods utilized by the Department may be either vacuum testing or water-pressure testing in accordance with the specifications as outlined in ASTM C1227.

(viii) Tank is equipped with above ground-level, sealed, access risers of appropriate height.

(ix) All inlet and outlet pipes and fittings, to and from all tanks, are of the appropriate material and specified size, and are properly bedded and sealed.

(x) Tank has been installed in accordance with the provisions outlined in *Section 17*.

(2) Pump Tank

The aspects involved in the inspection of the pump tank include, but shall not be limited to, verification of the following:

(i) Tank conforms to all provisions as set forth in *Section 10*, *Section 18* and *Section 17*.

(ii) Appropriate tank size as specified on the approved LPP design plans and/or the *Permit for Construction*.

(iii) Tank is supplied by an approved manufacturer.

(iv) Tank is structurally sound. At the Department's discretion, the verification of this item may require load testing or documented certification that said tank meets or exceeds the structural design requirements as outlined in ASTM C1227. Additionally, tank is undamaged and is free of stress cracks, holes, etc.

(v) Tank contains one compartment.

(vi) Tank contains proper inlet baffle.

(vii) Tank is watertight. The verification of this item may require testing at the Department's discretion. The test methods utilized by the Department may be either vacuum testing or water-pressure testing in accordance with the specifications as outlined in ASTM C1227.

(viii) Tank is equipped with above ground-level, sealed, access risers of appropriate height.

(ix) Tank contains the proper pump and controls, as specified on the approved LPP design plans and/or the *Permit for Construction*. The installation of said pump, controls, and related pipes and fittings shall be in accordance with the specifications outlined in *Section 16*.

(x) All inlet and outlet pipes and fittings, to and from all tanks, are of the appropriate material and specified size, and are properly bedded and sealed.

(xi) Tank has been installed in accordance with the provisions outlined in *Section 17*.

(3) LPP Disposal Field Components

The aspects involved in the inspection of the disposal field components include, but shall not be limited to, the verification of the following:

(i) The gravel media is of the proper size classification and free of fines.

(ii) At several points, in each trench, determine that the gravel media is to the correct depth, and that the lateral line pipe has remained at the correct level.

(iii) The gravel media has been raked smooth so as to ensure that the gravel is at a consistent depth of six inches below the ground surface throughout the entire length of each lateral line.

(iv) Each lateral line trench is covered with the proper material (i.e. construction paper, filter fabric, etc.).

(v) No gravel is present in the manifold trench (i.e. between the valve and the beginning of the lateral line trench), in accordance with the provisions set forth in *Appendix 3*.

(vi) The stand pipes have been removed, the proper connections have been made to the lateral lines and the proper galvanized metal cap has been placed on the turn-up.

(vii) Each and every lateral line valve has been equipped with the appropriate ground-level access riser and cover.

(h) Inspect any other required portion of the system to ensure that it meets construction standards. Use rock probe, level, or any other equipment, where necessary.

F. Inspection of MLPP Systems

The inspection process for MLPP subsurface sewage disposal systems is essentially the same as the process for LPP systems. However, due to the requirement of placing the compatible soil fill material on the MLPP installation site, additional inspections are necessary to ensure that the soil material utilized for the installation is compatible to the soil characteristics of the site, the site is properly prepared to allow the placement of said soil fill material and the soil fill material is placed so as to be in accordance with the permit requirements.

1. Inspection Sequence

   The following information outlines the standard inspection sequence for MLPP subsurface sewage disposal systems. However, where a particular site necessitates a variation from the standard inspection sequence (i.e. where a site has been determined by the Department as having unusual site characteristics that may adversely affect a system's installation), the Department shall provide written documentation that will outline any additional inspection requirements.

   The installer shall be responsible for contacting the Department and requesting the appropriate and/or specified inspection in the required sequence. Failure to complete the inspection sequence, in its standard or required order, shall result in a Red Flag for the installation in question and will be considered as grounds for suspension of an installer's license.

   The standard inspection sequence is as follows:

   (a) Layout - 1

   (b) Soil Check

   (c) Site Preparation Inspection

   (d) Modification Placement and Incorporation Inspection

   (e) Layout - 2

   (f) MLPP Open Trench

   (g) Pressure Head Verification - This inspection shall be made immediately upon the completion of the MLPP Open Trench inspection.

   (h) Drain - Open Ditch

   (i) Drain - Final (may be requested along with the Final)

   (j) Final

   <u>*Note*</u>*:* A Construction Related Problems Inspection shall be required in accordance with the information outlined in *Subsection A, Part 13, of this Section*.

2. Items and Components Subject to Verification

   The items and components, of MLPP systems, that shall be subject to verification during the inspection procedure shall include, but shall not be limited to, the following:

   (a) During the Layout - 1 Inspection

   The designated or platted MLPP subsurface sewage disposal system areas, in addition to all other required lot staking, have been properly field-staked by a licensed Registered Land Surveyor, and the designated or platted subsurface sewage disposal system areas have been properly cordoned off to prevent any and all vehicular traffic from damaging said area. See *Appendix 6* and *Appendix 10*.

   (b) During the Soil Check Inspection

   All tasks and/or conditions have been completed so as to be in accordance with the provisions outlined in *Subsection A, Part 1, Subparts (a), (b), (c) and (d), of this Section*.

(c) During the Site Preparation Inspection

The aspects involved during this inspection include, but shall not be limited to, verification of the following:

(1) The vegetative cover of the platted or designated MLPP installation area, including all associated buffer zones, has been properly removed.

(i) The grass has been mowed to within three (3) inches of the ground surface.

(ii) Any and all trees, bushes, or any other types of vegetation has been cut so as to be level with the ground surface.

(iii) All cut vegetation has been completely removed from the platted or designated MLPP installation area.

(2) The ground surface of the platted or designated MLPP installation area, and all associated buffer zones, has been scarified or broken in order to provide the proper natural soil/imported soil fill material interface.

(3) The grade stakes have been properly located over the entire area that will be subject to the placement of the compatible soil fill material.

(4) Each grade stake has been clearly marked (i.e. with a marker pen, brightly colored spray paint, etc.) to show the required depth of the soil fill at the stake.

(d) During the Modification Placement and Incorporation Inspection

All tasks and/or conditions have been completed so as to be in accordance with the provisions outlined in *Subsection A, Part 4, Subparts (a), (b) and (c), of this Section*.

(e) During the Layout - 2 Inspection

The tank locations (i.e. septic and pump tank), supply line, manifold line and every lateral line, of both the primary and secondary system, has been staked or clearly marked, in some manner (e.g. spray painted, lined out in chalk, etc.) entirely within their respective platted or designated subsurface sewage disposal system area.

(f) During the MLPP Open Trench Inspection

Same as in *Subsection E, Part 2, Subpart (c).*

(g) During the Pressure Head Verification

Same as in *Subsection E, Part 2, Subpart (d)*.

(h) During the Drain - Open Ditch Inspection

Same as in *Subsection E, Part 2, Subpart (e)*.

(i) During the Drain - Final Inspection

Same as in *Subsection E, Part 2, Subpart (f).*

(j) During the Final Inspection

Same as in *Subsection E, Part 2, Subpart (g)*.

(k) Inspect any other required portion of the system to ensure that it meets construction standards. Use rock probe, level, or any other equipment, where necessary.

G. Inspection of Mound Systems

The actual construction procedures used to build a Mound system are as important as the Mound design itself. Improper construction techniques may lead to a malfunction of the Mound, thus resulting in a premature failure of the system. The use of proper equipment in the construction of the Mound is essential. Small, track-type tractors work best. The use of wheeled tractors may cause sand and/or soil compaction and are difficult to maneuver in the fill material. Other techniques, as approved by the Department, may be used so long as the basic principles of Mound design, operation and construction are not violated.

1. Inspection Sequence

   The following information outlines the standard inspection sequence for Mound systems. However, where a particular site necessitates a variation from the standard inspection sequence (i.e. where a site has been determined by the Department as having unusual site characteristics that may adversely affect a system's installation), the Department shall provide written documentation that will outline any additional inspection requirements.

   The installer shall be responsible for contacting the Department and requesting the appropriate and/or specified inspection in the required sequence. Failure to complete the inspection sequence, in its standard or required order, shall result in a Red Flag for the installation in question and will be considered as grounds for suspension of an installer's license.

   The standard inspection sequence is as follows:

   (a) Layout - 1

   (b) Soil Check

   (c) Site Preparation Inspection

   (d) Layout - 2

   (e) Imported Fill Inspection

   (f) Mound Distribution Network Inspection

   (g) Pressure Head Verification - This inspection shall be made immediately upon the completion of the Mound Distribution Network inspection.

   (h) Clay Cap Inspection

   (i) Drain - Open Ditch

   (j) Drain - Final (may be requested along with the Final)

   (k) Final

   NOTE: A Construction Related Problems Inspection shall be required in accordance with the information outlined in *Subsection A, Part 13, of this Section*.

2. Items and Components Subject to Verification

   The items and components of Mound systems that shall be subject to verification during the inspection procedure shall include, but shall not be limited to, the following:

   (a) During the Layout - 1 Inspection

   The designated or platted Mound subsurface sewage disposal system areas, in addition to all other required lot staking, have been properly field-staked by a licensed Registered Land Surveyor, and the designated or platted subsurface sewage disposal system areas have been properly cordoned off to prevent any and all vehicular traffic from damaging said area. See *Appendix 6* and *Appendix 10*.

(b) During the Soil Check Inspection

All tasks and/or conditions have been completed so as to be in accordance with the provisions outlined in *Subsection A, Part 1, Subparts (a), (b) and (c), of this Section*.

Where Mound systems are to be constructed, all soil assessments shall be made by a Department Soil Scientist.

(c) During the Site Preparation Inspection

The aspects involved during this inspection include, but shall not be limited to, the verification of the following:

(1) The vegetative cover of the platted or designated Mound installation area, including all associated buffer zones, has been properly removed.

(i) The grass has been mowed to within three (3) inches of the ground surface.

(ii) Any and all trees, bushes, or any other types of vegetation has been cut so as to be level with the ground surface.

(iii) All cut vegetation has been completely removed from the basal area site.

(2) The ground surface of the Mound installation area (i.e. the basal area) has been properly plowed in order to provide the proper natural soil/imported sand fill material interface.

(3) The grade stakes have been properly located over the entire area that will be subject to the placement of the imported sand fill material.

(4) Each grade stake has been clearly marked with the appropriately noted elevations (i.e. the elevation of the top of the sand at that particular stake) or depth of the imported sand fill at each stake, and that each stake has been placed, in a grid pattern, at twenty-five (25) foot intervals throughout the entire basal area.

(d) During the Layout - 2 Inspection

The aspects involved during this inspection include, but shall not be limited to, the verification of the following:

(1) The tank locations (i.e. septic and pump tank), supply line and the basal area of both the primary and secondary Mound system, have been staked or clearly marked in some manner (e.g. spray painted, lined out in chalk, etc.) entirely within their respective platted or designated subsurface sewage disposal system area.

(2) The staked basal area of the Mound has been properly oriented so that the long axis of the Mound is parallel to the natural ground contours, and the short axis of the Mound is perpendicular to the natural ground contours.

(3) The supply line, from the pump tank to the Mound, enters the basal area at the point of highest elevation of said basal area.

(4) The supply line pipe is located and positioned appropriately with in the basal area bed. Additionally, it is extended vertically, from the designated point within the basal area, to the appropriate elevation in order to ensure that a proper connection can be made to the distribution manifold.

(5) The supply line pipe has been properly back-filled and the back-fill material has been properly compacted around the pipe in order to prevent any seepage or migration of sewage/effluent along said pipe. The vertical portion of the supply line pipe is properly secured to a rigid stake.

<u>IMPORTANT NOTE:</u> Since a portion of the supply line will be covered by the imported sand fill material, that part of the supply line shall be installed prior to and inspected during the Layout - 2 inspection.

(e) During the Imported Fill Inspection

The components and construction procedures to be checked during this inspection include, but shall not be limited to, the verification of the following:

(1) The imported fill material is of the proper type, as specified by the Mound design plans.

(2) The imported fill material has been placed to the proper depth, as indicated by the grade stakes, over the entire basal area.

(3) The imported fill material has not been compacted.

(4) The imported fill material is shaped, with regard to the side slopes, as specified by the design plans.

(f) During the Mound Distribution Network Inspection

The components and construction procedures to be checked during this inspection include, but shall not be limited to, the verification of the following:

(1) The distribution trenches have been located, positioned and excavated to the dimensions specified by the design plans.

(2) The distribution manifold pipe is properly constructed, with regards to materials (i.e., pipe specifications, fittings, connections, etc.); is properly connected to the supply line with approved fittings and techniques; and is properly installed with regards to approved excavation procedures.

(3) The gravel media is of the proper size classification and free of fines.

(4) The gravel media has been properly placed in the distribution trenches, in accordance with the design plans. No gravel is placed in the manifold trench.

(5) The distribution lateral piping has been properly placed within the gravel media.

(6) The bottom of each lateral trench is level throughout its entire length.

(7) The distribution lateral pipe conforms to the design specifications (i.e. specified diameter, etc.), and that the holes in the pipe are correctly sized, spaced and turned toward the trench bottom.

(8) The valves are present at each and every manifold/lateral line junction and meet the specifications outlined in these regulations and the approved design plans.

(9) Each lateral line has been properly connected to the manifold in accordance with the provisions in *Appendix 4*.

(10) The end of each and every lateral line has a properly constructed turn-up and a stand-pipe of the proper length attached to said turn-up.

(11) Each distribution trench is covered with the proper material (i.e. construction paper, filter fabric, etc.).

(g) During the Pressure Head Verification

The components and construction procedures to be checked during this inspection include, but shall not be limited to, the verification of the following:

(1) The pump tank shall be filled with clear water and a power supply shall be in place to power the pump, prior to requesting this inspection.

(2) The Department inspector shall observe the head pressure adjustment process.

(3) The appropriate length stand-pipes have been connected at each and every turn-up of the system.

(4) With the pump ON, verify that the water rises into and barely overflows the top of each stand pipe.

(5) Adjust the valves at each manifold/lateral line junction in order to verify that the balance and pressure head of the distribution network is in accordance with the approved design specifications.

(h) During the Clay Cap Inspection

The components and construction procedures to be checked during this inspection include, but shall not be limited to, the verification of the following:

(1) Prior to the installation of the clay soil cap, verify that the clay soil material that is proposed to be used, is of the appropriate density. The determination as to the clay soil materials suitability shall be made by a Department Soil Scientist.

(2) The clay soil cap has been properly placed on the upper Mound surface and that the extent of the cap ends at the Mound shoulder.

(3) The thickness of the clay soil cap is a minimum of one (1) foot at the Mound center and that the surface of said cap tapers to a minimum thickness of six (6) inches at the shoulder terminus.

(4) The lateral line stand pipes have been removed and the end caps have been properly connected to each and every lateral line turn-up.

(5) Each and every lateral line valve and lateral line turn-up has been equipped with the appropriate ground-level access riser and cover.

(i) During the Drain - Open Ditch

Same as in *Subsection E, Part 2, Subpart (e).*

(j) During the Drain - Final

Same as in *Subsection E, Part 2, Subpart (f).*

(k) During the Final Inspection

The procedures concerning the inspection of the septic tank and the pump tank are the same those outlined in - *Subsection E, Part 2, Subpart (g).*

Additionally, the components and construction procedures to be checked during this inspection include, but shall not be limited to, the verification of the following:

(1) Verify that six (6) inches of top soil has been placed over the entire extent of the Mound surface.

(2) Verify that the Mound surface has been properly shaped so as to shed all rain water.

(3) Verify that the Mound surface has been properly stabilized, so as to prevent erosion. Erosion control measures shall have been specified by the Department on the design plans and shall conform to all provisions as set forth in *Section 23*.

(l) Inspect any other required portion of the system to ensure that it meets construction standards. Use rock probe, level, or any other equipment, where necessary.

H. Inspection of Any Other Type of System (e.g. Experimental Systems, etc.)

Where an experimental system has been approved for installation by the Williamson County Board of Health (e.g. a Modified Mound system), the Department shall issue, as a part of the permitting requirements, a written listing of all the inspections, in their sequential order, that shall be required for said experimental sewage disposal system.

I. Field Notification of System Installation Approval/Disapproval

The Department will use wire flags as a means of communicating system inspection status. Upon the completion of an inspection, the Department Inspector shall place the appropriate flag, in a conspicuous location on the site, that shall signify the status of that portion of the system. This field notification system shall be used for each and every phase of the inspection process.

1. Color Coding of Flags

There shall be three colors of flags used by the Department. Each color shall designate the specific status as follows:

(a) Green Flag

A green flag shall indicate that the system has been inspected and approved. Green flagged installations may be backfilled, covered, and dressed.

(b) Yellow Flag

A yellow flag shall indicate that the system has been inspected and was found to have minor deficiencies with regard to the provisions of these regulations. Yellow flagged installations are not approved and shall not be backfilled, covered, or dressed until said deficiencies have been corrected to the satisfaction of the Department.

The types of installation deficiencies considered by the Department to be *minor* include, but are not limited to, the information outlined Subsection J of this Section.

(c) Red Flag

A red flag shall indicate that the system has been inspected and was found to have major deficiencies with regard to the provisions of these regulations. Red flagged installations are not approved and shall not be backfilled, covered, or dressed until said deficiencies have been corrected to the satisfaction of the Department.

The types of installation deficiencies considered by the Department to be *major* include, but are not limited to, the information outlined Subsection J of this Section.

(d) Should a system inspection result in the issuance of a Yellow or Red flag, it shall be the responsibility of the licensed installer to contact the Department to schedule a Corrective Review Session.

J. Classification of Installation Deficiencies

This Subsection will outline the distinctions between minor (Yellow Flag) and major (Red Flag) installation deficiencies. See the previous Subsections of this Section for more specific topic information regarding any of the following listed deficiencies.

1. Minor Installation Deficiencies (Yellow Flag)

The following items shall result in a failed inspection and the issuance of a Yellow Flag:

(a) Where and when an installer makes a inspection request and the associated tasks for that inspection have not been completed.

(b) Failure to have all preparatory tasks completed at the time of Pressure Head Verification Inspection.

(c) Failure to have completely and accurately completed all as-built documentation requirements.

(d) Any other item and/or deficiency not specifically listed in *Part 2 of this Subsection*.

2. Major Installation Deficiencies (Red Flag)

The following items that shall result in a failed inspection and the issuance of a Red Flag include, but shall not be limited to the following:

(a) Covering or backfilling any part or portion of a subsurface sewage disposal system prior to being inspected or approved. Such violation shall be grounds for immediate license suspension.

(b) Failure to complete the inspection sequence in its standard or required order. Such violation shall be grounds for immediate license suspension.

(c) Excavation and/or Grade Related Deficiencies

(1) Trenches (any type) excavated/installed not according to approved layout inspection and/or not in accordance with the approved plans.

(2) Trenches (any type) excavated under wet soil conditions.

(3) Excavated trenches at incorrect depth, width, length and/or spacing.

(4) All minimum setbacks and/or required buffer distances have not been maintained.

(5) Excavated trenches out of grade

(i) Supply line/Tight line for any and all systems does not enter the disposal field at its point of highest elevation.

(ii) Conventional Systems

a. Trench bottoms are out of grade.

b. Incorrect elevation of trenches in relation to tank outlet.

c. Trench bottoms in recirculating systems are not at the same elevation.

d. Incorrect elevation of the crossovers.

e. Incorrect crossover location/construction.

(iii) Lateral line trench bottoms in LPP (MLPP) systems are not level throughout their entire length.

(iv) Drainage Improvement Practices

The excavation of a required soil improvement practice does not demonstrate the proper positive drainage outlet.

(v) Mound Systems

a. Supply line does not enter the basal area at its point of highest elevation and/or is not located and positioned properly.

b. Excavated manifold and distribution trenches are not properly located and/or positioned at the correct dimensions.

c. Distribution lateral line trench bottoms are not level.

(6) Supply line and manifold lines in LPP (MLPP) systems are not properly constructed with regards to approved excavation procedures.

(7) All dams in LPP (MLPP) lateral line trenches are not properly constructed with regards to their presence, position, dimensions, and approved construction techniques.

(d) Soil/Imported Materials Related Deficiencies

(1) Soil remediation activities have not been properly and/or satisfactorily implemented.

(2) Utilization of incorrect gravel media size classification.

(3) MLPP Systems

(i) Improper or inadequate site preparation prior to placement of the soil modification fill material.

(ii) Placement of the soil modification fill material under wet soil conditions.

(iii) Utilization of unapproved soil modification fill material.

(iv) Improper placement of the soil modification fill material

(v) Compaction of the soil modification fill material.

(4) Mound Systems

(i) Improper or inadequate site preparation prior to placement of the fill material.

(ii) The sand fill material is:

a. not of the proper size and classification.

b. not placed at the proper depths in accordance with the grade stakes and approved design plans.

c. compacted.

d. not properly shaped.

(iii) The soil material utilized for the clay cap is:

a. an unapproved clay fill material.

b. not properly placed over Mound to desired thickness.

(iv) The soil material utilized for the final Mound cover is:

a. an unapproved top soil fill material.

b. not properly placed over Mound to desired thickness.

c. not properly shaped so as to shed rain water.

(e) The distribution lateral pipe within a Mound system is incorrect in regards to its size, position and holes.

K. Corrective Review Session

The installer responsible for those installations which have been field flagged as having deficiencies (Yellow or Red flag) shall schedule a Corrective Review Session with the Department inspector to field review those deficiencies and formulate a plan for remediation. It is the installer's responsibility to contact the Department and schedule the Corrective Review Session with the Department inspector who conducted the initial system inspection. The installer shall have a maximum of ten (10) working days, from the date of a field-flagged deficiency, to contact the Department to schedule a Corrective Review Session, to participate in said review session and to complete all necessary corrective measures to the deficient system. Failure of the installer to remedy a deficient system, in the manner outlined in these regulations within this time frame shall be considered grounds for license revocation and seeking a draft on his/her *Letter of Credit* (See *Subsection D* and *E* of *Section 24*). Major deficiencies requiring soil remediation or additional field lines being added shall require an evaluation by a Department Soil Scientist. No re-inspection request shall be accepted nor shall any corrective actions be accepted where an installer has failed to participate in a Corrective Review Session.

Suggestions for the necessary corrective actions may be provided by the installer and considered by the Department. Said suggestions by the installer must be submitted to the Department in writing for consideration and review. However, the Department shall have the final authority to mandate the methodology and specifications regarding the corrections of said deficiencies.

Upon completing the Corrective Review Session, the installer may begin the measures approved by the Department. Upon completing all required corrective actions, it shall be the responsibility of the licensed installer to request a re-inspection of the installation.

<u>IMPORTANT NOTE:</u> The Corrective Review Session shall not be construed as nor confused with an installation inspection or re-inspection.

L. Re-inspections and Associated Fees

Where an installer has received a Yellow or Red flag during an initial inspection, the installation shall be subject to a re-inspection. However, before a re-inspection will be scheduled, the installer shall have scheduled and completed the Corrective Review Session with the appropriate Department inspector, and shall have corrected all noted deficiencies according to the approved measures. Only upon fulfillment of the above obligations and payment of the re-inspection fee (where applicable), shall the re-inspection process commence.

1. Assessment of Re-inspection Fees

(a) Where an installer has completed the installation of more than one subsurface sewage disposal system and subsequently requests an inspection (any type) for each of the installations, and where more than one of the installations is found to be deficient by the Department, the assessment of a re-inspection fee shall apply to each system installation individually. The request, by the installer, for a group of system inspections (i.e. multiple systems constructed by one installer) shall not be considered as one inspection or one inspection request.

(b) The assessment of re-inspection fees shall be applied to each and every subsurface sewage disposal system installation under the following criteria:

(1) An installer receiving a Yellow flag during an initial inspection will not be assessed a re-inspection fee for the first re-inspection of that site. However, where the initial re-inspection warrants the issuance of another Yellow or Red flag (i.e. the installer created new deficiencies and/or the original deficiencies were not properly corrected), the installer shall be required to pay a fee for the second re-inspection and every subsequent re-inspection until the installation receives a Green flag.

(2) An installer receiving a Red flag during an initial inspection shall be assessed a re-inspection fee for the first re-inspection of that site. Further, should the initial re-inspection warrant the issuance of a Yellow or Red flag (i.e. the installer created new deficiencies and/or the original deficiencies were not properly corrected), the installer shall be required to pay a fee for the second re-inspection and every subsequent re-inspection until it receives a Green flag.

(c) The provisions outlined in the previous subpart (b) shall be applicable to all types of inspections outlined in *Section 20, Subsection A*, with the exception of *Part 1(a), (b), and/or (d), and Part 13*.

(d) The fee for a re-inspection shall be in accordance with the provisions of *Section 33*.

2. Procedure for Requesting a Re-inspection

The installer requiring a re-inspection shall follow the same procedure as outlined in *Subsection B of this Section*. However, where the Department inspector has noted that a re-inspection fee is required, the installer subject to the assessed fee shall be required to make the re-inspection request in person at the Department offices and present payment of the re-inspection fee. Under no circumstances shall any re-inspection be conducted until such fees are paid.

M. As-Built Documentation

Prior to contacting the Department for a Final Inspection, the installer shall have prepared an as-built document for presentation to the Department inspector. No Final Inspection shall be conducted on a subsurface sewage disposal system installation where the as-built has not been properly prepared and submitted. The as-built document shall be prepared in accordance with the following specifications:

1. Format

The installer shall utilize the form presented in *Appendix 15*. The installer may make photocopies of the form, as it appears in these regulations, for day to day use. The as-built form shall be used for each and every subsurface sewage disposal system that is constructed in Williamson County. The same form is used for conventional, LPP, MLPP or Mound systems. All information on the as-built form shall be accurate and complete or the installation shall receive a Yellow Flag, which denotes a deficient subsurface sewage disposal system installation.

2. Supporting Documentation

In addition to completing the as-built form, the following supporting documentation shall be included (i.e. attached to or submitted with the as-built form), but not be limited to, the following:

(a) The installer shall attach a copy of the receipt from the purchase of the sewage/effluent pump.

(b) The installer shall attach a copy of the Approval tag from the State Electrical inspector that verifies that all electrical aspects of the pump installation have been approved.

(c) The installer shall attach a copy of the receipt from the purchase of the sand utilized in the construction of a Mound system. That receipt shall indicate that the sand purchased, was sieved and was of the required particle size, as specified on the approved Mound design plans.

(d) The installer shall provide any other documentation that may be requested by the Department which is determined to be pertinent to the system installation (e.g. receipt of gravel media or pipe purchases, etc.).

3. Diagram of System Installation

On the designated portion of the as-built form, the installer shall draw an accurate graphical representation (i.e. diagram) of the subsurface sewage disposal system installation. The minimum requirements and the format for presenting a properly drawn graphical representation are outlined in *Appendix 15*.

N. Final Approval Documents

1. *Certificate of Completion*

   Upon evaluation and verification of the submitted as-built form and determination of the final approval status, the Department inspector shall prepare a *Certificate of Completion*. This *Certificate of Completion* documents the location of the subsurface sewage disposal system installation, all parts of the system and any other items which relate to said system.

   (a) Once the final approval status has been achieved (Green Flag) the Department inspector shall document, in writing, all the required information as specified on the *Certificate of Completion* form.

   (b) Upon the *Certificate of Completion*, there shall be drawn an accurate graphical representation (i.e. detailed diagram) of the approved subsurface sewage disposal system installation, to provide for future location of the system and all related components thereof.

   (c) At such time that all required documentation has been completed, the Department inspector will sign the *Certificate of Completion*, thus indicating that the system has been properly installed as per these regulations.

2. *Certificate of Occupancy*

   This Department shall have the authority to require that the *Certificate of Occupancy*, a document issued by the Williamson County Department of Building and Codes, be withheld for those properties found to be in violation of the provisions of these regulations. Therefore, no *Certificate of Occupancy* shall be issued, for the use of a structure, where a subsurface sewage disposal system installation has been found to be deficient.

SECTION 21

BACKFILLING & FINAL GRADING OF SUBSURFACE SEWAGE DISPOSAL SYSTEM INSTALLATIONS

It shall be the responsibility of the recipient of the septic system Construction Permit to ensure that all provisions of this section have been met. Additionally, said permit recipient shall also ensure that any subcontractor, in the employment of the recipient (i.e. septic system installer, bulldozer operator, landscaping contractor, etc.) maintains compliance with the provisions of this section, regardless of status as employee or independent contractor.

A. Backfilling and/or Grading a System Installation

The individual/contractor shall take special care when backfilling and/or grading subsurface sewage disposal system installations. Backfilling and/or grading activities of or on the disposal field areas shall not be conducted when the soils are wet. Such actions may result in the compaction of the soils of the disposal field areas. As a result, such compaction may render the disposal field non-functional and lead to a failure of the installed system.

All soils utilized for the backfilling of the disposal field trenches shall be only those soil materials that were excavated during the construction of said disposal field. Excavation spoils from excessively deep construction (i.e. soil materials from the septic tank hole, basements, etc.) shall not be placed over the disposal field area or any other designated or platted subsurface sewage disposal system area.

The system installation area (for all subsurface sewage disposal system areas) shall be properly crowned and shaped to as to prevent ponding of any waters upon the ground surface over said installation area. In no case shall any individual/contractor place, during or after the backfilling and grading process, over five (5) inches of additional compatible soil over a disposal field area.

Should a site exhibit peculiar characteristics or require specific considerations, the individual/contractor shall request an assessment from a member of the Department Soils Staff for advisement or instruction on how to adequately accomplish the final grading procedure.

B. Backfilling In and Around Sensitive System Components

It shall be the responsibility of the individual/contractor to ensure that particular care is taken in the backfilling and/or grading activities on or around sensitive areas of the installed subsurface sewage disposal system. Some hand work will be necessary when backfilling some of these components. The areas considered sensitive include, but are not limited to, the:

- septic tank
- pump tank
- tank risers
- electrical control panels and/or other above ground electrical components
- valves and valve risers
- pressure distribution manifold components
- distribution boxes and their associated piping network
- alternating valve risers
- supply lines
- manifolds
- turn-ups
- outlet discharge pipes from interceptor drains

A Department inspector will, upon request, advise those individual/contractors who have any questions regarding this matter.

C. Equipment

It shall be the responsibility of the individual/contractor to ensure that the proper equipment is utilized for the purposes of backfilling and/or grading a subsurface sewage disposal system installation site.

The Department strongly recommends that the individual/contractor utilize lightweight track-type equipment in order to prevent compaction of the soils.

D. Excessive Fill Material Placement Over a System Installation

The placement of excessive amounts of backfill (i.e. an amount in excess of five (5) inches above the original natural ground surface, or in excess of the permitted amount of required compatible soil fill in the case of MLPP systems), of any type of soil material, over any portion of a system installation, or any other designated or platted subsurface sewage disposal system area, shall not be permitted.

Such action, regardless of the responsible party, shall be considered a violation of the requirements established by these regulations; thus, any and all previous approvals shall be rendered null and void. The Department staff will, upon request, consult with any individual/contractor, who is engaged in the process of backfilling and site grading lots, which are served by subsurface sewage disposal systems.

SECTION 22

MAINTENANCE AND CARE OF AN ON-SITE SEWAGE DISPOSAL SYSTEM

It shall be the property owner's responsibility to maintain the subsurface sewage disposal system serving his/her property in a safe and sanitary manner. A property owner may obtain a copy of the final subsurface sewage disposal system inspection information from the Department (where records are available).

A. Protection of the Platted or Designated Sewage Disposal System Areas

Each and every platted (i.e. the subsurface sewage disposal system areas shown on a legally recorded plat) or designated (i.e. where not platted, the subsurface sewage disposal system areas are described on the septic system installation permit) subsurface sewage disposal system areas are to be treated as permanent easements (i.e. they are permanent easements when shown on a platted lot). Removal or abolishment of these platted or designated subsurface sewage disposal system area easements can only be accomplished when a proper municipal/public sewer system is installed and is able to provide service to said property. No encumbrance or physical structure shall be placed in such a manner so as to interfere with the platted or designated sewage disposal areas intended purpose. It is the property owner's responsibility to ensure that the septic tank, pump tank (where applicable), system and all related components are protected and remain free from any unauthorized disturbances or encroachments.

Examples of prohibited disturbances and encroachments of a platted or designated subsurface sewage disposal system areas include, but are not limited to, the following:

1. Any excavation or filling on or adjacent to platted or designated subsurface sewage disposal areas for the purposes of:
   (a) Building or placing an in-ground or above-ground swimming pool.
   (b) Planting or removal of trees or other decorative vegetation.
   (c) Placement or construction of any unauthorized structures.
   (d) Placement of any type of utility line.
2. Landscaping practices that involve cutting and/or removal of soil or the importing of fill material onto a platted or designated subsurface sewage disposal area.
3. Construction of driveways, turnarounds, parking areas or any other type of paved area or impervious surfaces.
4. Crossing of platted or designated subsurface sewage disposal system areas with vehicular traffic (e.g. automobiles, trucks, construction vehicles, etc.) that would compact the soils.
5. Placement of unauthorized structures upon platted or designated subsurface sewage disposal system areas, including:
   (a) Prefabricated buildings (any type)
   (b) Detached garages.
   (c) Barns/sheds.
   (d) Green houses.
   (e) Gazebos.
   (f) Swimming Pools (in-ground or above-ground).
6. Construction of permanent appendages to an existing dwelling or structure which may include:
   (a) Sidewalks.
   (b) Porches.
   (c) Decks (constructed of any type materials).
   (d) Patios.
   (e) Retaining walls.

   Note: *See Table S13-1 in Section 13, regarding required minimum distance setbacks or buffers.*

7. Gutter down-spouts, storm water drains, footing and foundation drains, garage floor drains, basement sump pumps, storm drains or any clean water source shall not be connected into the septic tank or to any other portion of an on-site subsurface sewage disposal system (e.g. pump tank, disposal field trenches, etc.).

B. Maintenance and Care of a Subsurface Sewage Disposal System

Any and all maintenance shall be conducted by individuals who are specifically licensed for this purpose by the Department.

Maintenance and care of a subsurface sewage disposal system shall include, but is not limited to:

1. Pumping of the septic tank at regular intervals; the recommended frequency is every two (2) to five (5) years or as otherwise deemed necessary.

2. Pumping of the pump tank (where applicable) at regular intervals; the recommended frequency is every two (2) to five (5) years or as otherwise deemed necessary.

3. Proper cleaning of an effluent filter at regular intervals (*where such devices were installed prior to the adoption of these regulations*); if present, they will be attached to the outlet tee inside of the septic tank.

4. Proper pumping and cleaning of grease traps, where applicable, at regular intervals, in accordance with the provisions of these regulations. See *Section 11*.

5. Periodic inspection, and maintenance where necessary, of all electrical controls and alarms to ensure reliable and proper service.

C. General Aspects of Caring for a Subsurface Sewage Disposal System

1. It shall be the property owner's responsibility to practice care in his/her household habits. It shall be prohibited to:

   (a) flush excessive kitchen grease, fats, oils, skin emollients, or other non-biodegradable kitchen-type substances such as meat bones, coffee grounds, etc., into the subsurface sewage disposal system;

   (b) flush or place non-biodegradable objects such as, including but not limited to, cigarettes, disposable diapers, feminine hygiene products, rags, plastic items or containers, or other such materials into the subsurface sewage disposal system;

   (c) pour harsh chemicals or toxins such as, including but not limited to, pesticides, paints, paint thinners, household chemicals, gasoline, oil, transmission fluid, brake fluid or any other detrimental salts, solvents, or acids into the subsurface sewage disposal system.

   The property owner should be certain to purchase and use household products which are specifically labeled as being *safe and suitable for use in or with a septic tank/subsurface sewage disposal system*.

2. Subsurface sewage disposal systems do not have unlimited capacities. Excessive discharges of household wastewater into the system will result in the malfunctioning of the system. Care must be taken to properly maintain all plumbing fixtures in order to prevent leakage and subsequent excessive discharge into the system. The practice of water conservation will extend the life of any type of subsurface sewage disposal.

3. *Special Note Regarding Garbage Disposals*

   Though these devices are not illegal, the Department strongly advises against their use in any dwelling or structure which depends upon a subsurface sewage disposal system for its wastewater disposal.

   Garbage disposals or garbage grinders, typically attached to kitchen sink drains, should be used with discretion in order to avoid the placement of excessive amounts of organic (i.e. typical food wastes) waste materials (also called *solids*) into the septic tank. The additional wastes introduced to a septic tank via the garbage disposal will hasten the build-up of the solids in the tank. The presence of a higher volume of solids in the septic tank increases the potential for possible damage to sewage/effluent pumps (where present) or the disposal field trenches.

   Should these devices be utilized within a dwelling or structure, the recommended septic tank pumping frequency, as discussed in the previous *Subsection B*, should be increased to every two (2) years.

D. Subsurface Sewage Disposal System Malfunctioning

Where any subsurface sewage disposal system which fails to function (i.e. discharges sewage upon the ground surface), the owner of said system shall be required to secure a permit for repair of said system, from this Department, in accordance with *Section 34*. Any and all repairs shall be conducted by individuals who are specifically licensed for this purpose by the Department.

E. Damages Occurring to a Subsurface Sewage Disposal System After Its Installation, Inspection and Approval by the Department

The Department accepts no liability where a subsurface sewage disposal system failure or malfunction occurs as a result of violation of the provisions of these regulations by the home owner, property owner, builder, installer or others. Additionally, the Department accepts no liability where a subsurface sewage disposal system failure or malfunction occurs as a result of an act of God.

SECTION 23

EROSION AND SEDIMENT CONTROL PRACTICES

The Department shall require the use of erosion and sediment control practices on properties where site conditions (i.e. soil types, topography, presence of impervious surfaces, etc.) indicate that water movement across the site may adversely affect a platted or designated subsurface sewage disposal system area and/or a proposed, current or existing system installation.

The Department shall have the authority to require the installation of erosion and sediment control practices. Said practices shall be implemented in the manner specified (i.e. using one type of erosion and sediment control practice, or using two or more types in conjunction with each other, etc.) by the Department. The use of said control practices may be part of the permitting requirements or their use may be mandated during any phase of a subsurface sewage disposal system installation (e.g. during a soil check, layout inspection, final inspection, etc.) process.

The types of erosion controls that may be specified for use on a site includes, but is not limited to:

- Natural fiber mesh material.
- Silt fences.
- Staked hay/straw bales.
- Terraces or berms.
- Grass seed and straw.
- Sod placement.

SECTION 24

LICENSING OF SEPTIC SYSTEM INSTALLERS

A. License and Provisions of Said License

1. No person shall construct, alter, extend or repair either alternative or conventional subsurface sewage disposal systems within Williamson County, unless he/she holds a valid installers license and identification card issued by the Department of Sewage Disposal Management in his/her individual name.

   (a) Licenses are issued to individuals only.

   (b) Licenses shall not be issued to corporations, partnerships, or other such business entities.

2. The Department shall recognize three classes of licensed installers.

   (a) Conventional Installers License

   The conventional installers license shall only allow the holder of such a license to construct, alter, extend or repair conventional subsurface sewage disposal systems as set forth in these regulations.

   (b) Alternative Installers License

   The alternative installers license shall only allow the holder of such a license to construct, alter, extend or repair alternative subsurface sewage disposal systems as set forth in these regulations.

   (c) Combined Conventional and Alternative Installers License

   The combined installers license shall allow the holder of such a license to construct, alter, extend or repair both conventional and/or alternative subsurface sewage disposal systems as set forth in these regulations.

3. This provision is applicable to all persons who install systems either as a primary contractor or subcontractor.

4. No licensed installer may subcontract with an unlicensed individual for installation of these systems in whole or in part.

5. The installers license shall be deemed necessary in addition to any other business permit or license required and shall be obtained prior to beginning construction, alteration, extension or repair of such systems.

6. Every construction, alteration, extension, or repair shall be under the direct supervision of a licensed installer.

   (a) Direct supervision requires the licensed installer to be personally responsible for the performance of every installation of a subsurface sewage disposal system.

   (b) Direct supervision entails personal direction of the work, by the licensed installer, on any given site by providing proper instruction to any and all of his/her employees and to ensure that each phase of the installation has been properly constructed within the bounds of state law and the Williamson County subsurface sewage disposal system regulations.

   (c) The licensed installer shall personally and individually check each phase of each installation on-site prior to directing that the next phase of the installation may proceed.

   (d) The licensed installer shall be present and remain on-site during any and all excavation work associated with any phase of the installation of a subsurface sewage disposal system.

7. In emergency situations, property owners may enact *emergency relief measures* to existing systems. Such measures shall be reported to the Department on the first business day following the day of enacting the emergency relief measure.

   (a) An emergency shall be defined as only those incidences where sewage is backing up into the internal plumbing fixtures of a structure.

   (b) The Department will inspect all such measures and, if required, permanent septic system repairs shall be made by a licensed installer in accordance with the requirements outlined in *Section 34*.

B. Installer Licensing Procedures

Procedures for obtaining an installers license and identification card shall be as follows:

1. An application form, obtained from the Department of Sewage Disposal Management, shall be completed in its entirety by the applicant, and returned to the Department.

2. Applicants and their employees (i.e. all employees who are directly involved with any type of subsurface sewage disposal system construction) shall complete, in full, all requirements of the training course sponsored by the Department of Sewage Disposal Management. The training course shall include, but will not be limited to, the following:

   (a) Rent and view the installation video. Deposit and rental fees for the video, are specified in accordance with the provisions of *Section 33*.

   (b) Meet with a Departmental inspector, as appointed by the Department Director, prior to commencing any subsurface sewage disposal system installation.

3. All installer licenses shall be valid from July 1st until June 30th of the following year (i.e. these dates correspond to the County's budget year). Should an installer receive a license after July 1st, said license fee shall be prorated. All installer licenses shall expire on June 30th. Following the effective date of the adoption of these regulations, as current installer licenses expire, upon meeting all the requirements of these regulations, a new installer license shall be issued for the remainder of the license term expiring on the following June 30th .

4. A properly executed Letter of Credit shall be required and shall be renewed on an annual basis.

   (a) On the date of application, applicants shall provide to the Department of Sewage Disposal Management a surety, in the form of a letter of credit in an amount to be determined by the Williamson County Board of Health. The surety amount for each class of license shall be reviewed by the Williamson County Board of Health as it deems necessary. The surety bond or letter of credit amount is specified in accordance with the provisions of *Section 33*.

   (b) It shall be the responsibility of all licensed installers to renew the Letter of Credit prior to the expiration date of said document. The Department shall provide no renewal notice or reminder to the installer. Should an installer's Letter of Credit expire, said installer will be immediately removed from the list of approved installers, and no requests for inspections shall be taken until the licensing requirements are reestablished.

5. The annual licensing fees shall be paid in full at the time of application submittal. Said fees will be established in accordance with the fee schedule adopted by the Williamson County Board of Health. This fee schedule will be reviewed on an annual basis by the Board for appropriate adjustments, as it deems necessary. The fee schedule is specified in accordance with the provisions of *Section 33*.

   (a) It shall be the responsibility of all licensed installers to pay the appropriate licensing fees upon the renewal date. The Department shall provide no renewal notice or reminder to the installer.

   (b) Should an installer fail to pay the annual license fee upon the renewal date, said installer will be immediately removed from the listed of approved installers, and no requests for inspections shall be taken until the licensing requirements are reestablished.

6. The applicant shall demonstrate to the Department of Sewage Disposal Management that he or she is capable of installing conventional and/or alternative sewage disposal systems that meet the requirements of the regulations as set forth herein. Applicants shall participate in a probationary period prior to the final confirmation of their license.

   (a) This probationary period shall include the applicant's first five subsurface sewage disposal system installations. These first five installations shall be under the direct supervision of the Department in order to allow confirmation of the applicant's qualifications.

   (b) Failure to complete the subsurface sewage disposal system installations in the probationary period to the satisfaction of the Department shall be considered grounds for the denial of a license.

7. Upon completion of the conditions above, the Department will issue a license and an identification card to the applicant. The license shall state if the licensee is qualified for installing conventional systems, alternative systems or both.

8. In the event that the Department determines an applicant is not qualified, the Director will issue written notice of disapproval of the application stating reasons for said disapproval. An applicant may be denied renewal of a license where past performance history reveals unsatisfactory work or repeated violations of the provisions as outlined in the construction permit, its related plans and any an all requirements outlined in the regulations as set forth herein.

9. Applicants who are denied an installers license may request review of such denials through the procedures outlined in *Section 25* of these regulations.

10. Applicants who are denied an installers license shall not be allowed to reapply for a period of one year from the date of final denial notification from the Department.

C. Suspension of License by the Department

1. Any installer's license may be suspended by the Department where immediate action may be necessary to prevent the conduct of the installer from violating any provisions of these regulations herein and/or from creating a public health risk.

   (a) The suspension shall be effective immediately.

   (b) Within seven (7) days of such suspension, a Board of Health meeting shall be convened to review and consider the action taken. The Board may recommend modification, ratification, continuation or termination of the suspension.

   (c) If the suspension is terminated by the Board, the matter shall be closed and no further action shall be required.

   (d) If the suspension is continued or modified, the installer may appeal such action in accordance with and pursuant to the procedures in *Section 25* of these regulations.

2. Any installer's license may be suspended by the Board of Health.

   (a) This suspension may occur as a result of the following circumstances:

      (1) The installer has received three Red Flagged failed inspections within a period of one year. This one year time period shall be concurrent with the installer's yearly licensing cycle. Violations of a significant nature resulting in a Red Flagged failed inspection, shall be those as outlined in *Section 20*.

      The receipt of ten (10) Yellow Flagged failed inspections within a period of one year shall be the equivalent of one Red Flag. This one year time period shall be concurrent with the installer's yearly licensing cycle. Violations of a significant nature resulting in a Yellow Flagged failed inspection, shall be those as outlined in *Section 20*.

      (2) If any part or portion of a subsurface sewage disposal system is covered or backfilled before being inspected or approved, the installer responsible for such actions shall be subject to a license suspension. Violations of this provision, by an installer, occurring more that one time shall be grounds for immediate license revocation. Revocation proceedings are outlined in *Subsection D, of this Section*.

      (3) Failure to complete the inspection sequence, for any subsurface sewage disposal system installation, in its standard or required order shall be grounds for immediate license suspension.

   (b) Upon the occurrence of one of the above circumstances, the Department will submit the name of the installer and all supporting facts to the Board of Health for their consideration regarding the recommended suspension. Where a license suspension is warranted the Department shall notify the licensed installer in writing, via certified, return-receipt mail, of transmittal to the Board of Health and of the date of the Board of Health meeting in which the suspension proposal will be heard. This notice shall be sent to the installer no less than ten (10) days prior to said meeting. The Board of Health will determine if a suspension is required. Furthermore, if a decision for suspension is rendered, the Board will determine the length of said suspension.

3. No new *Permit to Install* may be obtained by a licensed installer whose license is under suspension, nor may the licensed installer request and obtain inspections upon other permitted sites until the suspension status has been lifted.

4. Where any installer has their license suspended two or more times within a calendar year, the Department shall request revocation of the installer's license by the Board of Health pursuant to the revocation procedures set forth in *Subsection D, of this Section*.

5. Licensed installers whose licenses are suspended may request review of such suspensions through the procedures outlined in *Section 25*.

D. Revocation of License

1. The license revocation procedure may be invoked when the installer violates provisions of *Subsection C, Part 2, Subpart (a)(2), of this Section, Subsection C, Part 4, of this Section*, or the provisions outlined in *Subsection K* of *Section 20*.

2. Where an installer has repeatedly conducted business in an unprofessional manner and in conflict with or inconsistent with, these regulations, such action(s) shall be construed as a demonstration of a consistent pattern of incompetence or a willful disregard for these regulations by said installer. Violations of this provision shall be basis for license revocation.

3. Revocation procedures upon an installer's license are as follows:

   (a) At the inception of the revocation procedures said installer shall be notified by the Williamson County Attorney, in writing, via certified, return-receipt mail.

   (b) Upon receipt of the revocation notice, the said installer must respond in accordance with the *Section 25*.

   (c) Upon the receipt of the revocation notice, the installer shall not engage in the construction of any new subsurface sewage disposal systems. Said installer shall be denied a *Permit to Install* for any new systems.

4. An installer whose license has been revoked shall not be allowed to reapply, for a new license, for a period of five (5) years from the date of final notice of revocation from the Department.

E. Draft of Surety Bond or Letter of Credit

1. Failure to enact corrective measures regarding any deficiencies, in accordance with the provisions set forth in *Subsection K* of *Section 20*, shall result in an immediate draft of the surety bond or letter of credit.

2. Any action resulting in the initiation of the license revocation procedure shall constitute due justification for a draft of the surety bond or letter of credit.

3. The surety bond or letter of credit shall provide the financial means to correct violations of deficient subsurface sewage disposal system installations.

4. In the event a draft is presented on the surety bond or letter of credit, said installer shall be notified by the Williamson County Attorney, in writing, via certified, return-receipt mail.

5. Licensed installers upon whose surety bond or letter of credit has been drawn may request review of such action through the procedures outlined in *Section 25*, of these regulations.

SECTION 25

APPEAL AND REVIEW OF ACTIONS

A. Matters Regarding Installers

The following provisions shall pertain only to matters regarding any actions of the Department regarding installers licenses.

1. Appealable Actions

   The following adverse actions of the Director of the Department may be appealed pursuant to the provisions of this section.

   (a) Denial of License

   (b) Suspension of License

   (c) Revocation of License

   (d) Draft of the surety bond or letter of credit of the installer

2. Notice of Adverse Recommendation or Action

   An installer against whom an adverse action has been taken shall promptly be given special notice of such action. Such notice shall:

   (a) State the adverse action taken and summarize the grounds for such action.

   (b) Advise the installer of his right to a hearing pursuant to the provisions of this Section.

   (c) Specify the number of days following the date of receipt of notice within which a request for a hearing must be submitted.

   (d) State that failure to request a hearing within the specified time period shall constitute a waiver of right to a hearing and to an appellate review on the matter.

   (e) State that upon receipt of his hearing request, the installer will be notified of the date, time and place of the hearing, and the grounds upon which adverse action is based.

3. Request for Hearing

   An installer shall have ten (10) days following his receipt of the notice as provided above to file a written request for a hearing. Such request shall be delivered to the chairman of the Board of Public Health by certified mail.

   Failure to request a hearing in a timely manner shall be conclusively deemed to be an acceptance of the adverse action taken by the Director of the Department.

4. Appointment of Hearing Officer

   The Chairman of the Board of Health, within ten (10) days of receipt of a request for hearing shall appoint a Hearing Officer to conduct a hearing pursuant to the procedures set forth below.

5. Notice of Time and Place of Hearing

   After appointment, the Hearing Officer shall make all necessary arrangements for the hearing and shall notify both the installer and the Director of the Department of the time, place and date of the hearing.

6. Statement of Issues and Grounds

   The notice of hearing provided above shall contain a concise statement of the installer's alleged acts or omissions.

7. Personal Presence

The personal presence of the installer who requested the hearing shall be required. An installer who fails without good cause to appear and proceed at such hearing shall be deemed to have waived his rights in the same manner and with the same consequence as provided above in connection with failure to request a hearing.

8. Representation

The installer who requested the hearing shall be entitled to be accompanied by an attorney. The Director of the Department shall also be entitled to the services of the County Attorney in making his presentation to the Hearing Officer.

9. Rights of Parties

During a hearing, each of the parties shall have the right to:

(a) Call and examine witnesses.

(b) Introduce exhibits.

(c) Cross-examine witnesses against him/her.

(d) Impeach any witness.

(e) Rebut any evidence.

(f) Call and cross-examine an adverse party.

10. Procedure and Evidence

The hearing need not be conducted strictly according to rules of law relating to the examination of witnesses or presentation of evidence. Any relevant matter upon which responsible persons customarily rely in the conduct of serious affairs shall be admitted, regardless of the admissibility of such evidence in a court of law. Each party shall prior to or during the hearing, be entitled to submit memoranda concerning any issue of law or fact, and such memoranda shall become part of the hearing record. The Hearing Officer may, but shall not be required to, order that oral evidence be taken only on oath or affirmation administered by any person designated by him and entitled to notarize documents in Williamson County.

11. Official Notice

In reaching a decision, the Hearing Officer may take official notice, either before or after submission of the matter for decision, of any generally accepted technical or scientific matter relating to the issues under consideration and of any facts that may be judicially noticed by the courts of this state. Parties present at the hearing shall be informed of the matters to be noticed and shall be given opportunity on timely request, to request that a matter be officially noticed and to refute the officially noticed matters by evidence, or by written or oral presentation of authority, the manner of such refutation to be determined by the Hearing Officer.

12. Order and Burden of Proof

The Director of the Department must go forward with proof of the grounds for the adverse action taken. The installer requesting the hearing shall then have the burden of proving, by a preponderance of the evidence, that the adverse recommendation or action of the Director of the Department lacks a substantial factual basis or that such basis of the conclusions drawn therefrom are either arbitrary, unreasonable, or capricious.

13. Recording of Hearing

A record of the hearing shall be kept that is of sufficient accuracy to permit an informed and valid judgment to be made by the Board of Health of Williamson County. The Hearing Officer may select the method to be used for making the record, such as court reporter, electronic recording unit, detailed transcription, or minutes of the proceedings. Either party may have a court reporter present provided that the party arranging for those services pay for the appearance and transcript.

14. Postponement

Requests for postponement of a hearing may be granted by the Hearing Officer only upon a written request showing good cause and only if the written request is made as soon as is reasonably practical.

15. Recesses and Adjournment

The Hearing Officer may recess the hearing and reconvene the same without additional notice for the convenience of the participants or for the purpose of obtaining new or additional evidence or consultation. Upon conclusion of the presentation of oral and written evidence, the hearing shall be closed.

16. Findings and Ruling of the Hearing Officer

At the conclusion of all proof the Hearing Officer shall within thirty (30) days submit in writing findings of fact and law, which shall contain, but will not be limited to the following:

(a) A statement of the adverse action taken by the Director of the Department which is the subject of the appeal.

(b) A concise statement of the charges upon which the adverse action of the Director of the Department are based.

(c) A summary of the positions of the installer in response to the charges made by the Director of the Department.

(d) A summary of evidence considered, including a complete list of witnesses examined, exhibits introduced, and all other documents, publications, or authorities considered.

(e) A statement of issues of fact or law presented by the parties, and a statement of the findings of the Hearing Officer upon each of the issues.

(f) A ruling of the Hearing Officer on the case.

17. Effects of the Ruling of the Hearing Officer

The Ruling of the Hearing Officer, when rendered and distributed, is effective upon the date and time of receipt by the parties. Either the installer or the Director of the Department may request review of the Ruling of the Hearing Officer by written request to the Chairman of the Board of Health.

18. Review of Hearing Officer Ruling by Board of Health

Upon receipt of the request for a review of the Hearing Officer's Ruling, the Chairman of the Board of Health will cause a complete record of the hearing below to be prepared within twenty (20) days of the receipt of the request. The record shall contain the following information.

(a) The Ruling of the Hearing Officer.

(b) A transcription, or a summary of the testimony of all witnesses.

(c) Copies of all exhibits introduced in the hearing.

(d) The record may contain copies of any authorities relied upon by the Hearing Officer, or pertinent excerpts from such authorities.

A complete copy of the record shall be made available to each member of the Board of Health.

19. Final Ruling by the Board of Health

The Chairman of the Board of Health shall call a special meeting of the Board of Health to discuss and act upon the Ruling of the Hearing Officer. Each member of the Board shall have no less than fifteen (15) days to review and consider the record before it.

No action shall be taken by the Board of Health except by the vote of its members in a meeting called for that purpose. Members of the Board of Health shall not receive or consider information from other sources, or have ex parte communication with any other person in connection with the case before them.

After full discussion of the record in the meeting of the Board, the Board may take the following actions:

(a) Request any other information, materials, or authorities it may require from any of the parties. Each party must have full notice of any such request and must be given an opportunity to respond to any additional information requested by the Board.

(b) Continue its deliberations from time to time, for a reasonable period of time to allow for the additional information it requests.

(c) Affirm, modify, or reverse the action of the Hearing Officer.

The decision of the Board must be by a majority vote of the Members present and voting, upon a proper motion made by a member of the Board.

Within five (5) days of the decision of the Board, the parties must be notified in writing of the decision.

The decision of the Board is final, and is effective upon receipt by the parties.

B. Matters Regarding the Department

These provisions shall pertain to any actions of any officer or employee of the Williamson County Department of Sewage Disposal Management that materially and adversely affects approval of a system.

1. Actions Appealable

   Any decision of the Department that materially and adversely affects approval of the system may be appealed pursuant to the provisions of this section.

2. Request for Review

   The party against whom the adverse action was taken shall file a written request for review, delivered to the Chairman of the Board of Health by certified mail, including the remedy sought by the applicant.

   Failure to request review of such action written five (5) days from notice to party of such adverse actions shall be conclusively deemed an acceptance of such action.

3. Notice of Time and Place of Review

   Applicant for review shall be notified in writing of the Board of Health meeting at which review of the adverse action shall take place. In no event shall any applicant receive less than thirty (30) days notice.

4. Personal Presence

   The applicant shall be required to attend the Board meeting at which review of the adverse action shall take place.

5. Representation

   Although not required, the applicant may be accompanied by legal counsel.

6. Procedure and Evidence

   The applicant shall present a written statement, with supporting documentation, at least five (5) days before the meeting. He or she shall then have a maximum of ten (10) minutes to present oral argument or testimony related to such adverse decision. The applicant shall be entitled to present any supporting documents he so chooses, which shall be submitted in advance of the hearing when possible. The Department shall then have a maximum of ten (10) minutes to offer support for the decision. The Department shall be entitled to present any supporting documentation it so chooses. The applicant shall then have a maximum of five (5) minutes in rebuttal.

7. Ruling by Board of Health

The Board of Health has the following options:

(a) Affirm the decision of the Department;

(b) Reverse the decision of the Department and direct a result;

(c) Reverse the decision of the Department with direction to consider additional specific material prior to making a decision; or

(d) Defer the matter to the next regularly scheduled meeting.

The Board's decision must be reached by a majority vote of a quorum, upon proper notice.

Only one deferral is permitted on a single item.

Members of the Board of Health shall not receive or consider information from other sources, or have ex parte communication with any other person in connection with the case before them.

SECTION 26

SUBDIVISION OF LAND PARCELS

No proposed subdivision, where any proposed lots require the use of individual on-site subsurface sewage disposal systems, shall be approved by the State Planning Office, a local or regional planning commission or any other entity or agency authorized to approve subdivisions, until the plans for such subdivisions have been approved by the Williamson County Department of Sewage Disposal Management.

Further, the provisions of this section apply to any size lot (e.g. one acre subdivision lots, ten acre tracts, etc.) which is required to be platted (e.g. for Planning Department purposes) or simply being platted for the purpose of creating a *buildable* lot.

It is the intent that this section shall be consistent with Williamson County zoning and subdivision regulations adopted by the Williamson County Regional Planning Commission and the Williamson County Board of Commissioners.

A. Subdivision Platting Process

There shall be three (3) phases in which a plat will be processed. The three (3) phases consist of the Sketch Plan Phase, the Preliminary Plat Phase and the Final Plat Phase. Requirements of each phase are as follows:

1. Sketch Plan Phase

The sketch plan shows the generalized design concept of the proposed subdivision. It shall be considered only as a conceptual document which serves to illustrate potential development densities for subdivisions utilizing subsurface sewage disposal systems. As such, the sketch plan plat is subject to change with regard to the various features dictated by the presence of soils determined suitable for subsurface sewage disposal system usage (as revealed by the Extra High-Intensity soils map required at the preliminary phase). Examples of such features include, but are not limited to: the number of lots, lot line location/configuration, building envelope configuration, street and drainage configuration etc.

The sketch plan plat submitted to the Department for review shall be at a scale of one-inch equals one hundred-feet (1"=100') and shall illustrate proposed improvements and natural features of the property in question. Written documentation from a Department approved soil consultant or a Department Soil Scientist regarding the suitability for subsurface sewage disposal system usage shall accompany this plat. This statement shall indicate that suitable soils are available for each lot proposed within the development.

Once a sketch plan and its required supporting documentation has been reviewed, the Department shall indicate to the Williamson County Planning Commission, in writing, the validity of the proposed concept with regards to its suitability for subsurface sewage disposal system usage.

Once the sketch plan plat has been approved by both this Department and the Williamson County Planning Commission it may proceed to the preliminary plat phase. Approval of the sketch plan does not constitute overall approval of the subdivision, nor does it imply that the project is suitable for commencing any type of construction. Furthermore, sketch plan approval does not imply or guarantee the approval of the preliminary and/or final plat phase.

2. Preliminary Plat Phase

The preliminary plat serves as an actual pre-construction document illustrating the actual lot densities and designs, the placement of the various subdivision elements and the proposed areas to be allocated for subsurface sewage disposal system use. All aspects of the preliminary plat shall be generated based upon the soil properties and limiting factors as evidenced by the Extra High-Intensity soils map previously submitted to the Department (as referenced below). As such, only minor changes, with regard to building envelopes or drainage configurations, may be made between the preliminary plat phase and the final plat phase.

The preliminary plat shall be shown on a transparency (i.e., mylar, slick or plastic drawing material) represented at a one-inch equal one hundred-feet (1"=100') scale and shall show all proposed improvements including, but not limited to: lot lines, roads, any and all drainage easements, locations and routes of any and all soil drainage improvement practices (see Important Note below), building envelopes, subsurface sewage disposal system areas and all utilities and/or their easements. Any existing structures or utilities shall also be shown on the preliminary plat. Further, any limiting natural features shall be shown on this plat, including, but not limited to: sinkholes, caves, gullies, ditches, ponds, areas susceptible to flooding, old road beds and/or agricultural terraces.

An Extra High-Intensity soils map (See *Appendix 1*) shall be submitted to this Department a minimum of fifteen (15) working days prior to preliminary plat submittal. This soils map shall be subject to field verification and approval by the Department prior to review of the preliminary plat.

Additionally, a transparent contour map shall accompany the submitted preliminary plat. This contour map shall be constructed from field-run data, depicted at a one-inch equal one hundred-feet (1"=100') scale and shall show all contours at two (2) foot intervals. The Department shall have the authority to require the submittal of more detailed contour maps where deemed necessary. The proposed street configurations and lot lines shall be located on this contour map.

Once the preliminary plat and its required supporting documentation has been reviewed, the Department shall indicate to the Williamson County Planning Commission, in writing, the validity of the proposed preliminary plat. Once the preliminary plat has been approved by both this Department and the Williamson County Planning Commission it may proceed to the final plat phase.

Approval of the preliminary plat does not constitute overall approval of the subdivision, nor does it guarantee approval of the final plat phase. Once preliminary plat approval has been granted, all applicable protectionary measures as specified in *Appendix 10* shall immediately apply in order to prevent potential damage to the designated subsurface sewage disposal system areas.

<u>IMPORTANT NOTE</u>: Due to the critical nature of the placement of soil drainage improvement practice(s), these attributes shall be shown on the preliminary plat in accordance with the provisions outlined in Subsection A, Part 3, (g), (1)-(8) of this Section.

3. Final Plat Phase

The final plat serves as the recorded instrument governing the design and construction of all subdivisions. In the context of these regulations and as governed by this Department, all final plats are associated with only those subdivisions employing on-site subsurface sewage disposal methodologies. All aspects of the subdivision construction, including but not limited to: roadways, drainage, houses and all appurtenances, shall conform to the requirements of the final plat. Deviation from the final plat shall be grounds for revocation of lot approval.

The final plat shall show the absolute final arrangements of all pertinent elements the subdivision construction process. The pertinent elements to be shown shall include, but shall not be limited to: easements (of any type), drainage improvements and their associated configurations, road design details, grading plans, construction design, building envelope identification, subsurface sewage disposal system areas, all utilities (i.e. gas, water, electric, etc.) whether above-ground or below-ground and any other information which the Department deems necessary to complete a comprehensive review of the proposed subdivision.

Two (2) transparent copies (i.e. graphic representations of the plat printed upon a mylar, slick or plastic drawing material) and four (4) paper copies (e.g. blue-line copies made directly from each and every transparent copy) of the final subdivision plat, at the scale of one (1) inch equals one hundred (100) feet, shall be submitted to the Department. This final plat shall fully indicate, show and describe the following:

(a) Lot dimensions with all lots numbered in accordance with the regulations of the Williamson County Planning Commission.

(b) The building envelope.

(c) Any and all easements (e.g. roads, drainage, utilities, ingress/egress, etc.).

(d) All designated subsurface sewage disposal system areas.

<u>NOTE:</u> The disposal field areas shall be labeled in accordance with the examples shown in Figures A16-1, A16-2, A16-5 and A16-6 in *Appendix 16*.

All subsurface sewage disposal system areas shall be shown and identified, in accordance with *Appendix 8*, which shows the standards required for duplication and triplication (where applicable) for the actual square footage/area requirements for said sewage disposal areas.

(e) Easements for any purpose.

(f) Surface, subsurface, and underground drainage, and their appropriately designated easements, designed so as not to interfere with subsurface sewage disposal systems.

(g) Soil Drainage Improvement Practice(s). The information regarding this attribute shall include, but is not limited to:

(1) Graphically plot the location and entire route of each and every soil drainage improvement practice around the platted subsurface sewage disposal system areas for each lot, where applicable.

(2) The graphically represented soil drainage improvement practices shall maintain all minimum setbacks in accordance with the provisions outlined in *Section 13*.

(3) The graphically represented soil drainage improvement practice shall have elevation points shown at regular intervals sufficient to adequately define its profile and to ensure a positive flow discharge outlet is provided according to the required minimum depth.

(4) Each of the elevation points, as established in the above (3), shall be field staked/flagged and labeled so as to correspond to the elevation profile provided.

(5) Each of the established points shall be shown in an *elevation schedule table*. This table shall show the ground surface elevation and invert elevation corresponding to said point. The information shown in the elevation schedule shall include the point(s) of inception and positive flow outlet, and their associated elevations. See figure 16-7 in *Appendix 16.*

(6) Any and all off-site easements necessary to achieve positive flow outlets shall be shown.

(7) Indicate the soil drainage improvement practice minimum depth for each disposal field area on each and every lot.

(8) All soil drainage improvement practice designs shall be in accordance with the provisions outlined in *Appendix 5*.

(h) Positive drainage plan, where deemed necessary by the Department. A positive drainage outlet shall be available for each lot before the final plat is signed. If construction of a positive outlet is necessary, all construction shall be done before final plat approval is given. Off-site property easements may be necessary.

(i) Seal and signature of surveyor licensed to practice in the state of Tennessee (and seal and signature of engineer licensed to practice in the state of Tennessee, if separate entities). In order to survey and plat subdivisions said engineer shall also be a registered surveyor in the state of Tennessee.

(j) Precision of the unadjusted survey. A minimum ratio of precision of the unadjusted survey of 1:10,000 is required.

(k) Vicinity map. The vicinity map is not required to be to scale, however it shall be accurate in the descriptions it will depict.

(l) North arrow indicating magnetic north or otherwise and indicate the scale of the plat.

(m) All final plats shall have distances on all lines and shall indicate the identity of all corners such as steel post, concrete or iron pin.

(n) Title Block. The information shown within the title block shall include, but is not limited to:

(1) Name, address and telephone number (i.e. home, work, fax, pager, etc.) of the individual or firm preparing the subdivision proposal.

(2) Subdivision Name.

(3) Section Number of subdivision, if applicable.

(4) Number of lots shown on the plat.

(5) Total area encompassed by subdivision, as measured in acres.

(6) Property owners name, address and telephone number (i.e. home, work, fax, pager, etc.).

(7) Rate of Closure.

(8) Date of submittal, and the date of any subsequent revisions.

(9) Revision information, if applicable.

(10) Sheet number (respective to each sheet used in the platting of the subdivision)

(o) All restrictions, notes and charts as specified by the Williamson County Department of Sewage Disposal Management. See *Appendix 16.*

(p) Signature block for Williamson County Department of Sewage Disposal Management. See *Appendix 16*.

(q) Legend.

B. Soil Mapping Requirements

All parcels of land subject to being subdivided and platted, shall be soil mapped. All soil mapping products shall be prepared in accordance with the provisions, regarding soil mapping, outlined in *Section 27*.

Percolation tests shall not be utilized as a method of land assessment for any property subject to being subdivided and platted.

C. Subdivision Design Requirements

The information outlined in this Subsection describes the criteria that shall be utilized for all subdivision designs which incorporate the use of subsurface sewage disposal systems.

1. Lot Size

The minimum lot size for any platted subdivision lot shall be one (1) acre. The size of a lot shall be sufficiently large enough to construct the original subsurface sewage disposal system as required in these Regulations and to provide additional suitable repair area(s) for that system, in accordance with *Appendix 8*. The size and configuration of a lot and the availability of suitable soils may limit the type, size and location of the structure, and any related appendages, which can be built on the lot. The Department shall have the authority to make this determination where site and soil characteristics so warrant.

2. Surface Water Drainage

The use of curb and gutter drainage shall not be considered, proposed or approved in subdivisions where subsurface sewage disposal systems are to be utilized.

Where swales, ditches or any other means (e.g. conducting such waters into underground pipes) of directing surface water run-off are platted and designated as a type of easement, the limits of all proposed subsurface sewage disposal system areas shall be a minimum of twenty-five (25) feet from the limits of said easement boundary.

3. Subsurface Water Drainage

Where the subdivision designer allocates, designs and configures a subsurface sewage disposal system area within a soil mapping unit, or units, that requires the use of any type of soil drainage improvement practice (including, but not limited to, curtain drains – WCD; drawdown drains – WDD or DDD; plan curtain drain – PCD; etc.), said designer shall ensure that each and every proposed disposal field area for each and every proposed lot or parcel, subject to said drainage improvement requirement, has an unrestricted access to a *positive drainage outlet* (See Appendix 5).

The soil mapping information shall indicate the minimum depth to which said drainage improvements are to be constructed. Therefore, the subdivision designer shall ensure that said lot design will accommodate or provide the necessary elevation difference between the disposal field area and the point of achieving a positive drainage outlet. The positive drainage outlet shall either be upon the proposed lot or shall be via easements provided for this purpose. Where easements are provide for this purpose they shall be specifically dedicated for this purpose alone.

4. Allocation, Design and Configuration of Subsurface Sewage Disposal System Areas.

(a) All platted subsurface sewage disposal system areas are to be considered as permanent easements. Removal of said easements can only be accomplished when a proper municipal sewer service becomes available. Once a connection to the sewer is completed, and approval notification (i.e. valid documentation) from the utility is provided to this Department, the subsurface sewage disposal system areas easements can become null and void.

No encumbrance or physical structure shall be placed in such a manner so as to interfere with the platted subsurface sewage disposal system areas' intended purpose. Any changes in the location of the proposed structure, building footprint, utilities and/or their easements or deviations from the approved final plat shall result in a revision of said plat being submitted to the Department for review.

(b) Design Criteria for Subsurface Sewage Disposal System Areas shall include, but are not be limited to:

(1) Soils that are shown on a soil map which have an estimated soil absorption rating in excess of 75MPI shall not be considered suitable for either conventional or alternative subsurface sewage disposal system use.

(2) The required square footage of acceptable soils land surface area proposed for subsurface sewage disposal system usage shall be in accordance with *Appendix 8*.

(3) The subsurface sewage disposal system areas shall be drawn parallel to the naturally existing ground contours so as to facilitate ease of system installation.

Poorly configured subsurface sewage disposal system areas which are designed or shaped so as to require special installation considerations (i.e. necessitate the use of short, multiple disposal field trenches of less than fifty feet in length) shall not be approved. See the example in Figure A16-3 in *Appendix 16*.

(4) The subsurface sewage disposal system areas shall be configured in such a manner so as to provide simplicity of system construction within the proposed disposal field installation area. See the example in Figure A16-4 in *Appendix 16*.

(5) The subsurface sewage disposal system areas shall be of sufficient shape and size so as to adequately allow proper installation of disposal field lines at a minimum length of one-hundred (100) linear feet (i.e. where conventional systems are proposed to be utilized)

(6) The subsurface sewage disposal system areas shall be increased in size for those sites where the area proposed, possesses multiple or complex (i.e. hummocky) slopes, dense vegetation or any other potential installation-restrictive characteristics. The area shall be increased in size commensurate with the proposed needed installation requirements of the intended structure.

(7) Where any subsurface sewage disposal system areas prove to be questionable, the Department shall require that extensive site and design plans, including actual field staking of the system layout be provided in order to aptly demonstrate that the required system can be physically installed in such a manner so as to provide for an adequate soil buffer, as determined by a Department Soil Scientist.

5. Setback Requirements for Platted Subsurface Sewage Disposal System Areas

All proposed subsurface sewage disposal system areas shall be located and designed so as to be in accordance with the provisions outlined in *Section 13*. See the examples in Figures A16-5 and A16-6 in *Appendix 16*.

6. Use of Soil Mapping Units and the Subsequent Designation of Subsurface Sewage Disposal System Areas

Soils that are shown on a soil map which have an estimated soil absorption rating in excess of 75MPI shall not be considered suitable for either conventional or alternative subsurface sewage disposal system use.

Where the approved soil mapping information reveals the presence of soil units of suitable properties and of sufficient size (i.e. soil units meeting the specifications outlined in *Appendix 1* and the area requirements outlined in *Appendix 8*), the designation of the disposal field areas shall be contained entirely within the confines of said soil units.

However, where the soil mapping information reveals the presence of many small, dissimilar units of soils (i.e. soil units having different MPI rates, required soil improvement practices, etc.), or a mixture of both the aforementioned scenarios, the designation of the disposal field areas shall meet the following requirements:

(a) Where there exists the inclusion of two (2) or more dissimilar soil units within a proposed disposal field area, in order to meet the disposal field area size requirements (i.e. *Appendix 8*), the conditions for the use of the soil unit having the most restrictive soil characteristics (e.g. higher MPI rate, unit is designated for LPP use only, required use of a soil improvement practice for any purpose, soil unit laying upon a steeper slope class, etc.) shall take precedence in the design, designation and subsequent use of that disposal field area. See the example in Figure A16-2 in *Appendix 16*.

(b) Once the disposal field areas have been delineated for a particular lot, the areas shall be identified as to the type of subsurface sewage disposal system installation which shall be utilized in said disposal field areas.

(1) Type of Subsurface Sewage Disposal System to be Utilized

The subsurface sewage disposal system area size requirements, as shown in *Appendix 8*, in conjunction with the soil map information (i.e. the information indicating what type of system the soil will support), will determine the type of subsurface sewage disposal system that will be required.

Additionally, the disposal field area having the most restrictive soil characteristics and/or conditions for use, the available amount of square footage (as per *Appendix 8*) and/or the highest soil MPI rating shall dictate the type of system that shall be utilized in each subsurface sewage disposal system area designed for that lot. See the examples in Figures A16-1 and A16-2 in *Appendix 16*.

There shall be no mixed use of subsurface sewage disposal system types on any lot (e.g. one area cannot be designated for a conventional system and a LPP system used for the other area; both areas in this example would have to be designated for LPP system use). Should the aforementioned criteria indicate that a proposed disposal field area require the use of a particular system type, all duplicate disposal field areas shall be of the same type of system regardless of the soils that may occupy those areas.

(2) Identification of the Subsurface Sewage Disposal System Areas

The subsurface sewage disposal system areas delineated upon a plat shall require a means of identification so as to distinguish one area from another. For this purpose, each area shall be assigned and labeled with a capital letter A, B or C, where applicable. Thus, where any charts or other type of notes are needed to provide information pertaining to a specific disposal field area, that information shall be referenced to the area identified by its respective label.

(3) Lot Restrictions

The Department shall have the authority to place restrictions upon any proposed lot represented upon a subdivision plat. These restrictions may include, but shall not be limited to:

(i) Placement and/or configuration of a building envelope.

(ii) Placement and/or configuration of the lot's subsurface sewage disposal system disposal field areas.

(iii) The type of subsurface sewage disposal system to be utilized upon a lot.

(iv) The number of bedrooms that may be placed within a dwelling.

(v) The use of a structure proposed to be placed upon the lot.

(vi) The use of oversized bathing fixtures within a structure or dwelling.

The assessment and subsequent placement of such restrictions upon a subdivision lot shall be determined by the Department during the subdivision design review process. Said restrictions shall be based upon the assessment of factors including, but not limited to, the amount of available soil suited for subsurface sewage disposal system use, size of disposal field areas, slopes, data from Table A8-1 in *Appendix 8*, existing vegetative conditions (i.e. big trees), and any other potential subsurface sewage disposal system installation restrictive characteristics that may be noted by the Department.

7. Additional Site Limitations Restricting Suitability of Proposed Subsurface Sewage Disposal System Areas

The following information discusses the various types of physical and/or natural land features that shall be assessed by the subdivision design engineer and thus taken into consideration in the subdivision design process.

The Department shall have the authority to request any type of additional information or data regarding the proposed subdivision site, so as to ensure a thorough assessment of any potential problems, and as a basis for determining the suitability of the subdivision or any and all individual lots prior to approving any final plat.

Other types of data, in addition to that stipulated in any of the provisions of these regulations, that may be required by the Department may include, but is not limited to, soil observation pits, additional grid staking, geotechnical data, archeological investigations, etc.

(a) Prior to the design of subsurface sewage disposal system areas, the suitability of the proposed subsurface sewage disposal system site shall be demonstrated through acceptable soil absorption rates, acceptable soil conditions, freedom from groundwater interference or impervious strata below the level of the disposal field.

(b) The size (i.e. square footage) of the subsurface sewage disposal system areas shall be determined by the soil mapping information (i.e. estimated soil absorption rates, slope of the ground surface, etc.) and the requirements for the use of said soil map information (See *Appendix 8*). The size of the proposed subsurface sewage disposal system areas shall be calculated and expressed (i.e. denoted in the proposed subsurface sewage disposal system area depicted on the plat) in square footage of land area.

(c) The upper most surface of the local groundwater table, either permanent or perched, shall be at least four (4) feet below the bottom of the disposal field, except that a lesser depth may be permitted where soil conditions so warrant.

Borings (i.e. excavation of observation wells) for determination of perched groundwater and the groundwater table may be required by the Department. Where the Department requires such investigation, all borings shall be made to a minimum depth of six (6) feet. Sufficient time, as determined by the Department, shall be provided for stabilization of groundwater before water table elevations are recorded. In sandy soil this may require not less than thirty (30) minutes while clay soil may require several hours or overnight. Borings shall be plotted upon a plat by a licensed land surveyor. Said plat shall show the contour elevations of the investigation vicinity, at a two (2) foot interval, and each bore hole shall be identified by a number system, whereas the field boring I.D. number corresponds to the numbered boring shown on the plat. Borings shall be conducted during the historically wettest part of the year and at a time approved by the Department.

(d) Where surface rock outcropping or subsurface rock formations exist to such degree as to affect operational effectiveness of subsurface sewage disposal systems, a sufficient number of borings (i.e. observation holes) to a minimum depth of six (6) feet may be required by the Department.

Where site conditions so warrant, observation pits may also be required by the Department. Borings or pits shall be utilized to determine whether subsurface sewage disposal systems can be expected to give satisfactory service. Such borings or pits shall be in the exact same manner as prescribed for the observation wells, in the previous Subpart (i.e. *Subpart (c)*).

All rock formations shall be at a depth greater than four (4) feet below the bottom of a subsurface sewage disposal system, provided a lesser depth may be permitted where soil conditions so warrant as determined by a Department Soil Scientist.

(e) Other Site Considerations include, but are not limited to:

(1) Areas consisting of cut, filled, compacted, or disturbed soils shall be excluded from the area considered for installation of the septic tank and disposal fields. This condition my be waived by the Department if conditions so warrant, as determined by a Department Soil Scientist.

(2) Gullies, ravines, dry stream beds, natural drainage ways, sinkholes, wells, springs, cisterns, streams, areas subject to flooding which have no surface drainage outlet, closed depressions or depressional areas, caves, grave sites, cemeteries, Indian burial grounds, mined areas (i.e. phosphate mines), rock quarries, landfills or any type of dumping site (active or abandoned) shall be excluded from consideration as usable areas for disposal systems.

(3) Maximum slope permitted for the area to be used for the septic tank system shall be determined by the consideration of lateral flow of effluent to the surface of the slope. Slopes of more than twenty-five (25) percent shall be considered unsuitable for subsurface sewage disposal system use.

(4) All areas platted and reserved for the subsurface sewage disposal system use, on any lot, shall not be disturbed during the course of any construction activities.

(f) Drainage Feature Considerations as Related to Subsurface Sewage Disposal System Areas

Each development shall provide for the on-site or off-site detention of excess storm water runoff resulting from that development. Drainage consideration and features shall include, but not limited to:

(1) An increase in the impervious surface of the site, including all additions of buildings, roads, and parking lots.

(2) Changes in soil absorption caused by compaction during development.

(3) Modifications in contours, including the filling or draining of small depressional areas, alterations of drainage ways, or re-grading of slopes.

(4) Destruction of forest.

(5) Alteration of drainage ways or installation of collection systems to intercept street flows or to replace swales or other drainage ways.

(6) The alteration of subsurface flows, including any groundwater de-watering or diversion practices including, but not limited to, existing subsurface drainage improvements and structures, as related to agricultural practices.

(7) The items outlined in *numbers (1) through (6) of this Subpart*, shall be designed so as not to interfere with the proper functioning of a platted subsurface sewage disposal system area(s). All minimum buffer distances, as specified in Table S13-1 in *Section 13*, shall be utilized during both the design and construction of a subdivision.

D. Plat Review Procedures

All plats (i.e. sketch plan, preliminary or final) requiring Williamson County Planning Commission approval shall be submitted to the Williamson County Department of Sewage Disposal Management, a minimum of twenty-one (21) working days prior to the scheduled Planning Commission meeting at which the proposed subdivision will be considered. All plats submitted to this Department for review, shall have been prepared in accordance with all provisions outlined in these regulations. All plat review fees shall be paid to the Department at the time of final plat submittal. See *Section 33*.

When plat deficiencies are found by the Department reviewer, said deficiencies shall be noted by the reviewer. The subdivision design engineer shall be contacted upon the conclusion of the initial review. Subsequently, it shall be the responsibility of said engineer to schedule a Corrective Review Session.

Deficient plats shall be corrected so as to meet all design criteria presented in these regulations. Plats which have not been properly corrected in the time-frame allowed, may be subject to removal from the Planning Commission's agenda.

Continued submission of deficient plats by any design engineer, or a designated representative of said engineer or the engineer's firm, shall be considered as a willful disregard of these regulations. Where an engineer continuously displays or exhibits this pattern of behavior, the Department will, with the aide of the Williamson County Attorney's Office, file a complaint to the State Engineering Board regarding the actions of said engineer.

At the time of submittal of the preliminary plat, each lot of the proposed subdivision site shall be accurately surveyed and lot boundaries designated by survey stakes with lot numbers shown on said stakes. Other attributes of the lot(s) that shall also be staked and clearly identified by a surveyor on said subdivision site include, but are not limited to:

1. The building envelope.

2. Any and all easements (e.g. roads, drainage, utilities, ingress/egress, etc.).

3. All designated subsurface sewage disposal system areas.

4. All soil drainage improvement practices.

At the Department's discretion, the above items are subject to field review.

E. Plat Approval Process

1. Plat approval (i.e. written statement approval for sketch plans and preliminary plats, and signature approval for final plats) of a subdivision shall not be made until all applicable provisions of these regulations have been met.

2. Once all provisions of these regulations have been fulfilled, the final plat will be signed by the designated representative of the Department.

3. Once a final plat has been signed, any unauthorized changes made upon said final plat shall void the plat approval.

4. Once a subdivision has been granted Planning Commission and Department approval and has been recorded with the Register of Deeds of Williamson County, the following tasks shall be completed:

   (a) One (1) recorded transparent copy (i.e. graphic representations of the plat printed upon a mylar, slick or plastic drawing material) and two (2) recorded paper copies (e.g. blueline copies made directly from each and every transparent copy) of the signed final plat of the subdivision shall be submitted to this Department.

   (b) All lots, easements, improvements and subsurface sewage disposal system areas shall be field-staked and identified, by a land surveyor licensed in the state of Tennessee. All required field staking shall be verified by the Department prior to issuing subsurface sewage disposal system permits. See *Appendix 6*, for further information regarding the complete subsurface sewage disposal system permit application process.

   (c) Prior to any earth moving permits being granted, the landowner or developer shall erect, and have inspected, fencing to protect the disposal area from disruption during the construction process. See *Appendix 10.*

   In accordance with the warning label on the final plat, if these areas are disturbed, the Department may require the use of alternative systems. If an alternative system cannot be provided, the Department shall have the authority to refuse to grant an Construction Permit or may revoke a Construction Permit where the integrity of the proposed subsurface sewage disposal system areas has been compromised (e.g. the soils within said area have been cut, filled, compacted, disturbed, etc.).

   (d) Failure to comply with these regulations, or any part thereof, shall result in the denial of issuance of any subsurface sewage disposal system installation permits for any lots in said subdivision.

SECTION 27

APPROVED METHODS OF LAND ASSESSMENT

Land assessment involves the processes, practices and techniques utilized to evaluate the soils present on a parcel of land to determine whether or not those soils will support the installation of a subsurface sewage disposal system. This section, in conjunction with *Appendix 1* and *Appendix 2*, outlines those processes, practices and techniques that are approved by the Department.

A. Methods Approved for Conducting Land Assessments

Before a Construction Permit can be issued for the installation of a subsurface sewage disposal system on a parcel of land, the soils on said parcel of land shall be assessed, in an approved manner, so as to provide sufficient information to allow the Department to establish whether or not the soils have characteristics suited for such use. Thus, there must exist some method or methods in which to assess the soils on a land parcel.

The Department recognizes three methods of land assessment which are suitable for establishing data on soil characteristics and potential suitability for subsurface sewage disposal system utilization. The approved methods for making soil assessments are:

1. Soil Mapping

   A soil map is a graphical representation of the distribution and types of soils, physical features and cultural features that are present upon an area of land.

   The procedures that shall be utilized for all soil mapping activities, conducted within the boundaries of Williamson County, are specifically outlined in *Appendix 1*.

2. Percolation Tests

   A percolation test is a means of investigating the potential suitability of a designated land area for subsurface sewage disposal, by conducting the test (in a very specifically prescribed methodology) so as to record the general rate of water absorption within the said designated land area.

   The procedures that shall be utilized for all percolation test activities, conducted within the boundaries of Williamson County, are specifically outlined in *Appendix 2*.

3. Individual Lot Assessments by the Department

   An individual lot assessment is a service provided by the Department. This type of land assessment is conducted by the Soils Staff personnel of the Department. The scope of this service is limited to assessing a property for the installation of conventional subsurface sewage disposal systems. Department Staff will make an on-site investigation of the soils on a parcel of land (utilizing available Department equipment), and attempt to locate a site on said parcel of land that will meet all provisions of these regulations, and thus, allow the permitting and installation of a conventional subsurface sewage disposal system. See *Appendix 6* for additional information regarding Individual Lot Assessments.

   Where the Department Soils Staff is unable to delineate or establish the presence of a site for the installation of a conventional subsurface sewage disposal system (for any reason), the Department shall have the authority to specify the use of any of the provisions, or a combination of provisions, of these regulations to allow for the continuance, and subsequent completion of the land assessment process.

   This method of land assessment shall only be allowed where a property owner, or the property owner's legally designated agent, has initiated the Construction Permit application process for an unplatted parcel of land.

B. Use of Approved Methods

The use of the Approved Methods (i.e. when, where, and which method is to be utilized) outlined in this Section shall be at the discretion and/or direction of the Department.

IMPORTANT NOTE: The use of percolation tests shall not be authorized nor allowed for assessing parcels of land subject to commercial use (i.e. office buildings, retail businesses or stores, restaurants, apartment buildings, bed & breakfast establishments, etc.), industrial use (i.e. factories, etc.) or institutional use (i.e. schools, churches, human or animal hospitals/clinics, etc.) or for structures that will serve as any type of multiple family dwelling and requiring the use of more than one subsurface sewage disposal system as outlined in Section 4*. The use of percolation tests shall be restricted solely for the assessment of land parcels for the construction of single-family dwellings.*

Where any parcel of land is subject to resale or transfer, and an individual (e.g. persons selling the land parcel, real estate agent, etc.) wishes to establish whether or not said parcel of land has any soils with the potential to support the installation of a subsurface sewage disposal system (any type), the individual shall be required to have the subject land parcel assessed by either the Soil Mapping process or the Percolation Test process.

NOTE: Should the land parcel not have soils acceptable for percolation testing, soil mapping shall be required.

NOTE: Individual Lot Assessments by the Department shall not be allowed, as a method of land assessment, where any parcel of land is subject to resale or transfer.

C. Persons Authorized to Conduct Land Assessments

There are several different types of professional consultants that may conduct different types of land assessments. The following information describes the type of consultant who is approved to conduct the specifically noted type of land assessment procedure.

1. Soil Mapping

   Any type of soil mapping activity shall only be conducted by an Approved Soil Consultant/Scientist. Such individuals shall only receive approval by the Department when he/she is in compliance with the provisions outlined in *Appendix 1* of these regulations.

2. Percolation Tests

   Any type of percolation testing activity shall only be conducted by an Approved Soil Scientist (Approved by the State of Tennessee or by the Department), Registered Land Surveyor, Registered Professional Environmentalist, Registered or Professional Geologist, or a Licensed Engineer in the State of Tennessee.

   Any of the aforementioned consultants, active in a profession licensed and governed by the State of Tennessee shall be in compliance with the respective laws pertaining to said profession and shall be in good standing with said governing body.

D. Entry or Trespass Upon a Land Parcel by Department Personnel

In any instance where a member of personnel of this Department is requested to provide any type of land assessment service or activity, said personnel shall not enter nor trespass upon privately held land without the express, written consent of the owner of said land.

Any person requesting such services or activities from the Department (including the property owner), shall have completed the Department form entitled *Right of Entry*, and shall have submitted the original completed form, signed by said property owner, to the Department. Upon the verification of the aforementioned information, the Department will initiate the procedures to act upon said request for services or activities.

E. Validity and Expiration of Land Assessment Documentation

1. Soil Maps

   (a) All soil mapping information, whether on file in the Department offices or in the possession of private individuals, that was completed prior to October 1, 1990 shall be considered null and void *upon the effective date of the adoption of these regulations*.

   (b) All soil mapping information, whether on file in the Department offices or in the possession of private individuals, that was completed between October 1, 1990 and January 1, 1996 shall be considered invalid until said soil mapping information has been reassessed and approved for use by a Department Soil Scientist. The reassessment of the aforementioned classification of soil maps shall be completed in accordance with the provisions outlined in *Subsection F of this Section*.

(c) A soil map, whether on file in the Department offices or in the possession of private individuals, completed after January 1, 1996, and any of its associated documentation, shall have an expiration date effective five (5) years from the date that the soil map was completed. Expired soil mapping information shall not be utilized for any purpose until the information has been verified as accurate and undisturbed, and approved in accordance with the provisions outlined in *Subsection F of this Section*.

<u>IMPORTANT NOTE:</u> *The Department shall have the authority to require the reassessment of any soil mapping information where the Department deems such verification necessary.*

2. Percolation Tests

(a) Any percolation test, whether on file in the Department offices or in the possession of private individuals, regardless of whether or not the percolation test documentation has been reviewed and averaged by the Department, that was completed prior to October 1, 1990 shall be considered null and void *upon the effective date of the adoption of these regulations*.

(b) Any percolation tests, whether on file in the Department offices or in the possession of private individuals, regardless of whether or not the percolation test documentation has been reviewed and averaged by the Department, that were conducted between October 1, 1990 and January 1, 1996 shall expire upon the date being ninety (90) days *after the effective date of the adoption of these regulations*.

(c) A percolation test, whether on file in the Department offices or in the possession of private individuals, completed after January 1, 1996 but *prior to the adoption of these regulations*, and any of its associated documentation, shall be considered invalid until said percolation test information has been reassessed and approved for use by a Department Soil Scientist. The reassessment of the aforementioned percolation test documentation shall be completed in accordance with the provisions outlined in *Subsection F of this Section*.

(d) A completed percolation test, and any of its associated documentation, shall have an expiration date effective three (3) years from the date that the percolation test was conducted.

3. Individual Lot Assessment Documentation

Individual Lot Assessment documentation (i.e. a site assessed and designated for conventional subsurface sewage disposal system use by the Department as a result of the application process for a Construction Permit) becomes valid only at such time that a property owner/Construction Permit applicant obtains said permit. The documentation pertaining to the site approved for use by the Department for the installation of a conventional subsurface sewage disposal system shall be considered valid, provided that said approved site remains in a natural undisturbed state (i.e. said site is not cut, filled, excavated, compacted, etc.), until the expiration date of the actual Construction Permit. See *Section 7*, *Subsection A, Part 9*.

4. Land Assessment Documentation Associated with a Valid Construction Permit

Where any land assessment documentation becomes expired under the conditions outlined in this Subsection and that documentation is associated with a previously issued and valid Construction Permit (i.e. being considered by the Department as supporting documentation to the Construction Permit), said documentation shall remain valid until the expiration date of said Construction Permit.

F. Reassessment of Invalid or Expired Land Assessment Documentation

1. Soil Maps

(a) Where the soil mapping information, regarding any parcel of land (platted or unplatted), was completed prior to October 1, 1990, said land parcel shall be reassessed in accordance with the provisions, pertaining to soil mapping, outlined in these regulations (i.e. re-soil mapped).

However, should the soil mapping information in this category have been of Extra-High Intensity or greater (i.e. mapping upon a 50 foot grid or grid with a smaller staking interval), those maps may be reviewed, at the Department's discretion, in accordance with the provisions outlined in the following subpart (b).

(b) Where the soil mapping information, regarding any parcel of land (platted or unplatted), was completed between October 1, 1990 and January 1, 1996, said soil mapping sites shall be reassessed in accordance with the following procedure.

(1) The previously soil mapped site shall be cleared of excessive vegetation so as to in accordance with the provisions outlined in *Section 28* and *Appendix 1, Chapter 2, Subsection C*.

(2) The grid staking setup that was in place during the original soil mapping assessment shall be exactly recreated and reset in its entirety. This grid staking shall be in accordance with the provisions outlined in *Appendix 1, Chapter 2, Subsection B*. The plat showing the grid staking shall be in accordance with the provisions outlined in *Appendix 1, Chapter 2, Subsection A*.

(3) Upon the completion of the previous step, the plat showing the recreated grid staking shall be submitted to the Department. The Department will confirm that the plat and grid was properly prepared and presented.

Upon the confirmation of the plat and grid preparation, Department Soils Staff member(s) will go to the site and reassess the information presented upon the original soil map.

The aspects of the site and soil map that the Department Soils Staff will assess includes, but shall not be limited to, ensuring that the landscape and the soils of the mapped site and the immediately surrounding area (i.e. a zone extending approximately 50 feet from the grid area and surrounding the entire perimeter of the mapped site) have not been altered or disturbed (i.e. cut, filled, compacted, etc.) in such a manner that would affect the use of said site for a subsurface sewage disposal system installation.

Additionally, the conditions outlined in *Appendix 1, Chapter 8, Subsection A, Part (2)* will also be reassessed at this time.

(c) Where the soil mapping information, regarding any parcel of land (platted or unplatted), was completed after January 1, 1996, and was never utilized for the purposes of the issuance of a Construction Permit, and subsequently expired (i.e. expired five years from the date that the soil map was completed), said soil mapping sites shall be reassessed in accordance with the procedure outlined in the previous *subpart (b).*

(d) After a reassessment procedure, should the Department find that any soil mapping information does not conform to the provisions outlined in these regulations, the Department shall consider the reassessed soil mapping documentation invalid. Thus, the Department shall not accept nor utilize said documentation for the issuance of subsurface sewage disposal system Construction Permits.

2. Percolation Tests

(a) Where the percolation test information, regarding any parcel of land (platted or unplatted), was completed prior to October 1, 1990, said land parcel shall be reassessed in accordance with the provisions, pertaining to percolation testing, outlined in these regulations (i.e. re-percolation tested).

Should any percolation test site, under this category, be found to contain soils that are now considered ineligible for percolation testing (See *Appendix 2*), said sites shall be required to be soil mapped in accordance with the provisions outlined in these regulations.

(b) Where percolation test information, regarding any parcel of land (platted or unplatted), was established between October 1, 1990 and January 1, 1996 has expired (i.e. having a mature expiration date in accordance with *Subsection E, Part 2, Subpart (b) of this Section*), said land parcel shall be reassessed in accordance with the provisions, pertaining to percolation testing, outlined in these regulations (i.e. re-percolation tested).

Should any percolation test site, under this category, be found to contain soils that are now considered ineligible for percolation testing (See *Appendix 2*), said sites shall be required to be soil mapped in accordance with the provisions outlined in these regulations.

(c) Where percolation test information, regarding any parcel of land (platted or unplatted), was established between January 1, 1996 and *the adoption of these regulations*, said land parcel shall be reassessed in accordance with the provisions outlined in *subpart (d*) of this Subsection.

(d) Where percolation test information, regarding any parcel of land (platted or unplatted), was established subsequent to the adoption of these regulations and has expired, said percolation test sites shall be reassessed in accordance with the following procedure.

(1) The percolation test site shall be cleared of excessive vegetation so as to be in accordance with the provisions outlined in *Appendix 2, Subsection G*.

(2) The boundaries of the percolation test location shall be exactly recreated and all boundary markers (or stakes) reset. The re-staking and re-identification of the percolation test area shall be in accordance with the provisions outlined in *Appendix 10, Subsection A, Part 2, subpart (a)*. The plat showing the percolation test shall be in accordance with the provisions outlined in *Appendix 1, Chapter 2, Subsection A*.

(3) Upon the completion of the previous step, the plat showing the recreated percolation test area shall be submitted to the Department. The Department will confirm that the plat identifying the percolation test area was properly prepared and presented. Upon the confirmation of the plat preparation, Department Soils Staff member(s) will go to the site and reassess the information presented upon the original percolation test documentation.

The aspects of the percolation test site that the Department Soils Staff will assess include, but shall not be limited to, ensuring that the landscape and the soils of the percolation test site and the immediately surrounding area (i.e. a zone extending approximately 50 feet from the grid area and surrounding the entire perimeter of the tested site) have not been altered or disturbed (i.e. cut, filled, compacted, etc.) in such a manner that would affect the use of said site for a subsurface sewage disposal system installation.

(e) After any type of reassessment procedure, should the Department find that any documented percolation test information does not conform to the provisions outlined in these regulations, the Department shall consider the reassessed percolation test documentation as remaining invalid. Thus, the Department shall not accept nor utilize said documentation for the issuance of subsurface sewage disposal system Construction Permits.

Additionally, the Department shall have the authority to require that a percolation test be re-conducted upon sites where original percolation test documentation is insufficient or incorrect, where the soils conditions of a percolation test site are found to be inconsistent with the percolation test results, where percolation testing was improperly conducted or where percolation tests were conducted under outdated legal statues (e.g. Public Acts, Chapter 212; Public Acts, Chapter 301; Public Acts, Chapter 465, etc.) which allowed percolation testing that would not meet the provisions of these regulations.

3. Individual Lot Assessment Documentation

At such time that Individual Lot Assessment documentation (i.e. a site assessed and designated for conventional subsurface sewage disposal system use by the Department as a result of the application process for a Construction Permit) expires, it shall not be subject to any type of reassessment procedure. The Construction Permit process, which would initiate Individual Lot Assessment procedure, would have to begin anew in accordance with the provisions outlined in *Appendix 6, Subsection B*.

SECTION 28

VEGETATIVE CONDITION OF A PARCEL OF LAND

All of the various types of field work (i.e. soil mapping, system inspections, system recertifications, land assessments, repair investigations, etc.) conducted by personnel of the Department requires that said personnel be able to readily and freely move about (on foot, on a Department tractor, in a vehicle, etc.) upon a parcel of land and to be able to clearly see the ground surface over the extent of said parcel of land in order to properly conduct the business of the Department. Therefore, the Department shall have the authority to require that any parcel of land (i.e. a platted subdivision lot, individual tract of land, etc.) be cleared of any and all excessive vegetation when and where it is deemed necessary.

The Department shall have the authority to determine the appropriate method for the removal of excessive vegetation on any parcel of land where the use of an inappropriate method of vegetation removal could destroy any soils that may have the potential to support the installation of any type of subsurface sewage disposal system. Should the vegetative condition be determined to be of such severity or too excessive, the Department retains the right to require that any land assessment procedures be restricted to the winter months of the calendar year.

Various portions of these regulations specifically address the vegetative requirements that shall be necessary to conduct the business of the Department. Where specific requirements are outlined, those requirements shall be followed.

SECTION 29

ESTABLISHMENT OF GROUND CONTROL

Ground Control shall be defined as the placement or establishment of obvious and clearly visible landmarks (i.e. survey stakes, surveyor's flagging tape, etc.) upon a land parcel so as to identify the presence of man-made boundaries.

All of the various types of field work (i.e. soil mapping, various septic system inspections, land assessments, technical assistance investigations, repair investigations, etc.) conducted by personnel of the Department, requires that said personnel be able to readily and clearly discern the location of the actual boundaries of a parcel of land, or any other type of man-made boundaries contained upon said land parcel (i.e. easements for any purpose, platted features, etc.), in order to properly conduct the business of the Department. The knowledge of the location of said property boundaries is critical in the decision-making process of the Department personnel.

Thus, the Department shall have the authority to require that any and/or all boundaries (i.e. property lines, property corners, any type of easement, etc.) and/or any platted features of a property (i.e. lot corners, subsurface sewage disposal system disposal field areas, building envelopes, any type of easement, etc.) or parcel of land (i.e. a platted subdivision lot, or individual tract of land, etc.) be clearly and visibly marked by a Registered Land Surveyor when and where it is deemed necessary. Additionally, the Department shall have the authority to require the preparation of a survey plat document, by a surveyor, where the need for said documentation is deemed necessary to conduct business of the Department.

The Department shall specifically require that the placement or establishment of obvious and clearly visible landmarks (i.e. survey stake, surveyor's flagging tape, etc.) upon a land parcel, or the preparation of plat documents, be conducted by Registered Land Surveyors.

Various portions of these regulations specifically address the establishment of ground control that is necessary to conduct the business of the Department. Where specific requirements are outlined, those requirements shall be followed.

Grid Staking shall also be considered a method of ground control. The Department shall require that all grid staking work be prepared in accordance with the provisions found in *Appendix 1*.

SECTION 30

DOMESTIC SEPTAGE DISPOSAL

A. Septage Disposal

1. As of March 17, 1998, the Williamson County Board of Health mandated that all land spreading of domestic septage cease. The Board has ruled that all domestic septage shall be deposited in a public, community or private wastewater treatment facility that is permitted for such use by the Tennessee Department of Environment and Conservation. There shall be no land spreading of septage allowed in Williamson County.

2. No wastewater treatment facility of any type will be permitted as a temporary holding site for any type of wastewater, sewage, sludge or septage.

B. Persons Approved to Dispose of Septage

1. All septic tank pumping contractors conducting business in Williamson County shall have filed with the Department a valid copy of his/her Septic Tank Pumper Permit, as approved by the State of Tennessee, Department of Environment and Conservation, Division of Groundwater Protection.

2. All septic tank pumping contractors conducting business in Williamson County shall file with the Department a valid copy of his/her Septic Tank Pumper Permit within ten (10) days of its annual renewal to retain the privilege of conducting business within Williamson County.

C. Approved Discharge Sites/Facilities for the Disposal of Septage

1. All septic tank pumping contractors, operating in Williamson County, shall have filed with the Department a valid Wastewater Discharge Permit for Wastewater Haulers with a wastewater treatment facility approved by the State of Tennessee, Department of Environment and Conservation, Division of Water Pollution Control.

2. All septic tank pumping contractors, operating in Williamson County, shall file a valid Wastewater Discharge Permit for Wastewater Haulers with the Department or a valid copy of any renewal of this permit within ten (10) days of such renewal to retain the privilege of operating within Williamson County.

SECTION 31

PUMP AND HAUL OF HOLDING TANKS

A. General

Pump and haul (P&H) systems consist of a holding tank for collection of sewage which is periodically pumped and conveyed by hauling to the nearest treatment facility. P&H systems are “sewerage systems” as defined *in T.C.A. 69-3-103(24)* and shall be the regulatory jurisdiction within Williamson County of the Williamson County Board of Health as delegated to the Williamson County Department of Sewage Disposal Management (the “Department”). The system must be designed, installed, maintained and operated in a manner that will not cause a public nuisance or health hazard.

B. Conditions of Approval

1. New Sources

   It is not the intent of this section to specifically allow the use of pump and haul systems for new sources. P&H systems are appropriate when construction schedules of wastewater sources and collection facilities become mismatched and public sewers are to be available within twelve (12) months.

2. Existing Sources:

   P&H systems may be appropriate for existing sources where an existing treatment or disposal system has failed. The P&H system may be considered for use until a more permanent solution can be found. Although it is not intended that a P&H would ever be used as a permanent solution, no specific time frame will be set up for this category; however, the Board of Health may impose a time frame in which such permanent solution must be installed.

3. All Sources

   (a) The applicant must execute a contract with a sewage hauling company. The contract must be reviewed and approved by the Department. The contract must contain the following elements:

      (1) The tank must be emptied on a regular basis at no more that three-fourths (¾) full.

      (2) The waste must be transported to a system specifically designed for this purpose.

      (3) A representative of the pumping company must be present at all times when waste is being transferred to the haul truck to ensure that waste spills do not occur.

      (4) The pumper must agree to clean-up any spills that occur during wastewater transfer.

   (b) Portable chemical toilets operated under contract with specialty firms for temporary use on construction sites or event type public gatherings will not be subject to these requirements.

   (c) The Department will require and provide documents necessary for the use of a P&H system, including but not limited to: an agreement signed by the property owner, and an instrument signed by the property owner that will be recorded in the Register’s Office of Williamson County. Proof of contract with pumping service must also be provided by the homeowner to the Department.

C. Application Requirements

1. The applicant must first seek approval from the Department for a conventional or alternative subsurface disposal system in accordance with the current regulations.

2. The site must be inspected by the Department.

3. Plans for the holding tank must be reviewed and approved by the Department before construction can commence.

4. The applicant must supply a letter from a utility that promises to provide sewage collection and treatment within 12 months (for new sources).

5. The owner of the P&H system must execute a contract or an agreement with the utility providing ultimate treatment for the hauled wastewater. A copy of this agreement must be provided to the Department.

D. Construction Requirements

Plans for P&H systems must be approved by the Department. Plans must incorporate the following minimum requirements, but should consist of a complete engineering design, stamped by a registered engineer in the State of Tennessee:

1. The tank shall be sized to accommodate a minimum of four (4) days wastewater flow.

2. The tank must be equipped with a high level audible alarm and light that will be activated when no less than one day's capacity is remaining. The pumping schedule shall be set up to maintain the tank below this level.

3. A level gauge is required.

4. If the tank is below ground level, a riser to ground level shall be provided to facilitate pumping.

5. The tank must be constructed of durable materials. The design shall take into consideration internal and external pressures, hydrostatic uplift and roof leads as applicable. Tanks shall be ventilated.

6. Tanks shall be covered for vector control and safety. Fencing may be required in some areas.

7. Tank locations shall be subject to approval by the Department, after a field inspection of the site.

8. An all-weather access road must be provided to the holding tank.

E. Operating Requirements

The operating requirements will be specified for each site in a Letter of Agreement between the Department and the owner. The letter must be signed by both parties before any approval to build will be granted.

1. Operation reports showing the number of loads hauled, the volume of each load and the dates of hauling shall be maintained for each site. These reports shall be submitted monthly to the Department.

2. Proper sanitation shall be maintained at each pump site. Any spills shall be cleaned up and residuals treated with lime.

3. All wastewater must be transported to a system designed for that express purpose. No land spreading of P&H system wastes shall be allowed.

4. All P&H systems shall be retired within 30 days of sewer availability.

SECTION 32

ABANDONMENT OF TANKS

A. Tanks Subject to the Abandonment Requirements

The types of tanks that shall be subject to the provisions of *Subsection C*, include, but are not limited to, the following:

1. Septic Tanks, as defined in the Definitions in these regulations, or any other type of vessel, container or tank, constructed of any type of materials, that has served as a septic tank.

2. Pump Tanks, as defined in the Definitions in these regulations, or any other type of vessel, container or tank, constructed of any type of materials, that has been used as or has served as a pump tank.

3. Grease Traps, as defined in the Definitions in these regulations, or any other type of vessel, container or tank, constructed of any type of materials, that has been used as or has served as a grease trap.

4. Any type of vessel, container or tank, constructed of any type of materials, that has been utilized to retain, hold, or contain sewage for any purpose.

B. Implementation of Tank Abandonment Procedures

When and where the use of a septic tank, pump tank or grease trap is discontinued for any purpose (e.g. where establishing a connection to public sewer facilities, where a subsurface sewage disposal system cannot be made to comply with the regulations as set forth herein, etc.), the aforementioned tank(s) shall be abandoned and its (or their) further use prohibited.

C. Approved Methods of Tank Abandonment

The actual procedure to be utilized for tank abandonment shall be left to the discretion of the individual responsible for having a tank or tanks abandoned. However, when a tank is to be abandoned, one of the following methods shall be utilized.

1. Standard Method of Abandonment

   The tank(s) subject to abandonment shall be pumped, and its (their) contents disposed, in accordance with the provisions outlined in *Section 30*, collapsed (i.e. the tank walls demolished), and the remaining hole back-filled with two (2) to four (4) inches of gravel media to within twelve (12) inches of the ground surface. The remaining space (i.e. from top of gravel to ground surface) to be filled with soil material to the surrounding grade and appropriately crowned to allow for soil settling.

2. Alternative Method of Abandonment

   The only alternative to the provisions stated in *Part 1 of this Subsection*, for the abandonment of tanks, shall be the complete removal of said tank(s) from the premises. Prior to the removal of the tank(s) from the ground, its contents shall be pumped and disposed of in accordance with the provisions outlined in *Section 30*. The removed tank(s) shall be properly demolished (i.e. broken up or dismantled) and disposed of in an appropriate manner (i.e. an approved construction materials landfill site, etc.). The hole left by the removal of the tank(s) shall be back-filled with soil material to the surrounding grade and appropriately crowned to allow for soil settling.

SECTION 33

FEES FOR DEPARTMENT SERVICES

Fees shall be set for various Department services by the Williamson County Board of Health.

The assessed fees for said Department services shall be listed and displayed at the Department offices.

Fees shall be collected, for said services, in accordance with established Williamson County and Department policies.

SECTION 34

REPAIR OR MODIFICATION OF SUBSURFACE SEWAGE DISPOSAL SYSTEMS

In any instance where a subsurface sewage disposal system is to be repaired or modified, all said repairs or modifications shall be in accordance with the provisions of these regulations. The Department shall have the authority to investigate the site (i.e. property) where a subsurface sewage disposal system is in need of repair or proposed for modification, assess the condition of the existing system as well as the natural conditions (i.e. soils, topography, etc.) of said site and stipulate the course of action necessary to ensure proper on-site subsurface sewage disposal for said site (i.e. property).

A. Repairs and Modifications

1. Repair of a Septic System

   A subsurface sewage disposal system repair is defined as where a malfunctioning system, or any portion or component thereof, requires complete replacement with an appropriate or required replacement system and/or system components. The determination as to whether or not any malfunctioning subsurface sewage disposal system will require such replacement shall be made by the Department.

   Where the subsurface sewage disposal system, serving a structure upon a property, has ceased to function and is discharging sewage upon the ground surface, this condition is in violation of state law and the regulations. It shall be the responsibility of a property owner to contact the Department to initiate an investigation of the malfunctioning septic system, to obtain the required repair permit and have the stipulated subsurface sewage disposal system repairs conducted on said property in accordance with the provisions of these regulations.

2. Modification of a Septic System

   A subsurface sewage disposal system modification is defined as where any portion or component of properly functioning system is required to be relocated, increased in size (i.e. requiring a larger sized tank, adding additional disposal field footage, etc.) or completely replaced with another type of subsurface sewage disposal system (e.g. replacing a conventional system with a alternative system) for any reason.

B. Individuals Authorized to Request or Initiate Repairs or Modifications to Septic Systems

The only individuals authorized to request or initiate the process of obtaining a repair or modification Construction Permit, for any parcel of land (i.e. platted lots or unplatted lots), shall be the actual property owner, licensed septic system installer (i.e. licensed in accordance with the provisions outlined in *Section 24* of these regulations), building contractor or a legally designated or appointed representative or agent of any of the aforementioned persons.

The Department reserves the right to require that the person, present in the Department offices, intending or attempting to obtain said repair or modification Construction Permit, provide proof of property ownership or proof that said person has the legal authority to act on the behalf of said property owner.

C. Construction Permits for Septic System Repairs or Modifications

A permit for the repair or modification of a subsurface sewage disposal system shall be required.

1. Where the Department has investigated, assessed and stipulated the necessary course of action for subsurface sewage disposal system repair or modification, the issuance of the Construction Permit for said repairs or modifications shall be in accordance with the provisions outlined in *Section 7, Subsection A*.

2. No Construction Permits for subsurface sewage disposal system repairs or modifications shall be issued by the Department for any property or parcel of land having access to public sewerage services provided by a municipality, private utility district or other such entity.

   (a) Where a land parcel lies within the boundaries of an incorporated city or town in Williamson County, and where that government entity provides public sewerage services, the Department shall require that any structures, where repairs or modifications to an existing subsurface sewage disposal system are proposed or required, be connected to the public sewer system at the expense of the property owner.

   (b) The Department will not begin the septic system permit application process for any property where repairs or modifications to an existing subsurface sewage disposal system are proposed until the Construction Permit applicant has provided proof, in writing, from the city or town government that their property cannot be served, due to a valid technical reason, by the sewer system. Furthermore, this letter is to be authored and/or signed by the official or officials that direct or administer the sewer system for that city or town.

(c) The Department shall not consider the monetary cost that a property owner would incur in connecting to a sewer system to be a valid technical reason for why a structure on a property cannot be connected to that system.

D. Temporary (Un-certifiable) Repairs

The provisions of this Subsection apply to correcting existing subsurface sewage disposal system failures where the site or parcel of land does not meet the soil suitability, disposal field length and/or reserve area requirements as outlined in these regulations. In such cases the Department may allow temporary repairs to the failing system, provided the property is not being offered for resale and does not require a re-certification by the Department. The issuance of a repair or modification Construction Permit under these conditions shall not be confused with, imply nor guarantee a permanent (reliable) solution or fix to the system for any specified length of time. A temporary repair shall only be construed as a means of providing temporary relief of the failing condition of the system and shall be duly noted as such on said repair permit.

SECTION 35

RECERTIFICATION OF SUBSURFACE SEWAGE DISPOSAL SYSTEMS

(RESERVED)

APPENDIX 1

UNIFORM CODE OF SOIL MAPPING STANDARDS AND PROCEDURES FOR WILLIAMSON COUNTY, TENNESSEE

This Appendix shall be considered by the Department, as a comprehensive manual on the subject of Soil Mapping standards and procedures.

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PREFACE

The need for the private Professional Soil Scientist/Consultant in Williamson County is here to stay. With Williamson County's proximity to Metropolitan Nashville/Davidson County, the growth of the county's population, especially into areas lacking public sewerage facilities, has been tremendous in recent years. The trend is expected to continue well into the next century. Thus, the services provided by private consultants is invaluable and the demand for their services will, without any doubt, increase as the population grows. With the increased demand for soil information, there will be more and more private Soil Scientists/Consultants seeking to work in Williamson County. Thus, there exists the need for a specific, uniform code of standards pertaining to all aspects of soil mapping and interpretation to be followed by all consultants working in Williamson County.

This document has been compiled to outline the needs of the county and to provide a uniform code of standards to be followed by all Soil Scientists/Consultants approved to work in Williamson County.

The standards, methods and guidelines presented in the National Cooperative Soil Survey as expressed in the Soil Taxonomy, Soil Survey Manual and the National Soils Handbook provide a good professional foundation on which to build. This document will go a step further and provide the definitive standard to which all Soil Scientists/Consultants, working in Williamson County, will be expected to adhere.

The technology utilized in the field of subsurface sewage disposal is ever changing, and it is clear that the governmental regulation of such technologies will also change. Consequently, Williamson County has developed and established a progressive and successful subsurface sewage disposal program. In this light, we see this document as a first edition and it will undoubtedly be updated and refined in order to remain contemporary with future developments in this dynamic field.

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Williamson County Government
August 1997

GLOSSARY

The glossary contains definitions of common terminology used in the discussion of soil science matters as specifically related to the field of subsurface sewage disposal. Not all of the terms listed in the glossary are utilized in this document, however they are included because of their common use between professionals in this business.

aerate - to allow or promote exchange of soil gases with atmospheric gases.

aggregate - a unit of soil structure formed by natural processes as opposed to artificial processes and generally <10mm in diameter.

alluvial - pertaining to processes or materials associated with transportation or deposition by running water.

alluvium-colluvium - soil material, rock fragments or both moved by a combination of water and gravity and deposited at the base of slopes; utilized by the department for interpretive purposes (i.e. site stability, etc.).

Aqualfs - Alfisols that are saturated with water for periods long enough to limit their use for most crops other than pasture or woodland unless they are artifically drained. Aqualfs have mottles, iron-manganese concretions or gray colors immediately below the A1 or Ap horizons and gray colors in the argillic horizon. (A suborder in the US system of soil taxonomy)

Aquents - Entisols that are saturated with water for periods long enough to limit their use for most crops other than pasture unless they are artificially drained. Aquents have low chromas or distinct mottles within 50cm of the surface or are saturated with water at all times. (A suborder in the US system of soil taxonomy)

Aquepts - Inceptisols that are saturated with water for periods long enough to limit their use for most crops other than pasture unless they are artificially drained. Aquepts have either a histic or umbric epipedon and gray colors within 50cm of the surface or an ochric epipedon underlain by a cambic horizon with gray colors or have sodium saturation of 15% or more. (A suborder in the US system of soil taxonomy)

aquic - a mostly reducing soil moisture regime nearly free of dissolved oxygen due to saturation by ground water or its capillary fringe and occurring at periods when the soil temperature at 50cm below the surface is above 5 degrees centigrade.

Aquolls - Mollisols that are saturated with water for periods long enough to limit their use for most crops other than pasture unless they are artificially drained. Aquolls may have a histic epipedon, a sodium saturation in the upper part of the mollic epipedon of >15% that decreases with depth or mottles or gray colors within or immediately below the mollic epipedon. (A suborder in the US system of soil taxonomy)

Aquults - Ultisols that are saturated with water for periods long enough to limit their use for most crops other than pasture or woodland unless they are artifically drained. Aquults have mottles, iron-manganese concretions or gray colors immediately below the A1 or Ap horizons and gray colors in the argillic horizon. (A suborder in the US system of soil taxonomy)

Arents - Entisols that contain recognizable fragments of pedogenic horizons that have been mixed or disturbed by mechanical means. Arents are not saturated with water for periods long enough to limit their use for most crops. (A suborder in the US system of soil taxonomy)

argillic horizon - a mineral soil horizon that is characterized by the illuvial accumulation of layer-lattice silicate clays. The argillic horizon has a certain minimum thickness depending on the thickness of the solum, a minimum quantity of clay in comparison with an overlying eluvial horizon depending on the clay content of the eluvial horizon and usually has coatings of oriented clay on the surface of pores or peds or bridging sand grains.

association, soil - a group of soils geographically associated with a characteristic repeating pattern, usually defined and delineated as a single map unit.

bedrock - the solid rock that underlies the soil and other unconsolidated material or that is exposed at the ground surface. Examples of bedrock include shale, limestone, sandstone, dolomite and granite.

berm, diversion - a ridge of earth, generally a terrace (similar to an agricultural terrace), built to protect downslope areas by diverting surface runoff from its natural course.

bottom land - the normal flood plain of a stream, subject to flooding.

blocking layer - a horizon or layer in the soil that impedes or stops the downward movement of liquids through the soil. This term is synonymous with the term restrictive horizon.

bulk density - the mass of dry soil per unit bulk volume. The bulk volume is determined before drying to constant weight at 105 degrees centigrade. The value is expressed in megagrams per cubic meter.

chroma - the relative purity, strength or saturation of a color, directly related to the dominance of the determining wavelength of the light and inversely related to grayness; one of the three variables of color. (See - Munsell color system, hue, value and chroma)

clay - as a soil separate, the mineral soil particles less than 0.002 mm in diameter. As a soil texture class, soil material that is 40% or more clay, less than 45% sand and less than 40% silt.

claypan - a dense, compact layer in the subsoil having a much higher clay content than the overlying material, from which it is separated by a sharply defined boundary; formed by downward movement of particles or may have been formed in alluvial materials.

coarse fragments - if rounded, mineral or rock particles 2mm to 25cm (10 in) in diameter; if flat, mineral or rock particles (flagstones) 2mm to 38.1cm (6-15 in) long.

colluvium - soil material, rock fragments or both moved by gravity, creep or slide and deposited at the base of slopes.

complex, soil - a map unit of two or more soil series arranged in a complex, intricate pattern or being so small in area that it is not practical to map the individual units separately at the selected scale of mapping.

concretions - grains, pellets or nodules of various sizes, shapes and colors consisting of concentrated compounds or cemented soil grains. The composition of most concretions is unlike that of the surrounding soil. Calcium carbonate, manganese or iron oxide are common compounds in concretions.

consistency - (i) the resistance of a material to deformation or rupture. (ii) The degree of cohesion or adhesion of the soil mass.

Terms used for describing consistency at various soil moisture contents are:

- *wet soil* - non-sticky, slightly sticky, sticky, non-plastic, slightly plastic, plastic and very plastic.
- *moist soil* - loose, very friable, friable, firm, very firm and extremely firm.
- *dry soil* - loose, soft, slightly hard, hard, very hard and extremely hard.
- *cementation* - weakly cemented, strongly cemented and indurated.

control Section - the part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 and 40 inches.

consultant - a Soil Scientist approved to do soil mapping for the planning of on-site sewage disposal systems in Williamson County.

cut line - the manual and/or mechanical (typically by hand labor) clearing of the vegetation along the lines of a soil mapping grid. The vegetation is cut down to allow for a clear line of sight along the entire length of all gridlines.

delineation - a portion of a landscape shown by a closed boundary on a soil map that defines the area, shape and location of one or more component soils plus inclusions.

Department - the Willliamson County Department of Sewage Disposal Management.

drain, curtain - a drainage system that in designed to shield the designated septic field line area by intercepting laterally moving, subsurface water before it enters the field line area. (Note - curtain drains are sometimes referred to as *french drains*, *diversion drains* or *field drains*)

drain, diversion - See berm, diversion.

drain, drawdown - a drainage system designed to either completely enclose a septic field area or to be situated in such a manner as to attempt to lower a water table or saturated zone in the vicinity of the septic field.

drainage, surface - runoff or surface flow of water, from an area.

drop out - See soil pipe.

embankment - a landscape feature, created by natural or man-made erosional influences which result in an abrupt-cliff-like formation. Embankments can rise positively (upward) or fall negatively (downward) from the horizontal level.

escarpment - a steep-faced bank or bluff rising abruptly from the land surface.

first bottom - the normal flood plain of a stream, subject to flooding.

flood plain - a nearby, level, alluvial plain that borders a stream and is subject to flooding unless protected artificially.

foot slope - the inclined, generally concave, surface at the base of a hill.

fragipan - a natural subsurface horizon with high bulk density and/or high mechanical strength relative to the solum above, seemingly cemented when dry, but when moist showing a moderate to weak brittleness. The layer is low in organic matter, mottled, slowly or very slowly permeable to water and usually shows occasional or frequent bleached cracks forming polygons. It may be found in profiles of either cultivated or virgin soils but not in calcareous material.

grid staking - the system developed to provide proper ground control (i.e. field located reference points marked with wood stakes) for Soil Scientists to conduct Extra High-Intensity soil mapping. The name being derived from the manner in which the field stakes are arranged in a grid pattern spaced at fifty foot intervals. Grid staking can only be done by a Registered Land Surveyor.

grid-box centers (GBC) - the actual center point of a grid box.

groundwater (geological) - in the broad sense, all water below the ground surface; Specifically, that part of the subsurface water which is in the zone of saturation (a subsurface zone in which all the interstices are filled with water under pressure greater than that of the atmosphere).

groundwater (soil science) - the portion of the total precipitation that at any particular time is either passing through or standing in the soil and the underlying strata and is free to move under the influence of gravity.

horizon, soil - a layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes.
hue - One of the three variables of color. It is caused by light of certain wavelengths and changes with the wavelength. (See - Munsell color system, hue, value and chroma)

hydric soils - soils that are saturated, flooded or ponded long enough to periodically produce anaerobic conditions in the upper part of the soil profile, thereby influencing the growth of plants.

hydrophytic plants - plants that grow in and are adapted to an aquatic or very wet environment.

mottling, soil - irregular spots of different colors that vary in number and size. Soil mottling, with croma 2 or less, generally indicates poor aeration and impeded drainage. (See - variegation)

Munsell® color system - a color designation system that specifies the relative degrees of the three simple variables of color: hue, value and chroma. For example, 10YR 6/4 is a color (of soil) with a hue = 10YR, value = 6 and chroma = 4.

pan - a compact, dense layer in a soil that impedes the movement of water and the growth of roots.

parent material - the unconsolidated organic and mineral material in which soil forms.

percolation, soil water - the downward movement of water through soil, especially the downward flow of water in saturated or nearly saturated soil at hydraulic gradients of the order of 1.0 or less.

permeability - the quality of soil that enables it to transmit water or air. Permeability is measured as the number of inches per hour that water moves through saturated soil.

phase, soil - a subdivision of a series based on features that effects its use and management. For example, slope, stoniness and thickness.

profile, soil - a vertical Section of the soil extending through all its horizons and into the parent material.

regolith - a general term for the entire layer or mantle of fragmented and loose, incoherent or unconsolidated rock material, of whatever origin (residual or transported) and of every character, that nearly everywhere forms the surface of the land and overlies or covers the more coherent bedrock.

residuum (residual soil material) - unconsolidated, weathered or partly weathered mineral material that accumulated as consolidated rock disintegrated in place.

restrictive horizon - See blocking layer.

sand - as a soil separate, individual rock or mineral fragments from 0.05 mm to 2.0 mm in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85% or more sand and not more than 10% clay.

saprolite - a soft, earthy, thoroughly decomposed rock formed in place commonly by chemical weathering of igneous and metamorphic rocks. It often forms a thick (as much as 100 m) layer or cover, especially in a humid and tropical or sub-tropical climate. The color is commonly some color of red or brown, but colors may range through most of the Munsell colors.

series, soil - a group of soils that have profiles that are almost alike, except for differences in texture of the surface layer or of the underlying material. All the soils of a series have horizons that are similar in composition, thickness and arrangement.

silt - as a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 mm) to the lower limit of very fine sand (0.05 mm). As a soil textural class, soil that is 80 % or more silt and less than 12 % clay.

sinkhole (geologic) - a closed depression in the land surface, generally in a region underlain by carbonate rocks (typically limestone), connecting with subterranean passages developed by the solution of the joints and bedding planes in the bedrock. (See - soil pipe)

soil - a natural, three-dimensional body at the earth's surface capable of supporting plants. It has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

soil hydrology - the science dealing with the distribution and movement of the soil solution in the soil profile.

soil observation - each individual auger boring or pit utilized, typically at the grid stakes and grid-box center, by the Soil Scientist to see and identify the soil characteristics at one location.

soil pipe - a roughly circular (in some cases, elliptical) hole found on the ground surface. The hole size or diameter, may range from 1 foot to approximately 5 feet. These have been found on upland landscapes, but seem to be more common on bottom areas on the Bigby-Cannon and Hermitage limestone formations. These features may have a depth of 12 inches to several feet.

soil taxonomy - a basic system of soil classification for making and interpreting soil surveys. *Agricultural Document No. 436. Soil Conservation Service, US Department of Agriculture*.

SDS - Sewage Disposal System; in this document this term will See all septic systems, including Mounds.

stream order (geological) - first order streams are the smallest unbranched tributaries; second order streams are initiated by the confluence of two first order streams; third order streams are initiated by the confluence of two second order streams; etc.

structure, soil - the arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are platy, prismatic, columnar, blocky and granular.

subsoil – technically, the B horizon; roughly the part of the solum below plow depth.

surface layer - The soil ordinarily moved in tillage or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 cm). Frequently designated as the *plow layer* or the *Ap horizon*.

system - the term commonly used for any type of subsurface sewage disposal (i.e., septic) system, conventional or alternative.

taxadjuncts - soils that shall not be classified in a series recognized in the classification system. Such soils are named for a series they strongly resemble and are designated as taxadjuncts to that series because they differ in ways too small to be of consequence in interpreting their use and behavior, however they will generally require a different and/or specific interpretation for subsurface sewage disposal use.

terrace (geological) - an old alluvial plain (no longer the active floodplain or first bottom) ordinarily flat or undulating, bordering a stream, lake or the sea.

texture, soil - relative proportions of sand, silt and clay particles in a mass of soil.

toe slope - the outermost, generally concave, inclined surface at the base of a hill; part of a foot slope. Generally has lower slope gradient than the other portion of a foot slope.

type, soil - a member of a soil series. It differs from other members (types) of the series by the texture of the surface layer.

undifferentiated soil groups - two or more taxonomic units, which do not occur in regular geographic association, mapped as a single unit.

upland (geological) - land at a higher elevation in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

V-ditch - a broad trench, similar to an agricultural grassed waterway, with a v-shaped cross-section. The V-ditch is constructed to collect and channel surface water.

value, color - the relative lightness or intensity of color and approximately a function of the square root of the total amount of light. One of the three variables of color. (See - Munsell color system, hue, chroma and value)

variant, soil - a soil having properties sufficiently different from those of other known soils to justify a new series name, but occurring in such a limited geographic area that creation of a new series is not justified. Soil variants will generally require a different and/or specific interpretation for subsurface sewage disposal use.

variegation - refers to patterns of contrasting colors assumed to be inherited from the parent material rather than to be the result of poor drainage. (See - Mottling, soil)

water table - the upper surface of the zone of saturation or that level in the ground where the water is at atmospheric pressure.

water table, perched - the water table of a saturated layer of soil which is separated from an underlying saturated layer by an unsaturated layer.

wetland - those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs and similar areas. *Chapter 9, A1.6 of this Appendix* contains a short summary of wetland information. (See definitions for Hydric Soils, Hydrophytic Plants, Soil Hydrology)

CHAPTER 1

TYPES OF SOIL MAPS

The specific mission of the Williamson County Department of Sewage Disposal Management (i.e. the regulation of all aspects of individual on-site sewage disposal systems) necessitates the use of highly detailed soil mapping products. The critical need for accurate soil mapping products has, over the past 15 years, guided the Department to its current position regarding the types of soil maps that are to be prepared in this county for on-site SDS planning.

A. Types of Soil Maps

The three types of soil maps that can be prepared in Williamson County and accepted by the Department are the *Preliminary Soil Map*, the *Extra High-Intensity Soil Map* and the *Ultra High-Intensity Soil Map*.

(1) Preliminary Soil Maps

This type of soil map is exactly the same type of map that the State terms as a *High-Intensity* soil map. The purpose of this type of soil map is to make a general assessment of the location and extent of the soil associations and landscape features of a particular parcel of land. This document will not be utilized to plan septic system locations, however it will provide sufficient information to make decisions and recommendations regarding further land development.

The base map shall be at a scale of 1:1200 or 1 inch equals 100 feet. The soil mapping grid stakes are to be set at intervals of 100 feet. Areas of 2500 square feet or more with a significant difference from the adjoining soil mapping units shall be delineated.

Soil line placement shall have a tolerance limit of 20 feet. With the available ground control, there should be no less than 13 observations per acre. Soil Observations should be made at each grid stake and the grid-box center. Any mappable landscape feature, natural or cultural, is to be located and plotted (i.e. drainways, embankments, field roads, wells, etc.).

In this type of soil map, soil complex (multitaxa) units (e.g. Ashwoood-Barfield-Gladeville Soils Complex) are frequently utilized. Units of similar characteristics can be complexed, however complexing soils having >75MPI ratings with soils with 75MPI or less ratings are not acceptable. Soils having drastically dissimilar characteristics (i.e. highly varying MPI ratings) are not to be complexed together. Also, do not complex soils with 30MPI ratings with soils with 60 or 75MPI ratings (e.g. Lomond-Bradyville Soils Complex, 45-75MPI). If the aforementioned situations cannot be avoided, clear and concise notes explaining the reason for the complex are to be placed on the map.

This type of map shall be clearly marked or labeled in red ink, in a conspicuous manner, as a *PRELIMINARY SOIL MAP*.

(2) Extra High-Intensity Soil Maps

These are special use maps that show a high degree of soil map unit and landscape configuration detail. Each highly detailed soil map unit will be accompanied by site specific interpretations and recommendations (i.e. specific soil improvement practices such as field line depth restrictions, curtain drain depth requirements, soil modification, etc.). regarding the SDS use of the unit. This type of map is to provide the information needed, relative to soil characteristics and landscape features, so that the Department is able to thoroughly evaluate a site and ascertain its suitability to support conventional or alternative sewage disposal systems.

The base map shall be at a scale of 1:1200 or 1 inch equals 100 feet. The soil mapping grid stakes are to be set at intervals of 50 feet. Areas of 1000 square feet or more with a significant difference from the adjoining soil mapping units shall be delineated.

Soil line placement shall have a tolerance limit of 10 feet. With the available ground control, there should be no less than 41 soil observations per acre. Soil Observations should be made at each grid stake and the grid-box center. Any mappable landscape feature shall be located with absolute accuracy (i.e. drainways, embankments, field roads, wells, etc.).

These maps shall be clearly marked or labeled, in a conspicuous manner, as an *EXTRA HIGH-INTENSITY SOIL MAP*.

(3) Ultra High-Intensity Soil Maps

These are special use maps that show an extremely high degree of soil map unit and landscape configuration detail. Each highly detailed soil map unit will be accompanied by site specific interpretations and recommendations (i.e. specific soil improvement practices such as depth of fill to be removed, subsoiling methods and depths, field line depth restrictions, curtain drain depth requirements, soil modification, etc.). regarding the SDS use of the unit. This type of map is to provide the information needed, relative to soil characteristics and landscape features, so that the Department is able to thoroughly evaluate a site and ascertain its suitability to support conventional, alternative or possibly experimental sewage disposal systems.

When this type of soil map is needed, it will be specifically required by the Department. It will be used to assess sites that have been disturbed (i.e. cut, filled, compacted, etc.) or sites that have been previously assessed by High-Intensity Soil Mapping or Extra High-Intensity Soil Mapping, subsequently found to have unsuitable soil conditions present and thus denied a SDS permit. The typical site that would require this intensity of soil mapping will be 1 acre or less in size.

The base map shall be at a scale of 1:1200 or 1 inch equals 100 feet. In addition to the 1” = 100’ scale grid and map, a 1” = 50’ scale grid and map *enlargement* may be shown, with the delineated soil mapping units, for clarity. The soil mapping grid stakes are to be set at intervals of 25 feet and in some cases a smaller grid staking interval may be required (e.g. intervals of 20, 15 or 10 feet). Areas of 500 square feet or more with a significant difference from the adjoining soil mapping units shall be delineated.

Soil line placement shall have a tolerance limit of 5 feet with the 25 feet grid. The line placement tolerance will be less with the increase of the number of grid stakes utilized (e.g. at a 10 feet stake interval, the tolerance limit will be 2 feet). With the available ground control, there should be no less than 145 soil observations per acre. Soil Observations should be made at each grid stake and the grid-box center. Any mappable landscape feature shall be located with absolute accuracy (i.e. drainways, embankments, field roads, wells, etc.).

These maps shall be clearly marked or labeled, in a conspicuous manner, as a *ULTRA HIGH-INTENSITY SOIL MAP*.

B. Department Use of the Types of Soil Maps

Essentially, each type of soil map is intended to provide a certain level of information regarding the general nature of the soil on a parcel of land or the specific nature of the soil on a particular site. Therefore, each type of map will be utilized by the Department staff to make the appropriate interpretations regarding the suitability of a tract or subdivision lot to support a sewage disposal system.

(1) Preliminary Soil Map

The Preliminary Soil Map is for preliminary planning purposes only. It will not be used by the Department to assess a site for the purposes of issuing SDS permits or for final plat approvals.

This type of soil map is not regularly prepared in Williamson County. The most common use of the Preliminary Soil Map is on tracts of land being considered for subdivision development.

(2) Extra High-Intensity Soil Map

The Extra High-Intensity Soil Map is the mapping product most commonly prepared and utilized. This type of map replaced the previous standard of the High-Intensity soil map in 1990. It is used for the purposes of planning and permitting conventional, alternative and some experimental sewage disposal systems (including Mound systems). This type of map is the minimum degree of soil mapping that is used for the planning and/or engineering of subdivisions and the designation of SDS areas on subdivision lots.

(3) Ultra High-Intensity Soil Map

The Ultra High-Intensity Soil Map is the most intensive site assessment of the three types of soil maps. This type of mapping, where required by the Department, is most commonly used to evaluate disturbed sites (i.e. cut, filled, compacted, etc.).

These types of soil maps are generally used on sites, particularly subdivision lots, that have been either cut and/or filled.

CHAPTER 2

PLAT, GRID AND VEGETATIVE REQUIREMENTS

Before any soil mapping work begins on a site, the consultant shall be responsible for ensuring that the plat, the grid and the vegetative conditions of a site meet the standards and conditions as discussed in this Chapter.

A. Plat Requirements

Soil maps submitted to the Department shall be drawn on a plat prepared by a Registered Land Surveyor, registered in the State of Tennessee. The plat format will be reviewed at the time the soil map is received by the Department and any soil map submitted on a plat which does not conform to the proper format will be returned to the consultant.

It shall be the responsibility of the consultant to, before any mapping is started on a site, review the format of the plat to verify that it contains all of the required plat elements.

(1) Plat Production and Reproduction

The Department shall require that plats prepared by a Surveyor, for the purposes of depicting soil mapping grids, be printed or reproduced (e.g. on a computer controlled plotter machine, blueline machine, flatbed printer or equal) in a manner so as not to create distortion of the graphic information on the plat.

Where blueline prints (i.e. of a plat showing the soil mapping grid) are utilized, all blueline copies shall have been made directly from the original plat drawing prepared by the Surveyor.

Photocopied plats, photocopied portions of plats (i.e. a photocopy of the part of the plat showing only a grid, etc.) or FAX copies of plats shall *NOT* be utilized as a base map for the production of a soil map. Soil maps submitted to the Department that have been drawn on any of the aforementioned types of base maps or plats shall be returned to the consultant.

The Department shall have the authority to refuse the acceptance of any submitted soil map found to contain an unacceptable amount of distortion.

(2) Plat Presentation

(a) Paper Size Used for Plat

The maximum size of paper to be utilized for plat presentation, shall be 24 x 36 inches. Any plat submitted to the Department which is larger than 24 x 36 inches shall be returned to the consultant. The minimum size of paper to be utilized for plat presentation, shall be 8½ x 11 inches.

Though the standard 8½ x 11 inch sheet of paper may be of adequate size for small lots or small grids, the Department has noted that the 11 x 17 inch paper is the ideal size for showing grids on small parcels of land (i.e. the predominate size of land parcel subject to soil mapping) because there is usually ample room for all of the items listed in the following paragraph. Larger properties and/or the larger grids, will necessitate the use of larger sizes of paper (i.e. up to the 24 x 36 inch limit) in order to properly show the property lines and the grid.

It shall be left to the discretion of the Surveyor as to the size of the sheet of paper to be used for preparing a plat. However, it shall be the responsibility of the Surveyor to take into consideration (bearing in mind the required map scale of 1" = 100') the space needed to show the following items --

1) the boundaries of the lot (i.e. property lines),
2) the grid,
3) the space needed to show all of the required map elements,

4) and extra blank space for the consultant to show map notes.

-- when deciding on the appropriate size paper to use to prepare the plat showing the grid.

Where the maximum sized paper size (24 x 36 inches) does not allow for the necessary representation of a parcel of land and its associated grid, the parcel boundaries and grid shall be split or broken. The separated parts of the grid and property boundaries shall then be drawn or plotted on two or more sheets of paper. The point or line where the divisions of the said grid and property boundaries meet shall be represented by a clearly marked and defined *match line*, so as the two (or more) map sheets may be matched together.

(b) Superfluous Information

A plat prepared for use for soil mapping shall show only the elements outlined in Section A, Subsection (5) *Map Elements*. Superfluous information (listed below) serves only to clutter the grid or plat making the final soil map, drawn by the consultant, difficult or confusing to read.

A clean drawing field is necessary for the consultant to draw soil map unit lines, to clearly note the soil map unit information, show a map legend and show any notes pertaining to the soil map.

The following information ***shall not be shown*** on the plat nor in the soil mapping grid area -

1) *Topographic contour lines* (unless specifically required by the Department).

2) *Symbols for trees* (such as used by landscape designers).

3) *Wells, ponds, fences, buildings or any other miscellaneous physical features found on a piece of property*. It is the responsibility of the consultant to field locate and plot such features as they relate to the grid.

4) *Creek banks or other types of drainways*. It is the responsibility of the consultant to field locate and plot a creek bank or drainway as the feature relates to the grid.

5) *Centerline of a stream* (unless the centerline is an actual property line that must be shown).

6) *An identification label placed on every single grid stake point on the plat*. Show the letters and numbers on the plat as shown in the examples in Figure A1-2.

(3) Map Scale

The standard scale of any plat, prepared for soil mapping purposes, shall be 1 inch equals 100 feet; 1” = 100’.

This is the scale required for the Preliminary, Extra High-Intensity and the Ultra High-Intensity soil maps. In addition to the 1” = 100’ grid, a 1” = 50’ *enlargement* may be shown on the same plat for clarity.

(4) Plat Accuracy

The ratio of precision of the unadjusted survey shall be a minimum of 1:1000 or a Class E Survey.

(5) Map Elements

In addition to the soil mapping grid, the following basic map elements shall be required on all plats prepared for soil mapping purposes:

(a) There is to be a *location map* that shows the road on which the site is located, the other roads in the area, where the site is on that road and in the case of a large parcel of land, where the grid is located on the property. There is no required scale for this map.

(b) A North arrow is to be shown. The arrow can represent magnetic north, deed north or true north. The *nature* of north is to be noted near the arrow.

(c) A means of property identification in the form of a Subdivision name and Lot number or a Tax Map number and Parcel number.

(d) A Certificate of Accuracy shall be shown.

(e) The scale is to be stated (e.g. Scale 1" = 100').

(f) A Bar Scale or Graphic Scale shall be shown.

(g) The surveyor's seal shall be shown.

(h) The signature of the surveyor shall be shown.

(i) The name, telephone number and mailing address of the surveyor shall be shown.

See Figures A1-1A, A1-1B and A1-1C, illustrating various plat scenarios containing all of the required basic map elements.

(6) Miscellaneous Cultural Features

(a) Road Right Of Way (R.O.W.)

The surveyor shall show, in addition to the road or centerline of the road, the actual R.O.W. limits of any roadway (County, State or Federal) IF any part of the soil mapping grid is within 50 feet of a designated R.O.W.

(b) Easements

The surveyor shall show the placement and limits of any and all easements that are located on a property that is being surveyed for the purposes of setting a soil mapping grid.

Common types of easements that are to be shown are -

- Ingress - Egress Easements
- Drainage Easements
  - -Surface Drainage
  - -Subsurface Drainage (such as culverts)
- Utility Easements
  - -Communications Lines - Above ground & Underground
    - Telephone
    - Cable TV
    - Fiberoptic Cable
  - -Gas Lines (any type)
  - -Electric Power Lines - Above ground & Underground
  - -Water Lines (any type)

B. Grid Staking

The soil mapping *grid* is the standard method of ground control utilized for all soil mapping in Williamson County. The grid stakes shall be set, on a parcel of land, by a Registered Land Surveyor. Subsequently, the actual position of the stakes on the ground surface are to be graphically plotted on a plat by the surveyor.

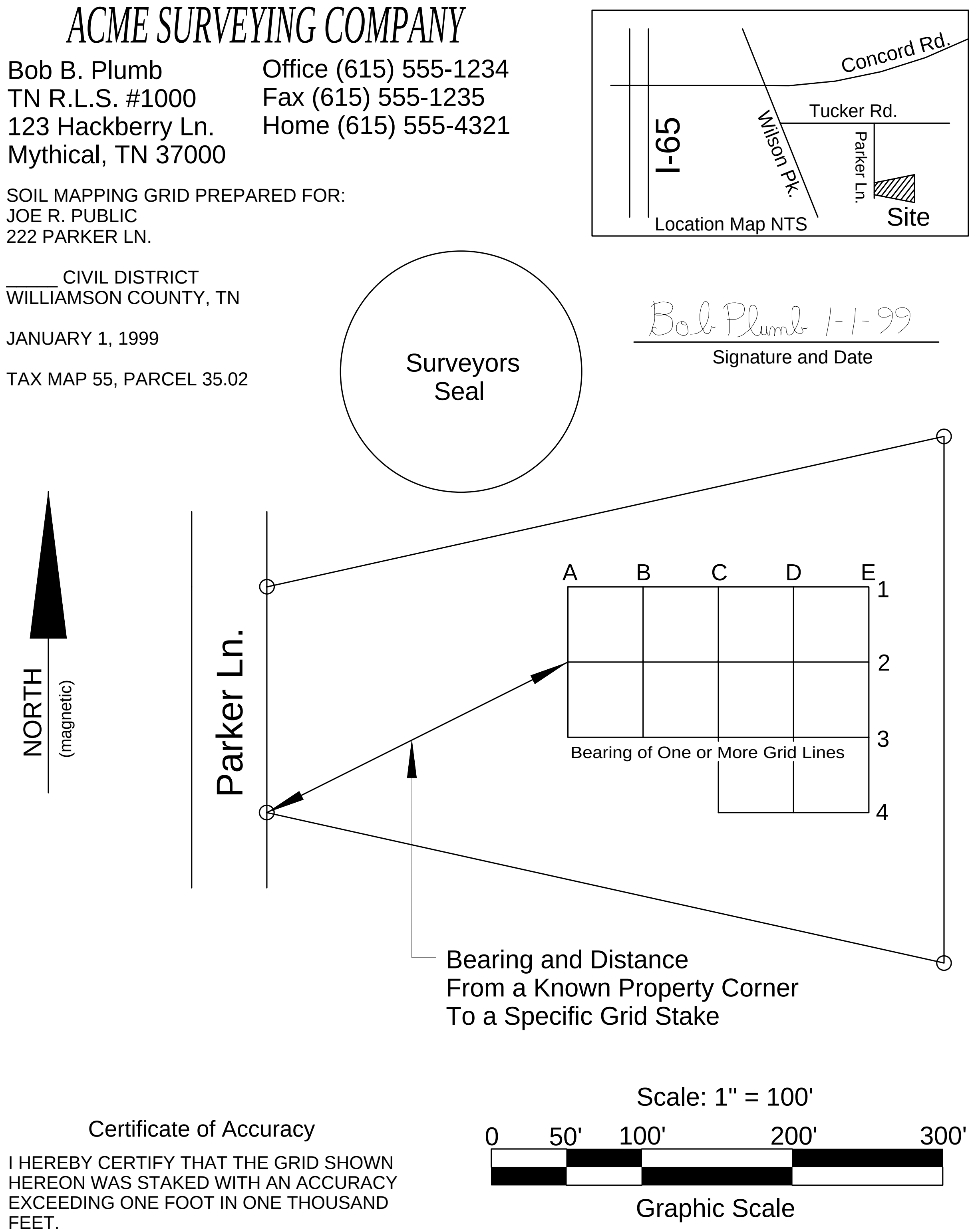
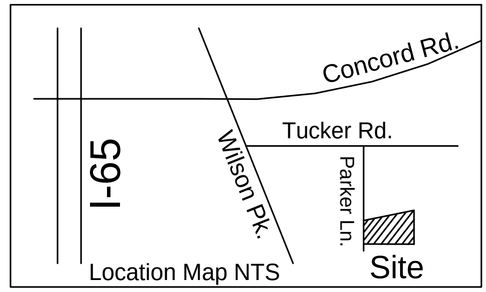


Figure A1-1A. Example plat showing grid staking.

ACME SURVEYING COMPANY

Bob B. Plumb
TN R.L.S. #1000
123 Hackberry Ln.
Mythical, TN 37000

Office (615) 555-1234
Fax (615) 555-1235
Home (615) 555-4321



SOIL MAPPING GRID PREPARED FOR:
JOE R. PUBLIC
222 PARKER LN.

_____ CIVIL DISTRICT
WILLIAMSON COUNTY, TN

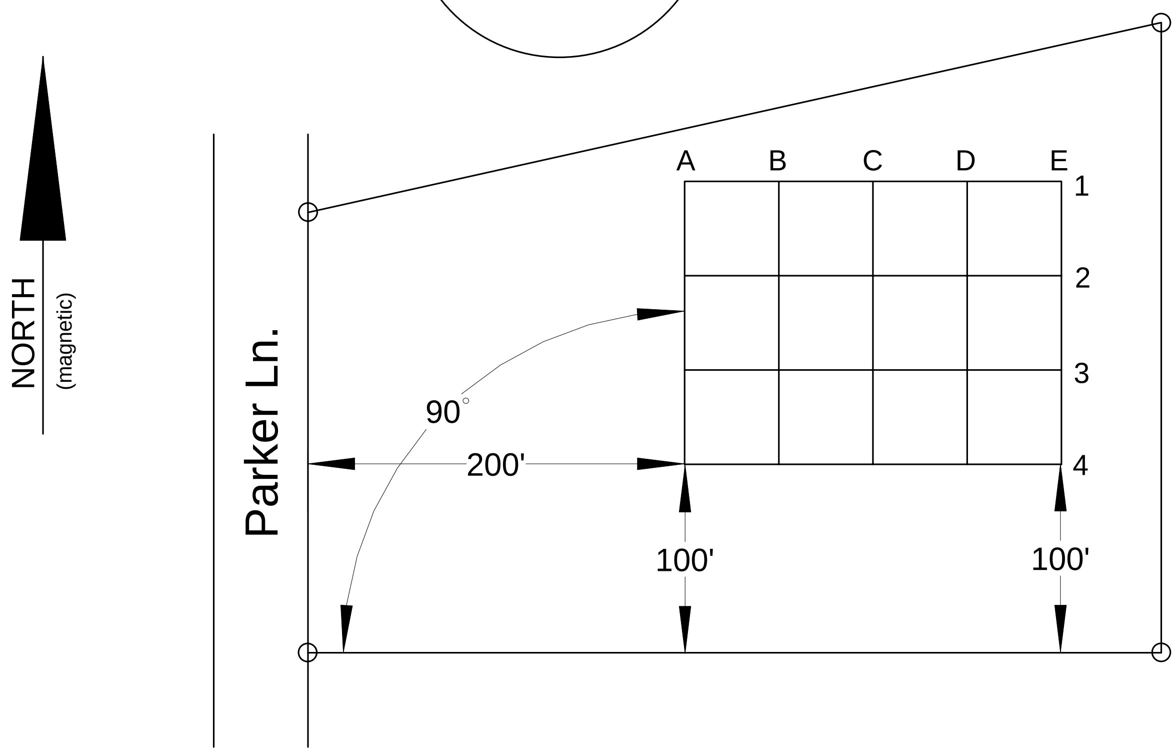
JANUARY 1, 1999

TAX MAP 55, PARCEL 35.02

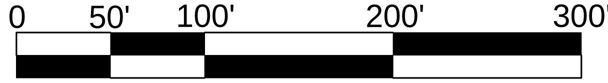
Surveyors
Seal

Bob Plumb 1-1-99

Signature and Date



Scale: 1" = 100'



Graphic Scale

Certificate of Accuracy

I HEREBY CERTIFY THAT THE GRID SHOWN HEREON WAS STAKED WITH AN ACCURACY EXCEEDING ONE FOOT IN ONE THOUSAND FEET.

Figure A1-1B. Example plat showing grid staking.

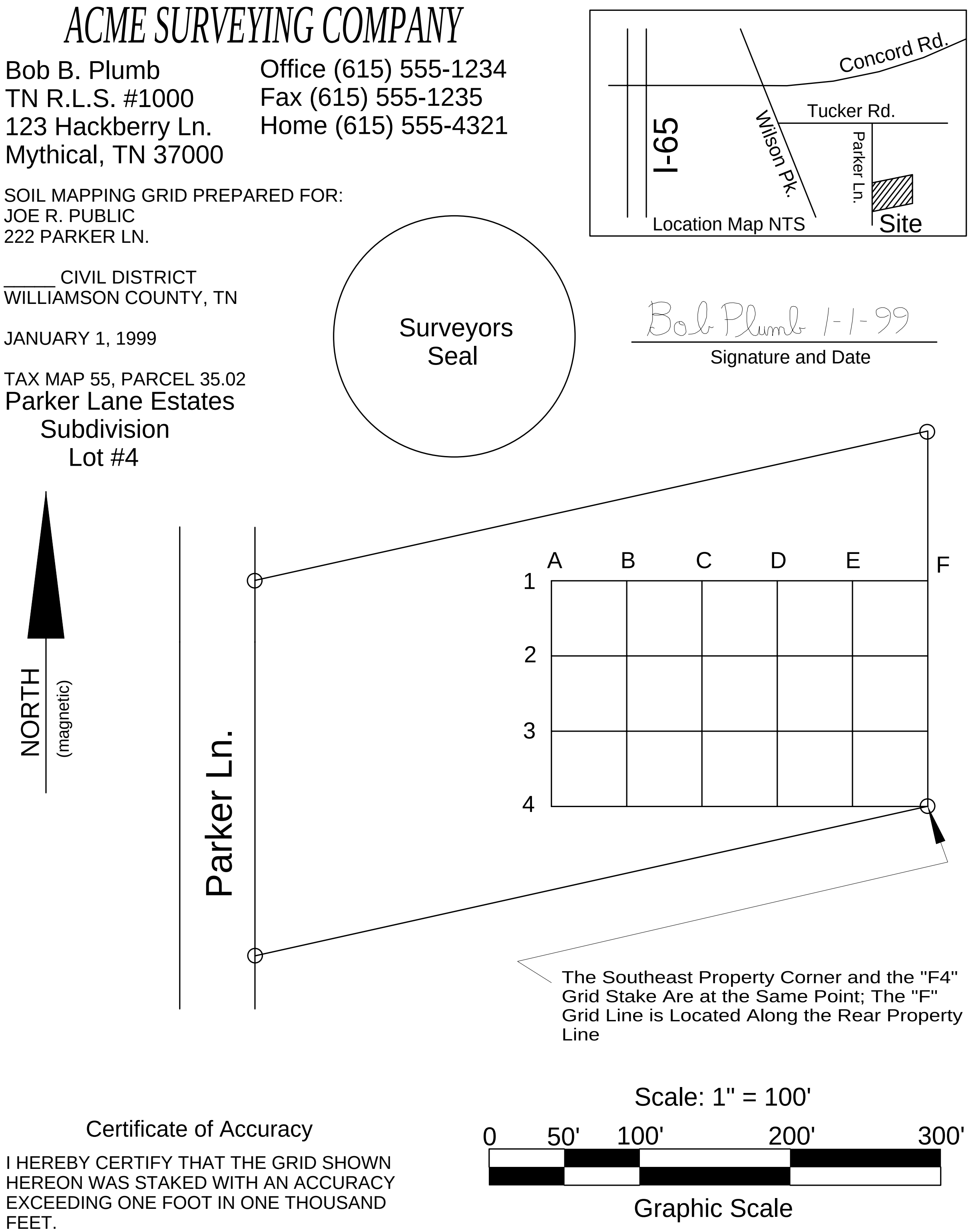


Figure A1-1C. Example plat showing grid staking.

(1) Spacing

The spacing of the grid stakes depends upon the intensity of the soil mapping being performed. The stake spacing requirements are as follows:

(a) Preliminary Soil Map - 100 feet, maximum.

(b) Extra High-Intensity Soil Map - 50 feet.

(c) Ultra High-Intensity Soil Map - 25 feet, minimum; the Department may require a lesser spacing of the grid stakes depending on the site circumstances.

(2) Type of Stakes

Wooden stakes shall be utilized for all grid staking. The stakes shall stand a minimum of 16 inches (utilizing line stakes or equal) above the ground surface or more on open-field settings. The stakes shall stand a minimum of 36 inches (utilizing Lathe stakes or equal) or more on wooded lots or where specifically indicated by the Department.

<u>NOTE:</u> The stakes may stand less than 16 inches, but greater than 12 inches, from the ground surface only on cleared, mowed subdivision lots of one (1) acre or less in size when the lot is being re-soil mapped.

Wire flags shall not to be used, in any manner, on grids set for Preliminary (100 foot interval), Extra High-Intensity (50 foot interval) or Ultra High-Intensity (25 foot interval) soil maps.

(3) Configuration

The configuration of the grid staking shall be that of a square box. Grid line sets (i.e. the lettered lines or the numbered lines) shall always be parallel. The intersection of the lettered grid line set to the numbered grid line set shall always be perpendicular. Any other configuration or layout of a soil mapping grid is not acceptable (i.e. diamond shapes, trapezoidal shapes, etc.). See Figure A1-2.

(4) Labeling

The labeling of the grid staking, on the plat and in the field, shall be of the number and letter method. In one direction, the stakes are to be sequentially numbered (i.e. 1, 2, 3, 4, etc.), starting at number 1. In the direction perpendicular to the numbered lines, starting on the line of number 1 stakes, the stakes are to be sequentially lettered (i.e. A, B, C, D, etc.). If a grid exceeds the alphabet (i.e. more that 26 lines), the letters are to be doubled (e.g. AA, BB, CC, DD, etc.). See Figure A1-2.

Every stake shall be clearly marked or labeled, on two opposing sides, in the field with the appropriate letter and number which corresponds to the stake.

The example below shows the standard labeling configuration of the grid stakes in the field, but the labeling of the grid on the plat is to look like the example shown in Figure A1-2.

A1	A2	A3	A4	A5
B1	B2	B3	B4	B5
C1	C2	C3	C4	C5
D1	D2	D3	D4	D5

When labeling the lettered lines, in the field and on the plat, capital letters shall be used.

The diagrams show the standard configuration to be used on all soil mapping grids set in Williamson County. The Extra High-Intensity soil mapping grid is illustrated in this Figure. The scale is 1”=100’ and the grid stakes are spaced at intervals of fifty (50) feet. The numbered grid lines shall always be perpendicular to the lettered grid lines.

The diagrams also illustrate the standard numbering/lettering system to be utilized on all grids set for soil mapping purposes. The lower diagram shows an example of where the number of lettered grid stakes has exceeded the number of letters in the alphabet. Thus, after the letter Z, so as to continue the lettering sequence, the alphabet begins again with AA at the next lettered grid line, such that the letters are then doubled. Should the size of the grid create the necessity, the lettering may be tripled, etc.

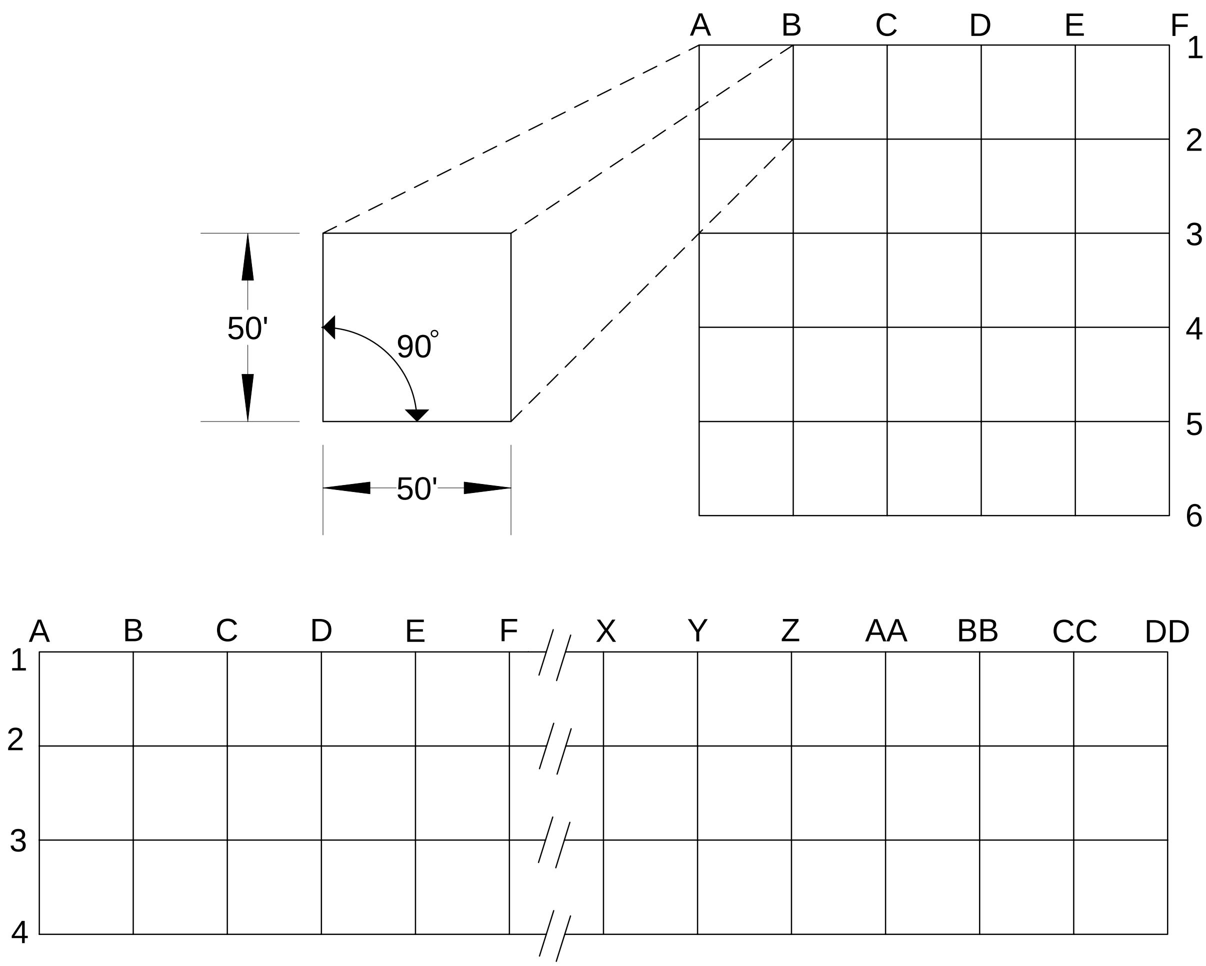


Figure A1-2. Standard grid staking configuration and numbering/lettering system.

<u>NOTE:</u> It is an acceptable practice to not use the letters " H " and " I " when lettering a grid. Depending on how the Surveyor writes the letters and orients the labeling on the stake, the capital letters " H " and " I " can be misread or confused.

(5) Location or *Tie-down* of a Grid

Once the grid has been set on the property, it shall be precisely located and plotted on a plat. Thus, a grid shall not *float* within a property boundary with no information showing or describing its location. The Department shall require that the grid shall be tied to a property corner or property line in some manner.

The Department has no particular preference as to the actual method utilized by the surveyor to tie down the grid, as long as the location of the grid is described in such a manner as to provide any Registered Land Surveyor with adequate data to reconstruct the grid exactly as it was originally laid out.

A standard method of locating or tying down a grid is to use a property line as a reference line or base line for the grid. Another method utilized is to set the grid and then plot a line from a property corner to a point on the grid, measure the distance and note the compass bearing of that line and a compass bearing of one of the grid lines. See Figures A1-1A, A1-1B and A1-1C for examples of methods to identify grid location.

(6) Grid Staking of Land Parcels Intended for Subdivision Development

The Department shall require that a land parcel intended for small lot subdivision development (i.e. the proposed subdivision lots being 1 to 3 acres in size) be grid staked in its entirety. The grid staking shall be in accordance with all provisions of this Chapter. The use of chaotically arranged (i.e. in a patch work manner) and/or overlapping grids (See Figures A1-3A, A1-3B and A1-3C) shall be prohibited. Subsequently, any soil mapping work done on such grids (i.e. chaotically arranged and/or overlapping grids) shall not be accepted by the Department.

(7) Grid Staking of Large Land Parcels

Depending upon the size of the land parcel which is to be soil mapped, the placement of the soil mapping grid is generally planned so as to cover the entire extent of the land parcel (e.g. 1 to 3 acre lots) or the specific area intended for mapping (e.g. 3 acre tracts and larger). Where a site or land parcel is large (i.e. typically larger than 5 acres) and the specific areas to be soil mapped are separated in a manner so as to require the setup of two or more individual grids (of any size, to map a specified area), the Department shall require that the individual grids correspond to an overall Master Grid Plan (MGP). The MGP is essentially a large grid that is drawn to the scale of 1" = 100' and graphically plotted, on a plat indicating the property boundaries, so as to encompass an entire parcel of land (See Figure A1-4). Subsequently, the actual field grid setup on the dispersed soil mapping sites shall correspond, in orientation and labeling, to the portion of the MGP to which those sites correspond (See Figures A1-5, A1-6A and A1-6B).

The use of this methodology (i.e. the use of a MGP) shall be utilized on, but not limited to, all proposed large lot subdivision developments and for large tract developments where soil mapping is required by the Department.

C. Vegetative Requirements

A site to be soil mapped is to be accessible by foot and free of excessive vegetation. The ground surface is to be visible such that the nature of the landscape and all associated landscape features can be readily seen.

- Open fields are to be mowed or bush-hogged. The vegetative cover, during the time period of soil mapping, is to be no more than 6 inches high. This vegetative condition is to be maintained at that height until all field work is complete.

- Mature woodland (i.e. wooded areas with very little to no undergrowth) areas are usually accessible. However, if excessive undergrowth exists on the site, it is to be cleared or removed in some manner to provide a clear view of the land surface.

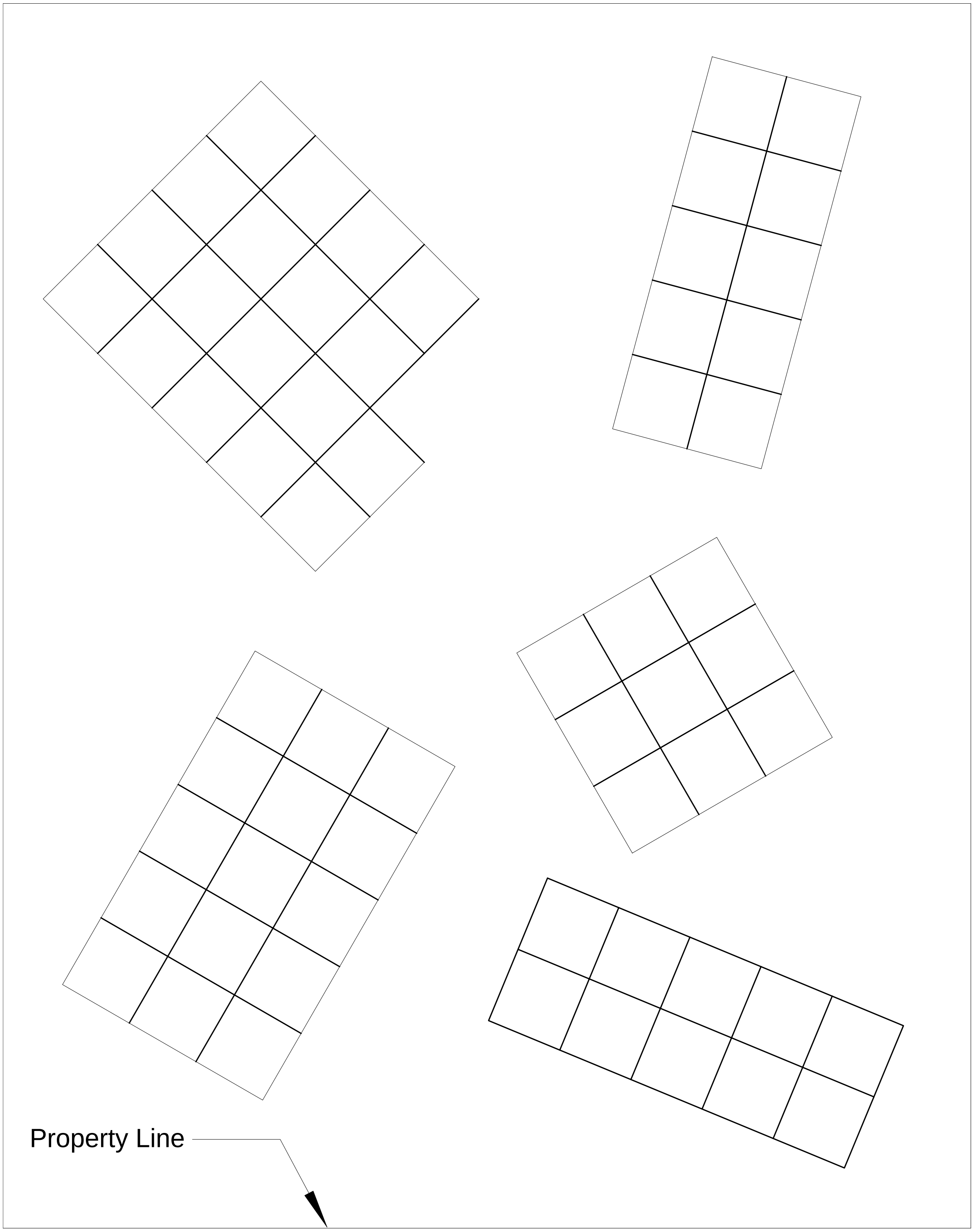


Figure A1-3A. Example of Chaotic Grids.

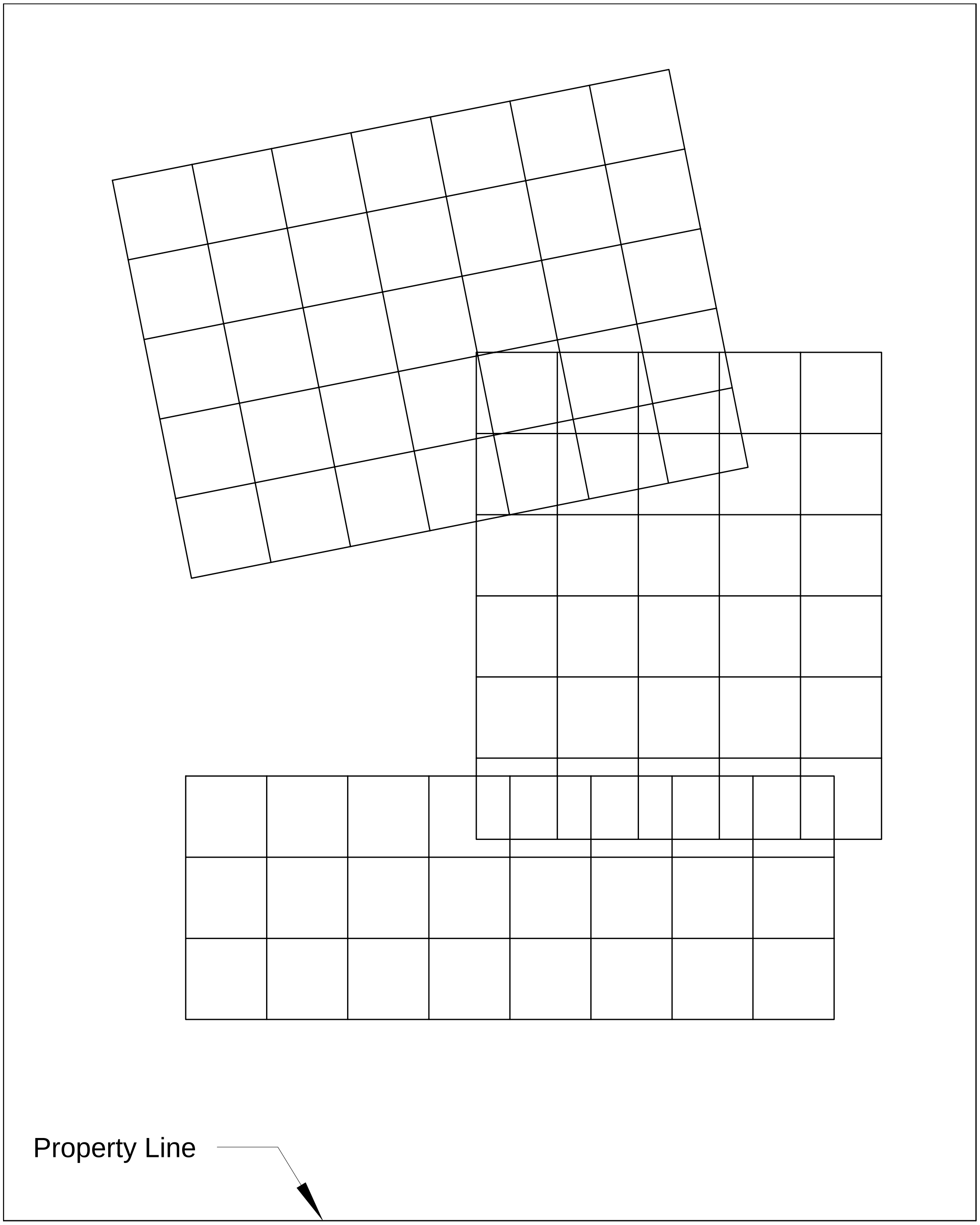


Figure A1-3B. Example of Overlapping Grids.

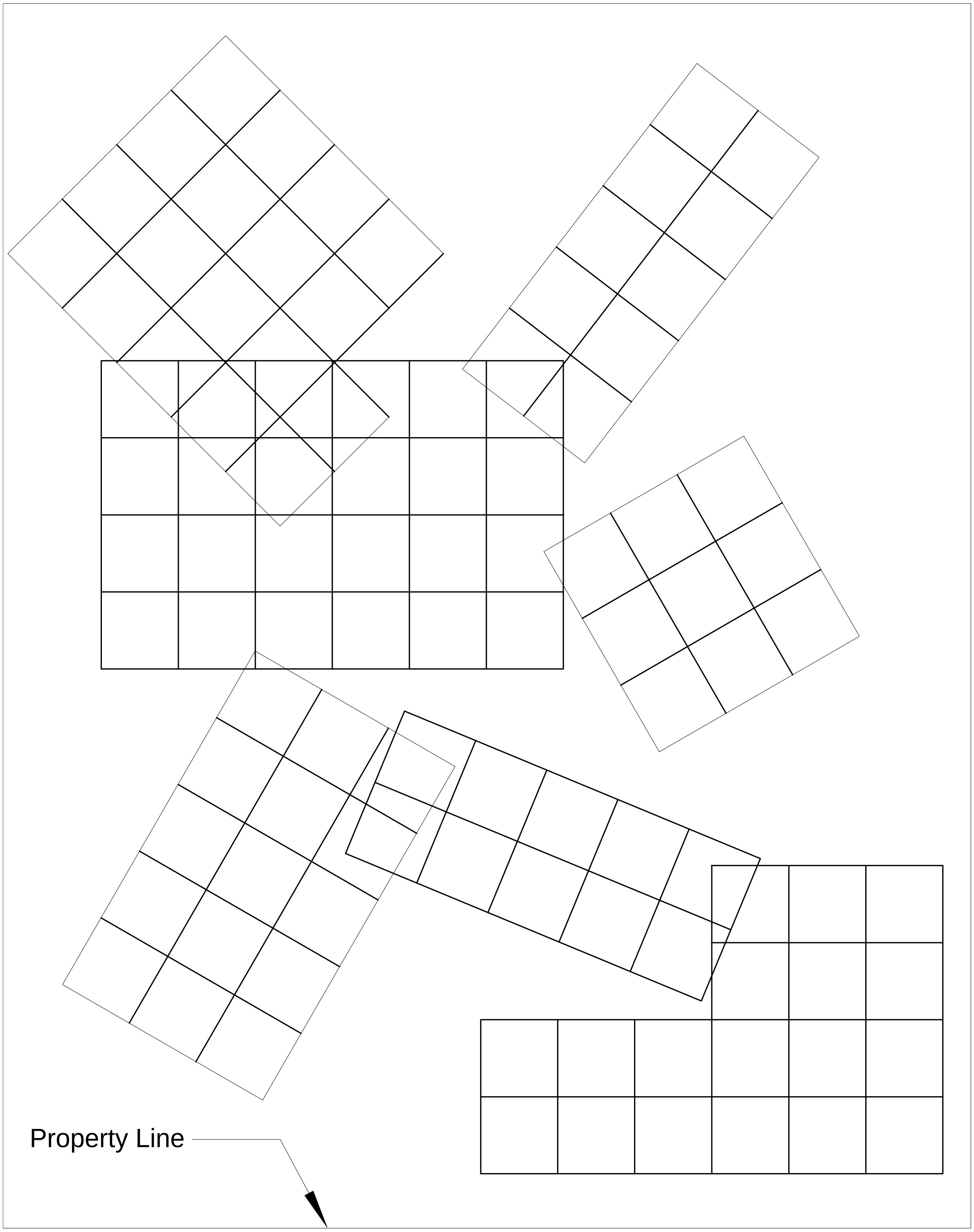


Figure A1-3C. Example of Overlapping Chaotic Grids.

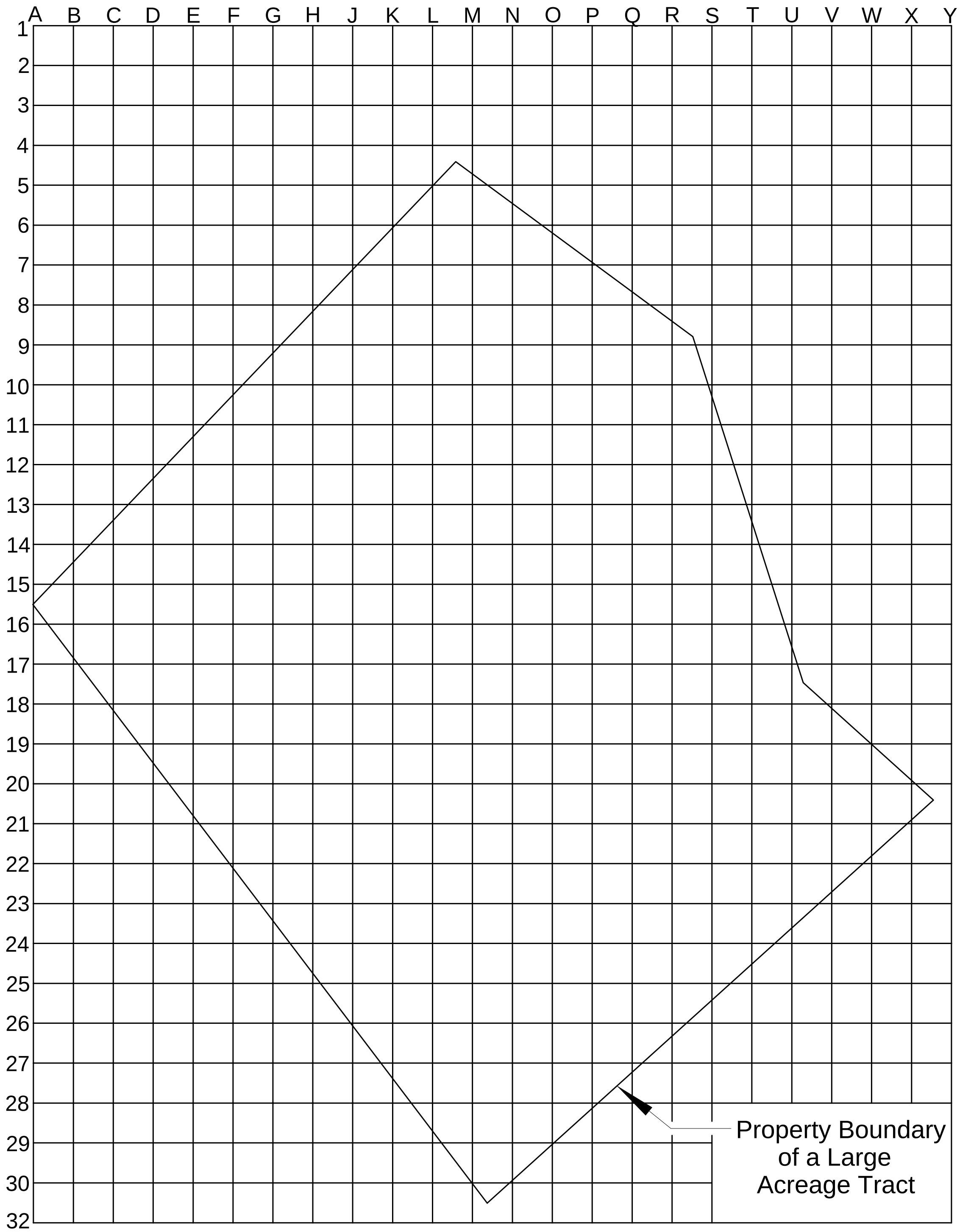


Figure A1-4. Master Grid Plan for a parcel of land.

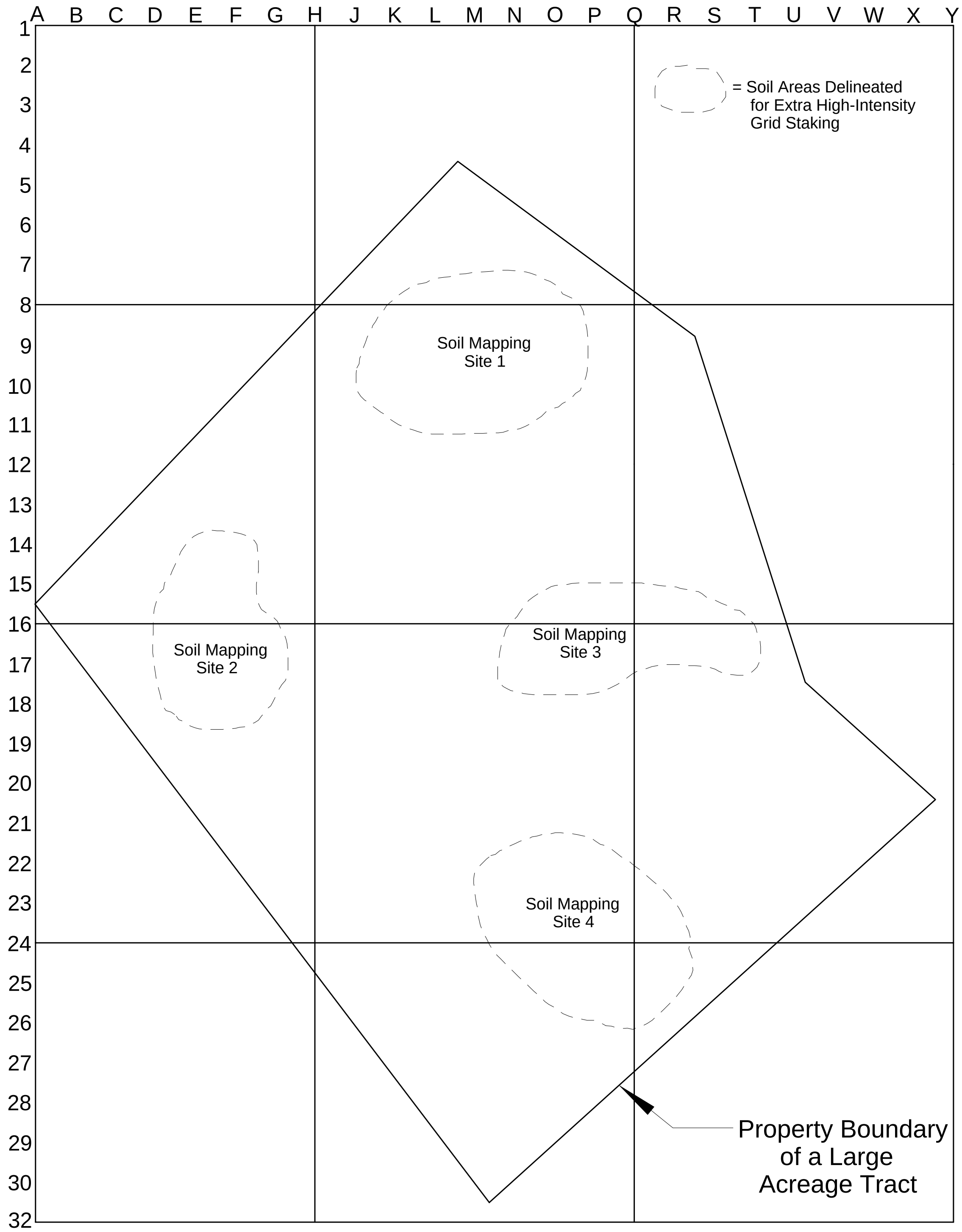


Figure A1-5. Sites to be soil mapped on the example parcel of land.

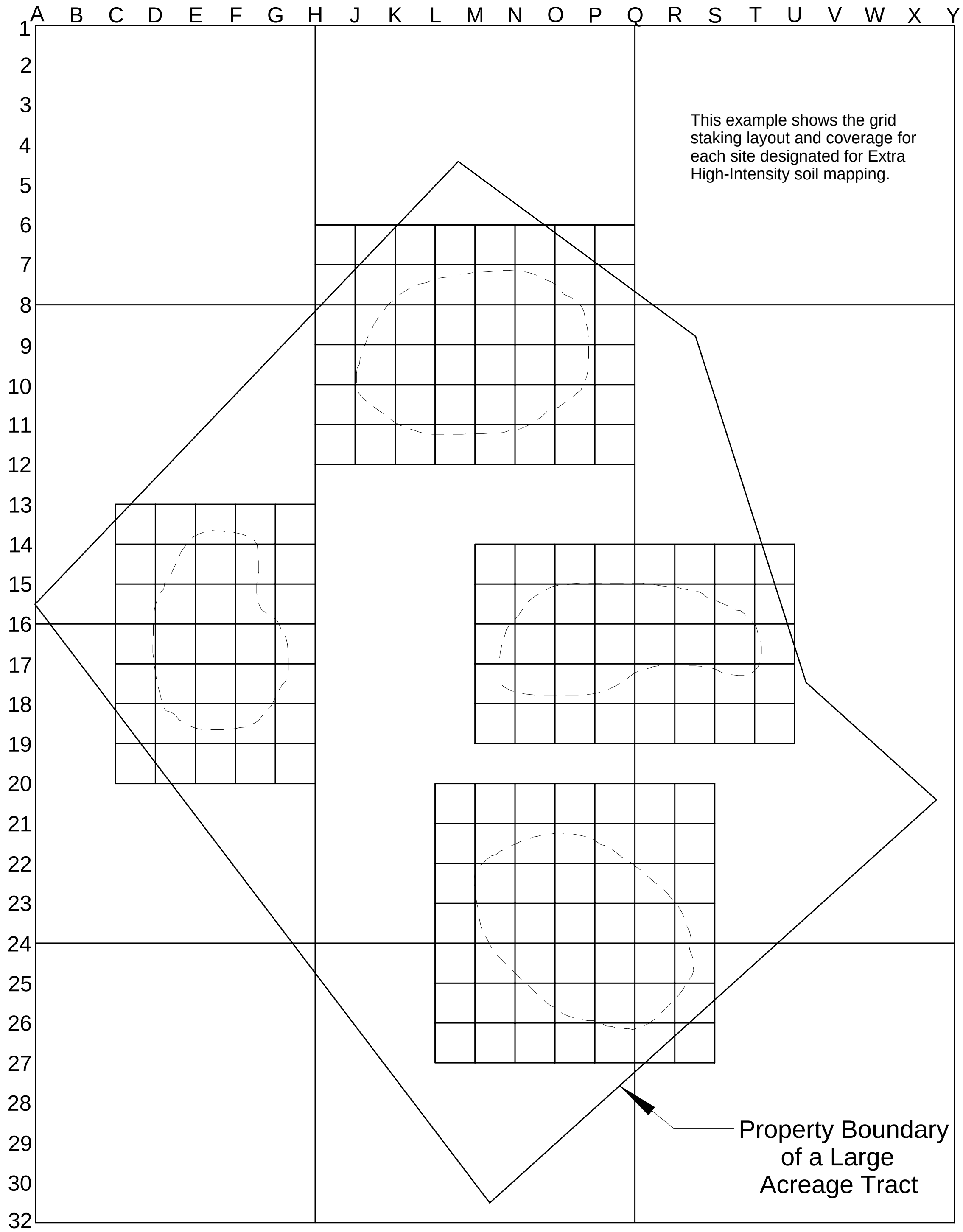


Figure A1-6A. The soil mapping grid locations are established so as to exactly correspond to the Master Grid Plan and to adequately cover the sites to be soil mapped on the example parcel of land.

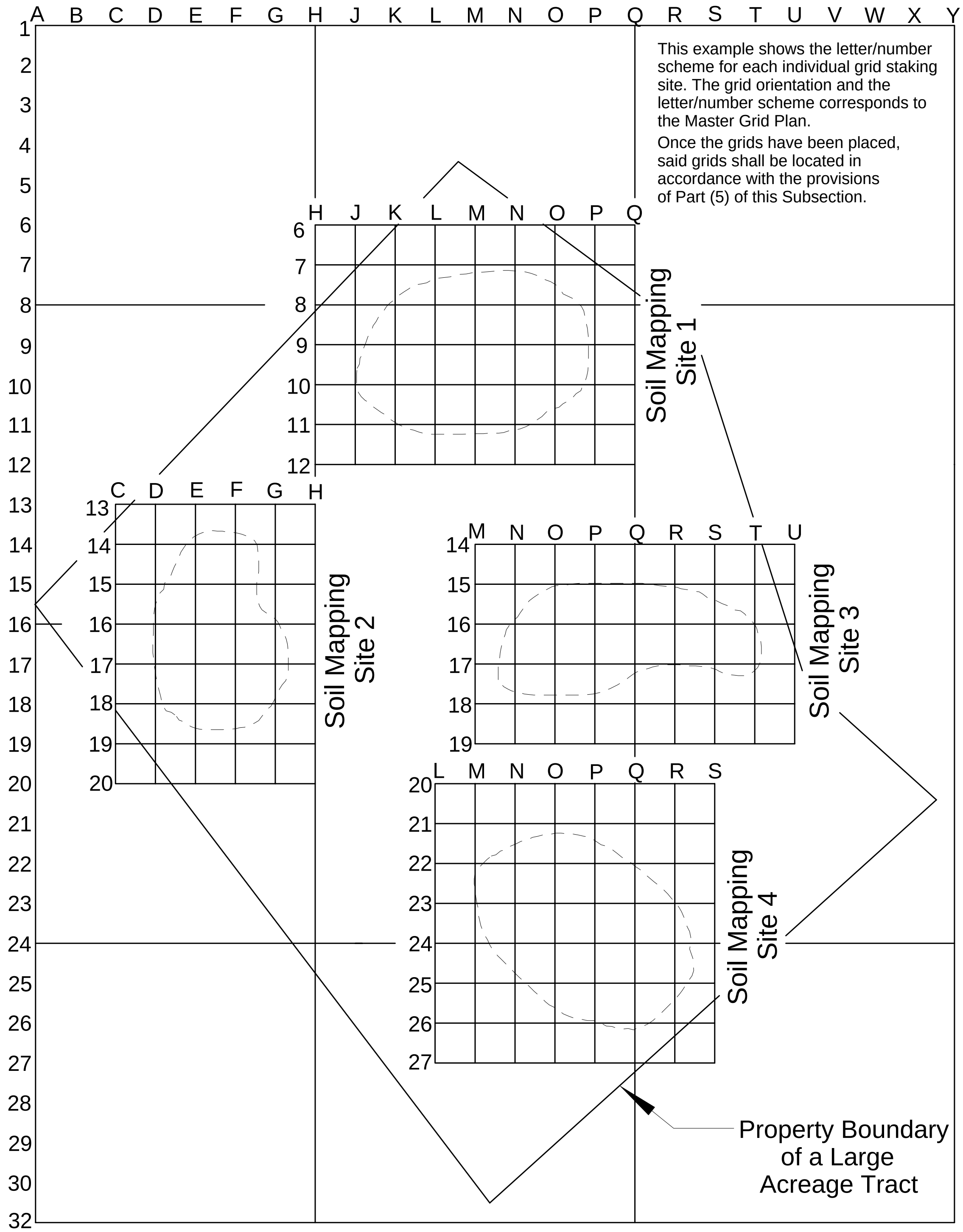


Figure A1-6B. The established soil mapping grid locations are identified (i.e. lettered and numbered) in accordance with the coordinate system of the Master Grid Plan.

- Where a property is covered by heavy, thick or excessive vegetation, it shall not be soil mapped unless, on a 50 foot or less grid stake interval, a clear line of site or *cut line* is provided along all grid lines. The cut line is to be a minimum of 5 feet wide and the height of the vegetation is to be 6 inches or less to the ground surface.

In some cases and at the discretion of the consultant, the vegetative conditions may warrant the need to simply wait until the winter months of the year to do the grid staking and soil mapping. The vegetation *may* die down to the extent to allow a proper soil mapping assessment of the site. However, if the site is still in need of clearing, it will be the responsibility of the consultant to indicate to their client that the site is to be properly cleared.

If the property is covered by excessive vegetation to such an extent that there is no practical way in which to clear the vegetation for grid staking and soil mapping, the lot or site may have to be cleared by some type of mechanical means.

<u>IMPORTANT NOTE</u>: The Department has no regulations regarding whether or not an individual can have a bulldozer contractor clear a parcel of land of vegetation. HOWEVER, the Department strongly recommends that the consultant discuss with their client the possible problems that may occur when a site is cleared in this manner (i.e. the bulldozer operator, if not careful or experienced, may cut or disturb the soil to the extent that the soil shall not be utilized for SDS use). The consultant should stress the importance of obtaining the services of a competent bulldozer contractor to their client if they are insistent upon having their property cleared in this manner.

CHAPTER 3

SOIL MAPPING

The need for highly accurate soil mapping products is critical due to the manner in which property is developed in areas outside the limits of municipal sewage collection and treatment facilities.

Generally, the soil mapping procedures and requirements of Williamson County differ from the State requirements with which most Soil Scientists are familiar. Therefore, the following information is put forth as the expected standard of practice for professional consultants working in this county.

A. Soil Observations and Map Purity

In order to make a quality soil map, at any intensity, an adequate number of soil observations (i.e. auger borings or pits) shall be made over the entirety of the site being mapped. Subsequently, the increased number of soil observations made on a site will increase the accuracy or purity, of the soil map produced.

The Department shall consider that the *minimum* number of observations that are to be made, on a grid-staked site, is whatever number equals the number of grid stakes placed on a site to be mapped.

The number of observations per acre noted in *Chapter 1, Section A*, for each of the different types of soil maps accepted by the Department, are based on the number of stakes on a one acre square area and the number of GBC for each intensity map described. Depending on the landscape of which one is mapping, more soil observations are generally necessary.

On a relatively uniform landscape, where the soil or mapping units are consistent over a large area, soil observations at the grid stakes are probably sufficient. However, on a landscape where the soil or mapping units are changing over short distances or in a complex and intricate arrangement, soil observations at the GBC and at other points will be necessary.

<u>IMPORTANT NOTE</u>: The consultant working in Williamson County shall be obligated to make as many soil observations as necessary, aside from the grid stakes, in order to fully delineate any and all soil types encountered.

B. Limits of Soil Mapping

There will be cases where the grid may not cover an area sufficiently to show all the area that needs to be soil mapped. Therefore, soil mapping may be done outside of the grid staked area as long as the grid stakes and grid lines are clearly visible to the consultant. Any soil observations made outside the grid shall be accurately located and plotted in proper relation to the actual grid.

Should any soil mapping activity be extended outside of the grid staked area, it is the responsibility of the consultant to ensure that any and all map unit delineations made are accurately located and plotted in proper relation to the grid.

(1) On Extra High-Intensity Soil Maps -

(a) The Department shall consider 50 feet to be the maximum limit to extend soil mapping off of a grid in wooded areas. Any mapping extended over 50 feet outside of the grid, in a wooded area, will not be acceptable.

(b) In an open field situation, up to 75 feet of mapping outside of a grid will be accepted. Any mapping extended over 75 feet outside of the grid will not be acceptable.

(2) On Ultra High-Intensity Soil Maps -

(a) The Department shall consider 15 feet to be the maximum limit to extend soil mapping off of a grid in wooded areas. Any mapping extended over 15 feet outside of the grid, in a wooded area, will not be acceptable.

(b) In an open field situation, up to 25 feet of mapping outside of a grid will be accepted. Any mapping extended over 25 feet outside of the grid will not be acceptable.

Should the consultant see the need to extend any soil mapping activity beyond the specified limits, arrangements should be made by the necessary parties involved (i.e. property owner, realtor, developer, etc.) to have the surveyor provide more grid staking coverage over the area of concern.

C. Landscape Features

Landscape features include any and all physical and cultural features found in an area of soil mapping which will or could possibly affect the layout and functioning of any type of sewage disposal system (subsurface or above ground). These landscape features, when encountered during soil mapping, shall be located and accurately plotted on the soil map.

When mapping any site, the consultant shall look 25 to 50 feet beyond the area of mapping for any obvious landscape features that could affect the layout or functioning of a sewage disposal system. Just because a feature, such as an embankment, gully or drainway, is not within the actual grid area, its presence can affect the use of a mapped area for SDS use. Thus, the consultant shall be obligated to show such features on the soil map.

Physical features, for the purpose of this discussion, will be considered as attributes of the landscape that would affect the placement of a septic system, whether that attribute be of a man-made or natural origin.

♦ Physical features that are natural in origin include, but are not limited to:
  - streams (of all sizes)
  - embankments along streams
  - escarpments or bluffs
  - sinkholes
  - enclosed depressions (of any type or size)
  - springs
  - gullies
  - landslide or slip
  - natural, short steep slopes
  - wooded or forested areas

♦ Physical features that are man-made in origin include, but are not limited to:
  - drainage channels, on farms and in subdivisions
  - farm roads or paths of vehicular traffic
  - roadside ditches
  - trench silos on old farms
  - agricultural terraces
  - embankments resulting from agricultural practices
  - embankments associated with road building and construction
  - escarpments associated with road building and construction
  - gullies resulting from man-made changes to the landscape
  - ponds, lakes and detention basins
  - earthen dams
  - wells, drilled for any purpose
  - quarries

Cultural features, for the purpose of this discussion, will be considered as attributes of the landscape that would affect the placement of a septic system and are creations of man.

These features are placed or constructed in or on the land to serve some purpose to man. Cultural features would include, but are not limited to, the following:

- fence lines when they are also property lines
- power transmission lines (above or below ground)
- pipe lines (of any type or size)
- Indian Mounds
- buildings or structures
- cemeteries

D. Soil Map Units

A map unit is a collection of soil areas that have been found to have the same soil components, characteristics and features. Each map unit differs in some respect from all others and is uniquely identified and delineated on a soil map. Map units may consist dominantly of one component or of two or more components, of similar characteristics, which are identified in the name of the map unit.

Each delineation on a soil map contains the name of the soil series (taxadjunct or variant, if appropriate), the estimated soil absorption rate for a designated SDS and the slope ranges. Where the delineation is too small to write-in or include the unit designation, the information may be written in the margins of the map sheet with an arrow leading to the appropriate delineation. Typically, the intensity of the map will dictate the manner in which the map is prepared and presented.

Single Taxon map units with only one named soil series, variant or taxadjunct are preferred. The named soil series should constitute at least 75 percent of the delineation on a Preliminary Soil Map. The named soil series should constitute at least 90 percent of the delineation on a Extra High-Intensity Soil Map. The named soil series should constitute at least 98 percent of the delineation on a Ultra High-Intensity Soil Map.

Complex or *multitaxa* units (map units in which two or more soils are named) are acceptable where the map scale is too small to clearly show single taxon map units or where soils are similar and/or have similar predicted behaviors. Where mapping involves very similar series types or common associations (e.g. Stiversville-Armour-Maury or Talbott-Barfield-Gladeville), multitaxa units are perfectly acceptable.

<u>NOTE:</u> The Department strongly recommends that the consultant review Chapter 9, A1.2. The complexing of soils, in a multitaxa soil mapping unit, is to be limited to soils having like SDS limitation ratings and in an acceptable known soil associations.

Highly contrasting soils in intricately arranged patterns in areas too small to delineate may also need to be shown in multitaxa units.

<u>NOTE:</u> When this is the case, the interpretation of the soil with the most limiting characteristics, within the multitaxa map unit, determines the limitations for the entire map unit.

As mentioned before, showing a complex map unit with highly contrasting soils or soils with drastically dissimilar characteristics is not acceptable. If for some reason it is necessary, the reason as to why such a unit is shown should be clearly explained with a note on the soil map. Any named soil in a multitaxa map unit must constitute at least 15 percent of that unit.

(1) Taxadjuncts and Variants

Taxadjuncts and/or variants are to be mapped just as any other soil series. The mapping unit will consist of the series name that it most closely resembles and how it differs from that particular series.

Examples: Barfield variant - depth to rock, 22” to 26”
Dellrose variant - texture of Bt, clay
Talbott variant - drainage class, mottled at 26"

The property or properties that cause the soil to be a taxadjunct or variant shall be specifically stated, especially the property or properties that could dictate a change in the interpretation of that soil. The appropriate rate is to be noted for the taxadjunct or variant as well as any soil improvement practices that may be required.

(2) Soil Name

The soil name consists of the name of one or more established, currently utilized soil series, a variant of a soil series, taxadjunct to a series, phase of a series or a miscellaneous land type.

<u>NOTE:</u> *See Chapter 9, A1.1 for a listing of the soil series to be mapped in Williamson County.*

(3) Absorption Rates

Soil absorption rates are estimates made by the consultant, based on the soil properties observed and determined during the actual field delineation of the soil map units. The estimate describes the capability of the soil to absorb a unit measurement of water in a specified period of time. The established method of describing this water absorption or percolation capability is expressed in the unit of *minutes per inch* or *MPI*.

Thus, the term (i.e. MPI) is describes how many minutes it will take a particular soil to absorb one inch (or for a column of water within the soil profile to drop one inch) of a unit measurement of water. The estimates are for the most unfavorable soil moisture content which normally occurs during, but is not limited to, the winter and spring seasons of the year. Estimates are made in 15 minute increments.

Estimated soil absorption rates are not synonymous with soil permeability rates or with actual soil percolation test rates. However, data from soil permeability tests and soil percolation tests are used to establish the known ranges of estimated soil absorption rates for established soil series.

The State soil handbook makes reference to the *Appendix 1 of the State Regulations to Govern Subsurface Sewage Disposal Systems*. This section of the State regulations assigns singular MPI rates to each known soil series in the State.

Section A1.2 of Chapter 9 of this document outlines the Department's position on how the soils of Williamson County shall be considered for SDS use. This information shall be closely reviewed by consultants working in Willliamson County. When soil maps are spot checked by the Department, close scrutiny will be given to delineated soil mapping units containing soils with known moderate and severe SDS Limitation Ratings.

(a) Variables That Determine Rates

The soil properties and/or site characteristics that determine soil absorption rates can be divided into two broad groups: Intrinsic and Extrinsic.

INTRINSIC -
The intrinsic soil properties that determine absorption rates include texture (including contrasting textures within a profile), clay mineralogy, structure (including contrasting structures within a profile), consistency, pore spacing, drainage class, soil pH and depth to a blocking layer. The precise effect of any one of these soil properties on a soil's water absorption capability is difficult to determine during normal field mapping procedures. However, the effect of those soil properties that determine the number, size and configuration of pore spacing will affect the quantity and rate at which a soil can absorb water.

<u>NOTE:</u> *Chapter 9, A1.3 outlines the basic correlation of soil texture and structure as it is related to estimated MPI ratings.*

In general, where soils exhibit any of the following characteristics:

- high clay content,
- high shrink-swell potential of the clay content,
- weak development of the structure and
- plastic soil consistency,

the permeability of that soil will be low.

EXTRINSIC -
The extrinsic soil properties that determine soil absorption rates are slope, configuration of the landscape (e.g. concave or convex) and the position of the soil area on the landscape. These features help to determine the quantity and rate that surface and subsurface water drains onto and/or away from a site.

The parameters established by the Department to be utilized in estimating soil absorption rates include, but are not limited to the following:

- Soils that are moderately permeable in the upper 36 inches of a soil profile have estimated absorption rates that range from 10 to 75MPI.

  ◊ Data from years of actual soil percolation tests, conducted in Williamson County, have demonstrated that absorption rates of 10 to 75MPI can be expected in these kinds of soils.

- Soils that are slowly permeable in more than 16 inches of the upper 36 inches of a soil profile have estimated absorption rates greater than 75MPI.

- Soils that have moderate permeability in a layer 24 to 30 inches in thickness in the uppermost 36 inches of a soil profile, but have slow permeability in the remaining part (i.e. being 24 to 30 inches below the ground surface) of the upper 36 inches have estimated absorption rates of 75MPI.

  ◊ Subsurface sewage disposal systems in these soils may require soil improvement practices, such as curtain drains and soil modification in the case of alternative (LPP) systems.

- Soils that have moderately slow permeability in the uppermost 24 inches of the upper 36 inches of a soil profile have an estimated absorption rate of 75MPI.

- Soils that exhibit characteristics of excess wetness within the uppermost 24 inches of a soil profile (as evidenced by the presence of 2 chroma and in some cases 3 chroma or less mottles), even though the wetness may be seasonal, have an estimated absorption rate greater than 75MPI.

  ◊ The consultant must fully assess the nature of the site (e.g. the topography, landscape position, etc.) and determine whether or not any soil improvement practices can modify the limiting conditions and allow for a lowering of the MPI rating.

- Soils in which very slowly permeable layers such as fragipans begin at depths, below the ground surface, of less than 24 inches from the ground surface, have an estimated absorption rate of greater than 75MPI.

- Soils in which very slowly permeable layers such as fragipans begin at depths, below the ground surface, greater than 24 inches have an estimated absorption rate of 75MPI.

  ◊ This type of site condition will typically require the utilization of soil improvement practices such as curtain drains and soil modification in the case of alternative (LPP) systems.

See *Chapter 9, A1.4* for further discussions on MPI rating. This section of *Chapter 9* contains an outline of the interpretative guidelines utilized by the Department to aide in establishing MPI rates in real-world scenarios. The methodology discussed was developed and implemented as the standard operating procedure for Department Soil Scientists by Mr. Eugene T. Lampley in 1988.

(b) Percolation Test Qualifications

If a soil map unit is mapped as >75MPI and meets all of the outlined criteria, a percolation test will be necessary to determine the actual absorption rate of the unit/units under consideration for SDS use. The Department will make the determination, based on the soil map information (i.e. soil type, profile description, physical features, square footage of useable area, etc.), whether or not a site will qualify for percolation testing.

Contained within these regulations, in *Appendix 2*, are the site conditions and soil properties on which percolation tests may be conducted.

<u>NOTE:</u> See Appendix 2 of these regulations regarding soils and property size requirements for the conducting of soil percolation tests.

Criteria to use for evaluating soils or sites for suitability for percolation testing shall be depth to rock, topography, slopes, wetness or water problems and soil textural classification.

Soils *<u>shall not</u>* qualify for percolation tests if they meet any of the following conditions:

- Soils that are classified in *The Keys to Soil Taxonomy* as belonging in suborders having aquic moisture conditions.
- Soils that are classified in *The Keys to Soil Taxonomy* as belonging in great groups having fragic properties.
- Soils that are classified in *The Keys to Soil Taxonomy* as belonging in subgroups having the modifier aquic, glossic, fragic or vertic in the series name.
- The soil does not have a minimum depth of 36 inches before encountering bedrock, a non-rock restrictive horizon (Cr) or permanent water table.
- The soil profile does not have a minimum depth of 18 inches (from the ground surface down) of soil with moderate permeability (10 to 75MPI) over soil with moderately slow (75 to 120MPI) permeability.
- The soil profile consists of soil material having slow (>120MPI) permeability in the upper 24 inches.
- The soil classifies, under the system of soil taxonomy, as being poorly drained, somewhat poorly drained or moderately well drained.
- The soil profile exhibits mottling due to wetness at any point within 36 inches of the ground surface.
- The soil area or map unit is located on slopes of more than 20 percent.
- The soil area or map unit is located in a landscape position subject to flooding.
- The soil area or map unit is located within an enclosed depression not having a surface drainage outlet. This would include areas that occupy the bottoms of sinkholes.

- The soil area or map unit is located in a water receiving landscape position and the inflow of water (both surface and subsurface) is to such an extent that it will be detrimental to the performance of a subsurface sewage disposal system.

- The soil area or map unit has slight to moderate soil compaction or is compacted to the extent that 15% or more of the original soil pore space has been eliminated.

(4) Disturbed Areas

Disturbed areas consist of areas of excavation, cuts, cut banks, fill, soil compaction or soil mixing, all of which are the direct result of activities of man.

<u>NOTE:</u> Disturbed soil areas shall not be considered suitable for SDS use.

(a) Excavated Areas

Excavation is a general term used to define an area where soil material, whether natural soil or fill material, has been mechanically removed from a site by man. Excavation typically extends into the ground and across an area, in both the vertical and horizontal direction on a scale of feet, tens of feet or more. Excavation is typically associated with some type of construction activity.

Any area of excavation will be considered unsuitable for all types of sewage disposal system use. The excavated area, including any embankments associated with it, is to be delineated on a soil map, red line color-coded and shown as being unsuited for SDS use.

However, in some unique circumstances, the remaining area of an excavated landscape can be utilized for some type of sewage disposal system. These cases usually involve areas where the existing soil had an unusually great depth of A and B material to some type of blocking layer in the soil profile. Thus, if 24 inches of soil with some degree of permeability still exists above a blocking layer, the soil may still be suitable for some type of SDS use.

This type of case is rare; however if it is encountered, the soil area shall be evaluated through Ultra High-Intensity Soil Mapping. The required spacing of the grid stakes shall be determined by the Department.

(b) Cut Areas

Cut areas are essentially the same as excavated areas in that soil material, whether natural soil or fill material, is mechanically removed from a site. However, cut areas tend to be characterized by the horizontal extent of the soil removal rather than the vertical extent. Generally, cutting is the result of the attempt to level an area, thus the resulting landscape may not have an obviously altered appearance as does an excavated landscape.

An area is considered to have been *cut* if four (4) inches or more of the naturally occurring soil profile has been removed. When cut areas are encountered, they are to be evaluated in the same manner as areas of excavation (i.e. through Ultra High-Intensity soil mapping). Any area of cut soil will be considered unsuitable for all types of SDS use.

Through the soil mapping process, it shall be demonstrated that a mapping unit has an adequate depth of suitable soil material to a blocking layer, thus proving that it meets the requirement to be utilized for a specific type of sewage disposal system. If the overall suitability for sewage disposal use of the natural soil has not been lost, the area could be mapped as, for example Cut Stiversville, 75MPI. This example shows that the soil is still usable, however it now has a higher MPI rating (Stiversville is typically a 30 to 45MPI soil) because it now has a lesser depth to a blocking layer than it did before it was cut.

(c) Cut Embankments or Escarpments

Cut embankments or escarpments are man made features usually resulting from excavation or cutting into the face of a sloping land surface. Embankments tend to be thought of as a gently sloping to steeply sloping feature, whereas an escarpment is thought of as being a very steeply sloping to nearly vertical feature.

Embankments or escarpments are commonly found adjacent to roadways (of any type), around the perimeter of borrow pits, open pit phosphate mines, areas mined for *top soil*, man-made ponds or lakes and sites of construction (i.e. house cut). All of these features are created by the mechanical removal of soil.

It is critical that any significant embankment or escarpment be properly and accurately located on the soil map. These factors become extremely critical when the possible use of alternative sewage disposal systems is involved.

A significant embankment or escarpment is recognized as:

- when occurring on a 0 to 15 percent slope, the cut portion of the embankment has a vertical relief measurement of 18 inches and having a 1:1 slope or less.

- when occurring on a 15 to 25+ percent slope, the cut portion of the embankment has a vertical relief measurement of 12 inches and having a 1:1 slope or less.

- when occurring on any slope class and having a near vertical to vertical face.

(d) Fill Material

Fill material means soil material transported and deposited or excavated and redeposited through mechanical means by man. Soil material transportation and deposition are evidenced by one or more of the following factors:

- there are no distinct soil horizons present, the soil appears *mixed* and/or contrasting soil textures and colors are found at various depths.

- if there are some apparent soil horizons present, they will look altered or suspicious.

- the fill material typically exhibits some form of depositional stratification, where the material was placed in lifts by the earthmoving machinery thus creating soil layers that have abrupt boundaries to contrasting kinds of soil material.

- compaction of the natural soil material or layers of fill resulting from the machinery traversing the filled area.

- a buried organic layer may be encountered.

- the original or natural soil is encountered underneath the fill material.

- the position of the current landscape does not appear in proper relation to the surrounding landscape.

- contrasting geologic materials are noted, such as finding cherty Highland Rim material on a site in the Inner Basin.

- the presence of trash or man-made objects in the soil material.

The composition of the parent material is commonly reflected in the formation of the natural soil and the succession of soil horizons are characteristic of a natural, undisturbed soil. A soil horizon is defined as a layer of soil, approximately parallel to the soil/ground surface, having characteristics produced by soil forming processes. Once these natural soil horizons have been disturbed and the soil moved from its point of origin, the soil material becomes fill material.

1) Delineating Areas of Fill Material

The first step in assessing a filled area is the delineation of the natural soils from the fill material. The site is to be mapped by means of a Extra High-Intensity (50 foot grid) soil map for the initial assessment. There will be cases where an Ultra High-Intensity (25, 15 or 10 foot grid) soil map is required by the Department.

If a site is suspected or known to be filled, it is recommended that the consultant contact the Department to find out if the site has been previously assessed (i.e. has had any intensity of mapping).

2) Rating of Fill Material

<u>NOTE:</u> *The Department shall consider that any site covered in any depth of fill material to be unsuitable for SDS use. Any proposed use of a filled site shall be proven to the Department's satisfaction, via the specified soil mapping intensity, that it can be utilized in some manner or that the fill can be completely removed from said site to allow for the use of the existing natural soil.*

Any site or soil mapping unit found, other than the conditions outlined in Subpart 5)(i) in this part, to consist of fill material is to be red line color-coded.

Any site encountered as outlined in *Subpart 6)(i)*, may be assessed and rated with the AFR modifier. However, the mapping unit is still to be red line color-coded. The Department will not permit a site until it is shown that the fill material has been removed and the site reassessed per the requirements outlined in Subpart 5).

Any site encountered as outlined in *Subpart 6)(ii) & 6)(iii)* (fill material exceeding 12 inches in depth), is to be mapped appropriately (i.e. delineating the filled area) and red line color-coded. If the consultant mapping the area is of the opinion that the natural soil under the fill, provided it can be observed in some manner, has some potential for SDS use, notes to this effect are to be placed on the soil map. A recommendation is to be made as to the areas where the fill is to be removed and the depth of the fill material to be excavated from that area.

Prior to making such fill removal recommendations, It is important to consider what topographic configuration the site may have once the fill is removed. If the end process of fill removal leaves a closed depressional area with no surface drainage outlet, the site will still be considered unsuitable for SDS use regardless of the natural soil present. If the natural soil can be shown to be suited for SDS use and the fill removal leaves a closed depressional area, the consultant should note that the site could be utilized provided the area can be successfully drained.

3) Removal of Fill Material

The fact that most filled sites will require the removal of the fill before SDS permitting will be allowed by the Department, dictates that the consultant mapping a filled area must make every effort to provide all possible information pertinent to the site. The information provided by the consultant (i.e. extent of the fill, depth of the fill, nature of the fill, etc.) will be critical when the fill removal operation is started by a contractor, especially on sites where the soil under the fill will be considered for SDS use.

Fill material less than 6 inches deep may be left in place only if a soil mapping unit, under consideration for SDS use, meets the criteria outlined in *Subpart 5)(i)*.

Fill material less than 6 inches deep shall be removed from a site as outlined in *Subpart 5)(ii)* if the site is being soil mapped and is under consideration for SDS use.

Fill material, regardless of the nature of the material, shall be removed from a site if it is found to exceed 6 inches in depth on any portion of the site being soil mapped and more specifically on any mapping unit or area of consideration for SDS use.

In many cases, the Department will stipulate that if an area of fill is to be removed from a site under consideration for SDS use, the fill removal shall be field supervised by a Soil Scientist/consultant.

4) Site Reassessment After Fill Removal

The site shall be reassessed After Fill Removal (AFR) to ensure that the fill removal process did not damage (cut or compact) the mapped soil units.

The fill material will have to be removed from the site and then the site gridded for Ultra High-Intensity (minimum of a 25 foot grid, possibly smaller) soil mapping. Once the grid is set, the site is to be remapped.

<u>IMPORTANT NOTE</u>: This final assessment of the filled site will be the only soil mapping documentation that will be utilized by the Department for review and subsequently making the determination of the suitability of the site for SDS use.

5) Evaluating a Filled Area -
Fill Material Depth of 6 Inches or Less

If the fill material is found to be from 1 to 6 inches in maximum depth over the whole site, the natural soil below the fill has not been adversely affected (cut or compacted) by the activity of filling and the soil can be assessed to a minimum of 36 inches deep, then the soil can be rated as if the fill material was not present and the appropriate MPI rating assigned to the map unit.

(i) The fill material may be left in place and a SDS installed in the filled area only if all of the following conditions exist:

a. The fill material shall be 85-90% homogeneous in its composition over the area mapped.

b. The fill material shall be compatible (i.e. same texture) with the surface horizon of the natural soil under the fill material.

c. The natural soil under the fill material was not cut or compacted such as to require some type of soil improvement practice.

(ii) The fill material shall be removed if any of the following conditions are found to exist:

a. The fill material is found to have considerably different soil textures (heavy clay textures, etc.) from the natural soil under the fill.

b. The fill material contains unsuitable materials such as commercially processed gravel or vegetative debris (i.e. wood, grass, etc.).

c. The natural soil under the fill material was compacted or cut to the extent that it now has unsuitable soil characteristics and now some type of soil improvement practice (e.g. chisel plowing or soil modification) would be necessary to remediate the damage to the natural soil.

IMPORTANT NOTE: Careful notes, either in the soil map note Section or with each mapping unit, are to be shown on the soil map describing the nature (i.e. extent, range of depth, textures, disturbance of the natural soil, etc.) of the fill material encountered and the condition of the natural soil under the fill. These notes are especially critical if there is a possibility of utilizing the filled site for any type of SDS.

6) Evaluating a Filled Area -
Fill Material Depth Exceeding 6 Inches

(i) Fill Material - 6 to 12 Inches in Depth

If the fill material is found to be from 6 to 12 inches in maximum depth over the whole site, the natural soil below the fill has not been adversely affected (cut or compacted) by the activity of filling and the natural soil can be assessed to a minimum of 36 inches deep, then the soil can be rated as if the fill material was not present and the appropriate MPI rating assigned to the map unit with a modifier of AFR (After Fill Removal) attached to the soil rate. Any other necessary soil improvement practice is to be noted as a condition to receive the indicated MPI rating.

(ii) Fill Material - 12 to 24 Inches in Depth

Soil observations shall be made with a 5 foot or longer, auger (standard bucket and a 4 foot extension) or perhaps with backhoe pits.

NOTE: The use of backhoe pits is left to the discretion of the consultant. Backhoe pits will not be a requirement of the Department since the Department would not recommend that anyone enter a pit exceeding 4 feet in depth.

If the fill material is found to be from 12 to 24 inches in depth, over the whole site, the natural soil below the fill has not been adversely affected (cut or compacted) by the activity of filling and the natural soil can be assessed to a minimum of 36 inches deep, then the soil can be rated as if the fill material was not present and the appropriate MPI rating assigned to the map unit and with a modifier of AFR (After Fill Removal) attached to the soil rate. Any other necessary soil improvement practice is to be noted as a condition to receive the indicated MPI rating.

(iii) Fill Material - 24 to 48+ Inches in Depth

Making accurate interpretations of the natural soils in this circumstance becomes very difficult to nearly impossible.

Soil observations would have to be made with an auger set up to add shaft extensions to bore through the fill or perhaps with backhoe pits.

NOTE: The use of backhoe pits is left to the discretion of the consultant. Backhoe pits are not a requirement of the Department since the Department would not recommend that anyone enter a pit exceeding 4 feet in depth.

If the fill material is found to be from 24 to 48+ inches in depth, the site is to be mapped, delineated, appropriately described and red line color-coded. The Department will consider the site unsuited for SDS use.

If enough information about the natural soil under the fill is obtainable, the consultant is to make recommendations as to whether or not the site warrants any further investigation.

(e) Soil Compaction

Soil has a natural density or state of compaction called *bulk density*. Soil compaction occurs when outside forces, usually by mechanical means (i.e. man made vehicles of any type), impact on a soil area and increase the soil bulk density, concomitantly decreasing the soil porosity. The increase in the soil bulk density is a function of both the compactive forces applied and the soil moisture content at the time the force is applied.

The soil moisture content is very important to the amount of soil compaction that occurs. If the soil moisture content is low, the soil particles are randomly organized thus requiring greater forces to compact the soil.

As the soil moisture content increases and the water film between the soil particles becomes thicker, the film acts as a lubricant between the soil particles. Thus, as forces are applied to a soil area, the soil particles become oriented by sliding over and around each other to form a denser mass. As the mass becomes denser, the large pore space is replaced in the soil mass by the oriented soil particles. An increase in the applied force, to a soil area, results in a higher degree of orientation of the soil particles and the subsequent increase in the density of the soil.

As the thickness of the water film between the soil particles increases further, the density decreases due to the dilution effect of the water on the concentration of the soil particles per unit volume. The increased amount of water, which is now filling the pore spaces, prevents the soil particles from sliding over and around each other to become oriented, thus making the soil more difficult to compact.

The most common cause of soil compaction is through vehicular traffic over a soil area. The type of vehicle and the manner in which it travels across the ground surface (i.e. wheeled or tracked) affects the degree of compaction of the soil. Soil compaction can result from both horizontal forces (thrust) and vertical forces (loading). Typically, the compaction that a Soil Scientist will encounter is caused by the vertical forces or loading, from the weight of the vehicle that traveled over an area. A wheeled vehicle can cause compaction to greater depths (as deep as 35 to 40 inches) due to the smaller contact area in which the tire has with the ground surface as opposed to a tracked vehicle which distributes the weight of the machine over a much larger area.

Regardless of the cause of the compaction, the consultant is required to delineate the area of the compaction and determine the depth of compaction. The following properties, being very general in nature, are usually found in compacted soils:

- *mottling* - compacted soils may sometimes be mottled with gray or brown colors.
- *texture* - sandy, loamy and silty textured soils are usually more susceptible to compaction due to the nature of pore spacing in the soil. Clay soils, though considered less susceptible, can also be compacted; compaction in clay soils is usually more difficult to remediate.
- *structure* - compacted soil tends to have massive structure. The compacted soil will fracture into irregular chunks having angular corners or will have a platy appearance.
- *consistence* - a compacted soil layer will exhibit brittleness, somewhat similar to a fragipan and will usually shatter suddenly into a friable mass that displays very little cohesion or plasticity when compressed between the forefinger and thumb.
- *moisture* - the degree of moisture in the compacted layer will usually be much less than that of an uncompacted soil (due to the reduction of pore space and overall porosity), even under wet climatic conditions. Under dry conditions, the compacted layer is generally very hard and difficult to bore with a hand auger.

- *depth* - the compacted layer usually begins within the upper few inches of the profile of the natural soil. The hardest or densest part of the compacted area is usually the upper few inches of the compacted layer.

- *thickness* - the thickness of the compacted portion of a soil profile can be quite variable. The degree of compaction depends upon the length of time a load was applied to the area, the moisture content of the soil at the time the load was applied and the means by which the load was applied. Soil compaction can extend as deep as 35 to 40+ inches into a soil but is generally confined to the upper 10 to 20 inches of the soil profile.

Any areas of compaction shall be considered unsuitable for any type of sewage disposal system use. The area is to be delineated on a soil map, the depth of the compaction is to be noted and the unit red line color-coded and shown as being unsuited for SDS use. The consultant is not to make any assessments as to the possible soil rate once subsoiling is completed.

If a compacted soil area is going to be considered for any type of SDS utilization it is strongly advised that the consultant making the assessment of the compacted site contact the a Department Soil Scientist to set up a meeting for an on-site consultation.

Before a compacted site can be considered for SDS use, the compacted soil area shall be broken up. This operation is generally accomplished by utilizing tracked or heavy-duty wheeled machinery with subsoiling implements. The Department will typically require that a subsoiling operation be initiated in the driest part of the year (usually August) when soils tend to have a low moisture content. The Department will usually require that the compacted area be subsoiled thoroughly in one direction and then in the direction perpendicular to the first direction. The area is to be subsoiled to a minimum of 6 inches below the depth of the compaction.

A compacted soil area shall be reassessed after the subsoiling operation is completed. One subsoiling operation may not completely remediate a compacted area, thus several assessments may be necessary over long period of time. Full remediation of a compacted site may require several months to several years. The Department shall consider sites where the compaction of the soil extends to depths greater than 18 inches to be beyond remediation.

(f) Soil Mixing

The term *soil mixing* is used to describe areas of disturbed soils that do not fall into any of the aforementioned categories. The areas of soil mixing have been disturbed to some degree, but the area has not been cut, excavated or filled in an obvious manner. In many cases the landscape does not readily show any indication of the mixed soil area.

Three common scenarios found on properties are:

1) While mapping a site, it is noted that there are areas where the upper 6 to 10 inches of a normal soil profile has been mixed, but otherwise the soils are natural.

   This condition is usually the result of the clearing of wooded land or perhaps debris from an area, with a bulldozer. The soils are generally not harmed to the point of rendering them unsuitable for SDS use. They can usually be mapped, delineated and rated for SDS use with an appropriate note on the soil map describing the *mixed nature* of the soil.

2) While mapping a site, it is noted that there are randomly located areas, or *spots*, where the soil has been mixed from the surface to depths in excess of 10 inches and perhaps to depths in excess of 36 inches. The most commonly noted feature of these mixed spots is that they do not generally cover a large area.

This condition is usually the result of the clearing of wooded land and pushing up the stumps and root balls of large trees with a bulldozer. This condition is also associated with back-filled pits that were excavated for some purpose (usually the burial of trash, vegetative debris or animals).

IMPORTANT NOTE: When a mixed soil area is found to cover a large area and not just in spots, the consultant should be looking for indications of past mining activity. There are several areas of Williamson County where phosphate mining was conducted. Many of these sites are old and were reclaimed many years ago and thus may not show any obvious indications of the disturbance aside from the mixed soil. Mining activities are gone now, but were in operation through the 1980's. Therefore, the mined areas shown in the Williamson County Soil Survey, issued in 1964, are not the only mined sites in the county.

NOTE: This type of mixed soil area is considered unsuited for SDS utilization. The area is to be delineated and red line color-coded. Furthermore, the consultant is to make a recommendation as to an appropriate buffer distance to maintain from these areas with any type of sewage disposal system that could be placed in adjacent soil mapping units.

3) Many times, a combination of both 1 and 2 are found together on a mapping site.

The mixed soil areas described can be found anywhere since most all open land was cleared (and in some cases phosphate mined) at some point in history. The factor of time can allow for the *healing* or *recovery* of the landscape and thus covering or disguising the signs and evidence of where land was cleared. The mixed soil areas are most evident on recently cleared land.

(5) Slope

The slope classes discussed in this Subsection shall be used on all intensity soil maps. These slope classes are specifically designed to coincide with the SDS design criteria mandated in the Willliamson County Subsurface Sewage Disposal Regulations.

Slope shall be expressed as a percentage. The use of a clinometer is required to ensure the accurate measurement of the slopes.

The following slope class breaks are mandatory:

(a) Mapping for Conventional Systems
   1) 0-5 percent
   2) 5-15 percent
   3) 15-25 percent
   4) >25 percent
(b) Mapping for Low Pressure Pipe Systems (standard or modified)
   1) 0-5 percent
   2) 5-15 percent
   3) 15-25 percent
   4) >25 percent
(c) Mapping for Mound Systems (standard or modified)
   1) 0-6 percent
   2) 6-12 percent
   3) >12 percent

(d) Mapping Units to be Considered for Percolation Testing

1) 0-5 percent
2) 5-15 percent
3) 15-20 percent
4) >20 percent

Any mapping unit with a slope of greater than 25 percent (>12% in the case of mapping for a Mound) shall show only the name of the soil series, variant or landscape designation (e.g. Gulliedland), the slope designation of greater than 25 percent and a red line color-code. Do not denote the estimated soil absorption rate of the soil or indicate any other soil properties or characteristics in the map unit delineation or in the soil map notes.

Any mapping unit in which the consultant determines that percolation testing will be required, shall have a slope of less than 20 percent. Mapping units consisting of soils that could be percolation tested but have slopes greater than 20 percent shall show only the name of the soil series or variant, the slope designation of greater than 20 percent, a red line color-code and note indicating the unit to be *not percable*.

<u>NOTE:</u> Williamson County Sewage Disposal Regulations do not allow for the use of soils on slopes greater than 25 percent.

(6) Soil Drainage Classification

Soil mapping units consisting of soils that are classified as being Very Poorly Drained, Poorly Drained or Somewhat Poorly Drained are to receive a red line color-code and are to be shown with an estimated soil absorption rate of >75MPI. Where any soil mapping investigation is intended to delineate soil areas for percolation testing any of the aforementioned drainage classifications, where found and mapped, are to be clearly addressed with a notation indicating the unit to be *not percable*

(7) Rock and Non-rock Restrictive Horizons

Where soil mapping units are being delineated for any type of SDS consideration or for the determination as to whether or not a site is eligible for percolation testing, any and all information that can be obtained, via soil observations and probing (in some cases backhoe pits), is to be shown and noted on a soil map regarding the depth to rock or non-rock restrictive horizons when these soil features are evident or suspected in an area of soil mapping.

Disclaimers are typically placed on soil maps concerning rock depths or depths to non-rock restrictive horizons. However, a disclaimer regarding this or any other matter, does not relieve the consultant of making every possible effort to determine the nature of the rock in a mapped area if that area is to be considered for any type of SDS use.

For the purposes of discussion in this Section, the term *rock* will be synonymous with an R layer, lithic contact and unweathered bedrock. The term *non-rock* will be synonymous with Cr horizons, Bt horizons, paralithic contact, weathered rock, saprolite, water table or fragipans.

- *<u>Note on Saprolite</u>:* Though saprolite is geologically associated with igneous and metamorphic rock, the characteristics that define saprolite can be found in some sedimentary rock formations. Two prominent rock formations in Williamson County, the Hermitage Formation in the Outer Central Basin and the Ft. Payne Formation on the Highland Rim, are sometimes found to be deeply weathered. The weathering of the limestone is to the extent that the Cr horizon, particularly in the Hermitage formation (where the limestone bedding planes are clearly visible in deeply weathered areas), will have the appearance of saprolite, thus being *saprolite-like* or *saprolitic*.

<u>NOTE:</u> In Williamson County, any soil area found to be less than 24 inches in depth to Rock or a Cr (Non-rock) Restrictive Horizon, is considered unsuitable for SDS use and the area is to be delineated as a map unit an red line color-coded.

(a) Rock

Several soil series mapped in Williamson County are well known for being shallow in depth to rock and thus not suited for SDS use. Other soil series mapped in the county may not necessarily be described as being shallow to rock, but rock outcrops and shallow depths to rock are typically associated with the soil series. Many of the soils that are associated with rocky areas are common to the Inner Central Basin. However, associations of this type are not limited to the Inner Central Basin and are indeed found in all physiographic regions of the county.

When mapping in an area where rock outcrops are observed and/or shallow, subsurface rock inclusions (such as floaters or pinnacles), are encountered, a description of the nature of the rock shall be required in some manner on the soil map. Such notations shall be highlighted or written on the final soil map in a conspicuous manner. This may be done by placing rock depth descriptions in the soil map note section or by placing rock depth descriptions with the soil mapping unit notations.

However, where any soil mapping unit is indicated as being suited for SDS use, said map units shall not be described as having a percentage of subsurface rock or underlying rock within those units and assigned an MPI rating of 75 or less. Where any such mapping units are suspected as having a potential rock problem, the consultant shall either delineate such rock or denote the soil mapping unit as unsuited for SDS use with a red line color-code. Additionally, the consultant may indicate that such units are unsuited for SDS use, however they may have potential for use should such units be assessed via Ultra High-Intensity soil mapping procedures.

<u>NOTE:</u> *This requirement applies only when the soil mapping unit is to be considered for SDS utilization. Red line mapping units with outcropping rock or subsurface rock inclusions will not require detailed description. The only notation regarding the depth of the rock, in a red line map unit, will be a description of the general or average depth to rock (e.g. Talbott, 20-22" to rock, 0-5% slopes or Ashwood-Barfield-Rock Outcrops, 10-26" to rock, 15-25% slopes) in the map unit.*

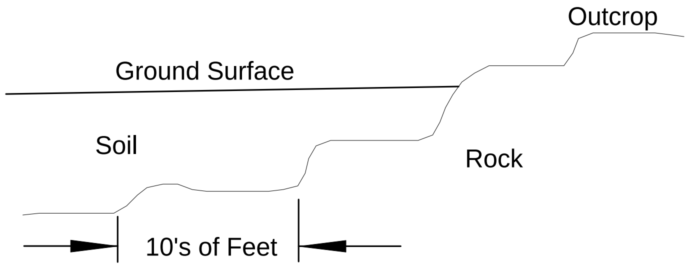
When delineating a red line mapping unit consisting only of Rockland (areas where 50 to 90 percent of the ground surface is exposed rock), it is not necessary to describe the nature of the rock or to delineate the required slope units. The map unit can simply be shown as Rockland with the range of slopes of the Rockland mapping unit (e.g. Rockland, 5-20% slopes).

Common terms used to describe the nature of rock outcrops, shallow subsurface rock layers or inclusions are:

- Tabular - broad, flat, areas of rock, typical to *glade* areas
- Undulating - subsurface rock, deep and shallow in places
- Pinnacle - rock found in spots in mapping area

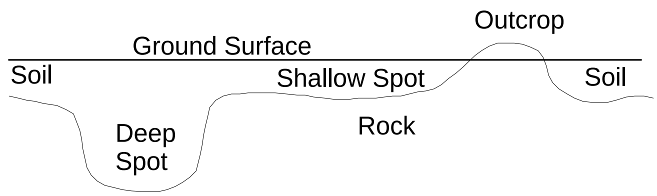
If the general nature of the rock depth remains questionable, no matter how much effort is expended on investigating a site (via probing and boring auger holes), the most restrictive soil depth noted in the mapping area (i.e. the shallowest rock depth encountered) is to be considered as the overall determining factor as to the suitability of the mapping unit for SDS use.

Figure A1-7 shows some common rock scenarios. The combinations of arrangements of subsurface rock is infinite. The natural complexity of the configurations of rock outcrops and related subsurface rock formations makes soil mapping in these areas difficult. The task becomes even more difficult when attempting to map the extent of soils suitable for SDS use and subsequently making the appropriate interpretations of the soils in these areas.



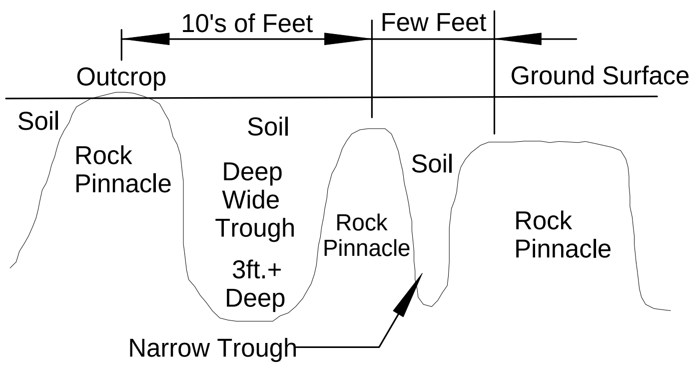
TABULAR

Generally associated with glade areas. The rock outcrops, when seen at the ground surface, exhibit a tabular appearance and typically cover large areas.



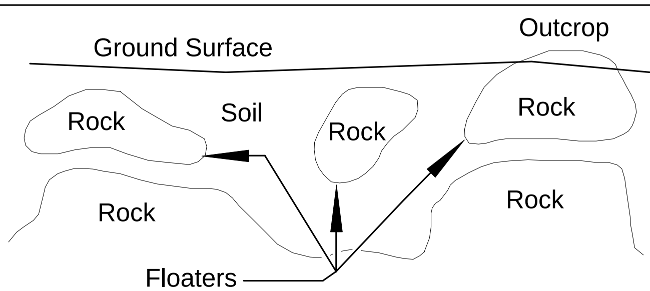
UNDULATING

The rock surface, below the soil, undulates. There will be deep spots and shallow spots of soil, with occasional surface outcrops of the bedrock.



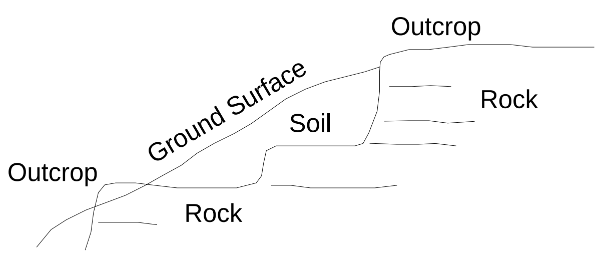
PINNACLE & TROUGH

This subsurface rockscape is characterized by rock pinnacles adjacent to deep troughs. These rock features generally trend with the local joint pattern found in the bedrock formations.



FLOATERS

Floaters are generally random in nature. They may or may not be associated with any of the aforementioned examples.



STAIR-STEP or LEDGE ROCK

This rock scenario is most typical of hillsides. However, it may be present on any degree of slope and in any type of soil association.

Figure A1-7. Examples of common subsurface rock scenarios.

(b) Non-rock Restrictive Horizons

The discussion of this Section will focus on four of the most common restrictive horizon scenarios encountered in soil mapping for SDS evaluations. The soil characteristics of concern are: water tables (seasonal or permanent), fragipans, abrupt clay horizons and Cr horizons (the most notable example being that of the *Hawthorne* soil series).

1) Water tables

When soil characteristics (2 chroma or less mottles) indicating water table problems (seasonal or permanent) are encountered, serious consideration of the nature of the site and soils shall be taken into account when making the assessment as to the suitability of that site for SDS use.

Water table problems encountered in a soil in the upper 24 inches of the soil profile make that soil unsuited for SDS use, unless a soil improvement practice can be utilized to remediate the problem with the site. If the soil properties are such that a soil improvement practice will not be effective in removing the water problem (such as in moderately well to poorly drained clay soils), the soil mapping unit is to be red line color-coded.

Since most water table problems are found on floodplains, foot slopes or on level to gently sloping upland positions, the consultant must make the determination as to interrelationships between:

- ♦ the topography of the area as it affects the site -
  - is the site on a concave or convex landscape position.
  - is surface water directed onto the site by the topography of the area.
  - will the topography allow for the diversion, in some manner, of surface and/or subsurface water affecting the site.
  - is the relief of the site such that there will be a positive outlet to any proposed or recommended soil improvement practice.
- ♦ whether or not the soil properties will allow for the soil to be drained utilizing a soil improvement practice -
  - is there a suitable blocking layer or restrictive horizon present into which a drain may be tied in order to provide an effective barrier to any laterally moving subsurface water.
  - is the texture of the upper 24 inches of the soil profile such that it will respond to drainage improvements.

2) Fragipans

Fragipans, whether strong or weak, are considered to be blocking layers or restrictive horizons. Unlike a water table, the fragipan is a fixed feature in the soil profile, thus its position in the soil profile does not fluctuate. When they are found to be present in the upper 24 inches of the soil profile, the soil mapping unit containing a shallow fragipan is unsuitable for SDS use and is to be red line color-coded.

In order to properly assess soils with fragipans for SDS use, the depth of the pan shall be determined with accuracy. Well over 95% of sites found to have fragipans require some type of soil improvement practice in order to utilize the site for SDS use.

Essentially, most sites with fragipans have some type of water problem. Thus, the consultant must make the determination as to the interrelationships between the soil mapping unit with the fragipan, to the topography and drainage factors (as noted in the previous Section regarding water tables) of the immediate area to make a determination as to the suitability of the site for SDS use.

3) Abrupt Clay Horizons

When a soil horizon exhibiting an abrupt increase in its clay content (i.e. relative to the textures prior to this horizon and having a 35% or more clay content) is encountered, that horizon is considered to be a blocking layer. Any soil series encountered containing these clayey horizons are to be assessed in much the same manner as soils with fragipans. If the clayey horizon is found to be present in the upper 24 inches of the soil profile, the soil mapping unit containing this horizon is considered unsuitable for SDS use and is to be red line color-coded.

Unlike soils having shallow water tables or fragipans, many soils found with these abruptly occurring horizons are well drained and the soil unit may allow for percolation testing if said horizon is 18 inches or more below the ground surface with an adequate depth to rock (i.e. in excess of 36 inches to said rock).

4) Cr Horizons

There are several soil series that are well known for having a weathered Cr horizon and in Williamson County the Cr horizon is considered to be a restrictive horizon. Thus, the depth to the Cr horizon and the textures of the soil material above the Cr horizon will be the main factors in interpreting and rating these soil areas for SDS use.

When the Cr horizon is present in the upper 24 inches of the soil profile, the soil will be considered unsuited for SDS use and a soil mapping unit containing this horizon is to be red line color-coded.

The approach to mapping and interpretation, regarding the suitability of a site for SDS use, of areas where soils having Cr horizons are found to be present is essentially the same as in the methodology outlined in the part concerning rock.

The majority of the soil series, having Cr horizons, are associated with the Ft. Payne formation of the Highland Rim and the Hermitage formation of the outer Central Basin.

CHAPTER 4

SOIL MAP COMPILATION

Soil map compilation is the placement of the field information obtained by the consultant onto a plat prepared by a surveyor. The resulting product is a *final* soil map.

The final soil map, whatever type of map it may be, is to be presented in a neat, legible manner. Maps submitted to the Department that are deemed unreadable will be returned to the consultant for correction.

In order to standardize the method of presenting soil map information and data, this Chapter will discuss the format that shall be utilized by consultants preparing final soil maps for use by the Department.

A. Plat (base map) Requirements

The basic plat requirements are outlined in *Chapter 2, Section A of this Appendix*.

It shall be the responsibility of the consultant to comply with the format of the plat to be utilized for the final soil map. If the soil map is submitted to the Department for use and the plat is found to be incomplete, the soil map will be returned to the consultant.

<u>NOTE:</u> If the surveyor is unfamiliar with the Plat Requirements of the Department, please ask the surveyor to contact the Department. The Department will provide the surveyor, via regular United States Mail, with a copy of the plat format outline.

B. Soil Map Information Placed on Plat

All information placed on a soil map shall be drawn or written (by hand or typed) in ink.

(1) Type of Soil Map

The types of soil maps prepared for Department use in Williamson County are discussed in *Chapter 1, Section A of this Appendix*.

The type of soil map being submitted shall be clearly labeled on the map. A map is to be described as a:

- Ultra High-Intensity Soil Map
- Extra High-Intensity Soil Map
- Preliminary Soil Map

<u>NOTE:</u> For the Preliminary Soil Map, the words PRELIMINARY SOIL MAP shall be written, printed or stamped, in a prominent and conspicuous manner, in red ink. See Subsection (6) in this Section.

(2) Map Units

Soil Map Units are to be identified, delineated and plotted onto the grid shown on the plat during the field work of the mapping process. The soil map units that are to be delineated are outlined and discussed *in Chapter 3, Section D of this Appendix.* The soil map units are then transferred from the field work plat to the final soil map plat.

The soil map unit lines shall be drawn on the plat in black ink. Standard roller point pens or mechanical drafting pens should be utilized in preparing the final map. The use of any type of felt tip pen is unacceptable.

The National Map Symbol Handbook, from the USDA-NRCS, specifies that the line weight for soil unit delineations is to be .010". The preferred line weight for maps submitted to the Department is .010" or .2mm. The line weight of the map unit delineations shall not exceed .020" or .5mm.

(3) Map Unit Identification

All delineated soil map units, within the designated limits of soil mapping, shall be identified. Any map submitted to the Department found to have unidentified soil map units will be returned to the consultant for correction.

(a) Basic Soil Map Unit Description

The basic soil map unit description, including the appropriate color-code, shall consist of:

- the name of a soil series, taxadjunct, variant, miscellaneous land type or a symbol referred to in the notes or legend.
- the estimated soil absorption rate. *<u>The MPI rate shall be noted on each and every delineated soil mapping unit</u>. (The only allowable exceptions being the land classes such as the >25% slopes, gulliedland and Rockland).*
- the slope classification.

(b) Additional Information

Additional information that shall be placed along with the soil map unit description:

- a note stating the reason why a map unit is being designated as a taxajunct or variant.
- depth to a blocking layer or restrictive horizon (e.g. fragipan or Cr horizon).
- the soil improvement practice required if the MPI rating is dependent upon the utilization of the practice.
- the depth requirement for a curtain drain.
- designation of the type of SDS for which the MPI rating is intended.

The map unit description notation should be placed within the soil map unit on the map sheet if space allows. However, as is usually the case, if the soil map unit is small or has an odd configuration, the map unit description notation may be placed to the outside of the grid area and a leader line drawn to the soil map unit. When drawing leader lines, it is critical that these lines can be easily followed to the intended soil map unit and not confused with map unit lines or other leader lines.

Chapter 9, A1.5 shows examples of map unit description notations as utilized by the Department.

(4) Color Coding of the Map Unit Identification

The color-code system is intended to communicate from the soil map maker to the soil map user, in a visual manner, the predicted performance of each type of soil or site condition shown on the soil map.

(a) General Outline

Color coding is required on all soil maps submitted to the Department.

The color-code may consist of one, two or three color lines. The number of color lines needed will depend upon the characteristics of the soil, the nature of the mapping unit, what type of soil improvement practices are necessary or the type of SDS system the mapping unit will require.

Single color-code lines shall be placed under the name of each soil or miscellaneous land type for each soil map unit delineation. Additional color-code lines may be placed under the name identifying the map unit or under the portion of the map unit description notation that additional color is intended to address. The additional color-code lines are to be utilized to indicate where marginally favorable or unfavorable soil conditions or moderate or severe limitations can be reduced, avoided or corrected by some type of approved soil improvement practice.

Chapter 9, A1.5 shows examples of the various color-code scenarios utilized (seen in the <u>Soil Map Notes</u>) by the Department.

(b) Color Code Scheme

The color-code scheme is outlined along with some of the common soil criteria associated with the color or colors listed.

Green

- favorable soil properties exist in the entire upper 36 inches of the soil profile.

- the estimated soil absorption rate ranges from 10 to 60MPI in the upper 36 inches.

Yellow

- marginally favorable soil properties exist in the upper 36 inches of the soil profile without the use of soil or site improvement practices.

- the estimated soil absorption rate ranges from 61 to 75MPI in the upper 36 inches.

Red

- unfavorable soil properties exist in at least 17 inches or more of the upper 36 inches of the soil profile.

- the estimated soil absorption rate is greater than 75MPI, less than 10MPI or the soils have poor drainage, are shallow in depth to rock, are on slopes greater than 25 percent or exhibit any other characteristic that precludes their use for any type of SDS.

Red / Green

- unfavorable soil properties exist in some portion of or all of the upper 36 inches of the soil profile.

- the unfavorable properties may be avoided by restricting the installation depths of the field line trenches (conventional or by the use of a MLPP), requiring the use of a soil drainage improvement practice (e.g. curtain drain, etc.) installed to a specified depth or a combination of both of the aforementioned practices.

- the estimated soil absorption rate ranges from 10 to 60MPI in a minimum of 30 inches of the upper 36 inches after the necessary improvements have been made.

Red / Yellow

- unfavorable soil properties exist in the lowermost 12 inches of the 36 inches and marginally favorable soil properties exist in the upper 24 inches of the 36 inches of the soil profile.

- the unfavorable properties may be avoided by restricting the installation depths of the field line trenches (conventional or by the use of a MLPP), requiring the use of a soil drainage improvement practice (e.g. curtain drain, etc.) installed to a specified depth or a combination of both of the aforementioned practices.

- the estimated soil absorption rate is 75MPI in 24 inches or more of the upper 36 inches after the necessary improvements have been made.

Red / Green / Green

- generally favorable soil properties exist in the entire upper 36 inches of the soil profile.

- the estimated soil absorption rate ranges from 10 to 60MPI in the upper 36 inches.

- the uppermost 24 inches of the soil profile exhibits more favorable soil properties and has an estimated soil absorption rate ranging from 10 to 45MPI.

- the more favorable properties in the uppermost 24 inches may allow for the use of a alternative SDS (MLPP) in conjunction with the soil improvement practice of modification, thus allowing for the improved MPI rating of the soil mapping unit.

Red / Yellow / Green

- unfavorable or marginally unfavorable soil properties exist in the lowermost 12 inches of the 36 inches and favorable soil properties exist in the upper 24 inches of the 36 inches of the soil profile.
- the unfavorable properties may be avoided by restricting the installation depths of the field line trenches (conventional), recommending the utilization of a alternative SDS in conjunction with the soil improvement practice of modification, requiring the use of a soil drainage improvement practice (e.g. curtain drain, etc.) installed to a specified depth or a combination of all the aforementioned practices.
- the estimated soil absorption rate is 10 to 60MPI in the upper 24 inches of the 36 inches of the soil profile after the necessary improvements have been made.

Red / Red / Green

- unfavorable soil properties, being either rock or a Cr horizon, occurs at a depth of 24 inches in the soil profile.
- the estimated soil absorption rate would be considered greater than 75MPI, due to the shallow depth to rock.
- the existing 24 inches of soil has favorable properties (texture and drainage) and has an estimated soil absorption rate of 10 to 60MPI.
- the unfavorable properties may be avoided by recommending the utilization of a alternative SDS in conjunction with the soil improvement practice of modification, requiring the use of a soil drainage improvement practice (e.g. curtain drain, etc.) installed to a specified depth or a combination of both of the aforementioned practices.

Red / Red / Yellow

- unfavorable soil properties, being either rock or a Cr horizon, occurs at a depth of 24 inches in the soil profile.
- the estimated soil absorption rate would be considered greater than 75MPI due to the shallow depth to rock.
- the existing 24 inches of soil has marginally favorable properties and has an estimated soil absorption rate of 61 to 75MPI.
- the unfavorable properties may be avoided by recommending the utilization of an alternative SDS in conjunction with the soil improvement practice of modification, requiring the use of a soil drainage improvement practice (e.g. curtain drain, etc.) installed to a specified depth or a combination of both of the aforementioned practices.

(5) Map Notes

All map note information placed on a soil map shall be written (by hand or typed) in ink, printed, or photocopied onto the plat in some manner. If any map note information is placed on the plat in some other manner (e.g. separate sheet of paper attached to the plat), that information shall be written (by hand or typed) in ink or printed and attached to the plat in a permanent fashion so as to thwart any attempt at tampering with said notes.

The map note section of the final soil map is to be utilized by the consultant to explain and describe any aspect of the map, including any special requirements, complex features or site conditions that a user of the map will need to be aware of in order to properly interpret the map information. The notes should be comprehensive, concise and relevant to the soil and site conditions. In some cases, items or information on the soil map will or can be explained in the map legend or on the map unit identification notation and thus may not need to be placed in the note section.

The Department will not mandate a specific format in which to present notes on a soil map. It will be the responsibility of the consultant to assess the soil map that has been prepared and place the appropriate notes, specific to the mapped site, on the soil map.

See *Chapter 9, A1.5* for three examples of soil map note sheets used on maps produced by the Department. The examples include standard notes, specific notes regarding subsoiling and complex slopes and the soil map legends describing the abbreviations and symbols used on those particular maps.

IMPORTANT NOTE: Where the consultant, during the process of preparing or compiling a soil map, feels that a feature or unit on a map needs additional explanation, include a note to cover that particular topic. The more information provided on the map, the less likely that the map will be returned to the consultant for additional information.

(a) Required Notes

Since the content of a note section will vary with every map, the Department shall require the consultant to place the following basic notes on every map:

- ♦ there is to be a note indicating that the soil map is subject to a field review by the Williamson County Department of Sewage Disposal Management. The soil information presented on the map shall not be utilized for any final subdivision planning or engineering, for the design for any alternative sewage disposal systems or for the issuance of any SDS permits until the soil information has been verified as accurate by the Department.

  NOTE: This note shall be in the form of a Red Ink Notation, see Subsection (6) of this Section.

- ♦ there is to be a note indicating that any cutting, filling, compaction or any other disturbance of the soils mapped, after the date of map completion, will void the soil map. See *Subsection (6) of this Section* regarding this note.

- ♦ there is to be a note or notes indicating the meaning of the color-codes utilized on the soil map. See *Part (c) of this Subsection* for further explanation on how the color-code is to be defined. Also see *Chapter 9, A1.5* for examples of color-code explanations used by the Department.

- ♦ there is to be a note or notes addressing how and why a recommended soil improvement practice improves a higher MPI rating to a lower MPI rating.

(b) Commonly Noted Information

The following topics are typically discussed in the soil map note section in order to provide additional detailed information related to the site or the topic.

- depth to bedrock or the nature of encountered rock.
- depth to fragipans or other restrictive horizons.
- depth to permanent or seasonal water tables.
- depth requirements for curtain drains.
- any recommended soil improvement practices and directions on their implementation.
- why a soil map unit is designated as a taxajunct or variant.
- complex slopes associated with a map site.

(c) Information Not to be Noted

Information that is not to be noted or statements that are not to be made by the consultant include, but is not limited to the following:

- soil map unit notations containing MPI ratings at specified depths. Examples:
  - ◊ 45MPI @ 18" for LPP system
  - ◊ 75MPI @ 24" for Conventional system

- statements relative to the permitting of a soil or site for any type of sewage disposal system.

  The Department shall make all decisions regarding the suitability of a soil mapped site to receive a SDS permit. The consultant should never make any statements such as:

  ◊ "the soil can be used"

  ◊ "the soil can be permitted"

  ◊ "it is suitable for a ____ system"

  <u>NOTE:</u> The Department strongly advises that the consultant exercise caution when making any type of verbal or written statements to a client regarding the potential for a property to be permitted for a SDS.

- a detailed explanation of the color-code system is not necessary.

  Therefore, for the note section of the soil map, the following examples would be acceptable:

  ◊ *Green* - These soils have properties that are favorable for subsurface sewage disposal systems.

  ◊ *Yellow* - These soils have properties that are marginally favorable for subsurface sewage disposal systems.

  ◊ *Red* - These soils have properties that are unfavorable in their present condition for subsurface sewage disposal systems. The unfavorable soil properties shall not be improved through the use of soil improvement practices.

  ◊ *Red / Yellow* - These soils have severely limiting properties that are unfavorable in their present condition for subsurface sewage disposal systems, however with the use of the designated soil improvement practice (curtain drain installed at 42"), the soils will have properties that are marginally favorable for subsurface sewage disposal systems.

(6) Red Ink Notations

There are three statements that are to be placed on all soil maps submitted to the Department. These statements shall be hand printed or stamped in a prominent and conspicuous manner on the map in *red ink*.

♦ On every soil map submitted to the Department, there shall be a statement indicating that the soil map is subject to a field review by the Williamson County Department of Sewage Disposal Management. The soil information presented on the map shall not be utilized for any final subdivision planning or engineering, for the design for any alternative sewage disposal systems or for the issuance of any SDS permits until the soil information has been verified as accurate by the Williamson County Department of Sewage Disposal Management Soils Staff.

♦ On every soil map submitted to the Department, there shall be a statement indicating that *any cutting, filling or compaction of the soil mapped area will void this soil map*. The wording may be expanded or rearranged in any manner, but the basic statement shown is to be used.

The Department utilizes a rubber stamp worded as follows:

WARNING:
ANY CUTTING, FILLING OR COMPACTION OF THE SOILS IN THE AREAS MAPPED WILL VOID THIS MAP AND MAY RENDER ANY USABLE SOILS UNSUITABLE FOR ANY TYPE OF SEPTIC SYSTEM USE

This notation may be handwritten, using a red pen or stamped with a rubber stamp.

♦ On Preliminary soil maps only, there shall be placed the words **PRELIMINARY SOIL MAP** in a conspicuous manner upon the map.

Again, this notation may be handwritten, using a red pen or stamped with a rubber stamp.

(7) Map Legend

Every map submitted to the Department shall have a legend. The legend shall show all abbreviations and symbols utilized on the map sheet and the explanation or meaning of the abbreviations and symbols.

A legend allows or provides the means for the consultant to present a large amount of information, regarding site features and various soil improvement practices in a short, concise format.

When a symbol is utilized to represent a landscape feature (e.g. a gully symbol), the consultant could place a notation on the soil map to explain the symbol and any other pertinent pertaining to said symbol. This same task could be accomplished via the use of explanatory text in the soil map notes, however lengthy notes would have to be written in order to describe the feature and how to address it in terms of SDS use. Thus, in many cases, through the use of a legend, simple symbols and short explanations may be utilized.

The legend allows for the description of anything. If an abbreviation is needed, it can be created and used as long as it is explained in the legend. Standardized symbols noted in *part (b) of this Subsection* are to be utilized, however, if a symbol does not exist for a particular purpose, a new symbol may be created to use on the soil map with the explanation for the symbol noted in the legend.

(a) Abbreviations

Any abbreviation may be created and noted to describe some aspect of the soil map. As long as the abbreviation used is defined, it will be considered valid.

Abbreviations utilized to denote commonly used terms include:

MPI -------------Estimated Soil Absorption Rate in Minutes Per Inch
WCD -----------With Curtain Drain
WPD -----------With Positive Drainage
PCD -----------Plan Curtain Drain
WDD ----------With Drawdown Drain
PFSW ---------Protection From Surface Water
STTF-----------Subject To Temporary Flooding
PAN ------------Fragipan
PP---------------Plow Pan @ ____ inches
VAR ------------Soil Variant
OW -------------Overwash
DIST -----------Disturbed
AFR ------------After Fill Removal
FLDR ----------Field Line Depth Restriction
SS--------------Standard System
CS--------------Conventional System (same as SS)
LPP ------------Low Pressure Pipe Septic System
MLPP ----------Modified Low Pressure Pipe Septic System
WMS -----------Mound System

(b) Symbols

The map symbols described in this *Section* shall be utilized for maps submitted to the Department. The symbols have either been used in Williamson County by Department Soil Scientists over the years or have been taken directly from the USDA-NRCS National Map Symbol Handbook.

The only exception to the previous paragraph is where a feature found on a site is so unusual that there is no symbol to describe that feature, a symbol may be created to represent said feature and explained in the legend.

The Department shall require that all symbols, other than symbols concerning water features, be drawn on the plat in black ink. Standard roller point pens or mechanical drafting pens should be utilized in preparing the final map. The use of any type of felt tip pen is unacceptable.

Water features have a critical influence on the placement of sewage disposal systems, therefore the Department shall require that all symbols concerning water features be drawn in blue ink. The feature, when drawn in blue ink, is more easily seen and is less likely to be overlooked on a map.

<u>IMPORTANT NOTE</u>: Two water related features, which are extremely critical in assessing a soil map for SDS placement, shall be shown in red ink. They are the well symbol and the spring symbol.

The following listing contains the standard symbols to be utilized in Williamson County.

Streams, Drainways and Water Features -

- Intermittent Streams or Drainways - the lines are to be in the centerline of the feature and the arrowheads are to point in the direction of water flow. On level sites, arrowheads may be placed on each end of the line if the flow direction shall not be accurately determined.

Water Flow Area or One Dot Drain

This category represents an area of water accumulation or collection and subsequent channelization due to the configuration of the landscape. The area of channelization is typically characterized as having a u-shaped cross-section and typically shows no direct evidence of scouring on the ground surface. The contour of the landscape may allow for the placement of SDS field lines or LPP lateral lines across the course of the water flow area. See Figure A1-8.

Water Flow Area on a level site

Two Dot Drain

This category includes areas having a more visible or defined drainway. The area of channelization is typically characterized as having a more distinct v-shaped cross-section and may or may not show any direct evidence of scouring on the ground surface. The contour of the landscape *will not allow* for the placement of SDS field lines or LPP lateral lines across the course of the drainway. See Figure A1-8.

Three Dot Drain

This category includes areas having distinctly visible drainways, 1 foot or greater in depth, with an obvious stream channel. The contour of the landscape will not allow for the placement of any SDS lines across the course of the drainway due to the steepness of the slopes or the depth of the drainway. See Figure A1-8.

- Perennial Streams - the lines with arrowheads are to be in the centerline of the feature and the arrowheads are to point in the direction of water flow.

Stream, less than 10 feet wide

Stream, 10 feet wide or wider

The plain solid blue line is representing the stream bank and it is to be plotted according to the crest of the bank.

Stream, 10 feet wide or wider

The stream symbol (blue ink) would be shown in the centerline of the feature and the stream banks may be represented with a embankment symbol (black ink) plotted according to the crest of the bank.

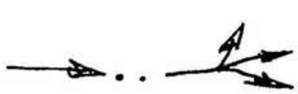
- Miscellaneous Stream, Drainway and Water Features -

Change in Size of Drainway

The drainway changes in size, for example from a one dot drain to a three dot drain, at the location of the short vertical cross line.

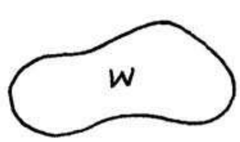
Erosional Drain

This category of drain describes a small, shallow drains (typically from 6 to 10 inches in depth) caused by activities of man. This type of drain may be smoothed over and conventional SDS field lines installed across these drains provided the depth of the drain does not exceed 10 inches. For LPP consideration the depth of the drains shall not exceed 6 inches.



Drainway Ends, Water Flow Dissipates

A plotted drainway, of any type and any obvious channel that the water was following along is no longer present, thus the water flow spreads out and dissipates.



Pond, Lake or Any Other Body of Water

The solid line denotes the water's edge.

This diagram show examples (in cross section) of one, two and three dot drains. The cross sections are intended to provide the consultant with a visual guide of the Department's concept concerning drain classification. The classification of drainways and the subsequent plotting of those drainways have a critical impact upon how soil mapping units may be utilized for SDS installations.

The vertical tick mark on each cross section represents the lowermost point of elevation of the drainway channel.

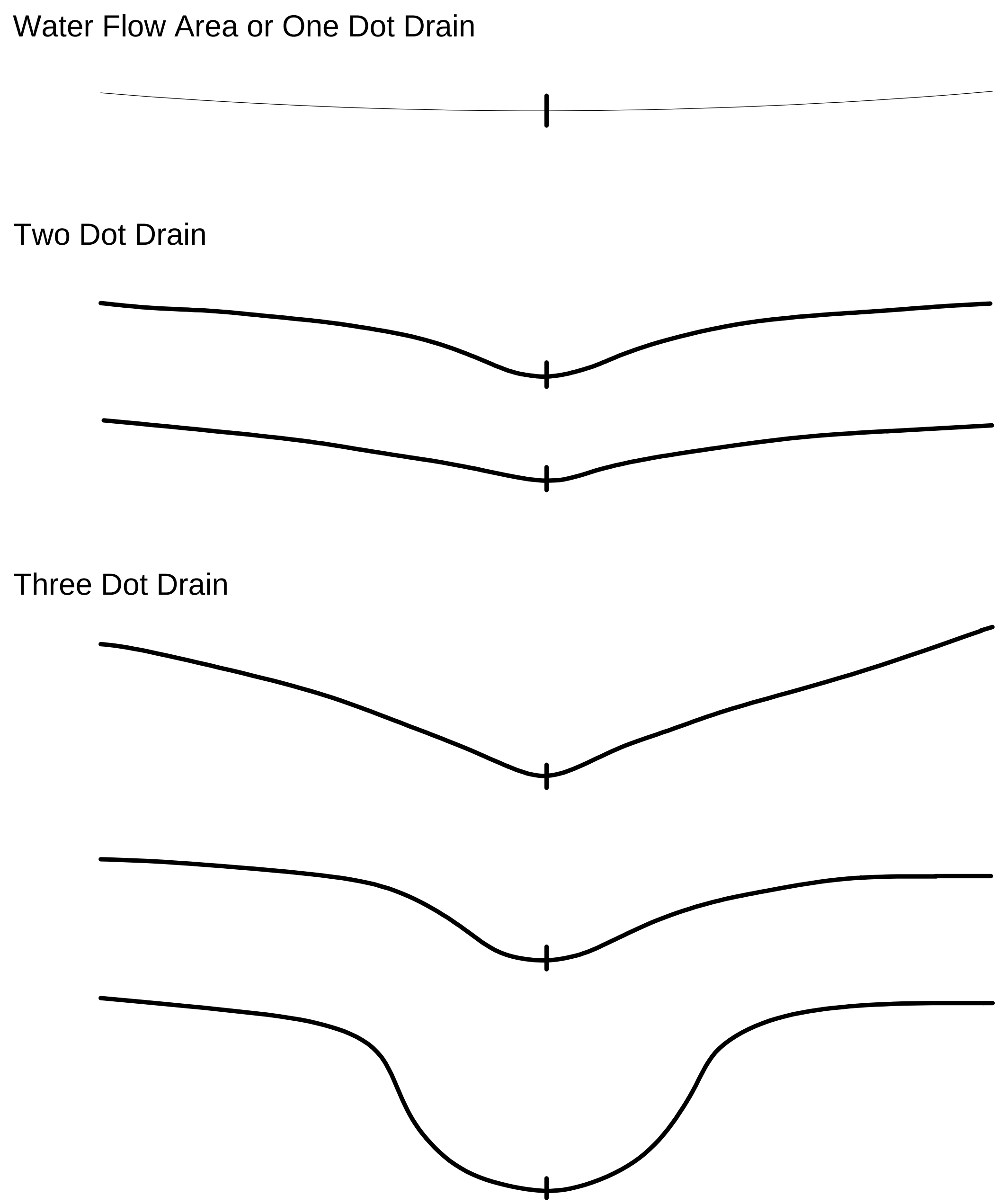
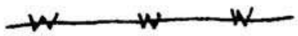
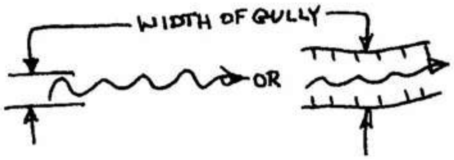


Figure A1-8. Typified drainageway cross sections.



Waterline (if known to be actual waterline)



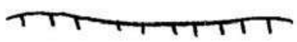
Gully

The width of the symbol on the map shall be scaled to represent the width of the feature on the landscape or embankment symbols shall be plotted on the map to represent the actual edges of the feature on the landscape.

Spring, ***SHALL BE SHOWN IN RED INK***

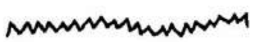
Well, ***SHALL BE SHOWN IN RED INK***

Topographic Features -

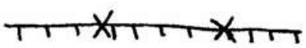


Escarpment, Embankment or Cut Bank

Solid line to be plotted on the crest of the feature and the tick marks to point to the down sloping side of the feature.



Rock Bluff or Escarpment



Fence Row with Embankment

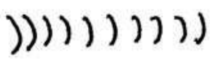
This feature is typically created by agricultural practices.

Short, Steep Slope

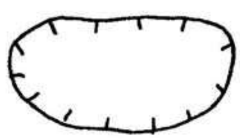
This feature, due to its relief, would or could affect the placement of a SDS of any type.

Agricultural Terrace

The solid line is to be plotted as the crest of the feature and the tick marks are to show the downslope side of the berm. The arrow lines, ***DRAWN IN BLUE INK***, are to be plotted to represent the bottom of the trough.

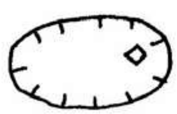


Built-up Berm or Plow Throw

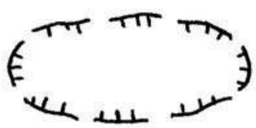


Closed Depression, Pit or Large Sinkhole

This type of feature has no obvious surface outlet and typically shows evidence of ponding water, either after heavy rain events or seasonally.



Closed Depression or Sinkhole with Outlet

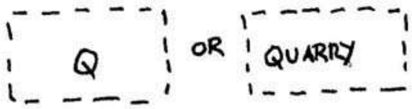


Possible Closed Depression or Sinkhole

This feature may not have an obvious surface water outlet. If it is suspected to be a closed depression or sinkhole, use this symbol and make a notation describing this feature. This type of feature may need to be assessed by an engineer or surveyor via a topographic study of the vicinity of the feature.

Small Sinkhole, Soil Pipe or Dropout

This symbol is to be used on these types of features where the diameter of the feature is 10 feet or less.

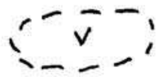


Quarry

Tree Throw

Miscellaneous Features, Natural and Cultural -

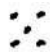
Rock Outcrops



Subsurface Rock

The limits of shallow subsurface rock is to be noted in this manner, if it is encountered during mapping and its limits can be delineated.

Abundant Chert Fragments



Sand Spot

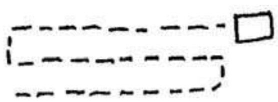
Pile of Material

This symbol is to be plotted showing the limits of material piled on a mapping site, typically by a dozer clearing land. The material may consist of rock, fill material, vegetative debris, etc.

Fence (any type)

Powerline (overhead)

Buried Pipe (any type other than waterline)



Septic Tank and Field Lines

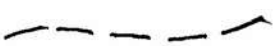
If this feature cannot be accurately plotted, simply delineate the general area and show as a map unit.

Vehicular Path

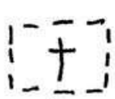
This symbol is to be utilized to show paths of vehicular traffic, such as a farm road, found on the land surface.

Ground Surface Road

This type of road may be paved or gravel (e.g. driveways or roads).

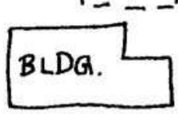


Trail or Path (any type)



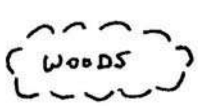
Cemetery

The perimeter of the cemetery is to be plotted as accurately as possible.



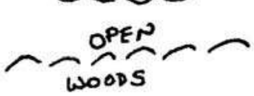
Building or Structure (any type)

The perimeter of the building or structure is to be plotted as accurately as possible.



Wooded Area

The perimeter of the wooded area is to be plotted as accurately as possible.



Tree Line (separating woods from open land)

(8) Indicating the Limits of Soil Mapping

The limits of soil mapping shall be shown on all soil maps submitted to the Department. Whether the mapping is confined to the gridded area of the site or the mapping extends outward from the grid a few feet, the limits of the actual soil mapping shall be shown.

If a map submitted to the Department does not show the limits of the actual soil mapping, the limits of the soil mapping will be assumed to be the gridded area only. If a soil mapping unit was supposed to extend outward of the grid, it will not be acknowledged.

The limits of mapping may be shown in any manner the consultant chooses, provided that the method of showing the limits of the mapping is denoted or explained on the map.

NOTE: Department procedure involves outlining the actual area of the soil mapping with a red pen and identifying the red line as the *Limits of Soil Mapping*.

(9) Consultant Information

The consultant is to place the following information on the map sheet:

- Name
- Current Mailing Address
- Current Telephone Number (office, mobile, pager, etc.)

(10) Signature and Date

- A soil map submitted to the Department shall have the signature of the consultant on the map. All copies of the map shall have an original, written in ink, signature. Photocopied or blue-line reproduction signatures will not be accepted.
- A soil map submitted to the Department shall be dated with the date that the map was completed.
- A soil map submitted with no signature or no date will be returned to the consultant.

C. Reproduced Soil Maps

In recent years, it has become a common practice for consultants to submit maps that have been graphically reproduced. Thus, the consultant creates a master original soil map and then has that copy reproduced. This practice is commonly utilized for reproducing large maps covering large areas.

Since several copies of a map are needed to disperse to different individuals (property owners, engineers, real estate agents, government agencies, etc.), the Department has no objection to this practice. However, the consultant utilizing this method of map reproduction must be aware of the problems created when maps, especially large maps, are graphically reproduced.

It has been found that the manner in which the map is reproduced may cause a distortion of the map. There have been cases where maps submitted to the Department, were found to have a 20 to 30 foot (measured on the map at a the standard map scale of 1"=100') or more, stretch in the image. Therefore, if the grid is distorted this would mean that the soil map units are also distorted and any soil map in this condition is impossible to use for conducting a plat review (i.e. to confirm that plotted SDS areas on the engineered plat are correct).

_IMPORTANT NOTE_*: The consultant shall be responsible for checking graphically reproduced maps for any type of distortions prior to submitting the map to the Department. If maps of this type are submitted and found to have distortion problems, the map will not be accepted and it will be returned to the consultant. It shall be the responsibility of the consultant to correct the problem, in whatever manner is necessary, such that the soil map being submitted has zero distortion.*

To avoid such problems, the Department strongly advises that the final soil map prepared for submittal to the Department, be hand-drawn on an original plat document prepared by the surveyor. When this method is utilized, the Department shall specify that the soil map or maps be drawn on either a blueline copy of a plat (i.e. a copy produced directly from the original mylar or plastic drafting sheet) prepared by the surveyor or upon an original copy of a plat generated by a computer controlled plotter machine.

For larger plats (i.e. any size ranging from 11 x 17 inches to the maximum of 24 x 36 inches), the consultant shall specifically request blueline prints or original computer generated/plotted prints of the plat, from the client or surveyor, on which to draw and prepare the soil map. The consultant then should seek the services of a reputable blueprinting company that has a *flatbed printer* on which to reproduce copies of the original final soil map.

NOTE: Any map that has been prepared and submitted to the Department on photocopied portion of a plat, shall not be accepted. A map shall be drawn upon a complete plat document.

D. Submission of Soil Maps to the Department

The Department shall require that the consultant send one dedicated copy of the completed map to this office via regular United States Mail or any other reputable delivery service (e.g. UPS, Federal Express, etc.).

Address your submittal to: Department of Sewage Disposal Management
Office Manager
1320 W. Main Street, Suite 411
Franklin, TN 37064

The Department will accept maps brought to this office by individuals (property owners, realtors, builders, etc.), however the copy delivered by an individual will not be considered as a valid map until it can be compared to the copy provided by the consultant.

CHAPTER 5

SOIL IMPROVEMENT PRACTICES

Williamson County encompasses three major physiographic regions; therefore soil characteristics vary greatly across the county. However, the generalized soil characteristics, relating to SDS utilization, may be placed into three basic groups. They are:

- soils with favorable properties in the upper 36 inches of the soil profile.
- soils with marginally favorable properties in the upper 36 inches of the soil profile.
- soils with unfavorable properties in the upper 36 inches of the soil profile.

Soil improvement practices that are recommended by a consultant are generally concerned with the second and third category of soil properties.

Soils are placed in these categories for different reasons. The most common reason being the presence of a blocking layer, such as a fragipan or a high clay layer (Bt horizon), within the upper 36 inches of the soil profile. The presence of these types of blocking layers is the dominate factor in creating marginally favorable or unfavorable soil characteristics. The presence of a fragipan or Bt horizon may also be associated with wetness problems in a soil. A soil series with a wetness problem alone (i.e. no fragipans or Bt horizons being present) may be the dominate factor in creating marginally favorable or unfavorable soil characteristics when being assessed for SDS utilization.

When marginally favorable or unfavorable soil characteristics are encountered, the consultant is responsible for making the proper assessment and interpretation as to whether or not a soil improvement practice is necessary. Should a soil improvement practice be necessary, will it allow for the SDS utilization of the soil mapping unit. Thus, if a improvement practice is determined to be applicable to the mapping unit, a recommendation of the appropriate soil improvement practice (soil modification, drainage modification or a combination of both practices) shall be noted and explained by the consultant.

Should there be any concerns or questions regarding the use or recommendation of a soil improvement practice on a site being mapped, contact a Department Soil Scientist to ask a question or schedule a meeting for a site consultation.

<u>NOTE:</u> *Soil improvement practices are considered by the Department to be concerned with the correction, within the specified limits, of* naturally occurring *soil characteristic deficiencies in such a manner as to overcome these deficiencies to allow for the successful utilization of the soils for SDS purposes. The correction of man-made soil deficiencies, such as subsoiling compacted soils or removing fill material, are not considered to be soil improvement practices; these practices are considered to be attempts at soil remediation.*

A. Types of Soil Improvement Practices

In Williamson County, there are only two categories of soil improvement practices. The first category is concerned only with soil modification. The second category deals with the modification of drainage characteristics of a site which would include the removal or diversion of surface and subsurface water from a site.

The Williamson County SDS Regulations restrict the depth at which conventional septic field trenches are installed. *The maximum allowable conventional field line trench depth in Williamson County is 24 inches*. Therefore, the consultant is, on every soil mapping site in this county, to be assessing and interpreting the soils from the viewpoint that there will be a 24 inch maximum conventional field line trench depth.

(1) Soil Modification

Soil modification involves the addition of compatible soil fill material (i.e. soil material that has the same textural components as the existing soil in the mapping unit), a minimum and maximum of 6 inches, over the area of a soil mapping unit in order to *create* an appropriate soil profile depth for alternative SDS installation.

The practice of soil modification is confined to sites or soil mapping units of 0 to 15 percent. Any site, in excess of 15 percent slopes, that would require soil modification for approval of that site by the Department, is to be red lined and shown as unfavorable for SDS use. Sites, in excess of 15 percent slopes, which would be *improved* by the use of modification, are not to be noted or indicated by the consultant; they are to be shown only with the MPI rating that would apply on the natural, unimproved unit.

Williamson County SDS regulations allow for the modification of LPP systems only. Modified conventional systems are NOT approved for use in this county.

The county regulations require that there be a 12 inch buffer between the bottom of the lateral line trench and the blocking layer, making the total required depth to a blocking layer 30 inches. Thus, there must exist a minimum of 24 inches of suitable soil material to a blocking layer in a soil mapping unit in order to consider that unit for modification.

If the minimum depth is found to be present, the consultant must then make the determination as to what the end result of the modification will yield. The modification will either allow the map unit to be deemed suitable for SDS use by the utilization of a Modified LPP (or MLPP) system or the map unit rate may be made more favorable with the utilization of the MLPP.

(a) Modification to Allow the Use of a Soil Map Unit

If a soil map unit has a definite blocking layer present at 24 inches (thus not having the 30 inch depth requirement to a blocking layer for LPP use) and the consultant intends to rate the unit for a LPP system, that unit will require modification in order to receive approval for MLPP use. Thus, the soil improvement practice of modification will yield a specified rate for a MLPP system. This shall be indicated in the map unit notation.

Example Map Unit Notation: Stiversville, Eroded (clay @ 24")
75MPI, CS
60MPI, MLPP
5-15% Slopes

It is an unacceptable practice to rate a map unit, that has a blocking layer at 24 inches, for standard LPP use by noting that the unit has a certain MPI rate at 18 inches. The installation of the LPP lateral lines at 18 inches leaves only a 6 inch buffer between the blocking layer and the bottom of the lateral line trench, therefore this situation would require modification to attain the required 12 inch buffer between the lateral trench bottom and the blocking layer.

(b) Modification to Improve the MPI Rate of a Soil Map Unit

If a soil map unit has a definite blocking layer present at depths exceeding 30 inches (thus meeting the 30 inch depth requirement to a blocking layer for LPP use) and the soil material to the blocking layer has favorable soil properties to that depth, the soil may have potential of achieving a lower MPI rate with the utilization of a MLPP system. Thus, the soil improvement practice of modification will yield a lower MPI rate for a MLPP system versus the rate for a standard LPP system. This shall be indicated in the map unit notation.

Example Map Unit Notation: Armour, Eroded (Bt2 @ 30")
60MPI, CS or LPP
45MPI, MLPP
0-5% Slopes

(c) Modification of Steep Sites (15 to 25 percent slopes)

Sites that range from 15 to 25 percent may be considered for modification, for either approval or improvement, may be considered ONLY if a mutual approval is reached by the consultant and a Department Soil Scientist during a joint *Steep Slope Modification Investigation*.

When these cases are encountered during the course of field mapping and the consultant mapping the site believes that the site should be considered for the modification improvement, they shall contact the Department to set up a meeting to jointly review the site. At the site meeting, the consultant and the Department Soil Scientist will specifically assess the soils, slopes and any other pertinent site information in order to make a determination of whether or not the site can actually be modified.

NOTE: Should there exist a matter of dispute between the consultant and a Department Soil Scientist, regarding whether or not a steep site may be modified, the decision of the Department Soil Scientist will stand as the final decision.

The basic criteria the Department will be concerned with are -

- the texture, structure and drainage of the soils on the site.
- the potential for erosion of the site.
- the position of the site on the landscape.
- the existing vegetative conditions of the site.

(i) Soil Texture, Structure and Drainage

The textures and structures of the soils must first meet the criteria of approval for MLPP use. Thus, a review of these soil characteristics are made to confirm that the site will benefit from the modification practice. SDS sites in this situation may not have internal drainage problems to contend with (due to the types of soils usually found in this situation), but there may still exist the need for some type of drainage modification, such as surface water diversion, to protect the modification on the site from erosion. See *Section 23* of these regulations.

(ii) Potential for Erosion

The erosion potential will be a critical factor to assess on the site in question. Soils with surface horizons composed of loess, for example, have a high degree of potential for erosion. Where a sites under consideration have O, E or A horizons with textures of loam, silt loam, gravely loam or gravely silt loam OR have these textures to a depth of 24 inches (e.g. BE or BA horizons), then the site may be deemed unsuitable for modification.

Since the practice of modification would necessitate the addition of compatible soil material and being that the aforementioned soil textures are susceptible to erosion, the resulting scenario (i.e. erosion susceptible modification/fill material placed upon erosion susceptible natural soil material) may preclude the site from approval unless the use of erosion control measures can be properly implemented on said site.

(iii) Landscape Position

The landscape position and general topographic nature of the site shall be such that the placement of the modification can be 1) physically accomplished and 2) be placed on the site such that it will remain on that site. Should the potential modification site be located on the landscape in such a manner that it would be easily eroded, it is unlikely that the site would be favorable for modification.

(iv) Vegetative Conditions

The vegetative cover on a steeply sloping site, under consideration for modification, will play an important role in determining the feasibility of modifying the site. The clearing of any type and any amount of vegetation (e.g. large trees, etc.), from an area being considered for modification may have a detrimental effect on the site conditions (i.e. creating *weak spots* where trees are removed, increasing the erosion potential of the site, etc.), thus rendering the site unsuitable for modification.

(d) Modification Exceeding 6 Inches in Depth

<u>NOTE:</u> The practice of Extra Modification is limited solely to MLPP systems. Therefore, the discussion of the assessment procedure and the site criteria requirements are referring only to the application of Extra Modification as it pertains to MLPP systems. The application of Extra Modification to a site determined to need a Modified Mound system is discussed in Chapter 6.

<u>IMPORTANT NOTE:</u> This practice is, like the Modified Mound system, considered experimental. Therefore, it will not be considered on any soil mapped sites intended for new development. This practice is explicitly restricted for sites or properties where a new sewage disposal system is to be constructed as a repair *to serve an existing structure on an existing lot or property. This practice is intended to provide an alternative, where and when the required site and soil conditions are present, to the installation of a Modified Mound system.*

On rare occasions the need for soil modification in excess of the standard 6 inch depth may be considered. On sites that consist of soils that do not quite meet the depth criteria for the approval and installation of a MLPP or standard Mound system (i.e. the site or soil mapping unit does not have the required 24 inches of appropriately drained and textured soil material to the blocking layer), the site may be considered for Extra Modification for a MLPP system as opposed to having to stipulate the installation of a Modified Mound system.

The Department will consider the use of up to 12 inches of soil modification, for a MLPP system, on a site should the consultant sufficiently prove that the site has -

- a minimum of 20 inches of appropriately drained and textured soil material to the blocking layer,
- and the site does not exceed 5 percent slopes.

Soil mapping units which fall within the 5 to 15 percent slope classification, shall be limited to the standard 6 inches of soil modification. Thus, a site having the steeper slopes could not be considered for Extra Modification.

When these cases are encountered during the course of field mapping and the consultant mapping the site believes that the site should be considered for Extra Modification, he/she shall contact the Department to set up a meeting to jointly review the site with a Department Soil Scientist. At the site meeting, both consultants will assess the soil characteristics of the soil mapping unit of concern in order to make a determination of whether or not the site is suited for Extra Modification.

(2) Drainage Modification

The concept of drainage modification, as utilized in Williamson County, is concerned with all factors related to man-made changes to the basic hydraulic nature (surface and subsurface) of a site. The two changes involved in site drainage modification involve the diversion of surface water and the drainage and diversion of subsurface water.

The diversion or drainage of surface and subsurface water is required when, during the field mapping process, the consultant determines that there exists marginally favorable or unfavorable soil drainage characteristics due to the following conditions:

- soil properties such as 2 chroma or less mottling present in the upper 24 to 36 inches of the soil profile.
- a soil mapping unit to be considered for SDS use is situated in or on a water collecting landscape position.
- a combination of both of the aforementioned factors.

Soil map units interpreted as having MPI ratings of 75MPI or less and requiring some type drainage improvement do not require any special notations or explanations other than indicating the improvement practice needed. However, should a soil map unit be interpreted as having a MPI rating of greater than 75MPI and/or consist of a soil series known to have drainage problems, the consultant making the map is indicating that the recommended improvement practice will allow for the utilization of the soil map unit for SDS purposes, the consultant shall present an explanation (in the soil map notes) of the reasoning behind the interpretation.

(a) Surface Water Diversion

This aspect of drainage is concerned with only one goal: the redirection of the water moving along the ground surface. Thus, any approach used for this purpose would involve the creation of a channel to collect and reroute the course of water flow over the ground surface away from the soil map unit to be considered for SDS use. The most commonly used methods of directing surface drainage away from or around the soil map unit is by the use of a berm, v-ditch or agricultural-type terrace. See Figure A1-9.

Should the consultant determine that excess surface water is to be removed or diverted away from a soil map unit, the consultant is to make some type of notation with the soil map unit description or comments in the note Section of the map.

The standard notation, placed with the soil map unit description, used by the Department is PFSW or Protection From Surface Water. The notation may be explained in the soil map unit description or in the map legend, along with the method in which the area is to be protected. See *Chapter 9, A1.5 of this Appendix*, for an example of the use of this notation.

<u>NOTE:</u> The use of a v-ditch in lieu of an actual curtain drain is not applicable in Williamson County for drainage situations concerning any sewage disposal systems. If a site is found to need a curtain drain, an actual curtain drain shall be utilized.

(b) Subsurface Water Drainage and Diversion

Subsurface water drainage and diversion involves two different approaches to two different subsurface water movement scenarios. Either the subsurface water is moving:

- ♦ laterally, downgradient along a subsurface soil horizon acting as a blocking layer (the blocking layer being 24 inches in depth or greater in soils to be considered for SDS use); or
- ♦ vertically, upwards into the upper 36 inches of the soil profile being evaluated for SDS utilization.

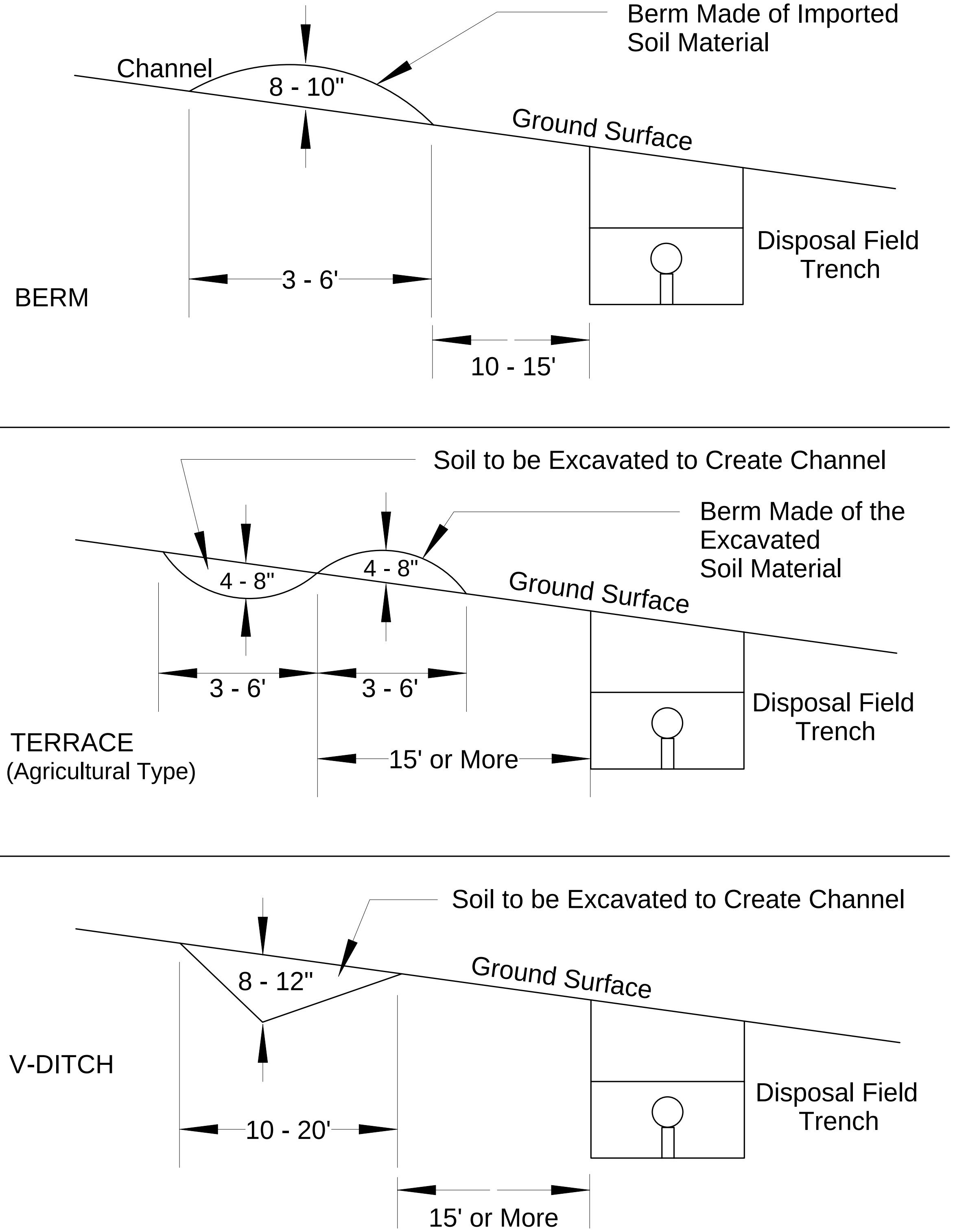


Figure A1-9. Examples of Surface Water Diversion Practices.

In order to drain and divert the lateral or vertical movement of the water, a path shall be provided to carry the water away from the area or soil map unit of concern. Typically, the path created for the water to follow is a trench filled with gravel excavated to a depth where it intersects with a blocking layer in the lower soil profile. The curtain drain has one main element that differs from the drawdown drain, it has a layer of plastic that is placed on the downslope wall of the trench and along the trench bottom. The plastic provides a impervious barrier so that laterally moving water is prevented from proceeding on its downslope course. Whereas the drawdown drain has an open interface between the gravel and the trench walls (and trench bottom) to allow free movement of subsurface water into the gravel from both sides (and bottom) of the trench. The trench thus becomes, in both cases, the conduit for the water to move to the outlet provided.

The two methods of draining and diverting subsurface water from a site are Curtain Drains and Drawdown Drains. The curtain drain is the type of drain used to divert laterally moving water. The drawdown drain is used to collect, drain and divert vertically moving water.

(i) Curtain Drains

Curtain drains are designed to intercept and divert laterally moving subsurface water flow around the area designated for SDS use. Curtain drains will be installed on the upslope side of the disposal field and will typically be configured such that they will shield the disposal field from any subsurface water moving downgradient from higher elevations. Curtain drains are generally utilized on slopes of 3 percent or more.

The depth of the drain will depend upon the depth of the subsurface blocking layer on which the subsurface water is laterally flowing. The drain shall be excavated to a minimum depth of 6 inches below the upper surface of the blocking layer. Therefore, the consultant must note the depth of the blocking layer on the soil map. See Figure A1-10.

Should there be a case where there is no distinct blocking layer present, the consultant is to make a notation as to the general depth in which restrictive soil properties become evident where possible. In these situations, where no distinctive blocking layers are found, the Department shall require that a drain be installed to a minimum depth of 18 inches below the depth of the bottom of a conventional field line trench or 24 inches below the depth of the bottom of a lateral line trench. See Figure A1-11.

(ii) Drawdown Drains

Drawdown drains are designed to lower a localized water table (water movement up and down in a vertical manner within a soil profile) found in an area designated for SDS use. Drawdown drains are installed 25 feet or more away from a disposal field and will be configured to either completely encircle or to *horseshoe* the disposal field. See Figure A1-12A.

The configuration and depth of the drain is intended to create a meniscus effect on the horizontal profile of the top of the water table, thus lowering the uppermost vertical level of the water table to allow the disposal field to function properly without being inundated. Drawdown drains are generally used on sites with slopes of 3 percent or less.

The depth of the drain will depend upon the depth of the subsurface blocking layer on which the subsurface water is flowing. The drain shall be excavated to a minimum depth of 6 inches below the upper surface of a blocking layer. See Figure A1-12B.

Should there be a case where there is no distinct blocking layer present, the drain shall be installed to a minimum depth of 30 inches below the depth of the bottom of a field line or lateral line trench. This depth will be 54 inches for conventional sewage disposal systems and 48 inches for alternative sewage disposal systems. See Figure A1-12B.

The site conditions may require ever greater depths for the drain to be installed; however the available outlet elevation will be the critical factor. If the outlet depth is not sufficient and the drain cannot be installed to the necessary depth, the soil map unit shall be redlined and indicated as unfavorable for SDS use.

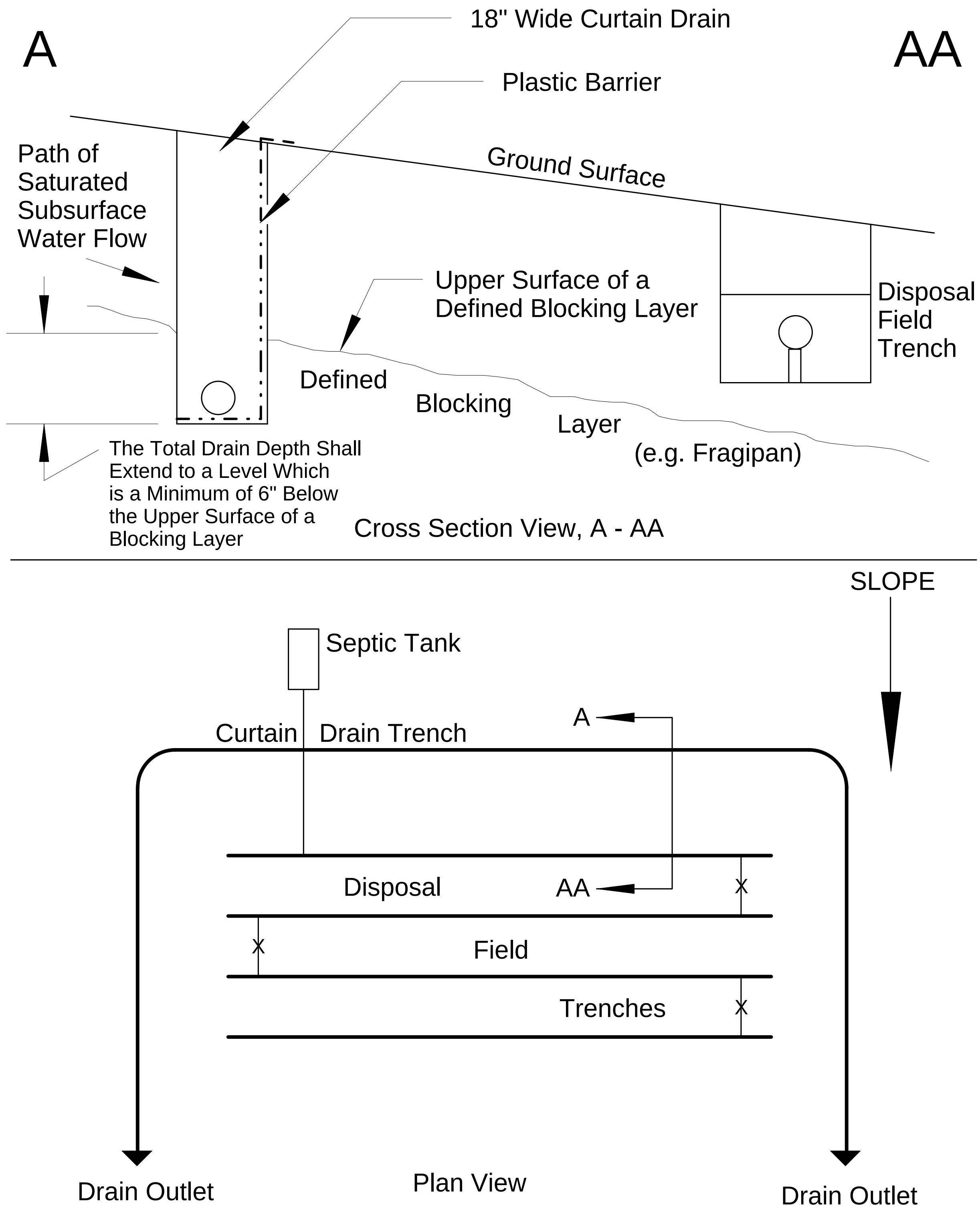


Figure A1-10. Examples of Subsurface Water Diversion & Drainage Practices.

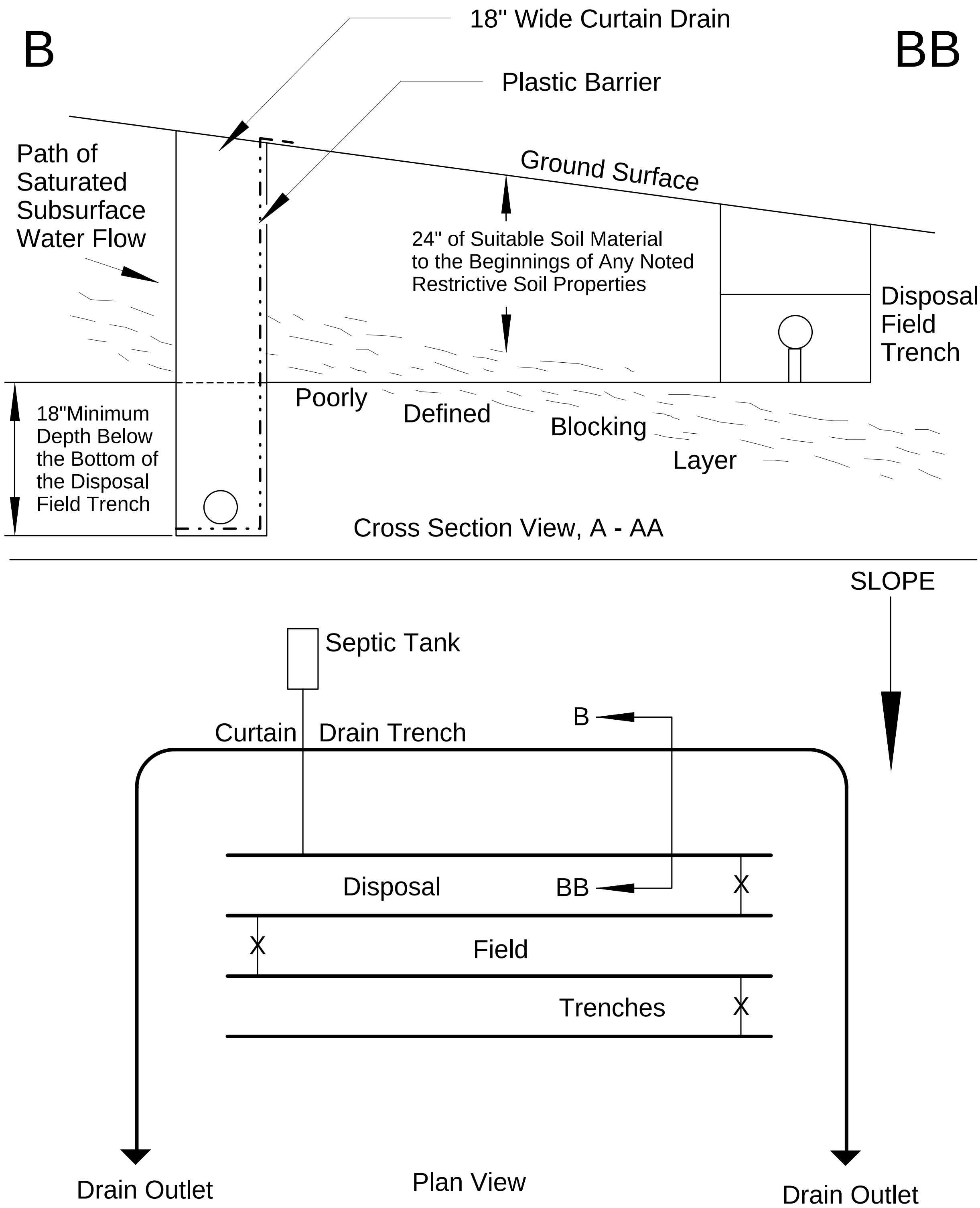


Figure A1-11. Examples of Subsurface Water Diversion & Drainage Practices.

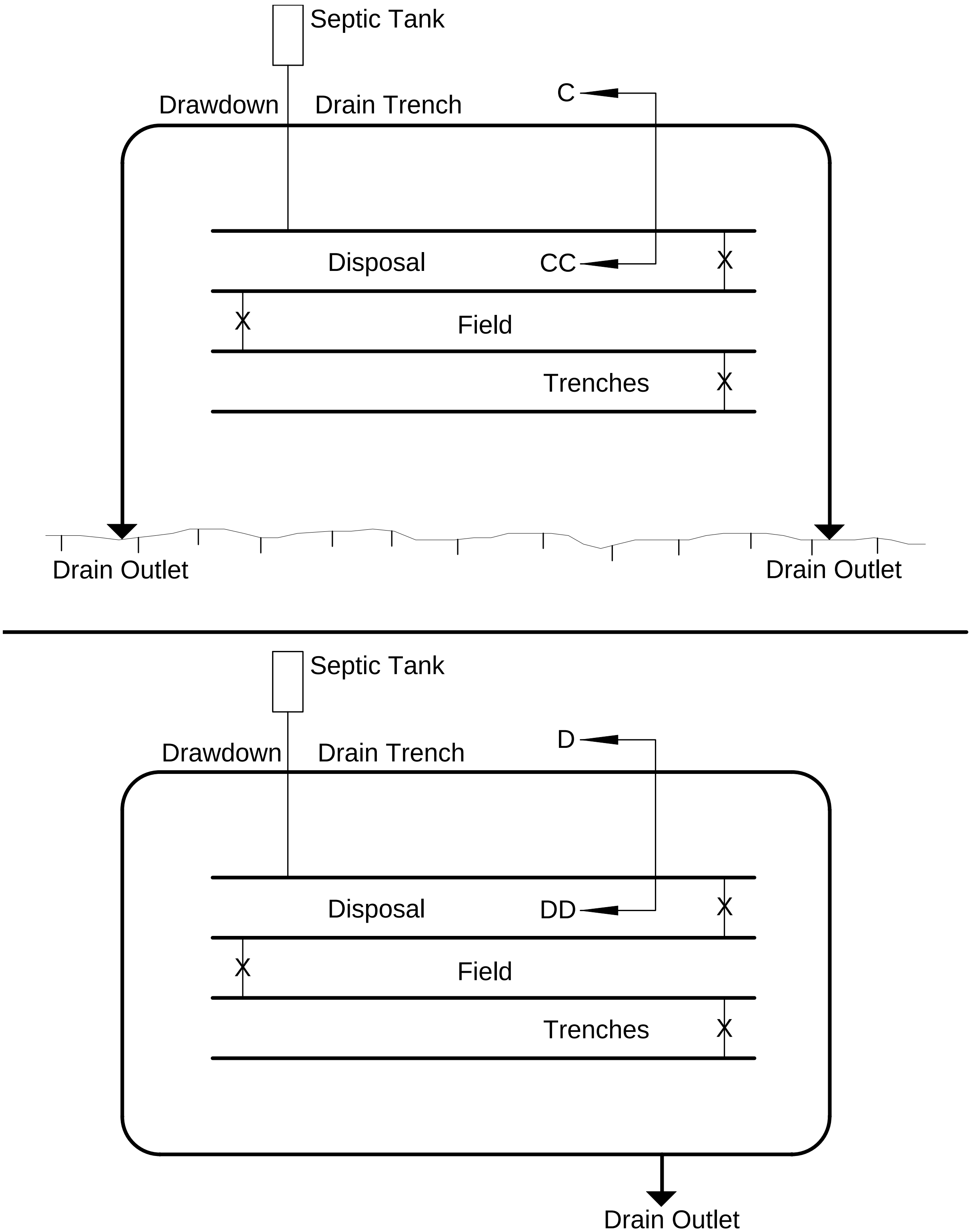
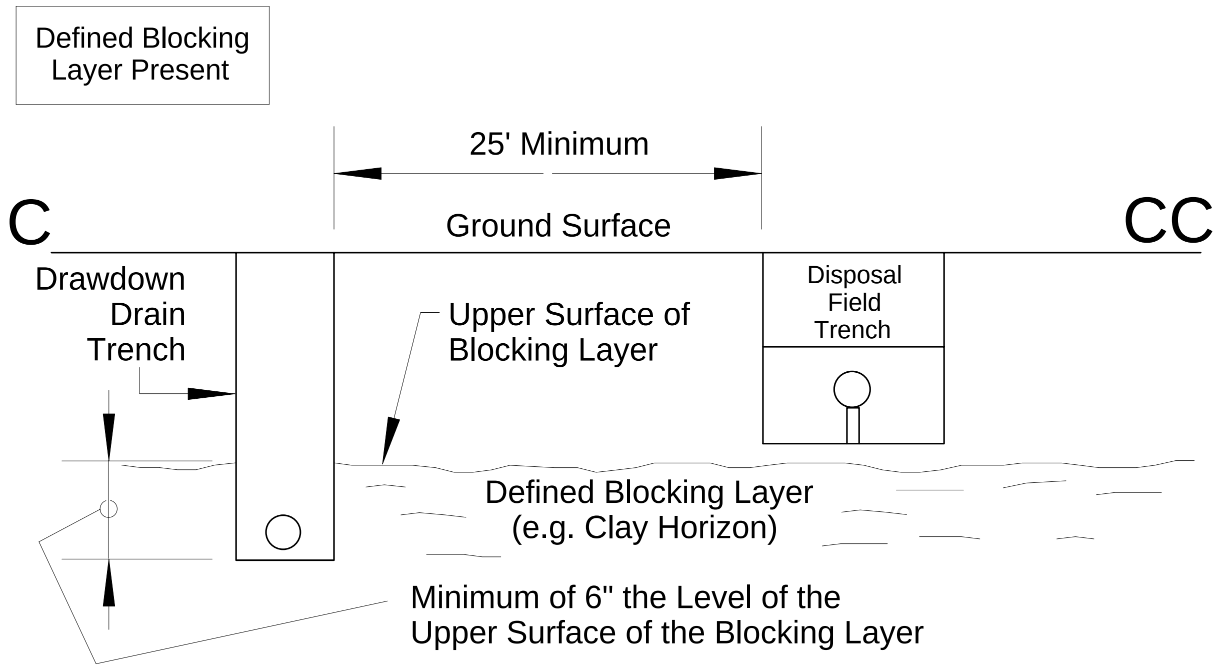
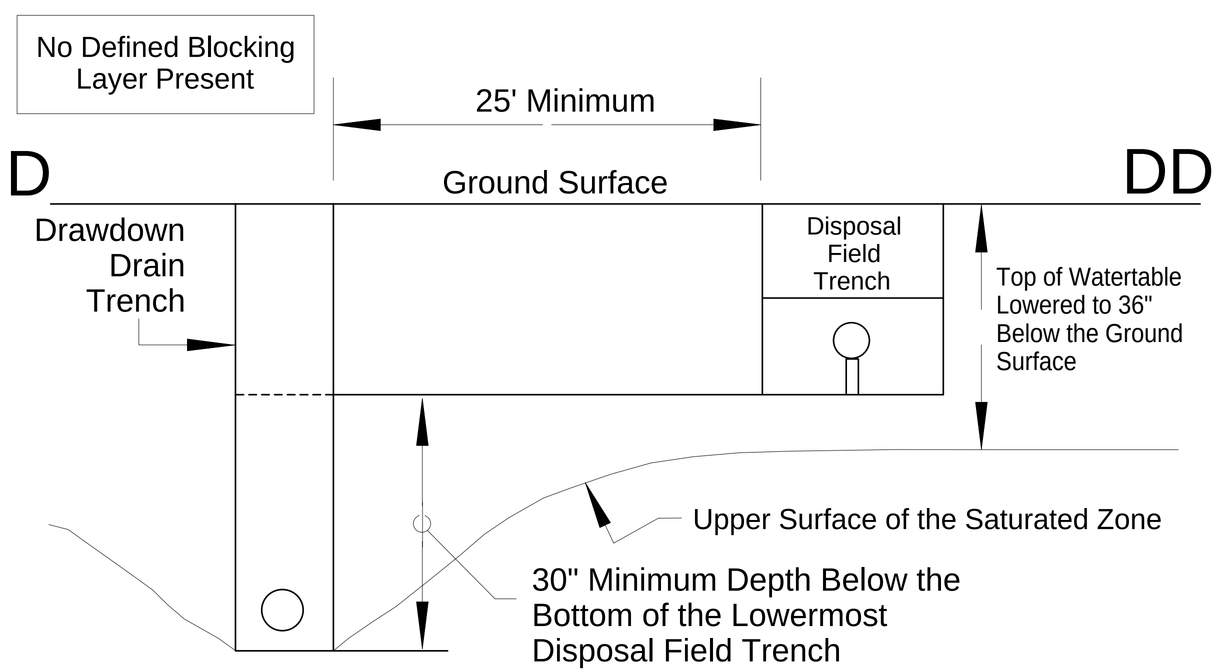


Figure A1-12A. Examples of Subsurface Water Diversion & Drainage Practices.



Cross Section C - CC



Cross Section D - DD

Figure A1-12B. Examples of Subsurface Water Diversion & Drainage Practices.

<u>IMPORTANT NOTE:</u> The consultant making the recommendation for a drawdown drain to be used as a soil improvement practice is essentially saying that the top of the water table can be lowered to 36 inches below the ground surface in the area to be considered for SDS use. The Department strongly recommends that the site and the soils are sufficiently assessed before making any final decision regarding approving a soil map unit contingent upon the utilization of a drawdown drain. Should any doubt exist as to the effectiveness that a drawdown drain may have in an area, the soil map unit in question should simply be redlined and noted as being unfavorable for SDS use due to uncorrectable subsurface drainage problems. The consultant may choose to note that a questionable soil area or soil map unit (i.e. questionable in regard to whether or not it can be physically drained) may become favorable for SDS use, should it be verified through the preparation of an engineered drainage plan prepared for the site in question, that the site actually has or can be provided with an adequate positive drainage outlet to a depth specified by the consultant.

Should the consultant determine that excess subsurface water (based upon the hydraulic properties of the soils series being mapped) is to be removed or diverted away from a soil map unit, the consultant is to make some type of notation with the soil map unit description or comments in the note section of the map.

The standard notation, placed with the soil map unit description, used by the Department is WCD (With Curtain Drain) or WDD (With Drawdown Drain). Along with this notation the consultant shall indicate the depth to which the curtain drain shall be installed (e.g. WCD @ 42 inches minimum depth or WDD @ 60 inches minimum depth). This information should also be shown in the map legend. See *Chapter 9, A1.5 of this Appendix* for an example of the use of this notation.

B. Soil Characteristics Affecting Soil Improvement Practices

Soil characteristics are the first factors observed by the consultant, during the field mapping process, that initiate the decision making process of whether or not soil improvement practices are needed. A soil's characteristics relate directly to the landscape position (and the geologic setting that the landscape is located on) that is being mapped, however this discussion will focus only on soil factors. Since the basic soil characteristics affecting or indicating the need for soil improvement practices have already been described, this part is intended to present a general summary of that information.

Two basic soil characteristics affect the need for and the functioning of any recommended soil improvement practice. These factors are the depth of the soil to a blocking layer, restrictive horizon or rock and the drainage classification of the soil.

The recommendation for soil modification is associated most commonly with soils known for having blocking layers or shallow depths to rock. However, any soil series may exhibit the need for soil modification. Factors such as the degree of erosion to which the soil has been subjected or the presence of indicators of drainage problems found at certain depths in the subsoil. Regardless of the factors noted, if the need for modification is observed the consultant is responsible for making the correct interpretation and recommendations for the modification of the soil map unit.

The recommendation for drainage improvements will generally be associated with soils that have inherent problems with groundwater, but not in every case. Whether or not the soil will respond to drainage improvements is the most important determination that the consultant will have to make. Conclusions, concerning any drainage recommendations, are to be based on field observations of the textures and structures of the soils being mapped and subsequently considered for such improvement practices. The need for drainage improvements may or may not coincide with the need for soil modification.

Several soil series mapped in Williamson County exhibit marginally favorable (moderately well drained soils) to unfavorable (somewhat poorly to poorly drained soils) drainage characteristics which simply can not be remediated with standard soil improvement practices for drainage problems. In addition to the drainage classification of the soil, it is known that soils having heavy silty clay loam to clay textured subsoils *with* drainage problems cannot be made favorable with the application of drainage improvement practices.

C. Landscape Configurations Affecting Soil Improvement Practices

The configuration of the landscape plays an extremely important role regarding whether or not a soil improvement practice, intended to provide corrective measures for a soil mapping unit, can be implemented on a site; and whether or not the soil mapping unit or site, in relationship to the landscape, will respond to the specified soil improvement practices so as to allow for successful SDS utilization. These factors may stand individually regarding how they relate to a site or they may both affect a site in conjunction with each other.

Not all factors affecting a site are items that the consultant is required to address. There are some aspects of the nature of the area that *should* be taken into consideration when a site is being assessed for SDS use, while there are other aspects that *shall be* taken into consideration as part of the site assessment. For example, the consultant is not required to determine how and where a curtain drain is placed on a site, but the consultant shall make the determination as to how deep a drain is to be constructed in order for it to be effective on that site. An unlimited number of variables may be observed in the vicinity of this example mapping site by the consultant that will influence the decision-making process in making the final assessment of the suitability of the soil map unit for SDS use.

For the purposes of discussion, the following scenarios include various factors to consider while making field observations in the area of the mapping site.

- The mapping site may be located in a broad depressional area or on a very level landscape, either a flood plain or a level upland position. In either case, the site is located on the landscape in such a manner that there exists no feasible outlet for either surface or subsurface drains. Should there be no doubt as to the non-existence of an acceptable positive drainage outlet available to the site, the consultant is to red line the map unit of concern and make any appropriate notes in the note Section. Along the same line of reasoning, should there exist some potential for the presence of a positive drainage outlet available to the site but the consultant is unable to assess the precise nature of the outlet, the consultant should still red line the soil unit. In the soil map note section, the consultant may make a notation regarding the possibility of how the soil unit could be used with the achievement of positive subsurface drainage.

- The mapping site may be located on the landscape in a position affected by the discharge from a drainage basin. An example being, second or third order stream drainage basins discharging into larger stream drainage basins. In this situation, the application of standard drainage improvement practices may not be able to remove all of the water affecting the site or soil mapping unit of concern. This situation may also lend itself to the presence of soil areas that are subject to flooding and thus this scenario alone would be sufficient cause to *not* consider the site appropriate for any type of drainage improvement practice. The total volume of water, moving through the subsurface and on the surface from one drainage basin to the other, simply can not be removed or controlled.

- The mapping site may be located on a steep slope and consist of a soil map unit that would require soil modification practices to allow the installation of a MLPP. The site may be too steep (15 to 25 percent slopes) to practically place soil modification on the area of concern. County SDS regulations preclude the modification of sites in excess of 15 percent, except where a Steep Slope Modification Investigation verifies the feasibility of adequately modifying such a site.

CHAPTER 6

EXPERIMENTAL SEWAGE DISPOSAL SYSTEMS

Williamson County has been a leader in the utilization new on-site sewage disposal technologies in the State of Tennessee. The use of the Low Pressure Pipe (LPP) System and the Mound System, once considered experimental, are now in common use across the State. The Modified Mound and the MLPP with Extra Modification are currently the only experimental systems that will be considered for use in this county.

Research on and consideration of experimental sewage disposal systems will continue in Williamson County. The Department position and policies regarding experimental sewage disposal systems are the subject of discussion in this Chapter.

A. Departmental Position on Experimental Sewage Disposal Systems

The Department, under the guidance and direction of the Williamson County Board of Health, will consider new sewage disposal system technologies as they become available.

The Department will assess the potential and validity of such technologies and subsequently establish and promulgate soil mapping procedures and guidelines related specifically to those technologies should they be approved for general use in this county. No soil map will be accepted by the Department if it has been prepared for the purpose of applying an unapproved sewage disposal system technology to the mapped site.

NOTE: The only experimental sewage disposal systems that any site may be specifically assessed for will be the Modified Mound System and MLPP system with Extra Modification.

B. Departmental Policy on Mapping for Experimental Sewage Disposal Systems

All soil mapping for the purposes of assessing a site for an experimental sewage disposal system shall be of the Ultra High-Intensity type. See *Chapter 1, Section A, Subsection (3) of this Appendix*, for information on and requirements for Ultra High-Intensity soil mapping.

No soil maps shall be submitted to the Department that designate a soil map unit for use with an experimental sewage disposal system. The Department shall require that any consultant intending to do any site mapping specifically for a experimental sewage disposal system must notify the Department prior to mapping. The Department shall require that an on-site consultation be arranged so that a Department Soil Scientist may meet with the consultant in order to jointly review the site under consideration for an experimental sewage disposal system.

No soil map will be accepted by the Department until it has been field reviewed and verified as suitable for the type of experimental system for which it was prepared. Therefore, a client shall never be advised by the consultant that the mapped site will be approved for an experimental sewage disposal system. Once the field review has been completed by the Department, either with or without the consulting Soil Scientist present (preferably with), the map will be either accepted, returned to the Soil Scientist for correction or refinement or rejected.

(1) Site and Soil Criteria for Modified Mound Utilization

All criteria for the Modified Mound system are essentially the same as for a standard Mound system. The critical difference is that a site may have as little as 18 inches of appropriately drained and textured soil material before encountering a blocking layer.

A proposed Modified Mound system may be considered for the practice of Extra Modification, if the purpose of the additional soil material is intended to provide an added buffer between the bottom of the sand/filter media and the natural soil/ground surface. The need of a Modified Mound system on a site inherently implies that 6 inches of compatible soil fill material would have to be added to the site where only 18 inches of appropriate, natural soil material is present.

Should a site have only 12 inches (or any other depth being less than 18 inches) of appropriate, natural soil material, the use of the Extra Modification practice shall not be recommended to create the required 24 inch deep soil profile necessary for Mound use. *There shall be a minimum of 18 inches of the appropriate, natural soil material present.*

A summary of the soil and site requirements for a mapping unit to be considered for Modified Mound system use are -

- The site shall be within the 0-6% or 6-12% slope classification. The slopes shall not exceed 12% if the site is to be considered for use.

- The soil shall have a minimum of 18 inches of natural, suitable soil material to a blocking layer. Soil suitability will be determined by the consultant and the Department Soil Scientist.

- The soil material which constitutes the upper 18 inches of the existing profile shall have the properties present to warrant a rate of 75MPI or less to be approved by the consultant and the Department Soil Scientist. See *Chapter 9, A1.3 of this Appendix* for soil textural classes to be utilized for assessment.

- The soil drainage classification shall be either moderately well or well drained. There may be cases where somewhat poorly drained soils may be considered, if the consultant can verify that the site can be adequately drained.

- A curtain drain will be required (per Williamson County SDS regulations) to a minimum depth of 36 inches (a greater depth may be required, depending upon the site and soil conditions), thus there must exist an outlet for the curtain drain in the site vicinity.

(2) Site and Soil Criteria for Utilization of a MLPP With Extra Modification

All criteria for the use of a MLPP with Extra Modification are essentially the same as for a standard MLPP system. The critical difference is that a site may have as little as 20 inches of appropriately drained and textured soil material before encountering a blocking layer.

A summary of the soil and site requirements for a mapping unit to be considered for MLPP With Extra Modification use are -

- The site shall be within the 0-5% slope classification.

- The soil shall have a minimum of 20 inches of natural, suitable soil material to a blocking layer. Soil suitability will be determined by the consultant and the Department Soil Scientist.

- The soil material which constitutes the upper 20 inches of the existing profile shall have the properties present to warrant a rate of 75MPI or less to be approved by the consultant and the Department Soil Scientist. See *Chapter 9, A1.3 of this Appendix* for soil textural classes to be utilized for assessment.

- The soil drainage classification shall be either moderately well or well drained. There may be cases where somewhat poorly drained soils may be considered if, the consultant can verify that the site can be adequately drained.

- A curtain drain will be required (per Williamson County SDS regulations) to a minimum depth of 36 inches (a greater depth may be required, depending upon the site and soil conditions), thus there must exist an outlet for the curtain drain in the site vicinity.

<u>IMPORTANT NOTE:</u> The Department Soil Scientist shall make the final decision regarding the propriety of utilizing any of the aforementioned systems.

CHAPTER 7

CONSULTANT APPROVAL

All Soil Scientists who wish to prepare soil maps of all intensities in Williamson County, Tennessee shall be specifically approved by the Williamson County Department of Sewage Disposal Management to work as a consultant in this county. Any soil map prepared by an unapproved Soil Scientist will not be accepted by the Department and the map will be returned to that Soil Scientist. Any and all persons concerned with the results of the aforementioned soil mapping will be informed that the mapping work will not be accepted due to the unapproved status of the Soil Scientist.

In this Chapter, the term *candidate* will be used to refer to an individual who is not approved as a consultant/Soil Scientist in Williamson County.

A. Requirements to be an Approved Consultant in Williamson County

A candidate shall be an approved soil consultant/scientist by the State of Tennessee, Department of Environment and Conservation, Division of Groundwater Protection as outlined in the *Tennessee <u>Regulations To Govern Subsurface Sewage Disposal Systems</u>, Section 1200-1-6-.17*, and the consultant must be approved to make soil maps of all intensities.

<u>IMPORTANT NOTE</u>: The State approval does not automatically give an individual an approved status to work as a consultant in Williamson County.

The Soil Scientist having a State approval shall apply, in writing, to the Department to be considered for approval to practice as a soil scientist/consultant in Williamson County. The individual will then be considered as a candidate for consultant approval by the Department. The candidate shall provide documentation of all training and experience during their career as a Soil Scientist, including all required information on education and a copy of their approval letter from the State Soils Consultant Supervisor.

B. Final Candidate Approval

Once the Department has determined that the candidate has met the aforementioned requirements, the individual will then be considered for final candidate approval. The Department Director shall contact the State Soils Consultant Supervisor so as to inquire as to the past performance history of all candidates and/or their performance during their State approval process.

The Department shall make a complete review of the candidate's credentials and Department Director will have the final determination as to whether or not a candidate is given a final approval to work as a consultant in Williamson County.

Should the candidate be denied final approval by the Department, the individual shall be informed in writing of the reason for denial.

Should the candidate receive final approval, the individual will then be considered as having the status of an *approved consultant on probation*. The individuals name will be placed on the county listing of consultants approved to make soil maps in Williamson County. The approved consultant on probation will have a two (2) year period, from the date of the final approval, to successfully complete the requirements stipulated under the following *probation mapping* Section.

If the consultant is unable to successfully complete the requirements of the probation mapping within the allotted two (2) year period, the approved status of the consultant will be rescinded by the Department.

C. Probation Mapping

The approved consultant on probation must submit all probationary maps to the Department for review and field confirmation. All maps submitted shall be assessed by a Department Soil Scientist to verify that the map was prepared in accordance with *The Uniform Code of Soil Mapping Standards and Procedures for Williamson County, Tennessee.*

The map, after being field checked, shall be rated as being either *satisfactory* or *unsatisfactory.* The consultant on probation must prepare ten (10) successive satisfactory maps (i.e. ten successive maps shall be initially rated as satisfactory) in order to be considered as a fully approved consultant by the Department.

Unsatisfactory maps will be returned to the candidate, with all deficiencies noted on the map, for correction. Once the corrected map is reassessed by the Department and determined to be satisfactory, it will not count as one of the ten (10) successive satisfactory maps.

CHAPTER 8

QUALITY MANAGEMENT

The Department expects all approved consultants (including Department Soil Scientists), producing maps for use in Williamson County, to work with integrity, diligence and professionalism to produce the highest quality soil maps for their clients. Ultimately, the work of every approved consultant comes into the Department office because an individual, developer or builder is seeking to obtain a sewage disposal system permit. Therefore, it is critical that accurate soil information is shown on each and every soil map produced.

The provisions outlined in this Chapter were developed to ensure that the methods and procedures set forth in the *Uniform Code of Soil Mapping Standards and Procedures for Williamson County, Tennessee* are consistently maintained by all approved consultants working in Williamson County. Any approved soil consultant that persistently fails to prepare maps, whether intentionally or unintentionally, in accordance with the *Uniform Code of Soil Mapping Standards and Procedures* will have their approved status revoked.

A. Mapping Review Procedures

(1) Office Review of Soil Map Compilation and Presentation

All soil maps submitted to the Department will be reviewed by a member of the Department Soils Staff for composition and content when they are received.

The plat on which the map was prepared will be reviewed for conformity with the requirements outlined in *Chapter 2, Section A of this Appendix.*

Each map will also be reviewed to ensure that its preparation is in accordance with the criteria outlined *in Chapter 4 of this Appendix*.

(2) Field Review of Soil Map Information

Once it has been determined that there are no problems with the plat or the map compilation and presentation, the field review of the map can be completed.

During the field review of a soil map, the Department Soils Staff will check the accuracy of the information presented. The major items subject to review include:

- Map Unit Delineations
- Soil Map Unit Descriptions
  - Soil Series Name
  - Assigned Estimated Soil Absorption Rates
  - Color Code
  - Map Unit Slope Designation
- Recommended Soil Improvement Practices
- Landscape Features
  - Natural Physical Features
  - Manmade Physical Features
  - Cultural Features
- Soil Map Notes

(3) Department Personnel Authorized to Field Check Soil Maps

Any member of the Department Soils Staff is authorized to field check soil maps. The staff is currently comprised of one Soil Scientist Technicians and three Soil Scientists.

Should any problems be found with a soil map by a Soil Scientist Technician, he/she shall have one of the Soil Scientists check the site where the problem was noted. A Department Soil Scientist will then contact the consultant regarding the matter.

(4) Amount of Mapping to be Field Checked

Once an approved consultant begins submitting soil maps to the Department, the Department will begin field checking maps. There will be no preset amount or percentage of maps to be checked. Any and all maps submitted to the Department are subject to a field review at any time.

The Department shall always make a field review of all soil maps that will be utilized in the development or creation of a subdivision of any size or type.

NOTE: *Department procedure requires that all sites to be permitted for the installation of a sewage disposal system shall be field checked by the Department. Thus, any site that has been soil mapped will be field checked if that site is subject to permitting.*

(5) Soil Map Review Assessment

Once the office and field review of a soil map has been completed, the following process will be followed:

(a) Problems Noted With the Submitted Soil Map

If problems of any type (e.g. questionable soil interpretations, questionable map unit delineation line placement, missed landscape features, incorrect soil improvement practice recommendation or lack of a soil improvement recommendation, etc.) are noted by the reviewer, the Department will contact the consultant regarding the problems noted with the submitted map.

The consultant shall contact a Department Soil Scientist regarding the situation and arrange a meeting with the consultant. Depending upon the nature of the problems noted with the map, an office meeting may be sufficient (e.g. the problem is related to compilation or presentation rather than soil data or interpretations). However, either the consultant or a Department Soil Scientist may request or specify that a field meeting be arranged to look at specific problems noted by the reviewer.

NOTE: *Should the reviewer of the map be a Soil Scientist Technician, the Technician will have a Department Soil Scientist make a review of the noted problems prior to the notification of the consultant who submitted the soil map.*

(b) No Problems Noted With the Submitted Soil Map

If the Department reviewer has completed the office and field review of the submitted soil map and no problems were found, the reviewer will prepare a report to the Department Director regarding the quality, accuracy and completeness of the soil map.

(6) Matters of Dispute

In matters where the consultant disagrees with the findings of the Department reviewer, the consultant shall be required to request, in writing, a field meeting with the reviewer and the Department's Director. During the field meeting, the consultant and the Department representatives will assess each and every problem noted by the reviewer. All individuals present at the field review will discuss the noted problems in a professional manner in order to attempt to resolve the matter.

However, in the event that the consultant refuses to engage in a professionally conducted discussion with the Department’s Director regarding the noted deficiencies of the submitted map, or the consultant is unwilling to accept constructive criticism of their map (i.e. regarding soil interpretations, soil map unit delineations, assigned MPI rates, etc.), the Director shall have the authority to make a final decision regarding the matter of dispute.

IMPORTANT NOTE: *Any and all decisions of the Department's Director shall be final.*

The consultant shall adhere to the final decision rendered by the Director, regarding the problems noted on the submitted map, make the corrections required by the Department and resubmit the map. Should the consultant refuse to accept the final decision of the Director, the Department shall refuse to accept the soil map prepared by the consultant. The consultant will then be issued a written warning for submitting the inaccurate or incorrect soil map information.

Continued and/or frequent actions of this nature by the consultant shall be documented and shall be considered grounds, as outlined in *Section B, Subsection (1), Part (c), Subpart (ii), second paragraph of this Chapter*, to implement an immediate revocation the approved status of the consultant.

B. Reprimand and Revocation

The Williamson County Department of Sewage Disposal Management has the authority to revoke the *approved* status of a individual approved to practice as a soil consultant in Williamson County.

The County and the Department shall consider that any actions on the part of the consultant that demonstrate fraud, deceit, gross negligence, incompetence or misconduct in the preparation of soil maps submitted to the Department, grounds for the revocation of the consultant's approved status. Furthermore, if the consultant has received written warnings and has been placed on probation, regarding poor mapping practices or performance and still continues to demonstrate disregard for the required soil mapping standards and procedures outlined in this document, the Department will revoke the approved status of the consultant.

(1) Procedures

The following procedural outline represents the progression of steps toward the final revocation of a consultant's approved status. The procedures of the Mapping Review Section will give all approved consultants the opportunity to learn to work within the framework of the standards and procedures required by the Department and outlined in this document.

(a) Written Warning

Following the completion of the Mapping Review Procedures and at the discretion of the Department Director, a consultant may be cited with a written warning regarding the problems or errors found on the consultant's map.

The problems or errors noted by the Department that would warrant such action would include any actions on the part of the consultant which are in direct violation or contrary to the soil mapping standards and procedures as outlined in this document.

(b) Probation

Should three written warnings be accrued by a consultant, there being no time periods or constraints regarding the accrual of said warnings, the consultant shall be notified in writing, along with the third written warning, that he or she shall be on probation.

The period of probation shall last for a period of one year. This period of probation shall begin upon the date of the issuance of the third written warning. At any time within the period of probation, should the actions of the consultant warrant the issuance of additional written warnings, the fourth written warning offense shall be grounds for the revocation of the consultant's approved status.

(c) Revocation

The Williamson County Department of Sewage Disposal Management has the authority to revoke a consultant's approved status. The Department Director shall have full discretion on the matter of revoking a consultant's approved status.

(i) Procedural Revocation

A consultant's approved status shall be revoked if the consultant receives a written warning while the individual is on probation as outlined in part (b). An individual that has had his or her approval revoked in this manner may have another opportunity to apply for consulting privileges after a waiting period of 5 years from the date of revocation of their approved status.

(ii) Immediate Revocation

Revocation shall be immediate in any case where it is found, by the Department, that an approved consultant has presented false information, of any type, whether intentionally or unintentionally, in order to receive approval to consult in Williamson County. An individual found to have acted in this manner shall never have another opportunity to apply for consulting privileges in Williamson County.

Revocation will be immediate in any case where it is found that the actions of a consultant, in the production of a soil map, have been acts of fraud, deceit or misconduct. An individual found to have acted in this manner shall not receive any written warnings nor be placed on probation. An individual found to have acted in this manner shall never have another opportunity to apply for consulting privileges in Williamson County.

CHAPTER 9

APPENDICES TO THE INFORMATION PRESENTED IN THIS MANUAL

A1.1 - Soil Series To Be Mapped In Williamson County

In the Williamson County Soil Survey, issued in 1964, 38 soil series were described and mapped in this county. Nine of the soil series mapped, some thirty years ago, have been phased out completely or are just no longer mapped in this area of the country (due to taxonomic classification factors, etc.). Several soil series mapped in adjacent and nearby counties (during the same period in which this county was mapped) were not utilized in Williamson County's published soil survey, but they are known to be present in Williamson County by virtue of being within the same physiographic province. Many new soil series have been described over the past three decades during more recent mapping activities of adjacent and nearby counties and it has been found that several of these new series also exist in this county.

In light of this information, a thorough review was made of all of the soil series currently mapped in the State of Tennessee in an effort to determine which soil series would likely be found in Williamson County. The following list contains 72 soil series and it is felt that this listing covers all series (currently recognized by USDA-NRCS) that could be possibly found in this county.

<u>NOTE:</u> *Only currently recognized soil series names are to be utilized on all mapping completed in Williamson County. For example, do not use Baxter, use Sengtown; do not use Huntington (as shown in the county survey), use Arrington. Huntington is a mesic soil and is no longer mapped in Middle Tennessee. Culleoka, being a mesic soil, has also been removed and replaced with Sandhill.*

Because soil classification and mapping is a dynamic process, the following list will be updated as series names are changed, phased out and created.

Current listing of soil series that would be mapped in Williamson County:

Almaville	Captina	Ennis	Lanton	Mountview	Stiversville
Armour	Colbert	Etowah	Lax	Nesbitt	Sugargrove
Arrington	Cumberland	Gladeville	Lee	Newark	Sulphura
Ashwood	Dellrose	Godwin	Lindell	Ocana	Sykes
Barfield	Dickson	Guthrie	Lobeville	Roellen	Taft
Beason	Dilton	Hampshire	Lomond	Sandhill	Talbott
Bewleyville	Donerail	Harpeth	Lynnville	Sango	Tarklin
Bradyville	Dowellton	Hawthorne	Maury	Sees	Tasso
Braxton	Dunning	Hicks	Melvin	Sengtown	Tupelo
Byler	Eagleville	Hillwood	Mercer	Sequatchie	Whitwell
Cannon	Egam	Humphreys	Mimosa	Staser	Wolftever
Capshaw	Emory	Inman	Minvale	Stemley	Woodmont

If a soil map is submitted to the Department for review and the consultant has identified a series not identified on the list, the map will be returned. The unlisted series will be noted for correction.

Should an unlisted series be located, the consultant shall contact a Department Soil Scientist to schedule an appointment for a joint field review of the soil series that has been located so that it may be verified prior to the submitting of the map. If it is verified by a Department Soil Scientist, the series will be added to the list and an amended list will be sent to all approved consultants.

A1.2 - Estimated Soil Absorption Rates and Sewage Disposal System (SDS) Limitation Ratings of Soils of Williamson County

Over the years, it has been noted that some Soil Scientists/consultants have consistently used, as the definitive MPI rating, the soil absorption rates assigned to each soil series shown in Appendix 1 of the *Regulations to Govern Subsurface Sewage Disposal Systems* of the State of Tennessee. These numbers are indicated as being averages and nothing more. Therefore, the table appears to serve little purpose other than to create confusion and inaccurate soil maps.

Every Soil Scientist knows (or should know) that specific soil MPI rates shall not be assigned to every individual soil series. Obviously, some soil series will have an absolute interpretation as to its SDS use capability based upon its physical characteristics (i.e. Gladeville, Taft, Mimosa, etc.), however many soils will have a range of possible SDS use capabilities. Reading through the series description of Armour, it could be interpreted as having a MPI rating, based on its *range of characteristics*, of 30MPI to >75MPI. The amount of erosion of a soil area alone can have a remarkable impact on the MPI rating of that area or soil map unit.

The Table A1-1 has been prepared to provide a point of reference as to the probable soil MPI interpretations that could be made about the soils of the county. The estimated MPI ratings are for conventional sewage disposal systems, with a 24 inch maximum trench depth, placed in the described soil series profile and for profiles based on the range of soil characteristics (i.e. depth to fragipan, soil textures for different horizons, depth to rock, etc.). The SDS limitation rating is based on the combination of many different factors (i.e. slopes, drainage, landscape positions, depth to bedrock, depth to fragipans, known problems with certain soils, etc.) and how they are known to affect the use of that particular soil for SDS use.

- *Slight* means that the soil series is typically suited for SDS use. In extreme cases, the soil may not be suited for SDS use, for example due to severe erosion.

- *Moderate* means that the soil series has characteristics that may preclude its use for sewage disposal systems. Soils with fragipans, restrictive clay horizons, drainage problems, steep slope factors (found on slopes >25%) and shallow depths to rock run a higher risk of being unsuited for SDS use. These soils, when usable or to be made usable, typically require the use of soil improvement practices. This rating also includes soils that are designated as >75MPI, but percolation testing (should the soil qualify for percolation testing) results may prove that, in some cases, they can be utilized for sewage disposal systems.

- *Severe* means that the series has inherently poor soil characteristics that make its use for sewage disposal systems virtually impossible. The main limiting factors are poor drainage that cannot not be improved, heavy clay soil textures near the ground surface, shallow depths to rock or combinations of these factors.

Table A1-1 consists of four parts; The soil series name, the range of possible MPI rates the soil series could have, the SDS Limitation Rating and the footnote number.

Table A1-1

Soil Series	Estimated Soil Absorption Rate in MPI	SDS Limitation Rating	Footnote
Almaville	>75	severe	3
Armour	30 - >75	slight	
Arrington	30 - 60	slight	1
Ashwood	>75	severe	2
Barfield	>75	severe	4
Beason	>75	severe	2
Bewleyville	45 - 75	moderate	
Bradyville	75 - >75	moderate	7
Braxton	75 - >75	moderate	7
Byler	60 - >75	moderate	6

Table A1-1, continued

Soil Series	Estimated Soil Absorption Rate in MPI	SDS Limitation Rating	Footnote
Cannon	<10 - 75	slight	1
Capshaw	>75	severe	2
Captina	60 - >75	moderate	6
Colbert	>75	severe	2
Cumberland	60 - >75	moderate	
Dellrose	30 - >75	slight	7
Dickson	45 - >75	moderate	3, 6
Dilton	>75	severe	2, 4
Donerail	75 - >75	moderate	3
Dowellton	>75	severe	2
Dunning	>75	severe	2
Eagleville	>75	severe	2
Egam	60 - >75	moderate	1
Emory	30 - >75	slight	1
Ennis	<10 - 45	slight	1
Etowah	30 - >75	slight	7
Gladeville	>75	severe	4
Godwin	>75	severe	2
Guthrie	>75	severe	2
Hampshire	75 - >75	moderate	7
Harpeth	30 - 75	slight	
Hawthorne	45 - >75	moderate	5, 7
Hicks	45 - 75	slight	
Hillwood	45 - >75	slight	
Humphreys	30 - 60	slight	
Inman	>75	severe	2
Lanton	>75	severe	2
Lax	60 - >75	moderate	6
Lee	45 - >75	severe	3
Lindell	45 - >75	moderate	3
Lobelville	30 - 60	moderate	3
Lomond	30 - 75	slight	
Lynnville	30 - 75	moderate	3
Maury	45 - >75	slight	
Melvin	60 - >75	severe	3
Mercer	75 - >75	severe	3, 6
Mimosa	>75	severe	2
Minvale	45 - >75	moderate	7
Mountview	45 - >75	slight	
Nesbitt	60 - >75	moderate	3
Newark	60 - >75	severe	3
Ocana	<10 - 60	slight	1
Roellen	>75	severe	2

Table A1-1, continued

Soil Series	Estimated Soil Absorption Rate in MPI	SDS Limitation Rating	Footnote
Sandhill	45 - >75	moderate	7
Sango	60 - >75	severe	3, 6
Sees	>75	severe	2
Sengtown	60 - >75	moderate	7
Sequatchie	45 - >75	slight	1
Staser	30 - 60	slight	1
Stemley	60 - >75	moderate	3, 6
Stiversville	30 - >75	slight	7
Sugargrove	30 - 75	slight	
Sulphura	45 - >75	moderate	5, 7
Sykes	60 - >75	moderate	
Taft	>75	severe	2, 6
Talbott	>75	severe	2, 5
Tarklin	60 - >75	moderate	6
Tasso	60 - >75	moderate	6
Tupelo	>75	severe	2
Whitwell	60 - >75	moderate	3
Wolftever	60 - >75	moderate	3
Woodmont	>75	severe	2

Footnotes -

1) Temporary flooding or ponding water during brief periods of heavy rainfall may make these areas of soils unsuitable for SDS use (conventional or alternative) even though the MPI rating may be favorable. Areas protected from flooding by natural means or man-made drainage improvement features (i.e. curtain drain, v-ditch, berm, terrace, etc.) or otherwise not subject to flooding, due to topographic location, may be suited for SDS use. These are dominantly well drained and moderately well drained soils along rivers and streams or possibly on alluvial fans.

2) A seasonally high water table, due to the position on the landscape and/or inherently poor soil properties (e.g. high percentage of clay in the subsoil) make most areas of these soils unsuitable for SDS use. These soil areas, where wetness is a problem, typically shall not be drained.

3) Temporary flooding and/or a seasonally high water table make these soil areas unsuitable for SDS use. However, where the landscape will allow man-made modifications, cases may exist where these areas can be protected from flooding and/or artifically drained to remediate the inherent soil problems (i.e. poor subsurface drainage characteristics) thus rendering the soil area suitable for some type of sewage disposal system (conventional or alternative).

4) Based on the soil series description, the depth to bedrock makes these soil areas unsuitable for any SDS use.

5) Based on the soil series description, the depth to bedrock may or may not allow the use of these soil areas. For these soil types to be considered suitable for SDS use, the rock depth shall be proven and verified as sufficient. This task requires a great deal of extra field investigation (including numerous soil observations and rock probing points) to delineate the usable soil areas. The use of the Ultra High-Intensity soil mapping procedure may be required for this purpose.

6) Based on the soil series description, the depth to fragipan may or may not allow the use of these soil areas. For these soil types to be considered suitable for SDS use, the depth to the fragipan shall be proven and verified as sufficient. This task requires a great deal of extra field investigation (including numerous soil observations) to delineate the usable soil areas. The use of the Ultra High-Intensity soil mapping procedure may be required for this purpose.

7) Based on the soil series description, some of these soil areas are known to occupy slopes greater than 25%. The portions of these soil areas on greater than 25% slopes are to be considered unsuitable for any SDS use, even though they may be rated with slight and moderate SDS limitation factors.

A1.3 - Estimated Soil Absorption Rates in Minutes Per Inch (MPI) Based on Soil Properties; Soil Textures and Soil Structure characteristics

NOTE: Estimated MPI rates, in regard to Soil Textures, are based on soil textures with less than 15% coarse fragments (2mm - 75mm) by volume

Soil Structure			
Soil Textures	Grade/Particle Size Class/Type of Structure	%Clay	Estimated MPI
All Sands -- - Coarse Sand - Sand - Fine Sand - Very Fine Sand	- Granular to single grains to structureless - Iron, clay, silt coatings on sand grains	< 10% Total clay + silt being ≤ 15%	< 10
Loamy Sands -- - Loamy Coarse Sand - Loamy Sand - Loamy Fine Sand - Loamy Very Fine Sand	- Weak, fine, Granular to single grains to structureless - Iron, clay, silt coatings on sand grains	< 15% Total clay + silt being ≤ 15%	< 10 to 15 (unless the % clay is > 12%)
Sandy Loams -- - Coarse Sandy Loam - Sandy Loam - Fine Sandy Loam - Very Fine Sandy Loam	- Weak, fine Granular; - most sand grains coated with Iron, clay and silt	Total clay + silt being between 15 - 57%	<10 to 30
Sandy Clay Loam	Weak, medium, subangular blocky to Moderate, medium subangular blocky		30 to 60
Clay Loam	Moderate, medium subangular blocky to Weak, medium, angular blocky		45 to 60
Sandy Clay	Moderate to Strong, subangular blocky to Coarse angular blocky		60 to >75
Loam	Weak, fine to medium, subangular blocky		10 to 45
Silt Loam	Weak, fine to medium, Granular to Moderate, medium, subangular blocky	12 - 27%	45 to 75
Silty Clay Loam	Weak, fine to medium, subangular blocky to Moderate, medium, subangular blocky	27 - 40%	45 to 75
Silty Clay	Moderate, medium to coarse, angular blocky or subangular blocky	40 - 60%	75 to >75
Clay	Weak, medium to coarse, angular blocky	> 40%	75 to >75

> = greater than; < = less than; ≤ = less than or equal to

A1.4 - Practical Field Guidelines Utilized for Soil MPI Rating in Williamson County

This Section contains an outline of the interpretive approach utilized by the Department for establishing MPI rates in real-world scenarios. The methodology discussed here was developed and implemented as the standard operating procedure for this department and all Soil Scientists that consult in this county, by Mr. Eugene T. Lampley (former State Soil Consultant Supervisor and former Williamson County Soil Scientist) in 1988.

Chapter 3, Section D, Subsection (3), part (a), as well as the factors outlined in *A1.3 of this Chapter*, provides a discussion and a correlation chart, respectively, of how various arrangements of soil characteristics generally affect MPI rates. The information presented is based on depths to blocking layers and generalized permeability ratings of soil material. Therefore, this information is designed to give the consultant a more practical guide to work with in the field when assessing a soil to assign it an appropriate MPI rating.

The following chart presents ranges in depths, from the ground surface, to a blocking layer in the subsoil and corresponding estimated MPI ranges for the types of sewage disposal systems utilized in Williamson County. While mapping in the field, note at what depth the blocking layer is encountered and utilize the ranges shown in the chart, in conjunction with the other information presented in this Section, regarding soil permeability, structures and textures, to make the appropriate assessment of the estimated MPI rating of the soils being mapped. Blocking layers of concern are discussed in *Chapter 3, Section D, Subsection (7).*

Depth From Ground Surface to the Blocking Layer (BL)	Conventional SDS	LPP (standard)	MLPP (modified)	Mound (standard)
< 24" of soil to BL (including rock or Cr horizon), regardless of permeability of the soil	>75	>75	>75	>75
24-29" of permeable to mod. permeable soil material to Rock or Cr Horizon	>75	>75	45-60	45-60
24-29" of S permeable to VS permeable soil material to Rock or Cr Horizon	>75	>75	75->75	75->75
24-29" of permeable to mod. permeable soil material to BL, >36" to rock or Cr	75	>75	45-60	45-60
24-29" of S permeable to VS permeable soil material to BL, >36" to rock or Cr	75->75	>75	75->75	75->75
30-35" of permeable to mod. permeable soil material to Rock or Cr Horizon	>75	45-60	45-60	45-60
30-35" of S permeable to VS permeable soil material to Rock or Cr Horizon	>75	75->75	75->75	75->75
30-35" of permeable to mod. permeable soil material to BL, >36" to rock or Cr	45-60	45-60	45	45
30-35" of S permeable to VS permeable soil material to BL, >36" to rock or Cr	75->75	75->75	75->75	75->75
36"+ of permeable to mod. permeable soil material to BL, >36" to rock or Cr	30-45	45-60	45	45
36"+ of S permeable to VS permeable soil material to BL, >36" to rock or Cr	60->75	60->75	60->75	60->75

mod. = moderately; S = slowly; VS = very slowly

The chart numbers indicated are for Well Drained soils (i.e. no 2 chroma mottles or less within the upper 36 inches of the soil profile). Should the blocking layer encountered be a water table (seasonal or permanent) or some type of wetness problem inherent to the soil series, the estimated MPI rating may need to be adjusted upward accordingly.

A1.5 - Examples of Soil Map Notes

The following are three examples of soil map notes used on Department maps.

Example 1

EXTRA - HIGH-INTENSITY SOIL MAP

SOIL MAP NOTES

(1) IF SOILS ARE DISTURBED (CUT, FILLED, COMPACTED, ETC.) AFTER 7-21-94, THIS SOIL MAP WILL BE VOID.

(2) SOILS UNDERLINED BY RED AND GREEN HAVE LIMITING SOIL PROPERTIES. SEE NOTES AND/OR SYMBOLS INCLUDED WITH EACH MAP UNIT.

(3) SOILS UNDERLINED BY RED, GREEN & GREEN HAVE LIMITING SOIL PROPERTIES. THE MOST LIMITING SOIL RATE (GREEN) CAN BE IMPROVED TO A BETTER RATE (GREEN) BY UTILIZING THE RECOMMENDED SOIL IMPROVEMENT PRACTICES AND/OR SEPTIC SYSTEM.

(4) SOILS UNDERLINED BY RED AND YELLOW HAVE SEVERELY LIMITING SOIL PROPERTIES. SEE NOTES AND/OR SYMBOLS INCLUDED WITH EACH MAP UNIT.

(5) SOILS UNDERLINED BY RED, YELLOW & GREEN HAVE SEVERELY LIMITING SOIL PROPERTIES. THE MOST LIMITING SOIL RATE (YELLOW) CAN BE IMPROVED TO A BETTER RATE (GREEN) BY UTILIZING THE RECOMMENDED SOIL IMPROVEMENT PRACTICES AND/OR SEPTIC SYSTEM.

(6) SOILS UNDERLINED BY RED HAVE SOIL PROPERTIES THAT ARE UNFAVORABLE FOR SUBSURFACE SEWAGE DISPOSAL SYSTEMS.

(7) PLOW PAN AREAS WHERE NOTED THROUGHOUT THE SOIL MAPPING GRID AREA. ALL MPI RATES SHOWN ARE CONTINGENT UPON SOIL COMPACTION REMOVAL. BREAKING UP THE SOIL COMPACTION SHALL BE DONE BY SUBSOILING. ANY AREA DESIGNATED ON A PLAT AS A SEWAGE DISPOSAL AREA (EITHER CS, LPP or MLPP) SHALL BE SUBSOILED TO A DEPTH OF 24 INCHES THROUGHOUT THE ENTIRE AREA AND ALSO 20 FEET OUT AROUND THE AREA. ONCE THE SUBSOILING IS ACCOMPLISHED THE AREA SHALL BE REEVALUATED BE THE WILLIAMSON COUNTY ENVIRONMENTAL DEPARTMENT

SOIL MAP LEGEND

	EMBANKMENT, >12" DEEP - AVOID BY 15' WITH LPP LATERALS AVOID BY 25' WITH CS FIELD LINES
MPI	ESTIMATED SOIL ABSORPTION RATE IN MINUTES PER INCH
VAR	SOIL VARIANT
OW	OVERWASH MATERIAL OVER NATURAL SOIL
DIST	DISTURBED AREAS, NOT TO BE UTILIZED
CUT	CUT SOILS, NOT TO BE UTILIZED
FILL	FILL MATERIAL, FOUND IN PILES AND SPREAD OUT
WCD	WITH CURTAIN DRAIN, DRAIN TO BE 30 INCHES DEEP MINIMUM
CS	CONVENTIONAL SYSTEM
LPP	LOW PRESSURE PIPE SYSTEM
MLPP	MODIFIED LOW PRESSURE PIPE SYSTEM

Example 2

EXTRA - HIGH-INTENSITY SOIL MAP

SOIL MAP NOTES

(1) IF SOILS ARE DISTURBED (CUT, FILLED, COMPACTED, ETC.) AFTER 11-20-95, THIS SOIL MAP WILL BE VOID.

(2) SOILS UNDERLINED BY RED AND GREEN HAVE LIMITING SOIL PROPERTIES. SEE NOTES AND/OR SYMBOLS INCLUDED WITH EACH MAP UNIT.

(3) SOILS UNDERLINED BY RED AND YELLOW HAVE LIMITING SOIL PROPERTIES. SEE NOTES AND/OR SYMBOLS INCLUDED WITH EACH MAP UNIT.

(4) SOILS UNDERLINED BY RED HAVE SOIL PROPERTIES THAT ARE UNFAVORABLE FOR SUBSURFACE SEWAGE DISPOSAL SYSTEMS.

(5) THE NATURE OF THE LANDSCAPE IN THIS UNIT / AREA IS CHARACTERIZED BY A HIGHLY VARIABLE AND COMPLEX ARRANGEMENT OF SLOPES. THE SLOPES ARE WELL WITHIN THE 5-15% ASSIGNED TO THIS UNIT / AREA; HOWEVER THEY ARE STRUCTURED IN SUCH A MANNER AS TO CREATE SMALL OR MICRO-WATERFLOW AREAS. THESE MICRO-WATERFLOW AREAS SHALL NOT BE ACCURATELY PLOTTED, HOWEVER THE UNIT / AREA IS SUITED FOR SEPTIC SYSTEM USE PROVIDED THE ENTIRE UNIT / AREA IS PROTECTED FROM SURFACE RUNOFF WATER (FROM UPSLOPE) BY THE CONSTRUCTION OF A TERRACE OR BERM UPSLOPE OF THIS AREA TO DIVERT THE SURFACE RUNOFF AWAY FROM THE AREA.

SOIL MAP LEGEND

	EMBANKMENT, >12" DEEP - AVOID BY 15' WITH LPP LATERALS AVOID BY 25' WITH CS FIELD LINES
	DRAINWAY, >12" DEEP - AVOID BY 15' WITH LPP LATERALS AVOID BY 25' WITH CS FIELD LINES
MPI	ESTIMATED SOIL ABSORPTION RATE IN MINUTES PER INCH
DIST	DISTURBED AREAS, NOT TO BE UTILIZED
CS	CONVENTIONAL SYSTEM
LPP	LOW PRESSURE PIPE SYSTEM
PFSW	PROTECTION FROM SURFACE WATER (SEE NOTE (5))

Example 3

EXTRA - HIGH-INTENSITY SOIL MAP

SOIL MAP NOTES

(1) IF SOILS ARE DISTURBED (CUT, FILLED, COMPACTED, ETC.) AFTER 4-16-96, THIS SOIL MAP WILL BE VOID.

(2) SOILS UNDERLINED BY RED AND YELLOW HAVE SEVERELY LIMITING SOIL PROPERTIES. SEE NOTES AND/OR SYMBOLS INCLUDED WITH EACH MAP UNIT.

(3) SOILS UNDERLINED BY RED HAVE SOIL PROPERTIES THAT ARE UNFAVORABLE FOR SUBSURFACE SEWAGE DISPOSAL SYSTEMS.

(4) THE LOCATION OF THE PHONE AND POWER LINES ARE APPROXIMATE, THE PHONE LINE WILL HAVE TO BE REROUTED PRIOR TO THE INSTALLATION OF ANY SUBSURFACE SEWAGE DISPOSAL SYSTEM.

SOIL MAP LEGEND

PAN	FRAGIPAN
MPI	ESTIMATED SOIL ABSORPTION RATE IN MINUTES PER INCH
WCD	WITH CURTAIN DRAIN, DRAIN TO BE A MINIMUM OF 42" DEEP
CS	CONVENTIONAL SYSTEM
MLPP	MODIFIED LOW PRESSURE PIPE SYSTEM
	TERRACE, CAN NOT BE CROSSED WITH ANY FIELD LINES
	EMBANKMENT, MAINTAIN 25' WITH CONVENTIONAL SYSTEM AND MAINTAIN 15' WITH A LOW PRESSURE PIPE SYSTEM

A1.6 - Wetlands - General Summary Information

In recent years, various governmental agencies (Federal and State governments in particular) have implemented new regulatory controls over the use and development of areas of land classified as *wetlands*. The Williamson County Department of Sewage Disposal Management has no intention to promulgate such regulations nor shall the Department require that any approved consultant specifically delineate or map wetland areas. For all practical purposes, the soils that typify wetland areas are generally not suited for SDS use due to their poor drainage characteristics.

The purpose of this information is not to set forth an absolute definition of a wetland by the Williamson County Government, but to present a general summary of the natural elements that typify a wetland should any consultant working in Williamson County ever have the need of this information.

A. Basic Elements Required to Define a Wetland

Essentially three basic elements constitute a wetland. They involve the soils, the vegetation and the presence of specific hydrologic conditions for a specific period of time.

(1) Soils

The presence of *hydric soils* is considered as being a integral element of a wetland area. Hydric soils have formed under conditions of saturation, flooding or ponding. The inundation of the soil has occurred for sufficient periods of time in order to create anaerobic conditions into the upper 12 inches of the soil profile.

Hydric soils can be identified by various morphological features including soil colors (from the Munsell color book) with chromas of 2 or less in the soil matrix and/or the presence of redoxomorphic features (i.e. the depletion or accumulation of iron and manganese) in the soil matrix. The redoxomorphic features are noticeable on the faces of the soil peds and along root channels are characterized by the colors of oxidized (red) and partially oxidized (yellow) iron.

Of the soils listed in *A1.1 of this Chapter*, the following are considered to be hydric (per a 1990 USDA-NRCS list) - Almaville, Dilton, Dowellton, Dunning, Guthrie, Lanton, Lee, Melvin, Newark and Roellen.

(2) Vegetation

The presence of *hydrophytic vegetation* is considered as being a integral element of a wetland area. Hydrophytic plants are essentially species of plants that have a high tolerance for water. The presence of these types of plants are generally indicative of long periods of saturated soil conditions.

(3) Hydrologic Conditions

The hydrologic condition of an area is an integral element of a wetland. The amount or quantity of water that moves over and through a body of soil for a specific amount of time (typically measured in days).

The wetland hydrology condition occurs where the soil profile is saturated to within 12 to 16 inches of the ground surface for several weeks of the calendar year. Furthermore, the saturation of the soil profile may extend to the ground surface for approximately 5 percent of the growing season. The typical growing season for Williamson County is 192 days, therefore the ground (consisting of a hydric soil) is saturated for approximately 10 days (5% of 192 = 9.6 ~> 10).

B. Additional Information

Should any consultant have the need for further information regarding wetlands, the Department recommends that they contact the US Army Corps of Engineers, the State office of the USDA-NRCS or the State of Tennessee, Department of Environment and Conservation, Division of Water Pollution Control.

<u>NOTE:</u> *The Department does not perform wetland assessments nor does the County soil mapping program provide the proper training to do this type of land evaluation. Individuals that do this type of work have undoubtedly had the proper training and have the credentials to do wetland assessments. Should any consultant wish to do such investigations, the Department strongly recommends that they contact one of the aforementioned agencies regarding this matter.*

APPENDIX 2

PERCOLATION TESTS – REQUIREMENTS AND PROCEDURES

Any property being considered for percolation testing shall have an area of soil on the lot that meets all County requirements before a percolation test can be legally conducted and accepted by the Department. These procedures shall be utilized for all percolation testing conducted in Williamson County.

The individual conducting a percolation test shall be a State Approved Soil Scientist, Registered Land Surveyor, Registered Professional Environmentalist, Registered or Professional Geologist, or a Licensed Engineer in the State of Tennessee. The term *consultant* shall See one of these professionals in this Appendix. The term *Department* shall See the Williamson County Department of Sewage Disposal Management in this Appendix.

A. Department Responsibilities

Under these procedural requirements, the role of the Department shall be to ensure that all proposed percolation test sites meet all County requirements, to monitor and structure all percolation tests in accordance with all County regulations, to provide the service of locating percolation test sites at the request of a consultant as the staff scheduling allows, and to attempt to execute the duties and services of the Department in a reasonable manner.

<u>IMPORTANT NOTE</u>: The Department works on a first come, first serve policy. The Department SHALL NOT be responsible for a consultant's scheduling problem and SHALL NOT be obliged to assess any property based on promises a consultant has made to a client.

B. Consultant Responsibilities and Professional Conduct

1. It shall be the responsibility of the consultant to maintain an adequate supply of the Department form entitled the REPORT OF SOIL ABSORPTION TEST. The Department shall provide the consultant with one copy of the County form, at no cost, from which the consultant shall be responsible for having copies produced. Any additional copies of the County form shall cost the consultant the current photocopy fee, per sheet.

   <u>NOTE:</u> A consultant conducting a percolation test in Williamson County shall not use the State form CN-0774, REPORT OF SOIL ABSORPTION TEST. Any test submitted on this form shall not be accepted by the Department and will be returned to the consultant.

2. It shall be the responsibility of the consultant to properly plan, within an appropriate and flexible time-frame, all site assessment requests and testing activities.

3. It shall be the responsibility of the consultant to explain to a client that the percolation test they are performing for the client is a service they are providing to their client, not to the Department. Further, the consultant shall advise their clients that the actual percolation test form will not automatically be sent to the Department. It shall be the responsibility of the client to bring the completed form the Department offices and request that the test be reviewed.

4. The consultant shall be responsible for advising his/her client that the percolation test site shall be surveyed and located, in accordance with the provisions of this Appendix, before the test will be considered valid by the Department.

5. The Department shall require that the consultant responsible (i.e. the consultant which will ultimately sign the percolation test document) for conducting the percolation test, shall provide direct supervision on the testing site during each phase of the test. Direct supervision means immediate, on site, personal oversite of the work at all times. The use of assistants to aid in the field work is acceptable, however they shall be directly supervised. Should the Department find that the consultant did not or was not present to provide supervision during the conducting of the percolation test, that test shall not be accepted by the Department.

6. The Department shall require that the consultant responsible (i.e. the consultant which will ultimately sign the percolation test document) for the conducting of the percolation test, either be the individual that performs the test readings or directly supervises the individual performing the readings, during the second phase of the percolation test. Should the Department find that the consultant was not present to supervise the individual performing the actual test readings during the conducting of the percolation test, that test shall not be accepted by the Department.

7. The consultant shall be responsible for the preparation of all percolation test holes on the testing site so as meet all provisions of this Appendix. Should the Department find that the consultant did not prepare the test holes, in accordance with the provisions of this Appendix or used the auger holes drilled by the Department during the initial site investigation, that test shall not be accepted by the Department.

8. The consultant shall be responsible for following all provisions of this Appendix when conducting a percolation test. When the Department has documented repeated disregard for these requirements, punitive actions shall be taken by the Department. See *Subsection C, of this Appendix*.

9. The consultant shall prepare all percolation test forms in the following manner:

    (a) Each percolation test form submitted shall have the original signature of the consultant, signed in ink.

    (b) Each percolation test form submitted shall have the consultant's seal, stamped in ink, and/or the consultant's State registration number shown on the form in the signature block.

10. The consultant shall not average a test nor shall a consultant make any statements to a client as to whether or not a percolation test passes in accordance with County requirements. Furthermore, the consultant shall not make any statements to a client as to whether or not a percolation test site shall be permitted for a sewage disposal system by the Department.

C. Punitive Actions for Violations of These Provisions

Percolation tests performed by consultants who repeatedly demonstrate a disregard for the requirements of this appendix shall not be accepted by this Department and may be subject to being barred from conducting percolation tests in Williamson County.

1. First Written Warning

    The Department shall issue to the consultant one written warning when the Department finds or discovers a violation of these provisions. The percolation test or test site which was subject to the noted violation shall be considered invalid, and the consultant shall be required to conduct a second test upon that site.

2. Second Written Warning – Probation

    Upon the discovery of a second violation, the Department shall issue another written warning. The percolation test or test site which was subject to the noted violation shall be considered invalid, and the consultant shall be required to conduct a second test upon that site.

    Upon the receipt of the second written warning, said consultant shall be advised that he/she is on Probation. The period of probation shall extend for a period of no less than one year from the date of the issuance of the second written warning.

    Should the consultant work for a period of one year and receive no more written warnings, the probation status shall be lifted.

    The receipt of another written warning after a period of probation shall start the process of this Subsection again.

3. Third Written Warning – Revocation of Consulting Privileges

The consultant who receives a third written warning during the period of probation, shall be advised that their consulting work, regarding the conducting of percolation tests, shall no longer be accepted by the Department. The percolation test or test site which was subject to the noted third violation shall be considered invalid, and the consultant shall conduct another test upon that site.

Once the second test is completed, the consultant shall be barred from conducting percolation tests in Williamson County indefinitely and his/her name shall be removed from any listings distributed to the public. Should the consultant attempt to conduct any further percolation tests, said tests shall not be accepted by the Department.

4. Immediate Revocation of Consulting Privileges

Where a consultant is found to have committed any obvious acts of fraud or deceit, the Department shall consider such actions as grounds for implementing an immediate revocation of the consultant's consulting privileges in Williamson County. Further, the Department shall seek to examine all legal means to see to the revocation of the consultant's professional certification.

D. Where Percolation Tests Are Allowed

Percolation tests shall not be allowed or conducted on any parcels of land subject to being subdivided and platted, regardless of the type or nature of the subdivision of the property. Such properties shall be required to be soil mapped via an Extra High-Intensity soil mapping procedures, in accordance with all provisions of *Appendix 1*.

A parcel of land shall be a minimum of five (5.00) acres is size in order for it to be considered for percolation testing. Additionally, a parcel of land shall not be part of a platted subdivision (i.e. a subdivision requiring platting) created by the extension and construction of new roads, utilities or easements.

The use of percolation tests in any other type of situation shall only be done at the direction of the Department (e.g. use of a percolation test to establish a soil MPI rating for alternative system site assessments, etc.).

E. Soil and Site Criteria

The provisions of these regulations require that any and all sites, on any parcel of land, to be subjected to a percolation test shall be field checked by the Department in order to see that the site has suitable soil properties and characteristics, and that the landscape conditions are appropriate to qualify for percolation testing.

The criteria used by the Department for evaluating soils or sites for suitability for percolation testing involves, but is not limited to, assessing the depth to rock, slope, wetness or water problems, and soil textural classification.

1. Soil Properties and Characteristics

A site ***shall not*** qualify for percolation tests if the soils meet any of the following conditions:

(a) Soils that are classified by USDA-NRCS as belonging in suborders having aquic moisture conditions.

(b) Soils that are classified by USDA-NRCS as belonging in great groups having fragic properties.

(c) Soils that are classified by USDA-NRCS as belonging in subgroups having the modifier aquic, glossic, fragic, or vertic in the series name.

(d) The soil does not have a minimum depth of 36 (thirty-six) inches before encountering bedrock, a non-rock restrictive horizon (Cr), or permanent water table.

(e) The soil profile does not have a minimum depth of 18 (eighteen) inches (from the ground surface down) of soil having moderate to medium subangular blocky structure with a clay content of 35% or less over soil having moderate to medium angular blocky structure with a clay content ranging from 35% to 50%.

(f) The soil profile consists of soil material having a clay content in excess of 50% and a structure ranging from strong angular blocky to a massive plastic structureless clay in the upper 24 (twenty-four) inches.

(g) The soil is classified by USDA-NRCS as being poorly drained or somewhat poorly drained.

(h) The soil profile exhibits mottling due to wetness at any point within thirty-six (36) inches of the ground surface.

<u>IMPORTANT NOTE</u>: Should any site be found to have soils meeting this criteria, the Department Soil Scientist shall have the authority to assess the soil on the site and make the determination as to whether or not the soil can be drained (based on soil properties and site conditions). If the Department determines that the site can be adequately drained, it may be approved for testing.

(i) The soil area or map unit has slight to moderate soil compaction or is compacted to the extent that 15% or more of the original soil pore space has been eliminated.

ALL of the above listed information shall be assessed by a Department Soil Scientist, Soil Scientist Technician, or a private consulting Soil Scientist approved to consult in Williamson County.

2. Site Characteristics

A site *<u>shall not</u>* qualify for percolation tests if the site characteristics meet any of the following conditions:

(a) The soil area or map unit is located on slopes of more than 20%.

(b) The soil area or map unit is located in a landscape position subject to flooding.

(c) The soil area or map unit is located within an enclosed depression not having a surface drainage outlet. This would include areas that occupy the bottoms of sinkholes.

(d) The soil area or map unit is located in a water receiving landscape position and the inflow of water (both surface and subsurface) is to such an extent that it shall be detrimental to the performance of a subsurface sewage disposal system.

(e) The soil area or map unit is located less than twenty-five (25) feet from any obvious watercourse or drainway.

ALL of the above listed information shall be assessed by a Department Soil Scientist, Soil Scientist Technician, or a private consulting Soil Scientist approved to consult in Williamson County.

F. Requesting a Site Assessment for Percolation Test Eligibility

The consultant shall contact the Department to schedule an appointment, in accordance with the provisions outlined in *Subsection B, Part 2* (i.e. regarding the requirement for sufficient advanced notification), with a Department Soil Scientist for an assessment of the site. At the consultant's request, the Department may conduct the site assessment in the absence of said consultant.

1. Property Location

The consultant shall provide accurate and detailed directions to the property. The consultant shall include information as to the best way to access the property, and whether or not there are any locked gates or barriers blocking access to the property from the road. The directions shall include details on how to find the proposed test site on the property.

Additionally, the consultant shall provide to the Department a copy of the tax map or plat (preferred, if available), the Tax Map Number and the Parcel Number of the property.

2. Property Conditions

The Department will only assess a property with Department equipment (i.e. a tractor and auger). If Department staff is unable to place its equipment onto the property, no attempt will be made to assess the property to locate a suitable test area, nor will the site of a proposed test area be assessed or approved.

The consultant shall indicate the vegetative condition of the property. If the Department staff finds that the property is so heavily vegetated that they are unable to maneuver a tractor onto the property or they are unable to adequately see the ground surface (fields and pastures shall be mowed such that the grass is six [6] inches or less in height), the site and/or the proposed test area will not be checked, assessed or approved.

3. Proposed Use of Property

The consultant shall provide detailed information regarding where a potential property owner or the current property owner wishes to place a house on the property, the number of bedrooms the proposed house will have, and whether or not the property owner is planning to place some type of oversized bathing fixture(s) (i.e. whirlpool, spa-type tub, Jacuzzi, etc...) in the proposed house. The consultant shall ensure that a proposed house location has been physically marked, in an obvious manner (e.g. with flagging or tall brightly painted stakes).

<u>IMPORTANT NOTE</u>: This task shall have been accomplished prior to requesting an assessment of the property by the Department. This information is important, as it will provide the Department staff making the assessment with the information necessary to know how large of a soil area (i.e. enough soil area to support the proposed structure) will need to be assessed.

G. Ground Control and Vegetative Control

Should the Department find that a property is inaccessible and/or location of property boundaries is unclear, the Department shall have the authority to require that the property be cleared or cleaned of excessive vegetation and/or any or all property boundaries be surveyed and clearly marked, in accordance with the provisions of *Section 28* and *Section 29* of these regulations.

It shall be the responsibility of the consultant to see to such requirements and ensure that required tasks have been properly completed. The consultant shall not contact the Department staff for another attempt at assessing the subject property until said tasks have been completed.

H. Establishment and Delineation of a Percolation Test Site

Where, based upon the soil conditions of the property, the Department is able to delineate a percolation test site, the Department shall make every effort to locate a percolation test area that will have a minimum area of 15,000 square feet. Where property size and soil conditions will allow, the Department will attempt to delineate an even larger area.

<u>IMPORTANT NOTE</u>: On each and every site approved by the Department, the staff will field mark the location (typically with wire flags and/or flagging tape) where the consultant shall dig each test hole and the outside limits of the percolation test area. Removal, relocation or tampering with these markers, as set by the Department, shall result in the disapproval of the area proposed to be percolation tested. Additionally, such tampering shall be construed by the Department as a violation of these provisions and shall constitute the issuance of a written warning to the consultant.

I. Preparation of the Percolation Test Site

<u>IMPORTANT NOTE</u>: Any deviations from these procedures, when found or noted by the Department staff, shall be construed by the Department as a violation of these provisions, and shall constitute the issuance of a written warning to the consultant.

Once the site has been approved for testing by the Department, the consultant shall adhere to the following procedure:

1. The consultant shall dig all of the test holes at the location of the markers placed on the site by the Department.

<u>IMPORTANT NOTE</u>: The consultant shall not use the holes dug by the department staff with our tractor auger as percolation test holes. The test will not be accepted if it is found that the consultant used our auger holes to conduct the test. Additionally, such actions shall warrant the issuance of a written warning to the consultant.

IMPORTANT NOTE: The Department may require as few as five (5) holes for a site. However, the Department shall make the determination as to how many holes each test site will require based on the soil properties of the site. Therefore, the consultant shall be required to dig a proper hole and test at each location the staff has marked on a site. The Department strongly advises that the consultant check with the Department if there is any question as to the number of holes that shall be required for any given site. Should it be found that the consultant has not prepared the proper number of holes on a site, the scheduling of the testing shall be delayed until the consultant has prepared the correct number of holes.

2. The holes shall be excavated (i.e. dug or bored) so as to have horizontal dimensions (i.e. diameter) of six (6) to twelve (12) inches and having vertical dimensions of twenty-four (24) inches, NO MORE, NO LESS.

3. The consultant shall carefully scratch the bottom and sides of each hole with a knife blade or sharp pointed instrument in order to remove any smeared soil surfaces, and to provide a natural soil/water interface into which the water may percolate unimpaired.

4. The consultant shall carefully remove all loose soil material from the holes.

5. The consultant shall place two (2) inches of coarse sand or fine (pea) gravel in the bottom of each hole in order to protect the bottom of the hole from scouring and sediment when placing the water into the hole.

J. Conducting the Percolation Test

The consultant shall contact the Department a minimum of three (3) working days prior to starting the test (i.e. the presoak phase) on any site. The Department will then schedule a staff member to monitor the test. The Department may or may not be able to schedule a staff member to stay with the consultant during the conducting of the entire test.

However, at the Department's discretion, a staff member shall have the authority to stop by the site and assess the consultant's performance of the test at any time during each phase of the scheduled test (i.e. the presoak and the actual test run). Therefore, the consultant shall always be on the site for the duration of all testing activities (i.e. to oversee the presoak and to make all test measurements).

1. The actual test shall be conducted between Monday and Friday excluding standard government holidays.

2. The consultant shall be required to contact the Department staff to schedule the presoak portion of a test on a Monday, Tuesday, Wednesday, or Thursday.

3. The consultant shall begin the test procedure with the presoaking of the test holes. The consultant shall carefully fill the holes with clear water to a minimum depth of ten (10) inches from the top of the gravel or sand in the bottom of the hole.

   IMPORTANT NOTE: No additives of any type are to be placed into any of the test holes which will aid the water in percolating into the soil. Should the Department find that any consultant has corrupted a test by placing some type of additive into any test holes, the Department shall consider this type of action an attempt of fraud and will consider such actions severe enough to initiate an immediate revocation action against the consultant. In addition to the immediate revocation of the consultant's privileges to practice in Williamson County, the Department shall pursue all legal means to revoke the consultant's privilege to practice in the State of Tennessee.

4. Mark the beginning water level (i.e. at the level being ten [10] inches above the gravel or sand) with some type of marker to establish a fixed reference point. A nail is typically used for this purpose.

5. The consultant shall identify each hole in some type of numeric or alphabetic arrangement so that each hole in the test area is accurately correlated to the appropriate line on the percolation test data sheet.

6. The presoaking of all the test holes shall be carried out for a minimum period of four (4) hours from the start time of this phase of the test. It shall be required that the test holes be continuously kept filled to the level of marker for the entire presoak period. The method of keeping the test holes properly filled is the responsibility of the consultant.

IMPORTANT NOTE: Once the Department has assessed the soil in the percolation test site, the Department may require that the presoak period be extended to a longer period. Some types of soils are composed of a high percentage of shrink-swell clay. These types of soils will require an extended presoak time period. The Department will inform the consultant as to whether or not this action shall be required after the site and soil assessment has been made.

7. The actual percolation test (i.e. the measurement phase) shall start at the time that is twenty-four (24) hours after the time the presoaking phase of the test began.

8. Prior to starting the actual percolation test, the consultant shall check each test hole to see whether or not any presoak water is still left in the hole. Should any hole be found to have any remaining presoak water, the consultant shall measure the depth to the level of the remaining water from the fixed reference point and record that information in the appropriate location on the test data sheet for that hole.

9. Prior to starting Step 10, the consultant shall go to each test hole and scoop out, by hand, as much mud as possible that has accumulated in the bottom of each test hole as a result of the presoak procedure, without disturbing the gravel or sand.

10. At the time that the actual percolation test is to start, the consultant shall bring the water level in each hole up to the fixed reference point (the marker placed in the hole at the time of starting the presoak phase of the test) and record the beginning time and the initial water level in the appropriate location on the test data sheet for each hole.

    NOTE: The consultant shall use standard time notations on the test data sheet (i.e. do not use military time, GMT time, etc.). Any test submitted to the Department with any other type of time notations shall not be accepted and shall be returned to the consultant.

11. The consultant shall take a reading and record the level of water drop from the fixed reference point at thirty (30) minute intervals for a total of four (4) hours for each hole in the test site. After each reading, the water level shall be brought back up to the fixed reference point. At each reading the consultant shall record the amount of drop (D) and the time (T) of each reading, at each test hole, in the appropriate location on the test data sheet.

    NOTE: The consultant shall always measure the distance of water level drop in inches, or parts of inches, on the test data sheet (i.e. do not use metric measurement scales, etc.). Any test submitted to the Department with any other type of measurement notations shall not be accepted and shall be returned to the consultant.

12. If, during the final reading (i.e. eighth reading) of the measurement phase of the test, it is found that any hole has not dropped a minimum of three-eighths (⅜) of an inch during the last thirty (30) minute interval or period, the consultant is to proceed to Step 13 and follow those directions.

13. The test holes where the water level has dropped at least three-eighths (⅜) of an inch at each reading shall be considered acceptable holes. The readings are to be taken and recorded accordingly to the end of the test period.

    HOWEVER, those test holes which have not dropped a minimum of three-eighths (⅜) of an inch during the thirty (30) minute period prior to the last reading, MUST be specifically assessed in the manner as follows:

    NOTE: During the actual measurement portion of test, the consultant shall make note of any test holes which are NOT dropping within the aforementioned limits, the consultant shall inform the Department representative about those test holes so that we may specifically watch the consultant's methodology when they are making measurements at those holes.

    (a) For a test to be considered by the Department as passing, it must *average* a one (1) inch drop in 105 minutes (1 hour and 45 minutes). In order to accurately assess these readings, the consultant must closely monitor those holes which have not dropped the required three-eighths (⅜) of an inch in the last thirty (30) minute reading period.

(b) For the test holes that are found to not be dropping at the minimum rate of three-eighths (⅜) of an inch during the last reading period, the Department shall require that readings be continued to be made at fifteen (15) minute intervals until the water in the slow hole has dropped one (1) inch. Readings at fifteen (15) minute intervals shall be used in order to ensure an accurate record the exact amount of time which elapsed while the one (1) inch of absorption was achieved (e.g. 90 to 105MPI). Once the water level has dropped that one (1) inch from the fixed reference point, the consultant shall record, in the time column, the time at which the water level reached this point.

(c) If, at the end of 105 minutes, the slow test hole still has not dropped one (1) inch, the exact amount or measurement of amount of drop at the 105 minute mark (i.e. 1 hour and 45 minutes), from the time noted in the seventh reading column, shall be recorded (e.g. □, □, □ of an inch in 105 minutes etc...) for that test hole.

<u>IMPORTANT NOTE</u>: *As in the case of the extended presoak period, the Department shall have the authority to require that the actual test period be extended (i.e. longer than four [4] hours) where sites consist of soils that are composed of a high percentage of shrink-swell clay. The Department will inform the consultant as to whether or not this action shall be required after the site and soil assessment has been made.*

K. Plat Documentation of Percolation Test Sites

Upon the completion of the percolation test procedure, the location of the actual percolation test site (or sites) and the location of each percolation test hole (within each site or sites) shall be precisely plotted upon a plat of the property. Measurements of the size of the test area shall be shown in some manner. Thus, the plat shall show all property boundary lines and the percolation test site (including the test holes). See Figure A2-1. Additionally, measurements from the test area to obvious and prominent landmarks (e.g. roads, fence lines, prominent trees, or other fixed points of reference on the property) may also be shown.

The plat documenting the location of the percolation test site (or sites) shall be prepared in the same manner as is utilized for grid staking. See *Appendix 1, Chapter 2, Subsection A* and *Subsection B, Part (5)*. Thus, the aforementioned information shall be prepared by a Licensed/Registered Land Surveyor. Should a percolation test be conducted by a consultant other than a Licensed/Registered Land Surveyor, the services of a Licensed/Registered Land Surveyor shall be secured in order to prepare the required plat documentation outlined in this Subsection.

All required plat documentation outlined in this Subsection shall be drawn at a scale of one inch equals one-hundred feet (i.e. 1" = 100'). However, in a situation where the parcel of land is large (e.g. in excess of 40 acres in size), the Licensed/Registered Land Surveyor may show the boundaries of the land parcel at a maximum of a one inch equals two-hundred feet (i.e. 1" = 200') scale and show the percolation test site (or sites) at the required one inch equals one-hundred feet (i.e. 1" = 100') scale as a detail on the same plat. See Figures A2-2A and A2-2B.

<u>*IMPORTANT NOTE:*</u> *The tasks noted in this subsection may be completed at any time after the proposed test site (and the field located percolation test hole locations) has been approved for testing by the Department. The test shall not be accepted by the Department unless the proper percolation test area location information is included with the original test data sheet. The location information (i.e. the plat) shall be on a separate boundary survey plat document, and attached to the test data sheet, when submitted to the Department.*

L. After the Test is Documented and Completed

THE CONSULTANT SHALL NOT RECORD THE MPI READING IN THE LAST COLUMN OF THE TEST DATA SHEET. THE DEPARTMENT SHALL CALCULATE THE MPI RATING AND AVERAGE THE PERCOLATION TEST DATA AT THE TIME THE TEST IS SUBMITTED TO THE DEPARTMENT FOR REVIEW.

The Department strongly recommends that the consultant advise their clients that if they intend to use the test for the purpose of obtaining a sewage disposal system permit or if the client is in need of having the test results determined for the purposes of buying or selling a parcel of land, they should bring the original test data sheet and boundary survey plat to the Williamson County Department of Sewage Disposal Management as soon as possible.

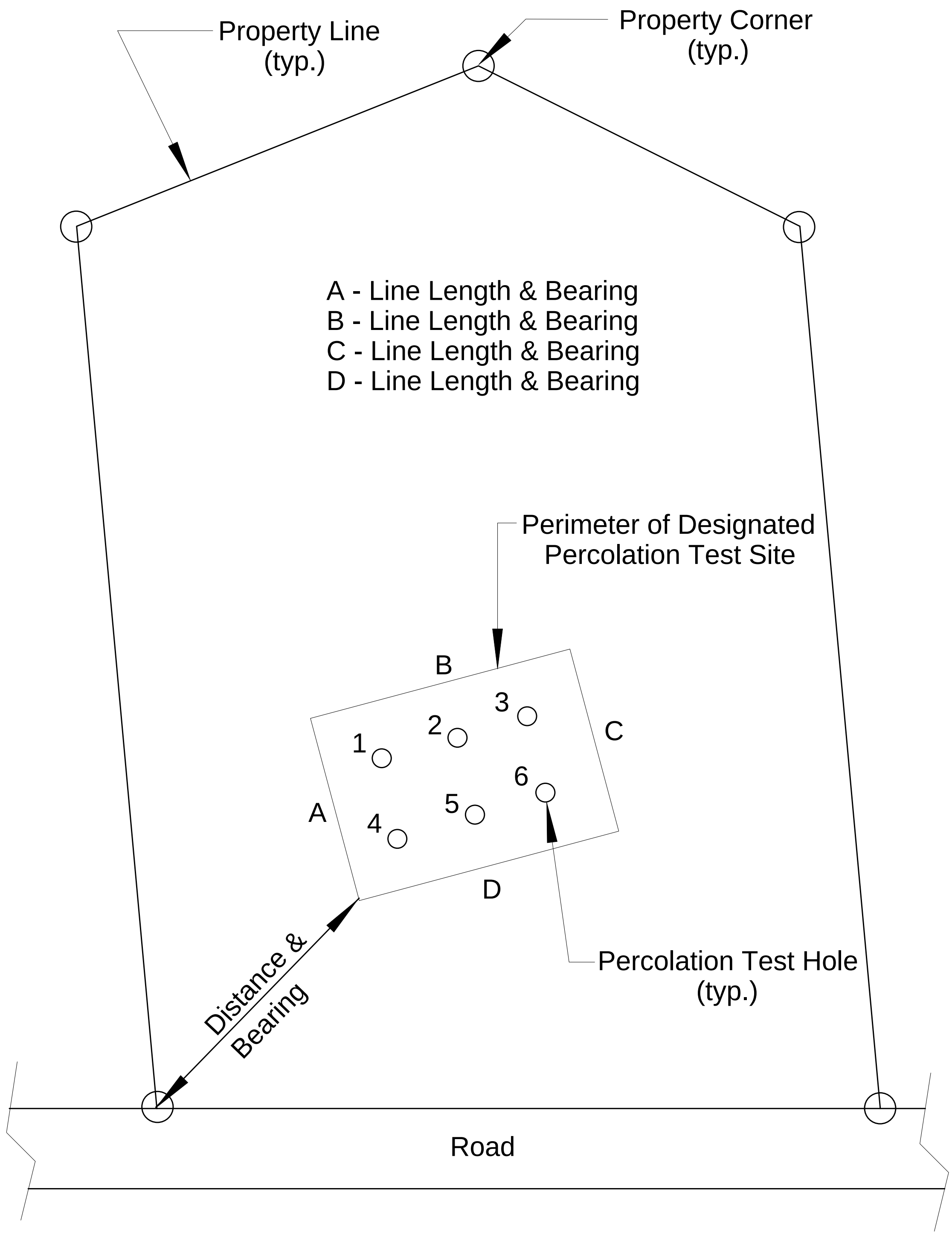


Figure A2-1. Locating a single percolation test site on a land parcel.

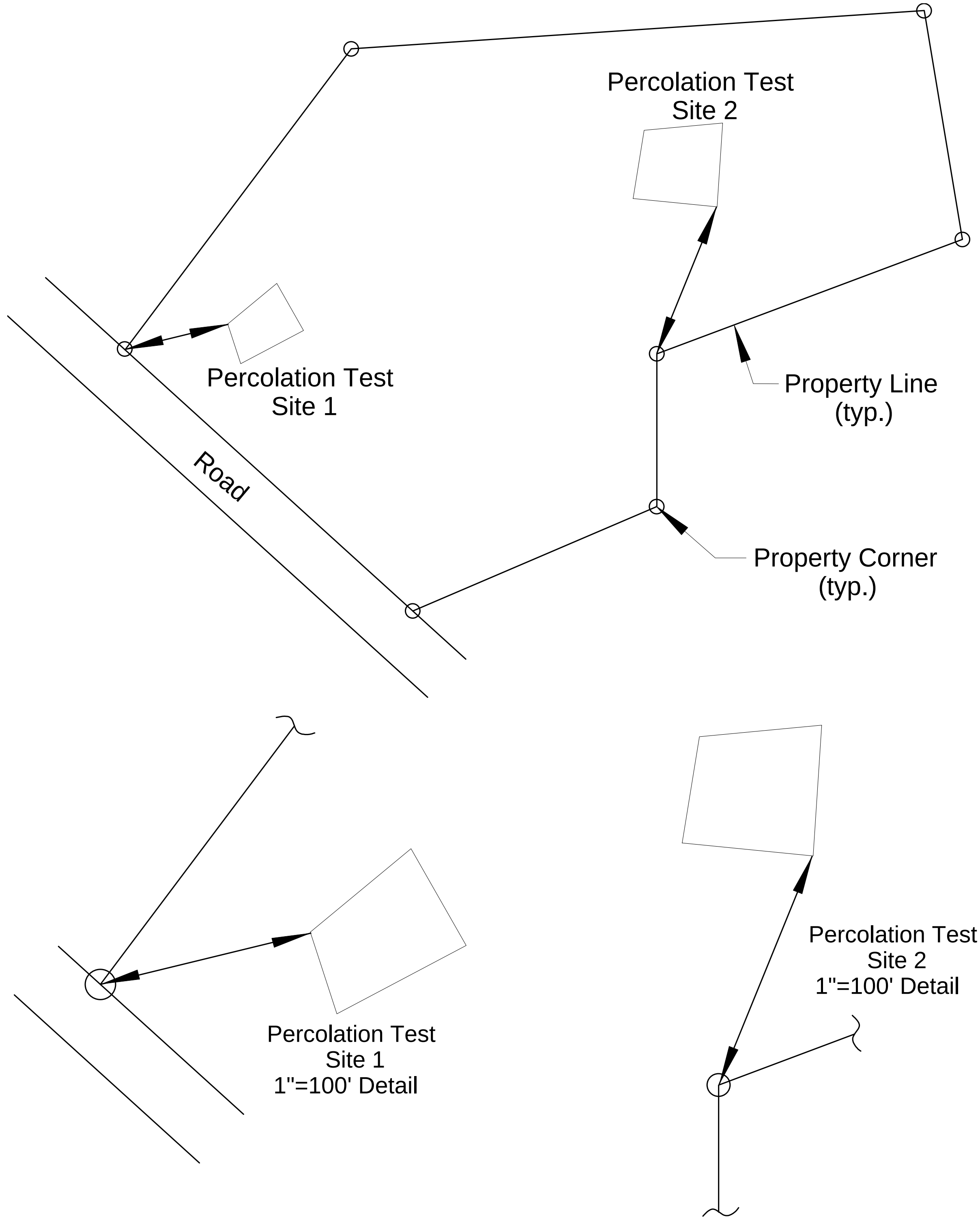


Figure A2-2A. Locating multiple percolation test sites on a parcel of land.

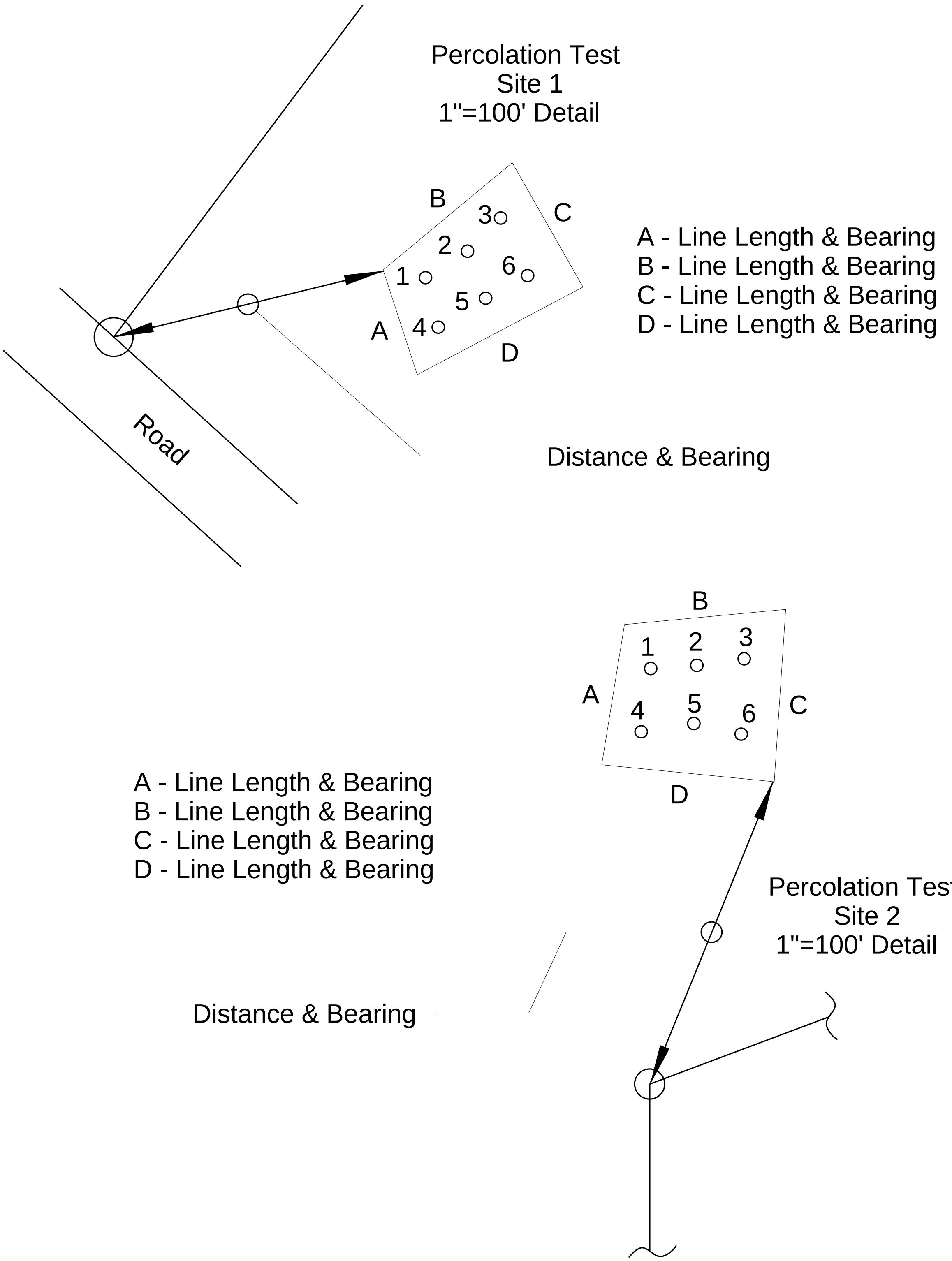


Figure A2-2B. Example showing the information that shall be shown on a 1”=100’ detail drawing.

The Department will inform any and all individuals that the review and averaging process for all percolation test data sheets submitted to the Department may take from ten (10) to fifteen (15) working days from the date the percolation test information is submitted.

M. Final Determination of Site Suitability for Subsurface Sewage Disposal System Use

Percolation tests shall not be considered as *prima facie* evidence of a site's suitability to support the installation of a subsurface sewage disposal system. The soil properties contained within the confines of the designated percolation test area shall also be given careful consideration. The arithmetic mean (i.e. average) of the percolation test data shall not be considered as the sole determination of said site suitability. The uniformity of the soil properties contained within the designated test area, the individual and overall performance characteristics of the test holes, topographic considerations surrounding the designated test area, and the information from the Department Soil Scientist's assessment of the aforementioned characteristics shall be taken into careful consideration when determining the percolation test site's suitability for supporting the installation of a subsurface sewage disposal system. Additionally, the evaluation of the percolation test data shall result in the determination of a suitable soil loading rate (i.e. the rate at which water can be applied to the soil, in a septic system, so that the system will not be overloaded and subsequently fail to function) for the purposes of designating and/or designing a subsurface sewage disposal system.

Based upon the Department's evaluation of the percolation test data, the Department shall have the authority to either accept or reject the percolation test, require additional information, and/or place specific restrictions upon the property's use (i.e. stipulate the type of subsurface sewage disposal system that shall be used on the property, size of said system, use of said system, etc.). Additionally, the Department shall also have the authority to mandate the size (i.e. number of bedrooms in the structure) and site location of any proposed dwellings and any of said dwellings' related appendages.

Once a percolation test area and the test's data has been evaluated and accepted by the Department, and all specifications and restrictions have been placed upon said test, the actual percolation test area shall then be considered as a designated subsurface sewage disposal system area. As such, the percolation test area shall be subject to all provisions outlined in *Section 9* of these regulations.

N. Expiration of Percolation Test Documentation

1. Any percolation test, whether on file in the Department offices or in the possession of private individuals, regardless of whether or not the percolation test documentation has been reviewed and averaged by the Department, that was completed prior to October 1, 1990 shall be considered null and void *upon the effective date of the adoption of these regulations*.

2. Any percolation tests, whether on file in the Department offices or in the possession of private individuals, regardless of whether or not the percolation test documentation has been reviewed and averaged by the Department, that were conducted between October 1, 1990 and January 1, 1996 shall expire upon the date being ninety (90) days *after the effective date of the adoption of these regulations*.

3. Any percolation tests, whether on file in the Department offices or in the possession of private individuals, regardless of whether or not the percolation test documentation has been reviewed and averaged by the Department, that was completed after January 1, 1996 but prior to *the adoption of these regulations*, will be subject to a reassessment investigation. Should the integrity of the percolation test be reaffirmed during the reassessment process, said test will be assigned an expiration date effective three (3) years from the date that the percolation test was reaffirmed.

   Should the reassessment reveal that the test is now invalid, said test shall become permanently null and void. See *Section 27, Subsection F, Part 2, subpart (d)*.

4. A completed percolation test, and any of its associated documentation, shall have an expiration date effective three (3) years from the date that the percolation test was conducted.

5. Where percolation test documentation becomes expired under the conditions outlined in this Subsection and that documentation is associated with a previously issued and valid Construction Permit (i.e. being considered by the Department as supporting documentation to the Construction Permit), said documentation shall remain valid until the expiration date of said Construction Permit.

APPENDIX 3

LOW PRESSURE PIPE SYSTEMS

This Appendix shall be considered by the Department, as a comprehensive manual on the subject of Low Pressure Pipe (LPP) Systems. Additionally, this Appendix/Manual will specify how these systems are to be designed and installed in Williamson County.

Important Note: This manual was adapted from the UNC Sea Grant, College Publication UNC-SG-82-03, *Design and Installation of Low Pressure Pipe Waste Treatment Systems*, May 1982. The content was edited to conform to the specific geologic and physiographic characteristics of Williamson County, Tennessee. These standards promote reliability and longevity of waste treatment systems for environmental protection and public health.

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INTRODUCTION

Many sites under consideration for development in Williamson County, Tennessee are not suitable for conventional subsurface sewage disposal systems. Among these sites are some which have enough depth and area of usable soil to provide safe disposal via low-pressure pipe (LPP) systems. Though LPP systems are not a panacea for all the unsuitable soils of Williamson County, they are useful for various specific conditions where conventional systems have been known to fail.

The information in this Appendix/manual specifies the procedures and materials to be used for appropriate site and soils evaluation, design, installation/construction and maintenance of residential LPP systems. Accurate site evaluation, utilization of proper materials, and strict adherence to the installation procedures, as specified in this manual, are critical to the successful performance of a LPP system. As with any subsurface sewage disposal system, proper maintenance is a necessity to ensure the longevity and performance of the system.

This Appendix/manual only covers design and installation of small LPP systems suitable for homes and small businesses. Due to the fact that Williamson County possesses a wide and diverse range of soil, geologic, and topographic conditions, each site will be carefully considered on an individual basis. The final determination for the use of the LPP system shall be made by the Williamson County Department of Sewage Disposal Management. All such determinations shall be based on the specific site and soil characteristics which exist upon a parcel of land where the use of LPP systems is proposed.

All LPP systems shall be designed by an engineer licensed in the State of Tennessee. Said plans shall be in accordance with the design guidelines as outlined in this manual and in accordance with the design format as established in *Section 19* of these regulatons. Additionally, the design engineer shall provide construction supervision and inspection where requested by the Department.

CHAPTER 1

What is Low Pressure Pipe Distribution

A distribution/soil-absorption system must serve two purposes:

- disperse untreated effluent below the soil surface, and
- treat and purify the effluent before it reaches ground or surface water.

Maximum treatment potential of LPP systems is achieved when the distribution area is not saturated with water or effluent, allowing efficient aerobic bacteria to treat the wastes.

There are several conditions which frequently hinder the operation of soil-absorption systems. Clogging of the soil can occur from localized overloading during use or from the mechanical sealing of the soil-trench interface during construction. This clogging can cause effluent to break through to the ground surface, resulting in a system failure, thereby creating a public health hazard. Anaerobic conditions, caused by continuous saturation due to overloading or a high water table, retard treatment of the effluent, thereby increasing the potential for pollution. Shallow soils are not deep enough to purify the effluent.

LPP systems have three design features to help overcome these problems:

- uniform distribution of effluent
- dosing and resting cycles
- shallow placement of trenches

Problems from localized overloading are decreased when effluent is distributed over the entire absorption area. Dosing and resting cycles help maintain aerobic conditions in the soil, improving treatment. Shallow placement of the distribution trenches increases the vertical separation from the system to any restrictive horizon or seasonally high water table.

LPP systems shall not be used to dispose of wastewater wherein the average concentration of grease exceeds one hundred fifty (150) milligrams per liter (mg/L) because of the clogging potential of the distribution network.

A LPP system is a shallow, pressure-dosed soil absorption system. A conceptual view of a basic LPP system is shown in Figure A3-1. It consists of:

- two-compartment septic tank
- pump tank
- submersible sewage/effluent pump and level controls
- high water alarm
- supply line and manifold
- distribution laterals
- suitable area and depth of soil

When septic tank effluent rises to the level of the upper pump control, the pump turns on and effluent moves under pressure, through the supply line, manifold and distribution laterals. These laterals are Schedule 40 PVC pipes containing small holes (5/32 inch diameter) spaced five (5) feet apart. The pipes are placed in narrow trenches eighteen (18) inches deep, spaced a minimum of five (5) feet apart. Under low pressure (five [5] feet of head pressure [2.17 pounds per square inch (psi)]) supplied by the pump, septic tank effluent flows through the holes and into the trenches. It diffuses from the trenches into the soil where it is treated.

The pump turns off when the effluent level falls to the lower control. The level controls are set so that the effluent is pumped two (2) to four (4) times daily with resting periods in between to allow aerobic treatment of effluent. If the pump or level controls should fail, the effluent would rise to the level of the alarm control. The alarm would turn on, signaling the homeowner of a problem.

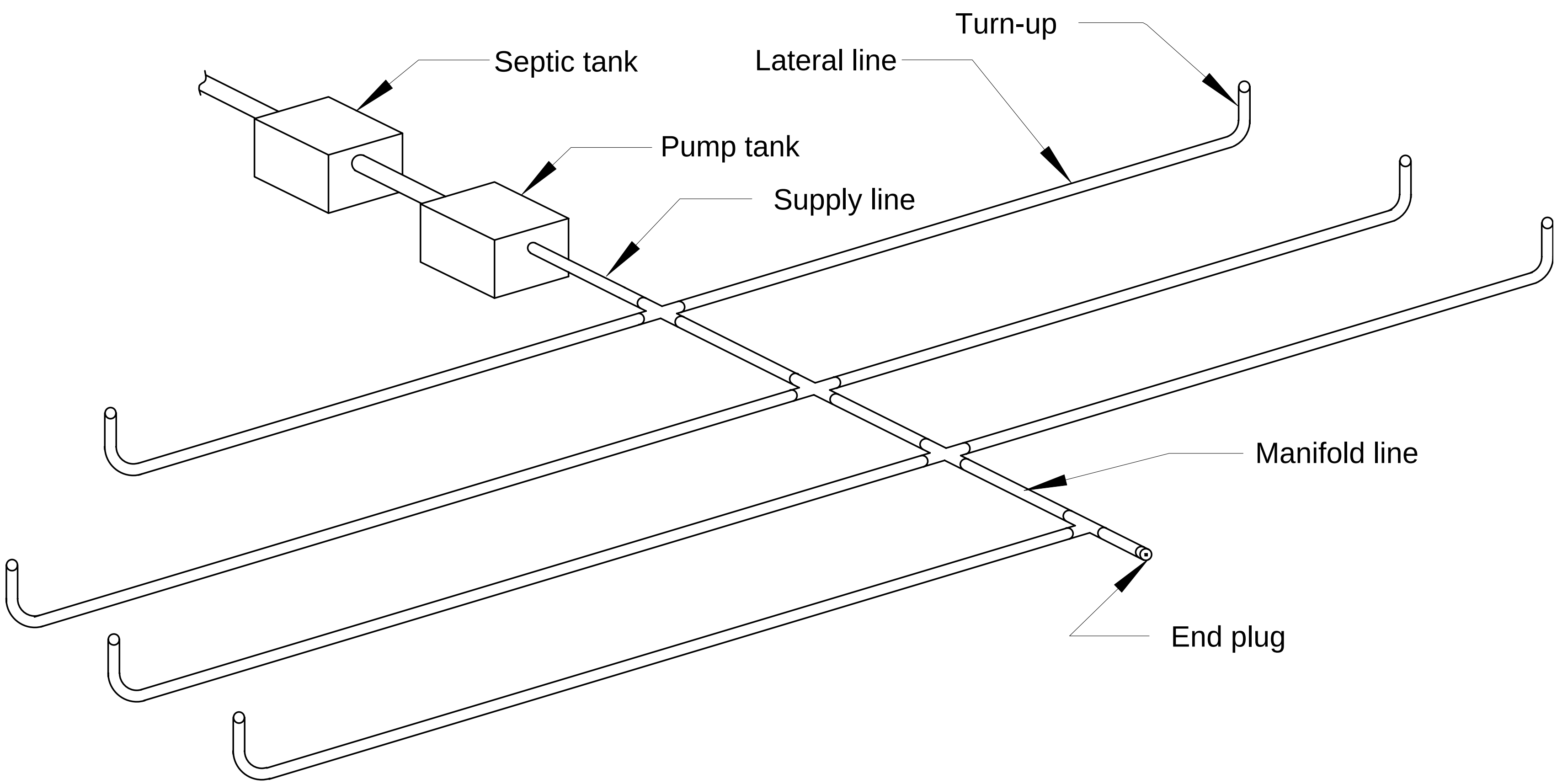


Figure A3-1. Basic conceptual diagram of a low pressure pipe system.

CHAPTER 2

Site and Soil Requirements for LPP Systems

The suitability of a LPP system for a given site is determined by the soil absorption rate, soil properties, slope, size and configuration of a suitable soil area (i.e. available space), and the anticipated daily waste flow (in gallons per day flow).

A. Acceptable Soil Area Requirements

The disposal field of most residential LPP systems (on newly constructed dwellings) occupies from 3,000 square feet to 8,500 square feet of area depending on the slope, soil properties, buffer requirements, and design waste load. Additionally, an area of equal treatment capability shall be set aside for future repair or replacement of the system. See Table A3-1 for LPP disposal field area requirements. Space between the existing lateral lines is not a suitable repair area.

All components of a LPP system shall meet all minimum setback restrictions as outlined in *Section 13*. *Although it is not feasible to integrate all of the site and soil setback criteria into a general lot size requirement, an undeveloped lot smaller than one acre will not be acceptable for a LPP system.*

Table A3-1. LPP Disposal Field Area Requirements

Number & Size (ft^2) of Absorption Fields					
Soil MPI Rates	Slopes	1-2 Bedrooms	3 Bedrooms	4 Bedrooms	5 Bedrooms
30-45 MPI	0-5%	2 @ 3,000	2 @ 3,000	2 @ 4,000	2 @ 5,000
	5-15%	2 @ 3,500	2 @ 3,750	2 @ 4,500	2 @ 5,500
	15-25%	2 @ 4,000	2 @ 5,000	2 @ 6,000	2 @ 8,000
60 MPI	0-5%	2 @ 3,250	2 @ 3,800	2 @ 4,500	2 @ 5,500
	5-15%	2 @ 3,750	2 @ 4,000	2 @ 5,000	2 @ 6,000
	15-25%	2 @ 4,000	2 @ 5,000	2 @ 7,000	2 @ 9,000
75 MPI	0-5%	2 @ 3,500	2 @ 5,000	2 @ 5,500	2 @ 7,500
	5-15%	2 @ 4,000	2 @ 6,000	2 @ 6,500	2 @ 8,000
	15-25%	2 @ 5,500	2 @ 6,500	2 @ 7,500	2 @ 8,500

Important Note*: The disposal field area requirements only represent the amount of square footage necessary to accommodate a single-family dwelling containing the number of bedrooms indicated in the column headings. No provisions regarding the additional square footage required in a disposal field area to accommodate any type of oversized bathing fixtures are included in Table A3-1.*

B. Soil Requirements

A LPP system shall be constructed in the designated or platted subsurface sewage disposal system soil areas on the lot. LPP systems shall be installed in natural, undisturbed soil. Areas of land that have been cut, filled or disturbed are considered unsuitable for LPP use. A minimum of twelve (12) inches of permeable soil, as ascertained by an approved Soil Scientist in accordance with the *Uniform Code of Soil Mapping Standards and Procedures for Williamson County, Tennessee* (*Appendix 1*), is required between the bottom of the lateral line trenches and any underlying restrictive horizons (or blocking layers). Restrictive horizons are described in detail in *Appendix 1*.

LPP lateral line trenches shall be placed at eighteen (18) inches deep, giving a minimum soil-depth requirement of thirty (30) inches. The soil shall have suitable textural, structural, absorption and drainage characteristics for such use as outlined in *Appendix 1*.

In cases where the depth to a blocking layer or restrictive horizon, within a soil profile, ranges from twenty-four (24) to thirty (30) inches, a *Modified* LPP (MLPP) may be installed using six (6) to eight (8) inches of compatible imported fill, as approved by the Department. MLPP lateral line trenches can be placed as shallow as twelve (12) inches deep, into the natural soil profile, giving a minimum natural soil-depth requirement of twenty-four (24) inches. Thus, the addition of the compatible soil fill material will result in a total soil profile depth of the required thirty (30) inches. The soil material covering a blocking layer or restrictive horizon shall have suitable textural, structural, absorption and drainage characteristics for such use as outlined in *Appendix 1*. It is essential that great care be used in installing these systems. Their design and construction are covered in *Chapter 7* of this Appendix/manual.

C. Topography and Landscape Positions

Low pressure disposal fields located on slopes require special design and installation procedures. The supply line delivering the effluent to the manifold, serving the lateral lines, shall always enter at the highest point of elevation in the distribution field. All LPP lateral line trenches shall be positioned and constructed parallel to the naturally existing contours of the ground surface in such a manner so as to ensure that the bottom of each lateral line trench remains level throughout its entire length.

<u>Important Note</u>: LPP systems may be installed on slopes ranging from zero to twenty-five percent (0-25%). LPP systems shall not be installed on sites where the slope exceeds twenty-five percent (25%). MLPP systems may be installed on slopes ranging from zero to fifteen percent (0-15%). MLPP systems may be considered for sites with slopes of sixteen to twenty-five percent (16-25%), however those sites shall be assessed in accordance with procedures outlined in *Appendix 1*, before any approval for such use is granted by the Department. MLPP systems shall not be placed on any slopes greater than twenty-five percent (>25%).

LPP and MLPP lateral line trenches may only be placed within the limits of a 100 year floodplain in accordance with *Appendix 1* of these regulations*.*

D. Drainage Requirements

All existing drainage features on a lot shall be avoided by the minimum setback requirements, as stated in *Section 13*, to prevent hydraulic overloading of the disposal field. All surface waters (including runoff from all impervious surfaces on the property) and all subsurface waters shall be intercepted and/or diverted away from the disposal field trench components (or all system components where determined to be necessary by the Department) of the LPP system via the use of the soil drainage improvement practice specified by the Department.

A curtain drain installed, as a soil improvement practice, around a LPP or MLPP disposal field shall be kept a minimum of ten (10) feet from any of the lateral line trenches. However, for MLPP systems, a site specific separation distance may be designated by a Department Soil Scientist depending upon the requirements for the limits of soil modification necessary for a particular site. See *Appendix 5*.

CHAPTER 3

Layout Design of a LPP System

The next three chapters outline a step-by-step procedure for designing a LPP system. Additional procedures used when designing LPP systems requiring the addition of modification of soil fill material (i.e., MLPP systems) are covered in Chapter 7 of this Appendix/manual.

Note: All LPP design plans shall conform to the design format as outlined in *Section 19* of these regulations.

A. Size of the Disposal Field Area

The total amount of absorption area depends on two factors: 1) the projected daily wastewater flow from the structure served by the LPP system and 2) the absorptive capacity of the soil within the designated LPP distribution area.

(1) Step 1 - Calculate projected daily waste flow.

For residential systems, the estimated daily wastewater flow shall be 150 gallons per day (gpd) for each bedroom (BDR) in the house. For those residences employing oversized bathing fixtures, additional flow calculations shall be incorporated into the overall gpd discharge figure. For calculations regarding dwellings containing more than one over sized bathing fixture and for facilities other than single-family dwellings, See *Appendix 7*, of these regulations, outlining the appropriate projected daily wastewater flows.

Example 1:

For a 3-BDR house:
Flow = 150 gpd/BDR x 3 BDR = 450 gal.

Example 2:

For a 3-BDR house with a 65-gal oversized tub:
Flow = (150 gpd/BDR x 3 BDR) + [(65gal – 30gal) x (3 BDR)]
Flow = 555 gal

(2) Step 2 - Determine the loading rate.

In conjunction with the estimated soil permeability rate (MPI) that is provided by the Department, determine the wastewater loading rate using Table A3-2 of this Appendix/manual.

Example:

For a 45MPI Stiversville soil:
Loading rate = 0.275 gpd/ft^2

Important Note: Where a designated or platted subsurface sewage disposal system area bridges two or more soils of dissimilar characteristics (i.e. permeability, drainage, or soil improvement practices such as modification, etc.), the Department shall require that the conditions associated with the most restrictive soil unit contained within that area prevail and dictate the LPP design specifications (i.e. permeability, drainage requirements and soil improvement requirements).

(3) Step 3 - Compute the Total Disposal Field Area Requirements

Compute the total area needed for the absorption system using the following equation:

Area = flow/loading rate.

Example:

Using flow and loading rates calculated above:
Area = 450 gpd/0.275 gpd/ft^2 = 1636 ft^2

(4) Step 4 - Determine total length of lateral distribution lines.

Spacing between lateral lines (center-to-center) shall be a minimum of five (5) feet to prevent overloading. Although the lateral spacing may exceed five (5) feet, the minimum required linear footage of lateral lines shall be determined by dividing the amount of required square footage of required soil area by five (5).

Example:

Length = 1636 ft^2/5 ft = 327 linear feet

Table A3-2. Wastewater Loading Rates

Maximum loading rates for LPP systems based on estimated soil absorption rates in Minutes Per Inch (MPI)	
Established Soil Absorption Rate in Minutes Per Inch (MPI)	Maximum Loading Rate* (gpd / ft^2)
10 - 45	0.275
60	0.200
75	0.150
90	0.100
105	0.075
120	0.050

*These loading rates shall be used only for calculating the size of LPP systems, not for other types of systems.

Note: When calculating area requirements for LPP systems to be installed in soils rated between 10MPI and 45MPI, a maximum load rating factor of 0.275 gpd/ft^2 shall be used.

Note: Soils rated above 120MPI are not approved for any type of LPP system use.

(5) Step 5 - Calculate gravel requirements.

To fiIl a six (6) inch wide trench twelve (12) inches deep with gravel, 1.85 cubic yards is needed per 100 feet of trench.

Example:

For 327 ft of line:
Gravel needed = 327 ft x (1.85 yds^3 /100 ft)= 6 yds^3

B. Sizing the Septic tank and Pump tank

Septic tank volume is determined according to provisions outlined in *Section 14*. Pump tank volume is determined according to the provisions outlined in *Section 18*.

For single-family dwellings, the minimum effluent storage capacity shall be a minimum of twice the volume of the normal projected daily wastewater flow so as to provide for a minimum of one (1) day of emergency storage.

Example:

For a 450 gpd waste flow:
$V_{\text{pump tank}}$ = 450 gal. x 2 = 900 gallon tank, minimum

C. Location of the Lateral Lines

The lateral lines of the LPP system shall be located in the designated or platted subsurface sewage disposal system area and shall be designed so as to conform to all aspects of these regulations.

D. Configuration of the Lateral Lines Within the Disposal Field Area

The supply line delivering the effluent to the manifold, serving the lateral lines, shall always enter at the highest point of elevation in the distribution field. All LPP lateral line trenches shall be positioned parallel to the naturally existing contours of the ground surface in such a manner so as to ensure that the bottom of the lateral line trenches will remain level throughout the entire length of the trench. Refer to Figures A3-2, A3-3 and A3-4 for examples of typical layout configurations.

<u>Important Note:</u> Under no circumstances shall split manifold designs be utilized in Williamson County.

E. Drainage Requirements for the Disposal Field Site

Curtain/Interceptor drains shall be required on all sites utilizing LPP systems. Curtain/Interceptor drains shall conform to all specifications as set forth in *Appendix 5* of these regulations. Furthermore, additional drainage practices (e.g. drawdown drains, etc.) may be required by the Department on a site specific basis.

F. Lateral Line Trench Dimensions

Lateral line trenches for all LPP system shall be eighteen (18) inches deep, six (6) inches wide and spaced a minimum of five (5) feet apart (center-to-center). All lateral line lengths shall conform to Table A3-3.

Table A3-3. Maximum Lengths of Various Size Lateral Lines (based on $^{5}/_{32}$ in. diameter hole at 5ft spacing).

Nominal Pipe Size Diameter (inches)	Maximum Lateral Line Length (feet)
1	60
1¼	95
1½	120
2	170

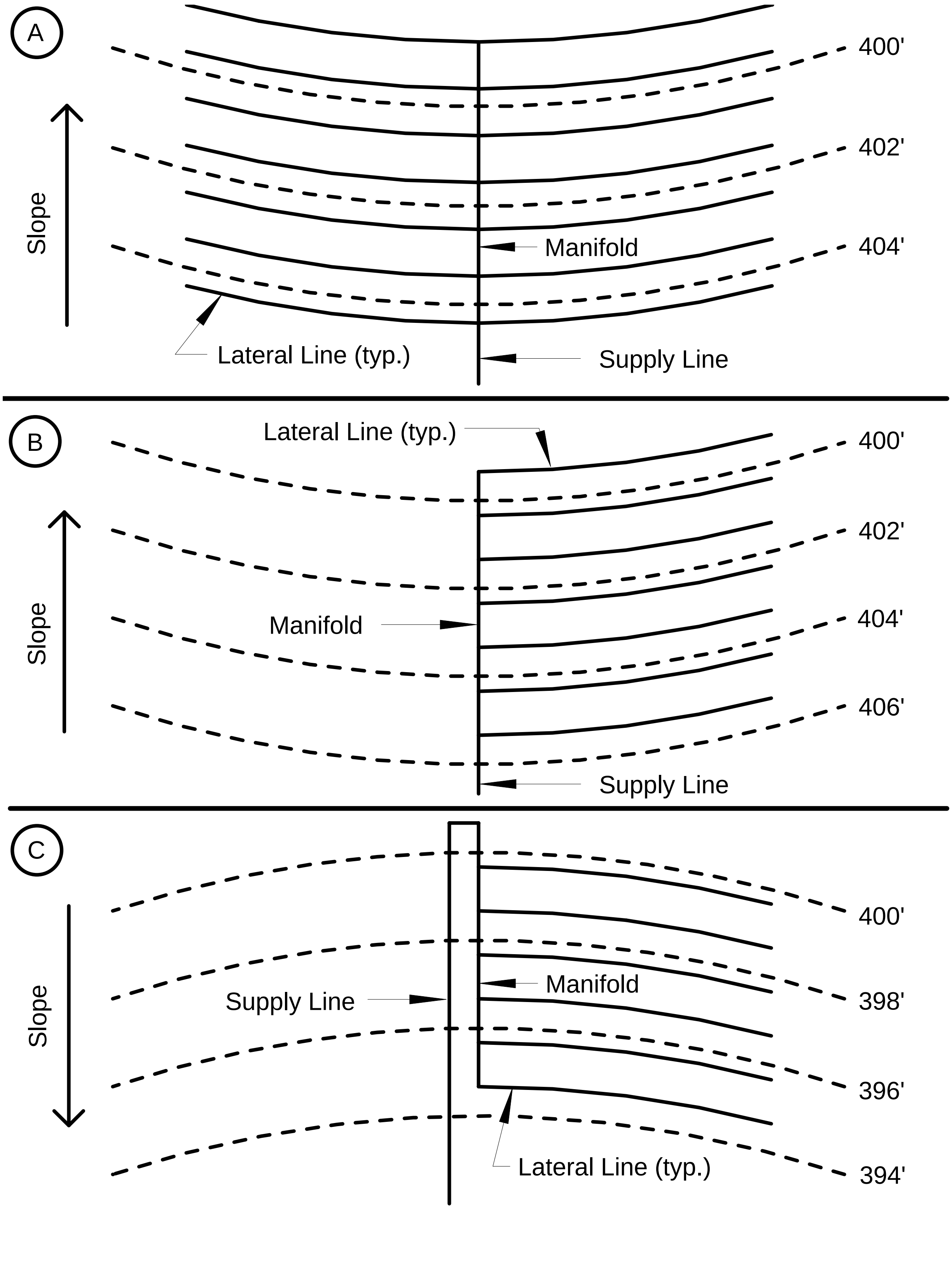


Figure A3-2. Three possible configurations of LPP distribution field; note that the supply line enters the manifold at the highest point in the field and that the lateral lines are laid parallel to the natural ground surface contours.

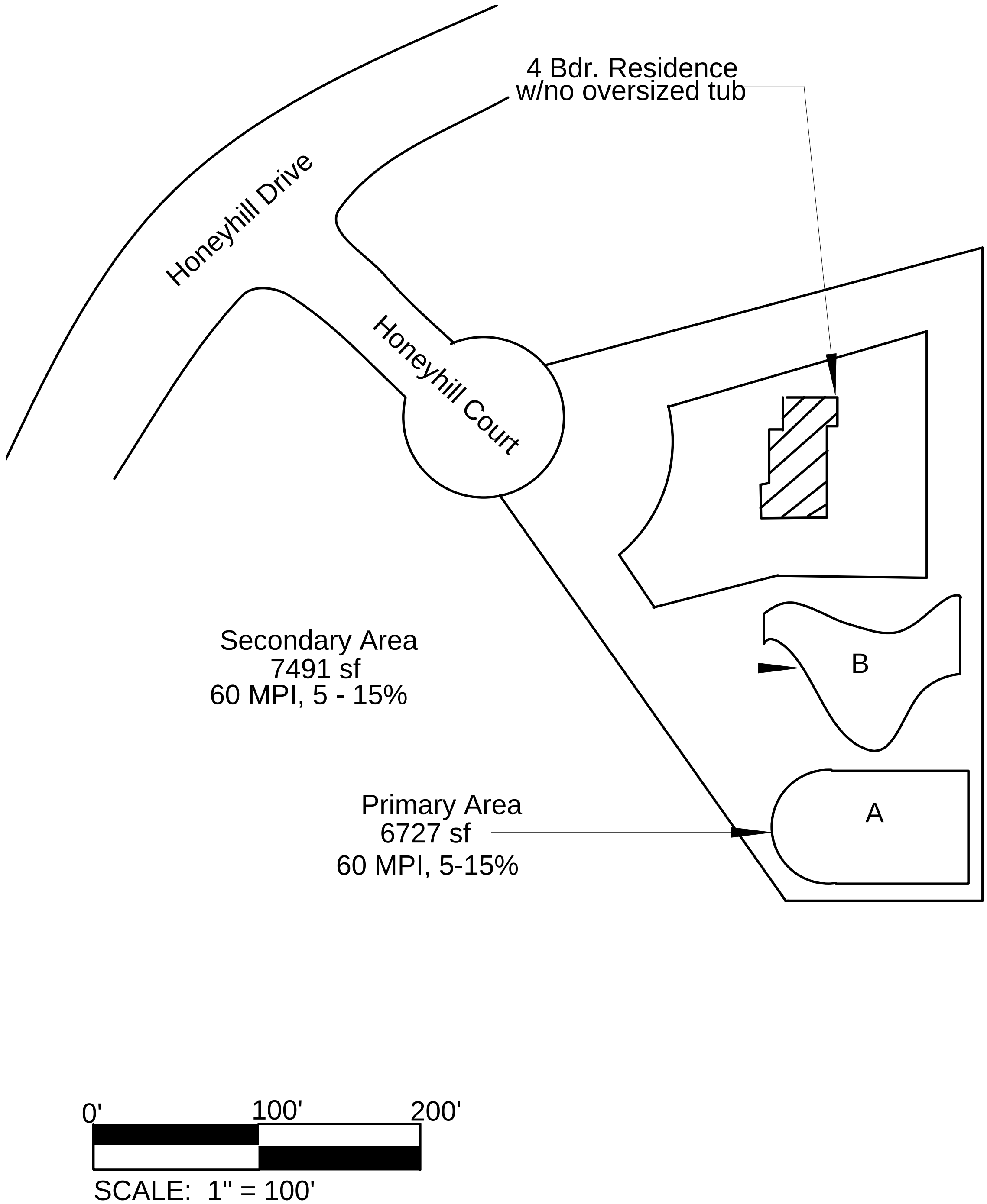


Figure A3-3. Example of a lot layout for a LPP system.

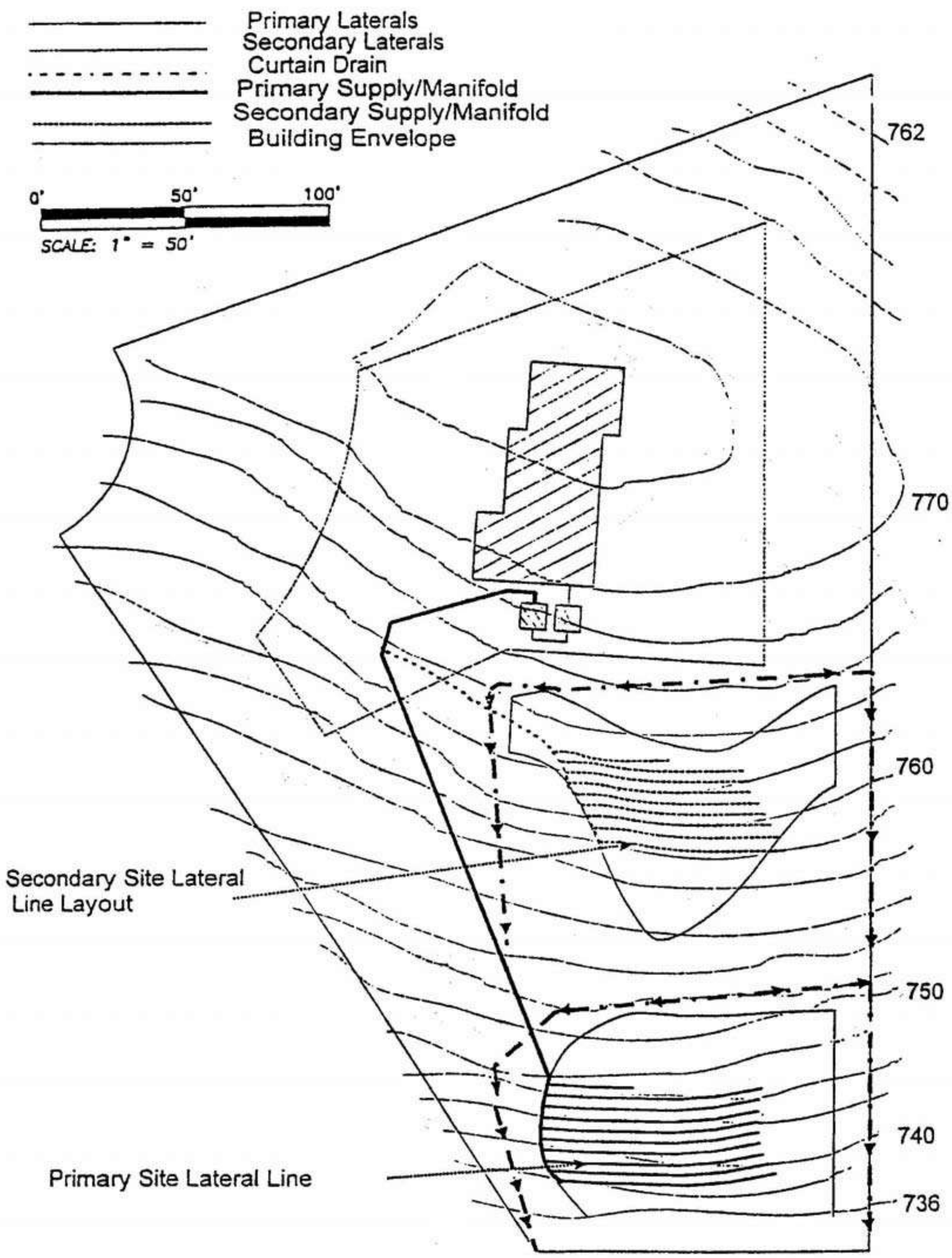


Figure A3-4. Example of a LPP system layout.

CHAPTER 4

Dosing and Distribution System Design

The purpose of low pressure dosing is to provide uniform distribution of sewage/effluent throughout the entire disposal field area. This is best achieved at a pressure head of five (5) feet [2.17 pounds per square inch (psi)]. Proper dosing involves balancing the size of the distribution system with the dosing volume, pumping capacity, desired pressure and flow rate.

A. Dosing Rate

The dosing rate per linear foot of disposal trench shall be uniform throughout the entire system. The gallons per minute (gpm) flow amount which the pump must provide shall be determined by adding the gallons per minute (gpm) flows per each and every hole over the entire system to be dosed by said pump. This dosing rate depends on the pressure head and the size and number of holes in the distribution lines. Pressure head shall be five (5) feet for adequate performance; holes shall be 5/32 inch in diameter, and hole spacing shall be five (5) feet (center-to-center).

(1) Step 1 - Calculate the number of holes.

Number of holes = length of line/hole spacing

Example:

For a system with 327 linear feet of lateral line at 5 foot hole spacing:

Total holes = 327 ft/ 5 ft = 65 holes

(2) Step 2 - Determine the flow rate per hole.

For 5 ft. pressure head and 5/32 in. holes, the flow rate equals 0.64 gallons per minute (gpm) per hole.

(3) Step 3 - Calculate total dosing rate.

Example:

Flow rate/hole = 0.64 gpm
Total flow rate = 0.64 x 65 holes = 41.6 gpm = 42 gpm

***Important Note**: For systems where the absorption field is at a lower elevation than the pump, a ¼ inch siphon-breaker hole must be drilled in the supply line above the liquid level inside the pump tank. This hole will prevent inadvertent siphoning of the contents of the pump tank into the field. An extra two (2) gallons per minute must be added to the pumping rate to compensate for flow through the siphon-breaker hole.*

Example:

For a system with 42 gpm flow rate and a siphon-breaker hole.
Total flow rate = 42 gpm + 2 gpm = 44 gpm

Important Note: For systems where the absorption field is at a higher elevation than the pump, a check valve may be necessary. See the Check Valve Calculation information in Part D of this Chapter. When a check valve is utilized, a vent hole shall be drilled in the discharge pipe below the check valve, inside the pump tank, to purge the pump of trapped air. (This practice is recommended by the Sump & Sewage Pump Manufacturers Association (SSPMA)). The vent hole size shall be in accordance with the pump manufacturers installation instructions. An extra two (2) gallons per minute shall be added to the pumping rate to compensate for flow through the vent hole.

Example:

For a system with 42 gpm flow rate and a check valve vent hole.
Total flow rate = 42 gpm + 2 gpm = 44 gpm

***Important Note**: With the total dosing rate (i.e. total flow rate) established, the design engineer shall verify that this rate conforms to the minimum required to ensure scour velocity. The acceptable flow rate that will ensure a minimum scour velocity of 2.5 feet per second shall be based upon the total dosing rate, in gallons per minute (gpm), and the supply line pipe size. See Table A13-1 in Appendix 13.*

B. Pump Selection

The pump must have enough power to pump effluent at the calculated flow rate against the total dynamic head (resistance) encountered in the distribution system. The total dynamic head is the amount of work the pump must do to overcome elevation (gravity) and friction in the system at the specified pressure and flow rate.

Thus, total dynamic head (TDH) = elevation head (EH) + pressure head (PH) + friction head (FH) + safety factor (SF).

or

TDH = EH + PH + FH + SF

Elevation head (EH) is the difference in elevation from the pump to the highest point of elevation of the manifold. Remember that the pump will be four (4) feet or five (5) feet below ground level in the pump tank.

Pressure head (PH) is the pressure required for even distribution throughout the entire lateral line network and shall be specified as five (5) feet.

Friction head (FH) is the loss of pressure due to friction as the effluent moves through the pipes. Pipe friction (PF) is estimated using Table A13-2 in *Appendix 13* of these regulations. When estimating pipe friction, use the total length of both the supply line and the manifold line but not the lateral lines. Add twenty percent (20%) to the pipe friction estimate to account for friction loss in joints and fittings. Note that friction loss varies with pumping rate as well as with pipe length and diameter.

A *Safety factor (SF)*, as described below, shall be added to the sum of EH plus FH plus PH. This factor of safety shall be based upon the potential elevation head (EH) and shall be dependent upon two factors:

- The accuracy and exactness of the location of the proposed house and its related tanks and pump; and
- The extreme potential elevation difference across the house site or building envelope.

The minimum safety factor (SF) shall be two (2) feet. If a LPP system design contains accurate and exact locations of the house, tanks and/or pump, or if the house site or building envelope is relatively flat or level (i.e., extreme elevation change across the house site or building envelope is less than or equal to two [2] feet based on the required topographical information submitted with the design packet), then the assigned SF shall be that of the minimum required (i.e., a safety factor equal to two [2] feet).

If however, the house, tank(s) and/or pump locations are only general in nature and not exact, then the SF shall be equivalent to the worst case scenario of where the pump/tank could be located, plus the minimum required safety factor.

Thus, for such a case, the total safety factor shall be equal to the greatest potential elevation change across the house site or building envelope (based on the required topographical information submitted with the design packet), plus an additional two (2) feet.

The total dynamic head must be calculated to select the proper size pump.

Important Note: The minimum assigned total dynamic head shall be ten (10) feet.

(1) Step 1 - Compute friction head (FH).

FH = 1.2(PF)

Example:

For 70 total linear feet of 2 inch diameter Schedule 40 PVC supply and manifold line and a 42 gpm pumping rate:

PF = (70 ft)(3.27 ft/100 ft) = 2.29 ft
FH = (1.2)(2.29 ft) = 2.75 = 2.8 ft

(2) Step 2 – Calculate total dynamic head (TDH).

Example #1:

For a system design in which the exact location of the house has been established from the site plan (and thus the exact location of the tanks and required pump is known), the topographic information reveals 10 feet of elevation head from pump to the point of connection between the supply line and the manifold (See Figure A3-5), with 5 feet of pressure head and with 2.8 feet of friction head:

Where:

PH = 5ft   FH = 2.8ft
EH = 10ft   SF = 2ft

Then:

TDH = EH + PH + FH + SF
TDH = 10ft + 5ft + 2.8ft + 2ft
TDH = 19.8ft

Thus, the system in this example will require a pump with a capacity of 42 gallons per minute against 20 feet of head.

Example #2:

For a system design in which the house site or building envelope is relatively flat (i.e., less than two foot of elevation change), the topographic information reveals a total elevation head from pump to the point of connection between the supply line and the manifold of 4.6 feet (See Figure A3-6), with 5 feet of pressure head and with 2.8 feet of friction head:

Where:

PH = 5ft   FH = 2.8ft
EH = 4.6ft   SF = 2ft

Then:

TDH = EH + PH + FH + SF
TDH = 4.6ft + 5ft + 2.8ft + 2ft
TDH = 14.4ft

Thus, the system in the example will require a pump with a capacity of 42 gallons per minute against 15 feet of head.

Example #3:

For the same system design as in the above example #1, except that the house, tank(s) and/or pump locations are only general in nature and not exact (See Figure A3-7):

Where:

PH = 5ft   FH = 2.8ft
EH = 8ft   SF = 8ft

Then:

TDH = EH + PH + FH + SF
TDH = 8ft + 5ft + 2.8ft + 8ft
TDH = 23.8ft

Thus, the system in the example will require a pump with a capacity of 42 gallons per minute against 24 feet of head.

It is always necessary to specify the total head when selecting a pump. The head and flow requirements are checked against the performance curve provided by the pump manufacturer. A example of a pump performance curve is shown in Figure A3-8.

Note: *Performance curves vary among pump brands. Thus, it is important to use the performance curve for the specific brand and size of pump to be used.*

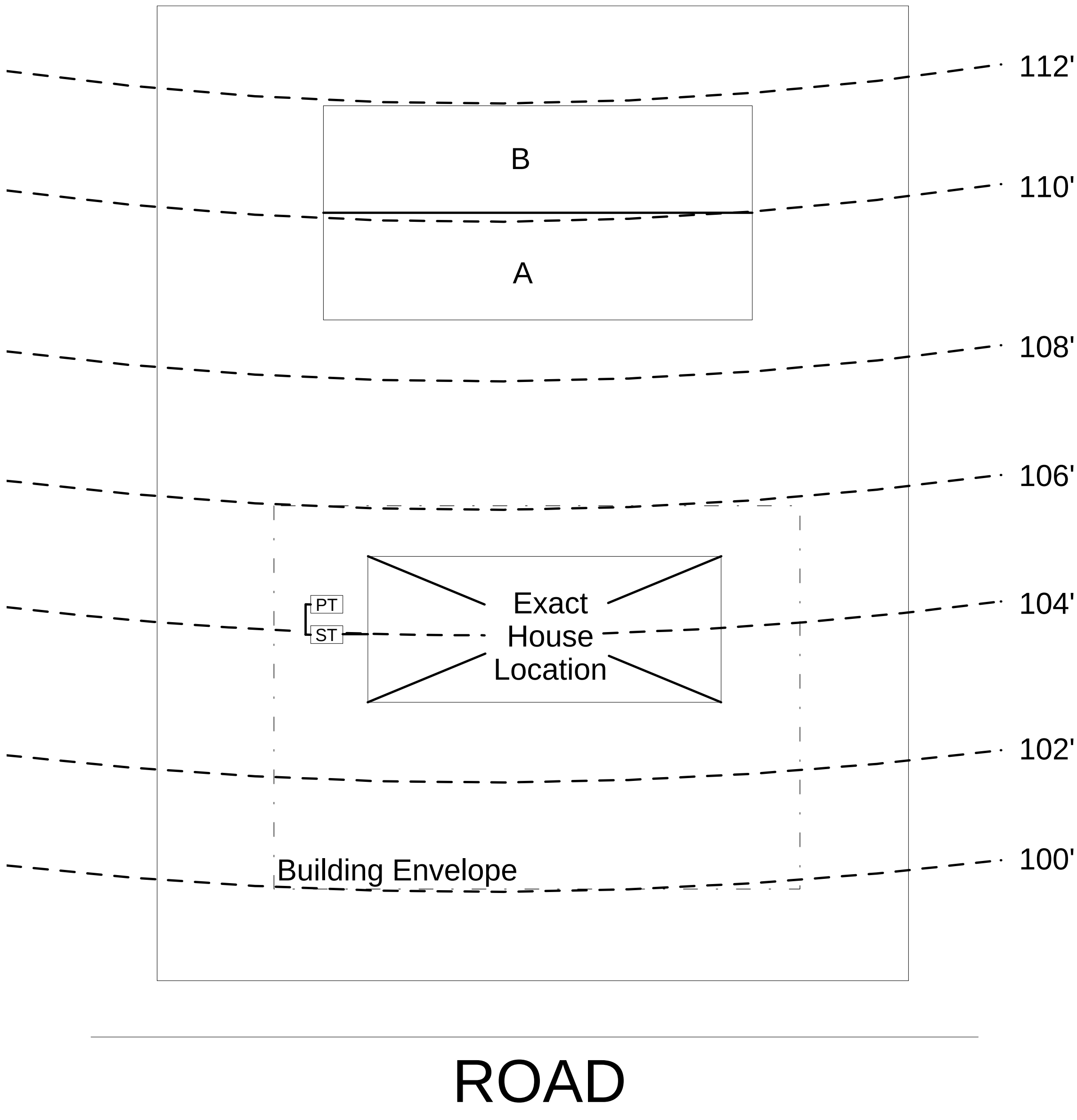


Figure A3-5. LPP system design showing <u>exact</u> house location. For example #1: EH=110ft – (104ft - 4ft) = 10ft; SF=2ft.

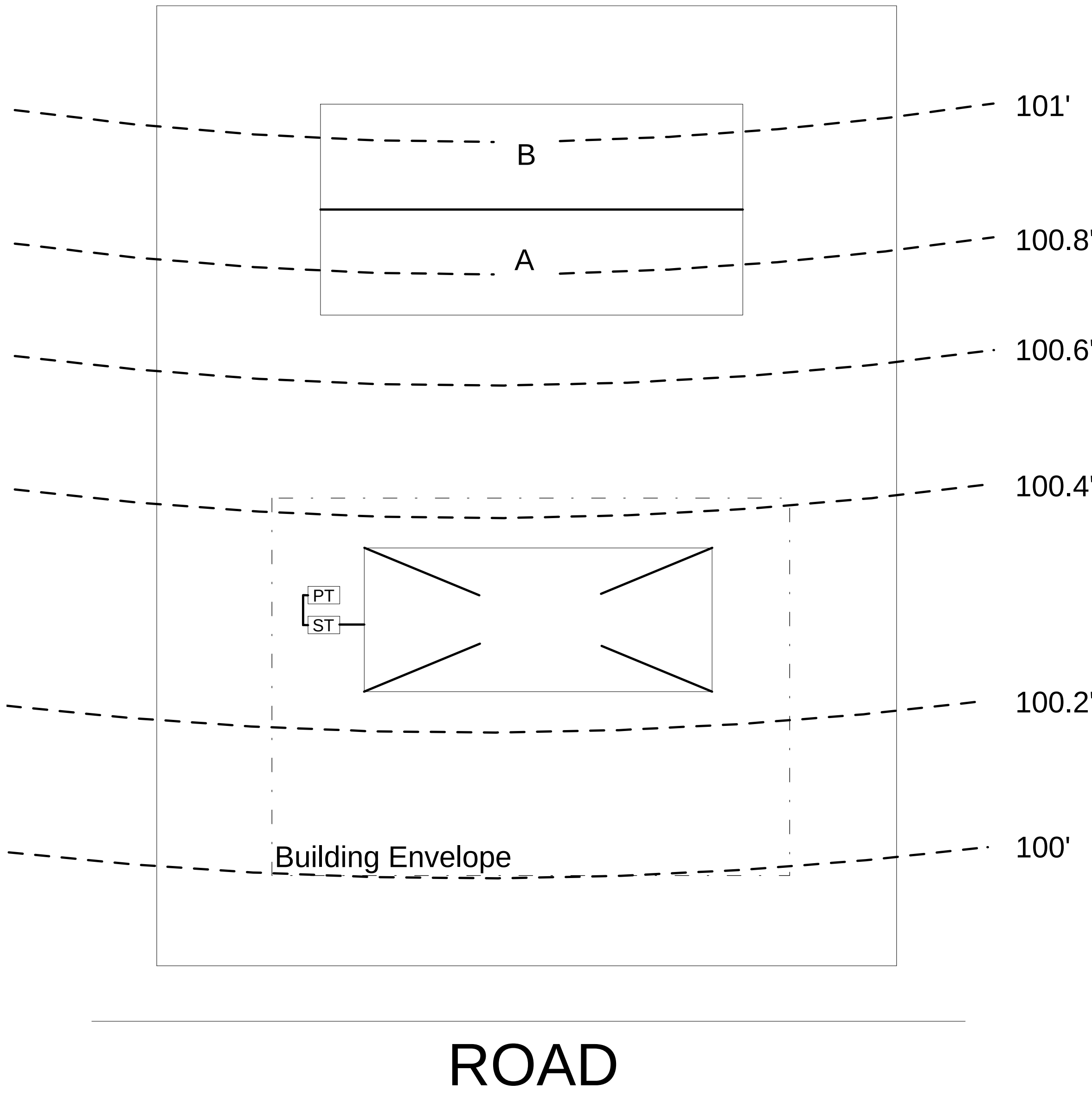


Figure A3-6. LPP system design on a relatively flat lot (i.e., $\leq$ 2ft elevation change). For example #2: EH = 100.9ft – (100.3ft – 4ft) = 4.6ft; SF = 2ft.

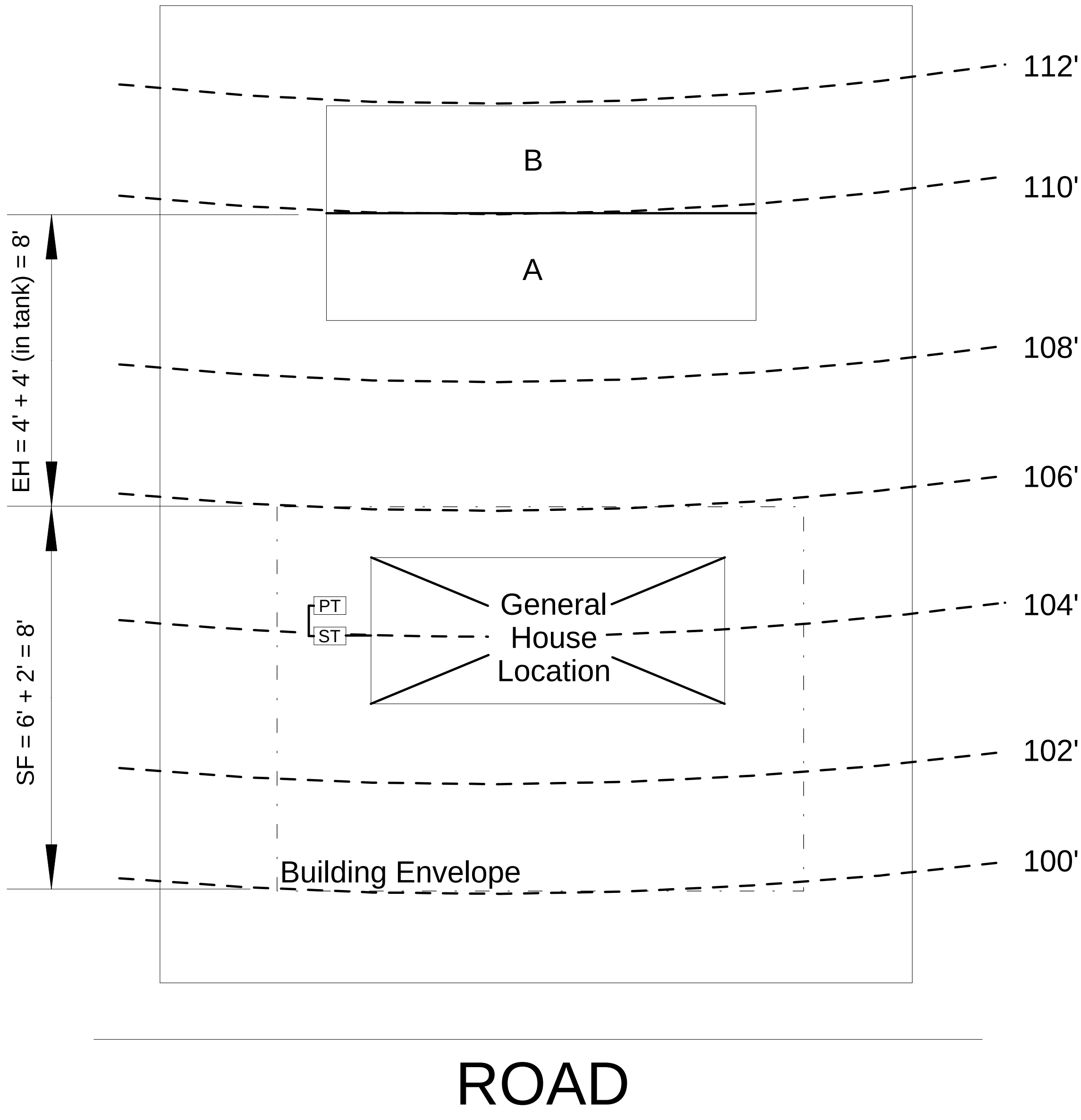


Figure A3-7. LPP system design for which the house location is only general in nature and not exact. For example #3: EH = 110ft – (106ft – 4ft) = 8ft; SF = (106ft – 100ft) + 2ft = 8ft. Note that this system layout is exactly the same as shown in Figure A3-5 for example #1 except the house location is general in nature and not exactly and accurately located.

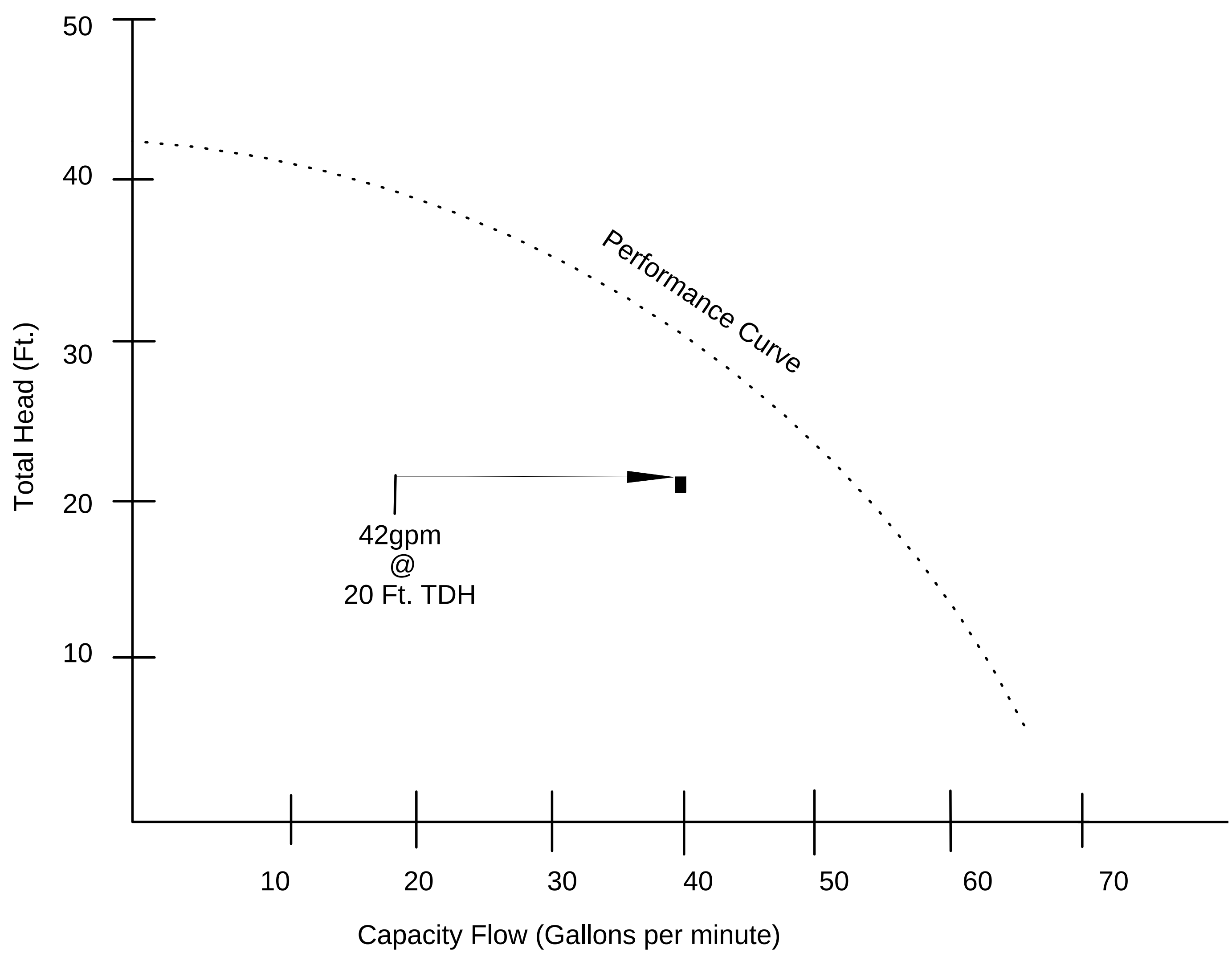


Figure A3-8. Example of a pump performance curve. The point shown falls below the curve; this particular pump is adequate for the situation described in example #1.

(3) Step 3 - Select a pump of proper capacity.

Consult the appropriate performance curve. The system requirements of flow and total head (in example #1, 42 gallons per minute at 20 feet) intersect at a point which must fall below the performance curve. If the point falls above the curve, then the pump is too small.

Example:

This point (as shown in Figure A3-8) falls below the curve; therefore, the pump is adequate.

When the chosen pump is too small, consider the following options:

- Select a larger pump.
- Reduce the friction-head loss by using larger diameter supply and manifold lines (two [2] inches is a minimum diameter for residential systems, with four [4] inch diameter being the maximum).

Important Note: The Department shall have the authority to specify pump sizing, where after a the review of a submitted LPP design plan, the Department determines that the proposed pump will not function properly on the proposed LPP installation site.

C. Dosing Volume

Dosing volume is the amount of effluent pumped to the absorption field each time the pump runs. The dosing volume must be large enough to provide adequate distribution in the field and adequate resting time between doses, yet small enough to avoid overloading. The minimum dose to provide adequate distribution depends on the size of the supply and lateral network.

(1) Step 1 - Calculate minimum dosing volume (V_{dose}).

$V_{dose\ min.} = V_{supply} + 5\ (V_{laterals})$

The minimum volume is the sum of the supply and manifold line volumes and five times the volume of the lateral lines. Storage capacities of various diameters of Schedule 40 PVC pipe can be found in Table A3-4.

Table A3-4.

Storage capacity per 100 feet of Schedule 40 PVC pipe	
Pipe Size (inches)	Storage Capacity ($^{gallons}/_{100\ ft}$)
1	4.50
1¼	7.76
1½	10.57
2	17.44
2½	24.91
3	38.39
4	66.12

Example:

1. For 70 total linear feet of 2 inch diameter Schedule 40 PVC supply and manifold line:

V_{supply} = (70 ft)(17.44 gal/100 ft)
= 12.21 gal

2. For 327 linear feet of 1¼ inch diameter Schedule 40 PVC lateral line:

$V_{lateral}$ = (327 ft)(7.76 gal/100 ft)
= 25.38 gal

3. $V_{dose\ min.}$ = 12.21 gal + 5 (25.38 gal)
= 139.11 gal

Thus, the minimum dosing volume for this example would be 140 gallons.

Dosing two (2)to four (4) times per day provides adequate resting time (as a general rule, use three [3] doses per day). Thus, the dosing volume shall be between one-fourth (¼) and one-half (½) the expected daily flow. In the example, for a 450 gallon-per-day design, this range would be between 112 to 225 gallons per dose (gal/dose).

Note: *In those situations where the minimum dose exceeds one-half (½) the expected daily flow, then the calculated minimum dose shall be the dosing volume.*

(2) Step 2. Select dosing volume.

Example:

Selecting 180 gal/dose would give between two and three doses per day. This volume is larger than the minimum in Step 1. If water use is less than 450 gpd, dosing will occur less frequently, providing longer resting periods between doses.

(3) Step 3 - Compute the depth of effluent pumped per dose.

In order to set the pump controls to deliver the proper dose, the depth of effluent to be pumped from the tank for each dose must be calculated. The following equation is used for this computation:

Dosing depth = (V_{dose} / V_{tank})(liquid depth of tank).

Example:

For a 900-gal pump tank, four (4) foot liquid depth (bottom of tank to invert of outlet); 180 gallon dose; (NOTE: If the liquid depth of the actual tank to be utilized is unknown, assume a minimum of a four (4) foot liquid depth [bottom of tank to invert of outlet]):

Dosing depth = (180 gal/900 gal)(4 ft) = 0.8 ft = 9.6 in.

The float control switch for the pump should be set for a nine and five-eighths (9 $^5/_8$) inch drawdown to provide automatic doses of approximately 180 gallons.

Important Note: This is a good approximation for the initial dosing volume and pump float switch setting. This dosing volume and float setting may require adjustment on site specific, case-by-case basis subject to the soil and topographic conditions present and to the individual resident's water use patterns.

D. Check Valve Calculation

Any effluent which remains in the supply line of a properly sited system has the potential to drain back to the pump tank when the pump shuts off. If this volume is too large, it can cause overuse of the pump and excessive consumption of electricity. A check valve is required to prevent this return flow to the pump tank, especially on a large system with a long pumping distance. A check valve shall be required if the total storage volume of the supply line pipe is greater than one fourth of the total daily waste flow.

(1) Step 1 - Calculate storage volume.

$V_{storage} = V_{supply}$

Example:

$V_{storage}$ = 12.21 gal

(2) Step 2 - Compare to ¼ daily waste flow.

Example:

(450 gpd)(¼) = 112 gal
12.21 gal < 112 gal
No check valve required.

Note: When a check valve is utilized, a vent hole shall be drilled in the discharge pipe below the check valve, inside the pump tank, to purge the pump of trapped air. (This practice is recommended by the Sump & Sewage Pump Manufacturers Association (SSPMA)). The vent hole size shall be in accordance with the pump manufacturers installation instructions. An extra two (2) gallons per minute shall be added to the pumping rate to compensate for flow through the vent hole.

CHAPTER 5

Parts and Components Specifications

All necessary equipment and tools shall be clearly listed by the LPP system designer in the complete design plan packet as outlined in *Section 19, Subsection C* of these regulations. In addition to ensuring that they meet the requirements as discussed below, *all* materials used in the construction of LPP systems shall conform to the specifications and provisions outlined in *Appendix 12* of these regulations.

A. Septic Tank and Pump Tank

All septic tanks and pump tanks utilized in LPP systems shall conform to the provisions outlined in *Section 10*, *Section 14*, *Section 17* and *Section 18*.

<u>Note</u>: Under septic system repair conditions, where a conventional septic system is being replaced by a LPP, the existing septic tank may be utilized only after inspection and approval by the Department.

B. Pipe and Fittings

All pipes and fittings in a LPP system shall be made of Schedule 40 pressure-rated PVC plastic with the exception of the gate, globe and/or ball valves used on the lateral lines and inside the pump tank. All of these valves shall be constructed of brass or bronze. The check valve inside the pump tank, however, may be either PVC, brass or bronze. There shall be no substitution of other plastic piping products (e.g. DWV [Drain, Waste and Vent] classified PVC pipe, ABS [Acrylonitrile-butadiene-styrene] pipe, CPVC [Chlorinated Poly Vinyl Chloride] pipe or plastic electrical conduit, etc.). In addition to meeting the material specifications as outlined in *Appendix 12* of these regulations, all PVC pipe shall also be utilized in accordance with all manufacturer recommended applications and installation procedures. All joints shall be properly solvent-welded.

<u>Important Note</u>: See Appendix 12 of these regulations for specifics regarding pipe materials.

The supply line from the pump tank to the LPP distribution field manifold shall be a minimum of two (2) inch diameter Schedule 40 PVC pressure-rated pipe. A bushing or reducer may be needed to adapt the pump to the supply line. The pump outlet pipe shall be connected to the supply line with a threaded PVC union, or other similar connecting device, to allow easy pump removal or replacement. In lieu of a PVC threaded union, all other similar connecting devices require the approval of the Department prior to installation. A bronze globe, gate or ball valve shall be installed between the outlet of the PVC union and the inside tank wall to prevent effluent back-drainage during pump maintenance. Where a check valve is required (*Chapter 4*), it shall also be installed with threaded fittings inside the pump tank to provide easy access for maintenance.

Manifold lines shall be of the same pipe size diameter and specification as the supply line. All manifold lines shall have a threaded PVC plug at the terminus to provide access for clean-out or back-flushing. The lateral lines shall be connected to the manifold via solvent-welded Schedule 40 PVC pressure-rated pipe fittings (i.e., tees, crosses or elbows). *No screw-in or tapping arrangements (including saddle-taps) into the manifold shall be allowed.*

Lateral lines shall be a minimum of one inch diameter Schedule 40 pressure-rated PVC. Appropriate holes in the laterals shall be drilled on site (*Chapter 6*). A brass or bronze gate or ball valve for final pressure adjustment shall be installed at every lateral line to manifold junction. The end of each lateral line shall be equipped with a capped "turn-up" to provide above ground access for clean-out or back-flushing. Forty-five degree (45^o) elbows shall be used, rather than 90-degree elbows, for the turn-ups. This will make clean-out easier to accomplish. The turn-up elbows shall be of the solvent-welded type Schedule 40 pressure-rated PVC pipe fittings. The turn-up caps shall be galvanized metal.

C. Pump, Float Controls and Alarm System

*<u>Important Note</u>**:** The pump and associated electrical controls for LPP systems shall meet all provisions outlined in Section 16 and Appendix 12 of these regulations.*

A good-quality, submersible sewage/effluent pump shall be used in all LPP systems. Grinder pumps shall not be used on LPP systems. The submersible pump shall be of sufficient quality to prevent corrosion by sewage and shall be located in the pump tank. Pumps with built-in switches shall not be used.

Pump selection shall conform to the information outlined in *Chapter 4* of this Appendix/Manual and be sized to meet or exceed the minimum flow and TDH requirements of the system. Pumping requirements for each system shall be checked against the performance curve of the pump to be used to ensure compatibility. The Department retains the authority to alter any pump specified in the alternative system design plans, where said pump is deemed insufficient by the Department for said use.

The controls for the pumping system shall include a switching control for turning the pump on and off and a high water alarm to signal pump malfunctions. The pump control system shall be adjustable to meet the recommended loading rates for different sizes and shapes of pump tanks. The controls shall be sealed against entry of corrosive effluent and/or corrosive/explosive gases from the effluent and should have NEMA (National Electrical Manufacturing Association) approval.

The pump controls shall be either sealed mercury float switches or sealed, self-contained mechanically-activated float switches. Mercury switches are activated by a sealed float which contains a tube of mercury in contact with power leads. The only approved mechanically-activated type switches shall be of the same design principle as that of the mercury-type switches. Instead of a tube of mercury, these mechanical switches employ a steel ball to activate the electrical contacts. Diaphragm switches or vertically rising mechanical-type float switches shall not accepted. All float switches shall be of a sufficient quality and material so as to perform under turbulent conditions and be resistant to the corrosive nature of the waste water.

The pump control system may employ either a single float switch or a dual float switch arrangement, operating in series, to control pump operation. In addition to the on and off control floats, there must be a separate float control for the high water alarm. This may be a sealed mercury-float switch or a sealed mechanically-activated float switch (as previously described) mounted several inches above the on/off float switch(es).

The high water alarm should consist of a clearly marked/labeled visual and audible alarm signal located in a conspicuous place. It should be on a separate electrical circuit from the pump power line, and be equipped with a test switch. The alarm should activate if the water level in the pump tank rises above the “pump-on" float control. The tank is sized to provide at least one day or more of excess storage capacity (depending on water use in the home) during which time the system must be repaired. See *Chapter 8* for repair and maintenance tips.

Important Note: Exact details regarding the electrical components and their set-up is outlined in Section 16 of these regulations.

D. Gravel

All LPP system installations shall require twelve (12) inches of gravel to be placed in the entire length of each and every lateral line distribution trench. The general gravel size shall be from one-half (½) to one (1) inch and shall be washed and free of fines. Gravel placement is discussed in *Chapter 6* of this manual.

Note: See *Appendix 12* of these regulations for the specific gravel requirements for LPP systems.

E. Home Water Conserving Devices

All homes served by a LPP system shall be equipped with low-flow shower-heads (2.5 gpm or less) and low-flush toilets (1.6 gallons or less per flush) in accordance with the *United States Code of Federal Regulations, Title 10, Part 430,* so as to minimize the hydraulic load on the system. These devices are a simple, low-cost way of reducing water consumption with no inconvenience to the homeowner. Installation of low-flow shower-heads and retro-fit dams for commode tanks shall be required in any existing home where a LPP system is installed.

CHAPTER 6

Installation Procedures

LPP systems shall only be installed by persons specifically licensed to install alternative subsurface sewage disposal systems in Williamson County. The licensed, approved installer shall have in their possession the *Permit to Install* packet prior beginning the installation of the LPP system. The packet will include the Permit to Install, a copy of the *Permit for Construction of a Subsurface Sewage Disposal System (i.e. Construction Permit)* issued for the lot, a copy of the approved LPP design plans, and any other pertinent supporting documentation. The installer shall be required to obtain this information prior to contacting the inspector for a Layout Inspection. Construction of the LPP system shall not begin until the Layout Inspection has been completed and approved by the Department. See *Section 20* of these regulations for specific guidelines and procedures in the installation and inspection process.

The LPP system installation shall conform to and shall not deviate from the permits, design plans and/or any other supporting documentation. During the course of the LPP system construction, should an installer encounter unforeseen problems, questionable soil conditions or other concerns not specified on either the permit or its related supporting documentation, the Department shall require that said installer cease construction immediately and contact the Department for consultation and an assessment of the problem. The Department shall schedule, as soon as possible, an *Assessment Investigation* of the problem (See *Subsection A, Part 13, of Section 20* of these regulations).

A. Machinery, Tools and Supplies

A backhoe is needed for the installation of the septic tank and pump tank. Additionally, a backhoe will be necessary to install the curtain drains, interceptor drains or drawdown drains. All other excavation is done with a trenching machine that will excavate a trench six (6) inches wide. An accurate surveying instrument is required for layout of manifold and all lateral lines.

Other common equipment and/or materials needed for installation may include:

- Shovels, rakes, hoes, and wheel barrows
- Electric drill to drill holes in lateral lines
- Drill bits
- Mechanical pipe cutter or Hack saw and blades
- PVC deburring tool, files, very course sandpaper, utility knife
- PVC primer and PVC solvent cement
- rags
- wire flags, wood stakes, spray paint
- Mortar to seal tank openings
- Measuring tape
- Electrical wiring tools, electrical tape
- silicone caulking
- plastic electrical wire ties
- miscellaneous hand tools (hammers, screwdrivers, pliers, etc.)

<u>Note</u>: The installer shall See the approved LPP design plans for the materials specification list.

B. Site Preparation and Imported Fill

One of the most important concerns for a LPP system is to protect the site from soil disturbance by heavy equipment. Cutting, compaction, or any disturbance of the soils in the designated LPP areas, especially during wet weather, will void the permit approval and may destroy the site's suitability for the use of a LPP system. As soon as the LPP areas have been platted or designated, they shall be *quarantined* from construction traffic in accordance with the requirements as outlined in *Appendix 10* of these regulations. No site preparation or LPP construction work shall occur if the soil is wet. A determination as to the proper soil moisture condition for LPP installation shall be solely determined by a Department Soil Scientist. Only after the preceding conditions are met, may the site be mowed of tall weeds/grass and cleared of brush and small trees. When trees larger than two (2) inches in diameter are to be removed, they shall be cut off at ground-level, rather than uprooted in order to avoid creating depressions and damaging the soil-pore network.

Provisions must be made for intercepting or diverting surface water and shallow groundwater away from the absorption area, septic tank, and pump tank in accordance with the approved LPP design plans and permit restrictions.

<u>Note:</u> All soil drainage improvement practices shall conform to all provisions of *Appendix 5* of these Regulations).

After the LPP area has been mowed and cleared, the location of the lateral lines and manifold shall be accurately staked out according to design specifications. Each lateral line must be laid out along a level contour using an accurate surveying instrument. One lateral may be higher or lower than the next one, but each individual lateral shall be level. Under no circumstances shall a lateral line be allowed to slope away (either up or down) from the manifold.

C. Septic Tank and Pump Tank Installation

The two-compartment septic tank for a LPP system is installed in the same manner as for a conventional system. Wastewater from the house flows directly into the large compartment of the septic tank. The septic tank shall be connected to the pump tank with an appropriate length of four (4) inch Schedule 40 PVC pipe, in such manner so as to ensure proper gravity flow from the septic tank outlet to the pump tank inlet.

The pipe connecting the two tanks shall be properly bedded and supported in such manner that will prevent it from sagging or being dislodged from the tanks. All pipe to tank connections shall be appropriately sealed in order to prevent infiltration and exfiltration.

All tank access lids shall be equipped with water-tight risers. The top of the risers shall be at least six (6) inches above final grade. Properly installed risers provide necessary access for repair and inspection and prevent surface water from entering the tanks. Under septic system repair conditions, where a conventional septic system is being replaced by a LPP, the existing septic tank may be utilized only after inspection and approval by the Department. Additional modifications to the existing septic tank may be required by the Department (e.g. installation of risers, baffle replacement, etc.)

Note: All tank installations shall conform to the provisions outlined in Section 17.

D. Supply Line, Manifold Line, and Manifold-to-Lateral Connection

The supply line conveys effluent from the pump to the manifold. The manifold line then distributes effluent to the individual lateral lines. The supply line and the manifold line shall be the same pipe size and specification. The supply line shall be designed and installed so as to ensure that it connects to the manifold line at the point of highest elevation in the designated/platted disposal field area (i.e., the supply line must enter the designated/platted disposal field area at the highest elevation). Further, the supply line shall be designed and installed so as to drain after each use unless the system design requires the use of a check valve.

The manifold line shall be installed perpendicular to the natural slope of the designated/platted disposal field area. The manifold line trench shall have a maximum depth of ten (10) inches and be uniform throughout its entirety. All manifold lines shall have a threaded plug at the terminus to provide access for clean-out or back-flushing. Further, the manifold line shall be designed and installed so as to drain after each use.

Important Note: Split manifold designs shall not be allowed under any circumstances. See Figure A3-9 for an example of a split manifold set-up.

The first lateral line shall be located in the highest portion of the designated/platted disposal field area. Thus, each subsequent lateral line will be placed below (lower in elevation) the previous. Each lateral line shall be connected to the manifold via solvent welded Schedule 40 pressure-rated PVC pipe fittings (e.g., crosses, tees or elbows). Additionally, bushings or reducers may be required due to differential pipe sizes (these fittings must also be of the solvent-welded type, Schedule 40 pressure-rated PVC).

No screw-in or tapping arrangements into the manifold shall be allowed. A brass or bronze gate or ball valve shall be installed between the manifold and each individual lateral line for pressure regulation. Further, the lateral lines shall be designed and installed so as to drain after each use. See Figure A3-10 for a visual depiction of typical manifold-to-lateral line connections.

After the manifold line has been placed in its trench and lateral lines connected, it shall be back-filled with tightly tamped soil *only* after passing the Open Ditch Inspection (as outlined in *Section 20* of these regulations). There shall be no gravel present in the manifold line trench (or the supply line trench).

E. Lateral Lines

The lateral line trenches shall be installed parallel to the naturally existing ground contours of the designated/platted disposal field area and spaced a minimum of five (5) feet apart (center to center). All lateral line trenches shall be six (6) inches wide and excavated to eighteen (18) inches in depth. The depth of a given lateral trench from the valve-assembly shall be uniform, and the trench bottom shall be level throughout its entire length. Under no circumstances shall a lateral line trench bottom contain rise or fall either towards or away from the valve-assembly. The lateral trench shall not extend more than one or two feet beyond the turn-up at the end of the lateral pipe.

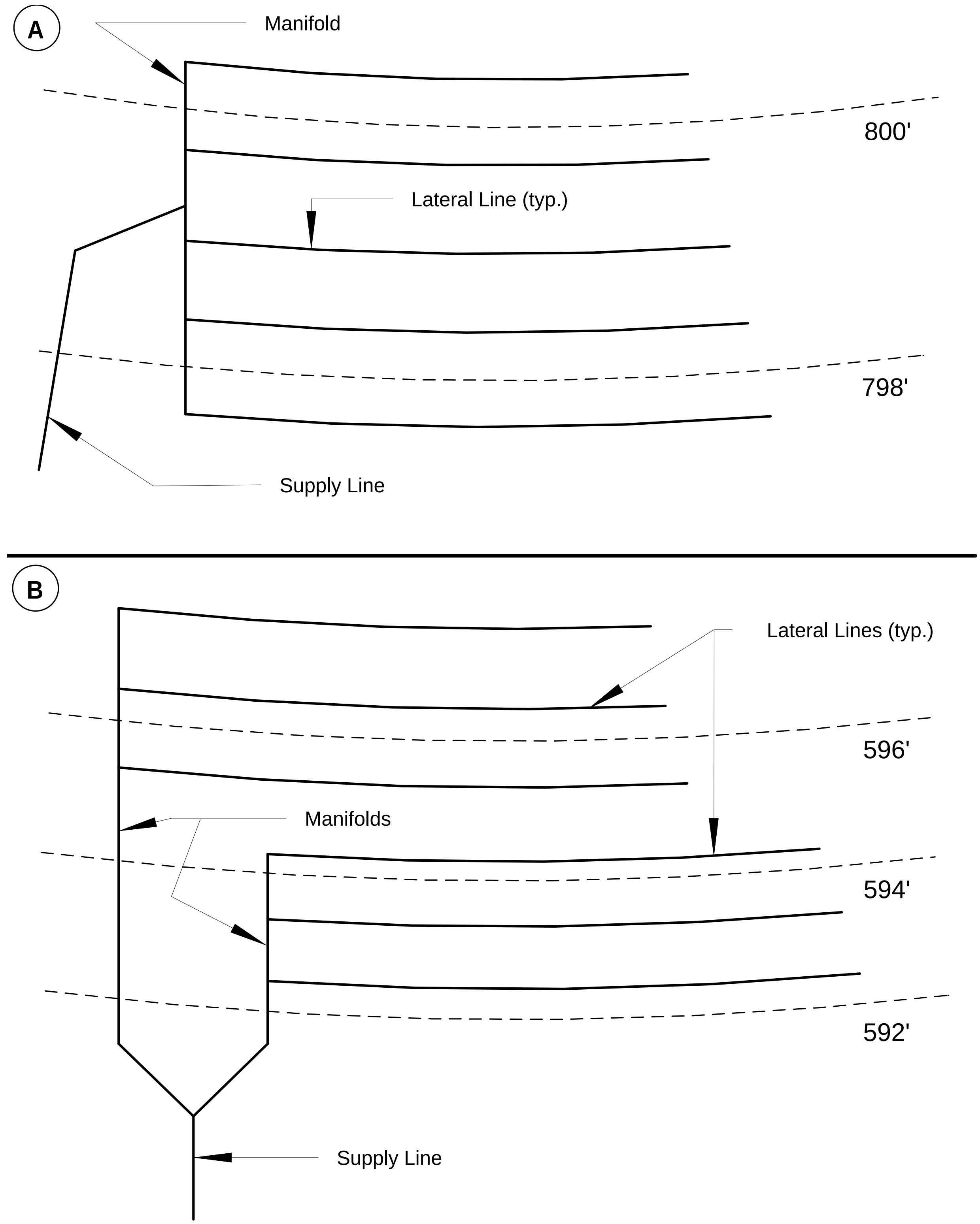


Figure A3-9. Examples of a split manifold design concept. This design concept is <u>not</u> allowed under the provisions of these regulations.

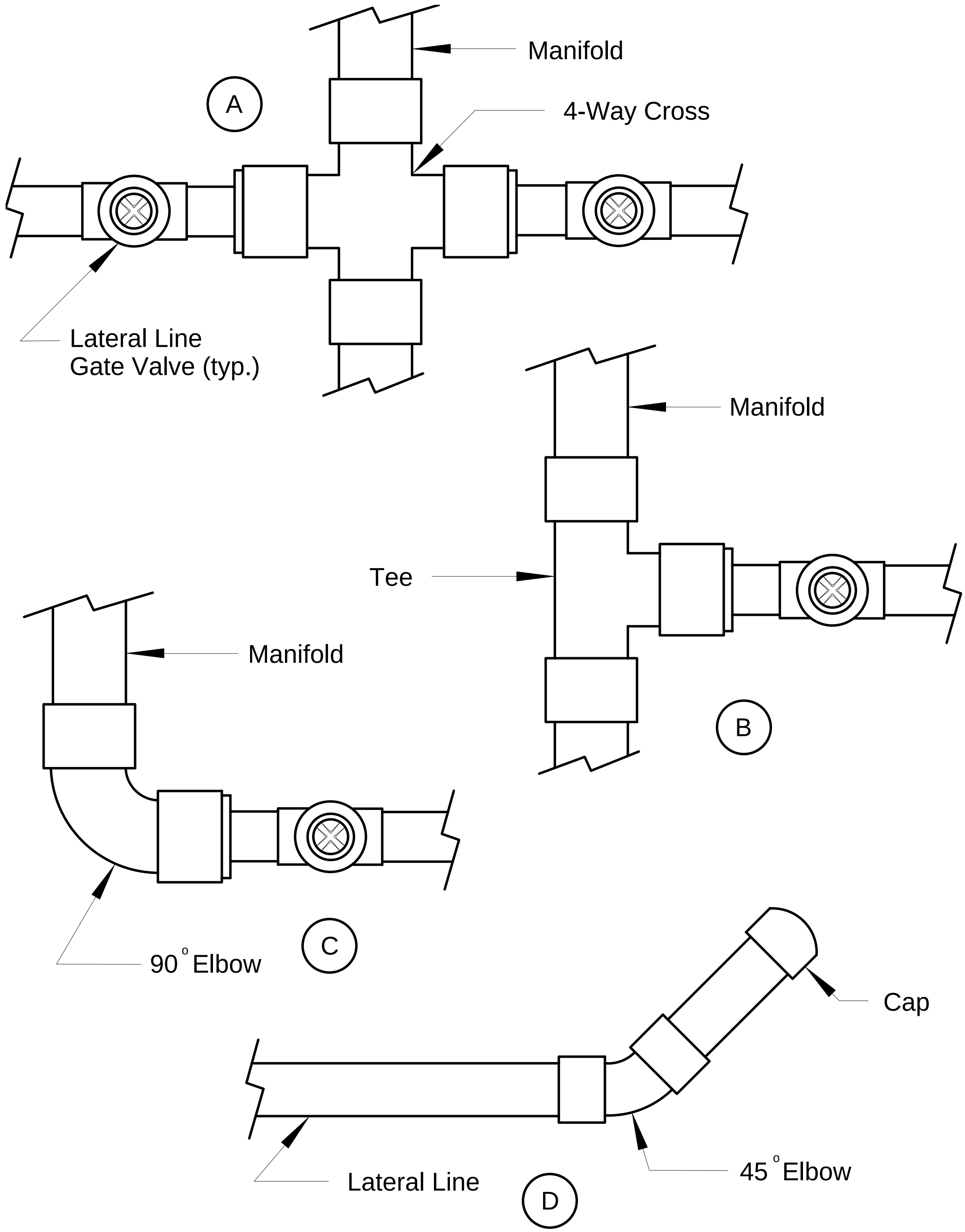


Figure A3-10. Examples of typical distribution pipe connections. Lateral line-to-manifold connections using (a) a 4-way cross, (b) a tee, and (c) an elbow. (d) Typical lateral line turn-up.

Earthen dams shall be placed at regular intervals throughout the length of the lateral line trench in order to maintain uniform distribution of effluent along each trench. Each earthen dam shall rise twelve (12) inches from the trench bottom and shall be a minimum of eighteen (18) inches long. The Department retains the authority to specify adjusted earthen dam dimensions as soil and site conditions so warrant. A four (4) inch deep notch shall be hand-cut with a sharp-shooter spade into the top of the dam in order to create a recess in which the PVC pipe will rest.

The initial dam shall begin at the outside edge of the manifold trench and extend into the lateral line trench. (The valve-assembly will actually be located within this initial dam. The placement of the valve-assembly in the initial dam shall be completed so as not to compromise its integrity. After placement, the valve-assembly shall be back-filled with tightly tamped soil <u>only</u> after passing the Open Ditch Inspection, as outlined in *Section 20* of these regulations). Each subsequent dam shall be placed at twenty (20) foot intervals thereafter. The dams shall be left as uncut from the soil during the trenching process by raising the trencher boom at the proper intervals when excavating the lateral line trench.

The Schedule 40 PVC pipes shall be laid out and cut to proper lengths for the lateral lines (*Note: Maximum lateral line lengths are established as per Table A3-3).* Holes are drilled (in a straight line) according to the design specifications after the laterals have been cut to their proper length. The first hole in each lateral shall be drilled at a point two and one-half feet from the valve; the last hole should be drilled two and one-half feet from the end of the lateral; the balance of the holes shall be spaced in accordance with the design specifications. Holes must not interfere with the earthen dams. Holes are only drilled through one side of the pipe. Should the drill bit go completely through the pipe, or if a hole is drilled in the wrong place, that section of lateral line pipe shall be discarded and replaced with a new length of pipe.

Lateral line pipes shall be suspended and/or supported at the proper depth within the trenches with the holes placed down toward the trench bottom. The end of each lateral line shall have a short turn-up with a metal end-cap. The capped end must be brought up above or flush with the final grade. At the time of trench back-filling, the turn-up shall be placed inside a short length of four (4) inch diameter corrugated black plastic (polyethylene) pipe with an appropriate end cap to protect it from damage, while still providing easy access. Positioning of the lateral line pipe shall be checked to ensure that it is level and centered at the proper depth within the trench. The lateral line pipe shall be centered between the trench sidewalls with the invert positioned eight (8) inches above the trench bottom. Thus, there shall be eight (8) inches of gravel media below the lateral line pipe invert. An additional four (4) inches of gravel shall be placed on top of that for a total of twelve (12) inches of gravel. Refer to Figures A3-11A and A3-11B for cross-sectional visual depictions of typical lateral line trenches.

<u>*Important Note*</u>: The gravel media shall not be placed in the lateral line trenches nor shall the lateral lines be covered with soil until they have received Open Ditch Inspection approval from the Department. See *Section 20* of these regulations regarding the inspection process and sequence.

Only after the lateral lines have been approved during the Open Ditch Inspection shall the gravel media be placed in the trenches. The gravel in the trenches shall be covered with untreated building paper or other comparable filter fabric determined to be equivalent by the Department. (Note: Straw shall not be allowed as covering for gravel media in LPP systems.) Corrugated polyethylene risers with snap-lock caps shall be placed over each and every lateral line valve and shall extend to the ground surface. Finally, the trenches are back-filled with the spoils from trench excavation. The lateral line trenches shall be back-filled as soon as possible after installation and Final Inspection approval, in order to protect the trenches from siltation.

F. Pump and Pump Controls

<u>***Important Note***</u>***:*** *The pump and associated electrical controls for LPP systems shall meet all provisions outlined in Section 16 and Appendix 12 of these regulations.*

Details of pump installation are shown in Figure A14-6 of *Appendix 14*. The pump shall be placed on two eight (8) inch concrete blocks, set tightly side-by-side, on the bottom of the tank. Elevating the pump (a minimum of eight inches) in this manner minimizes the potential of any solids from being drawn into the pump and discharged through the piping network. A length of nylon rope or other non-corrodible material shall be attached to the pump and to the outlet pipe for lifting the pump in and out of the pump tank.

Pump controls shall be securely fastened to the outlet pipe with a non-corrodible clamp or bracket. The pump control switches shall be positioned so as to pump the specified volume of effluent (as per design plans) while ensuring that the pump remains submerged at all times. The high water alarm control shall be positioned so as to ensure the minimum specified emergency storage capacity (as per design plans). Care shall be taken to ensure that the control floats do not become fouled by one another or by other components in the tank.

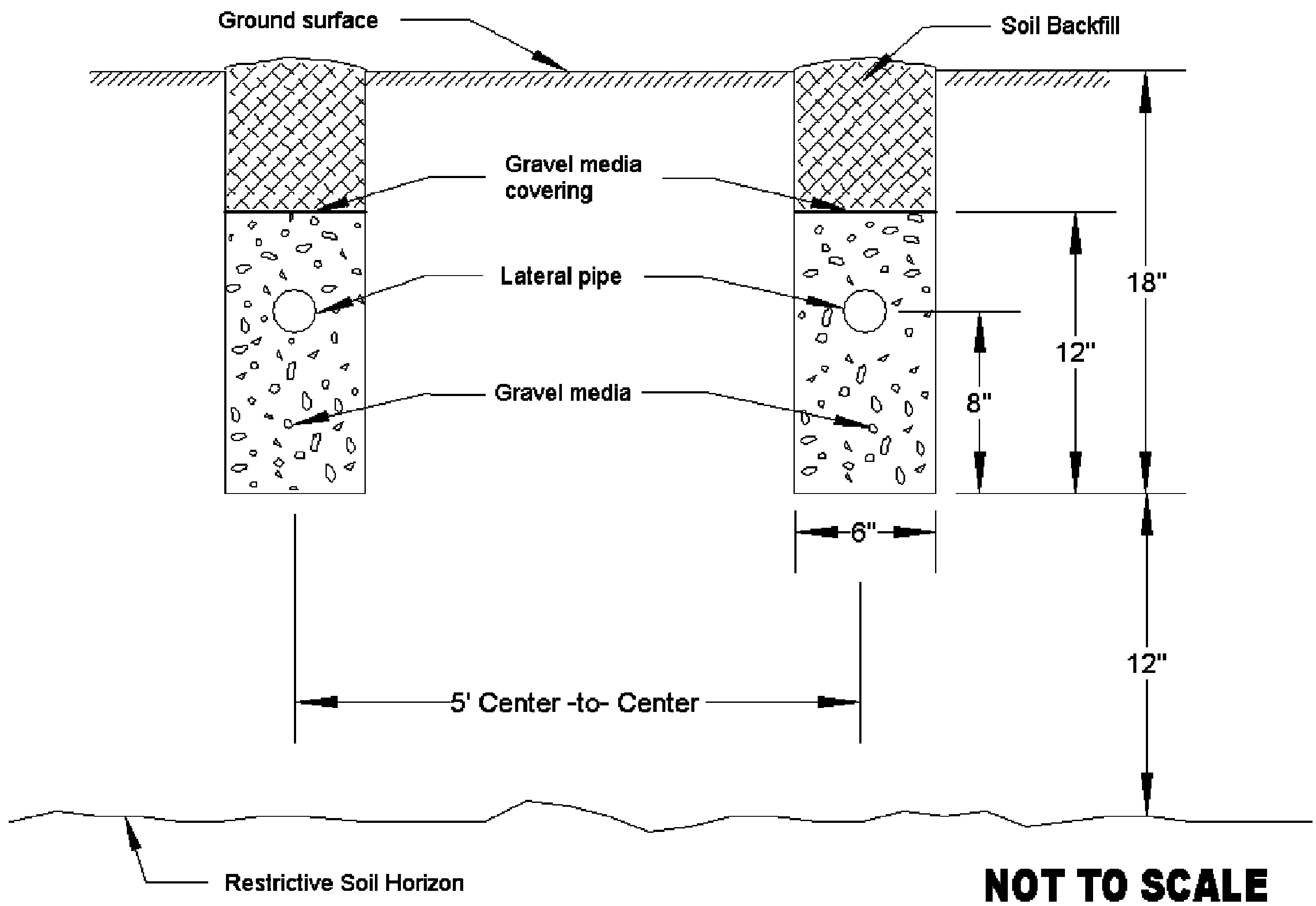


Figure A3-11A. Cross-sectional end view of typical LPP lateral line trenches.

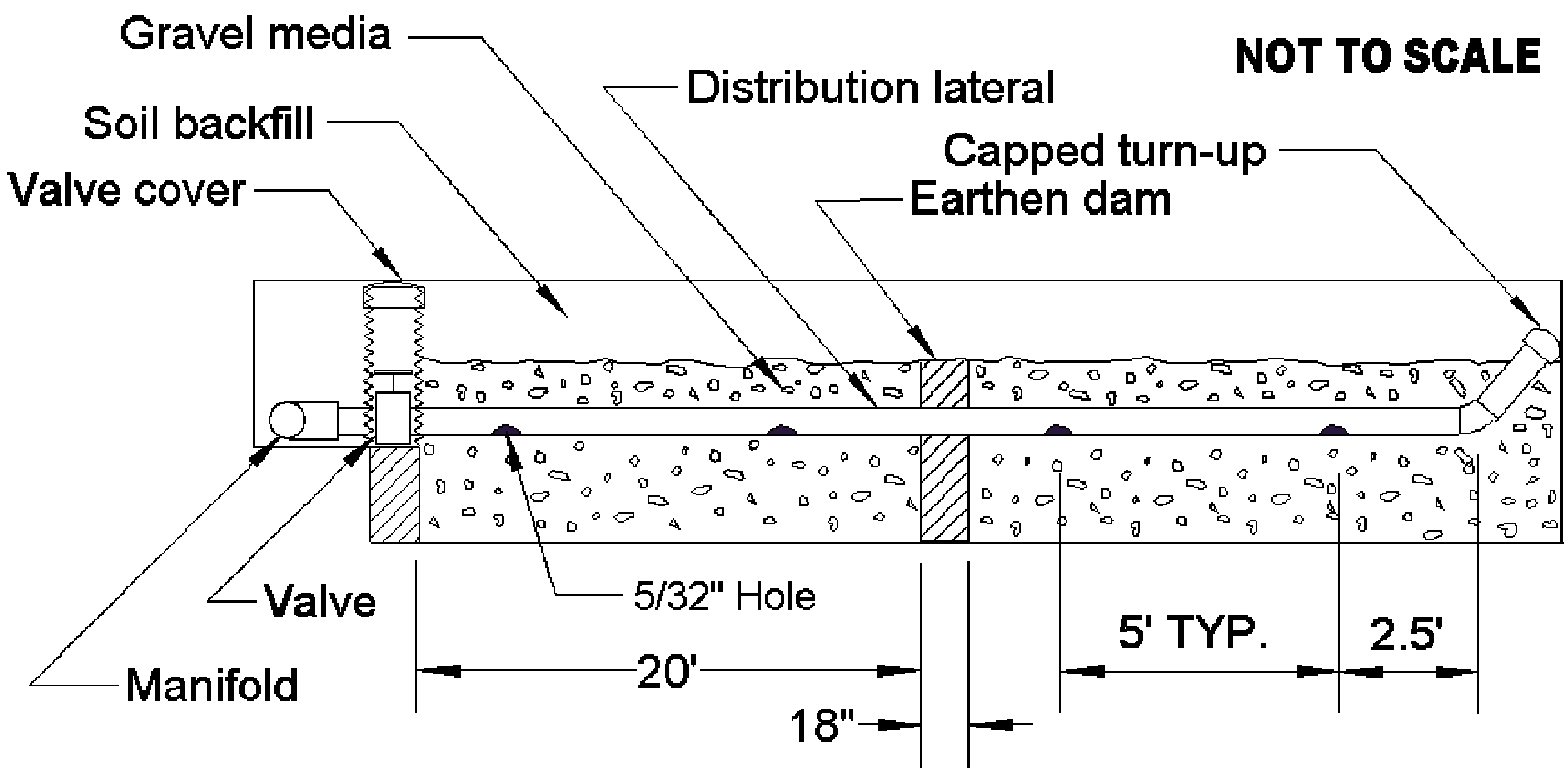


Figure A3-11B. Cross-sectional side view of typical LPP lateral line trenches.

A bushing or reducer may be needed to adapt the pump outlet to the pump outlet pipe. The pump outlet pipe shall be connected to the supply line with a threaded PVC union to allow for quick removal or replacement. A brass or bronze globe, gate or ball valve shall be installed in the supply line (within the pump tank) to prevent effluent back-drainage during pump maintenance. Where a check valve is required (*Chapter 4* of this Appendix/manual), it shall also be installed with threaded PVC fittings inside the pump tank to provide easy access for maintenance. For systems where the absorption field is at a lower elevation than the pump, a 1/4-inch siphon-breaker hole must be drilled in the supply line inside the pump tank. This breaks any vacuum in the system and prevents the inadvertent siphoning of effluent out of the tank. The placement of this hole is critical to the functioning of the system. Similarly, when a check valve is used, a vent hole (in accordance with the manufacturers recommendations) must be drilled in the supply line inside the pump tank. The placement of this hole will ensure the purging of any air trapped within the pump.

LPP systems are considered by the Department to be *Electrically Assisted Systems (EAS)* ---- i.e., any type of subsurface sewage disposal system requiring the use of a sewage/effluent pump. As such, all the electrical components (and their installation) associated with LPP systems shall meet all the requirements and provisions of these regulations relating to *EAS.*

<u>Important Note</u>: Details regarding the set up and placement of the electrical components is outlined in Section 16 of these regulations

G. Pump and Alarm Check

After all required installation tasks have been completed, the system shall be checked for proper operation. With electrical power turned off, fill the pump tank with water to a level sufficient to activate the high water alarm float.

Turn on the electrical power. The alarm should activate, and the pump should start operating. The alarm should deactivate when the liquid level falls below the high water alarm float. The pump should turn off when the liquid level reaches the lowest float control. At the lowest float control level, the pump shall remain completely submerged.

H. Pressure Head Adjustment

The valves on each individual lateral line must be adjusted so as to provide three (3) feet of pressure head at the end of each and every lateral line. The pressure head is measured as the height liquid will rise above the turn-up elbow when the pump is running. The pressure head check is performed simultaneously on all lateral lines to ensure proper effluent distribution.

To adjust the pressure head:

(1) Glue a five-foot length of PVC pipe to a threaded fitting that will screw onto the lateral line turn-up fitting. The pressure head standpipes and all necessary fittings shall be of the same size and specifications as the lateral line pipes.

(2) Replace each individual lateral line turn-up cap with a pressure head standpipe and appropriate connectors.

(3) Turn the pump on to allow the liquid level to rise in the standpipes.

(4) Adjust each lateral line valve until the liquid level reaches the desired height in each standpipe. Proper pressure head adjustment of each individual lateral line shall be achieved when the liquid barely overflows the top of each standpipe.

(5) Once the proper pressure head is achieved on each individual lateral, the pump may be turned off, the standpipes removed, and turn-up caps replaced.

(6) Upon the completion of this task, and with the approval of the Department inspector, the pressure of the system will have been properly regulated.

I. Final Landscaping

After the LPP system is installed, the following shall be checked to ensure that the system will not be hydraulically overloaded due to excessive surface and/or subsurface water:

- The trenches are back-filled with the spoils from trench excavation. The lateral line trenches shall be back-filled as soon as possible after installation in order to protect the trenches from siltation.

- The excess spoils, remaining after trench filling, shall be evenly spread over the entire distribution field area in order to shed rainwater and be free of low areas. These practices shall be implemented in such a manner so as to prevent compaction or rutting of the soils or any other damages to the system. Lightweight crawler-type bladed equipment is recommended for the completion of this task. Heavyweight dozers or any type of wheeled tractors/loaders shall not be used. Manual labor may also be used.

- The construction of any and all required soil drainage improvement practices upon any LPP installation site shall be in accordance with all provisions and requirements outlined in *Appendix 5* of these regulations. Additionally, the placement and/or location of said soil drainage improvement practices shall be in accordance with the any and all specifications required and/or approved by the Department.

- Gutter and downspout drains or any other runoff from impervious surfaces shall be directed away from the system.

Finally, the entire area shall be sown with grass in order to prevent erosion. The soil should be properly limed and fertilized before planting. After applying an appropriate amount of grass seed, the area shall be heavily mulched with straw or other suitable material. Additionally, the placement and/or use of any erosion control techniques (e.g. silt fences, sodding, geotechnical fabric, etc.), shall be in accordance with all Department specifications (i.e. either specified on the Construction Permit or its supporting documentation).

CHAPTER 7

Modified LPP (MLPP) Systems Using Compatible Soil Fill Material

Sites with a blocking layer, restrictive horizon or a seasonally high water table within twenty-four (24) inches of the surface are not suitable for a standard LPP system. Some of these sites can be used for waste treatment if the soil properties are such that the proposed subsurface sewage disposal system site can be supplemented with fill that has been carefully selected and added in accordance with the construction techniques outlined in this Chapter.

Where there is twenty-four (24) inches of usable soil on an acceptable site, as determined and noted through approved soil mapping standards and the use of such sites verified by the Department, a MLPP may be installed. Soil characteristics, site topography and landscape positions shall be assessed for such use under the criteria presented in *Appendix 1*. Prior to its application, all proposed imported soil fill material shall be evaluated and approved by a Department Soil Scientist as to its compatibility with the naturally occurring soil present on the designated MLPP site.

If the site requires imported fill to supplement the naturally existing soil profile, it shall be incorporated evenly into the underlying natural soil. It is critical that no sharp interface remain between the natural and imported soil layers. Before applying the imported fill to the absorption area, the ground surface shall be tilled with a small plow. Fill shall be applied with a minimum of wheeled traffic on the area, and the area tilled again to ensure even mixing. A very small tractor shall be used to spread the material around and to provide a convex shape to the area. There shall be no low spots or depressions, and the final shape should shed, rather than accumulate any surface waters.

Important Note: *The use of MLPP systems with Extra Modification (MLPP/EM) are experimental subsurface sewage disposal systems and as such shall be restricted to use on properties for repair purposes only. Such repairs shall be limited to properties where existing structures, buildings or homes, have non-functioning or non-existent subsurface sewage disposal systems, and where the proper soils conditions will not allow for the installation of a subsurface sewage disposal system to be in accordance with the provisions of these regulations. A Department soil scientist shall investigate a site's suitability for the use of this type of system. Should a site meet the provisions outlined in Chapter 6 of Appendix 1 for a MLPP/EM system installation, the design criteria shall be specified by the Department on an individual case-by-case, site specific basis.*

A. Modified LPP (MLPP) Design

The only difference between designing a MLPP and standard LPP is the calculation of the imported compatible fill requirements. The volume of the fill needed is the area to be filled multiplied by the depth of fill. The area to be modified is the absorption field plus an appropriate amount of incorporated soil buffer around the outside perimeter of the designated or platted subsurface sewage disposal system area. The required amount of incorporated soil buffer area is determined on a site-specific basis, depending upon the soil and site characteristics.

The buffer distance may range from five (5) to twenty-five (25) feet and shall be determined and specified by a Department Soil Scientist. The distance of the modification buffer requirement will increase on the downslope side of a MLPP site as the slope increases. However, depending upon the site and soil characteristics of the MLPP installation area, a Department Soil Scientist has the authority to specify the amount of modification buffer on any MLPP installation site. The final depth of fill (i.e. after natural soil settling) shall be a minimum of six (6) inches over the entire modification area. However, in order to achieve this minimum depth, the Department shall require that a minimum of eight (8) inches of imported soil material be incorporated to allow for natural soil settling.

Note: See Section 8, Part D of these regulations regarding the placement requirements of the soil fill material.

(1) Step 1 - Calculate area to be filled.

Example:

For a platted MLPP subsurface sewage disposal system area measuring 60 ft x 30 ft and requiring a 10 foot buffer around the perimeter:

Total area = 80 ft x 50 ft = 4000 ft^2

(2) Step 2 - Calculate the volume (V_{fill}) of fill needed.

Example:

V_{fill} = total area x depth of fill
$V_{fill} = (4000\ ft^2)(8\ in)(1\ ft/12\ in) = 2667\ ft^3$

(3) Step 3 - Convert to cubic yards.

Example:

$$V_{fill} = 2667 \text{ ft}^3/(27 \text{ ft}^3 \text{ per yd}^3) = 98.8 \text{ yd}^3$$

(4) For the remaining design steps, follow the procedures outlined in Chapters 3 and 4 of this Appendix/manual.

B. Installation

In order to ensure the successful functioning of a MLPP system, careful attention must used in selecting and incorporating the fill material. The soil fill material to be utilized on a MLPP site shall have been specifically approved for use by the Department prior to its placement on a construction site. The approved soil fill material shall not be excavated, hauled or incorporated wet.

One of the most important concerns for a MLPP system is to protect the site from soil disturbance by heavy equipment. Cutting, compaction or any disturbance of the soils in the designated MLPP areas, especially during wet weather, may result in revocation of Construction Permit approval and may destroy the site's suitability for the use of a MLPP system. As soon as the MLPP areas have been platted or designated, they shall be *quarantined* from construction traffic in accordance with the requirements as outlined in *Appendix 10* of the regulations.

The soil conditions of a MLPP installation site shall be dry prior to beginning the process of incorporating the modification soil onto said site. Incorporating or tilling damp or wet soil can cause compaction and sealing, leading to failure of the system. No site preparation or MLPP construction work shall occur if the soil is wet. A determination as to the proper soil moisture condition for MLPP installation shall be determined by a Department Soil Scientist. Prior to the incorporation of the soil fill material, and only after the preceding conditions are met, may the site be mowed of tall weeds/grass and cleared of brush and small trees. When trees larger than two (2) inches in diameter are to be removed, they shall be cut off at ground-level, rather than uprooted in order to avoid creating depressions and damaging the soil-pore network. After the brush and small trees have been removed, the soil surface shall be tilled to a minimum depth of six (6) inches using a plow.

Fill is moved to the system installation site using a front-end type loader. Care must be utilized to avoid driving on the plowed area. The first load of fill is pushed into place using a very small crawler tractor with a blade or a roto-tiller with a blade. The fill is then tilled into the first few inches of natural soil to create a gradual boundary between the two. Failure to do so could ruin the system by forming a barrier to water movement at the soil-fill interface. Subsequent loads of fill are placed on the system and tilled until the desired height is reached. The site should be shaped to shed water and be free of low spots before proceeding.

After the MLPP area has been mowed, cleared and the imported fill properly incorporated, the location of the lateral lines and manifold shall be accurately field-staked according to design specifications. Each lateral line shall be installed in the same manner as described in *Chapter 6, Part E* of this Appendix/manual.

Provisions shall be made for intercepting or diverting surface water and shallow groundwater away from the absorption area, septic tank and pump tank in accordance with the approved MLPP design plans and permit restrictions. The construction of any and all required soil drainage improvement practices upon any LPP installation site shall be in accordance with all provisions and requirements outlined in *Appendix 5* of these regulations. Additionally, the placement and/or location of said soil drainage improvement practices shall be in accordance with the any and all specifications required and/or approved by the Department.

The same installation procedures discussed in *Chapter 6* of this manual shall also apply to MLPP systems.

Important Note: *The imported soil fill material* ***shall*** *be incorporated onto the site under the direct supervision of the Department.*

CHAPTER 8

Inspection and Maintenance

A. Installation, Inspection and Approval

All inspection practices, procedures and final approval of the system installation process shall be in accordance with the information outlined in *Section 20*.

B. Operation Inspections

A properly designed and installed LPP system requires very little maintenance. Several routine items should be checked periodically and an extra pump should be readily available. LPP systems should be observed by the property owner one (1), three (3), six (6) and nine (9) months after initial installation, and every six (6) months thereafter. Should any problems be noted, the property owner shall contact the Williamson County Department of Sewage Disposal Management immediately. The Department retains the right to conduct an on-site investigation of the system and may further require participation from the design engineer and system installer.

C. Maintenance

All septic tanks, whether for conventional or alternative systems, require occasional pumping. Sludge and scum accumulation should be checked annually. Virtually all solids will be retained in the first compartment of the two-compartment septic tank. Little or no accumulation should occur in either the second compartment of the septic tank or in the pump tank. The rate of sludge accumulation will vary with individual living habits. It is recommended that septic tanks be pumped once every three (3) to five (5) years, regardless of the amount of solids accumulation.

Some LPP systems may gradually accumulate solids within the lateral lines. These should be removed at least once a year by unscrewing the caps on each of the turn-ups, and back-flushing the laterals.

Pressure head in all the laterals should also be checked and adjusted one month after initial installation and annually thereafter (*Chapter 6* of this manual) Proper pump and float-control operation should be checked during all routine inspections. The alarm panel operation should be checked regularly. Pump maintenance should follow the manufacturer's recommendations.

D. Minor Troubleshooting

The alarm should activate whenever the effluent level in the pump tank rises above the high water float setting. This can occur for several reasons:

- *Power failure*: If there has been a power failure, effluent will continue to accumulate in the tank until power is restored. At this time the alarm may come on for a brief period, but will go off as soon as the pump draws down the effluent.

- *Pump or switch failure*: If the pump or float switch controls malfunction, they can be quickly replaced with new components by unscrewing the PVC union and lifting the entire assembly out of the pump tank.

  <u>Important Note</u>*: It is imperative to ensure that the electrical power supply to the pump tank and its associated electrical control panel/box is shut off before beginning any work related to the pump or any of its associated components*.

- *Clogged valve or discharge holes*: If the distribution system becomes clogged, the tank will not be emptied. Back-flush the laterals, manifold and/or supply line if necessary.

Before replacing any components, make sure that the level controls have not simply become tangled. The problem can usually be isolated by checking the pump operation independently from the controls. Repair or replace the appropriate components.

Should the initial investigation reveal that more extensive repairs are required, the property owner shall contact the Department for proper advisement. Any and all repairs, other than those previously mentioned in this Chapter, shall follow all specifications set forth in these regulations.

APPENDIX 4

MOUND SYSTEMS

(RESERVED)

APPENDIX 5

SOIL DRAINAGE IMPROVEMENT PRACTICES

The Department shall have the authority to require soil drainage improvement practices on any lot served by subsurface sewage disposal systems.

A. Designation of Soil Drainage Improvement Practices

Soil drainage improvement practices shall be required on sites as prescribed by a soil map of said site or by an evaluation of said site by a Department Soil Scientist *(See Appendix 1)*. Further, all sites served by an alternative subsurface sewage disposal system shall require the use of a drain (i.e., curtain drain, interceptor drain, and/or draw-down drain or a combination of the aforementioned drainage improvements) as specified by the Department. Ground surface berms or swales shall not be considered, in lieu of drains, for the aforementioned sites.

Important Note: All soil drainage improvement practices shall be considered as part of the subsurface sewage disposal system and shall be subject to inspection by the department in accordance with the provisions outlined in *Section 20*.

B. Soil Drainage Improvement Practices Approved for Use

The concept of soil drainage improvement practices deals with modification of the drainage characteristics of a site. Drainage modification, as utilized in Williamson County, is concerned with all factors related to the hydraulic nature (both surface and subsurface) of a platted or designated subsurface sewage disposal system site. Site drainage modification may involve the diversion of surface water, and/or the removal and diversion of subsurface water. The following soil drainage improvement practices, approved for use in Williamson County, include but shall not be limited to:

1. Surface Water Diversion

This aspect of drainage is concerned with one goal: the redirection of water moving along the ground surface. Thus, any approach used for this purpose would involve the creation of a channel to collect and reroute the course of water flow over the ground surface away from the platted or designated subsurface sewage disposal system disposal field area. The most commonly used methods of directing runoff away from said areas is by the use of the following:

(a) Berm

Berms are typically specified for use on sites with gentle slopes where small volumes of surface water, at lower flows, are anticipated. Constructed from imported soil material placed directly on top of the natural ground surface, a berm is designed to divert water around and away from the disposal field area. The junction of the up-slope side of the berm with the natural ground surface creates a small channel to collect and direct the water. Where required, the Department shall specify the berm location and dimensions.

Depending upon site conditions, the use of berms may be required in conjunction with the use of one or more of the other soil drainage improvement practice(s). Under no circumstances shall ground surface berms be considered in lieu of any type of required subsurface drainage improvement practice.

(b) V-Ditch

V-Ditches are excavated channels typically used on sites with medium slopes where medium runoff volumes and flows are anticipated. These channels are designed and constructed to collect and divert water around and away from the disposal field area. Where required, the Department shall specify the V-ditch location and dimensions.

Depending upon site conditions, the use of V-ditches may be required in conjunction with the use of one or more of the other soil drainage improvement practice(s). Under no circumstances shall ground surface V-ditches be considered in lieu of any type of required subsurface drainage improvement practice.

(c) Terrace

Broadbase or channel-type terraces may be thought of as a combination of a V-ditch with a berm on the downslope side of the channel. The combination of these two drainage techniques results in a more effective surface water diversion method, capable of handling a wider range of runoff volumes and flows. Where required, the Department shall specify the terrace location and dimensions.

Depending upon site conditions, the use of terraces may be required in conjunction with the use of one or more of the other soil drainage improvement practice(s). Under no circumstances shall ground surface terraces be considered in lieu of any type of required subsurface drainage improvement practice.

2. Subsurface Water Drainage and Diversion

Subsurface water drainage and diversion involves two different approaches to two different groundwater movement scenarios. Either the subsurface water is moving laterally, downgradient along a subsurface restrictive layer or vertically, upwards into the upper thirty-six (36) inches of the soil profile of the platted or designated areas for subsurface sewage disposal system utilization.

In order to drain and divert the lateral or vertical movement of groundwater, a path shall be provided to intercept or collect the water and carry it away from the disposal field area. The path created for the subsurface water to follow is a trench filled with gravel excavated to a depth where it intersects with a blocking layer in the lower soil profile. The trench thus becomes the conduit for the water to move to the outlet provided.

There are three (3) methods, approved by the Department, to drain and divert subsurface water from a site. They are interceptor drains, curtain drains and drawdown drains. Interceptor and curtain drains are used to collect and divert laterally moving groundwater, while drawdown drains are used to collect and divert vertically moving groundwater.

(a) Interceptor Drain

Interceptor drains are designed to intercept and divert laterally moving groundwater flow around the area to be protected. The interceptor drain contains an impermeable barrier placed on the downslope wall of the trench and along the trench bottom. This impermeable barrier acts to intercept the laterally moving subsurface water, preventing it from proceeding on its downslope course and diverting it away from the subsurface sewage disposal system disposal field area. This impervious barrier is the only main element that differentiates it (and a curtain drain) from a drawdown drain. See Figures A1-10, A1-11 in *Appendix 1* and Figure A14-8 in *Appendix 14* for examples of typical cross sectional views of interceptor drains.

The configuration of this drain is the main difference between an interceptor and a curtain drain. An interceptor drain is only located at the highest elevation of the disposal field area, above the initial or first field line, and parallel to the disposal field trenches. It does not wrap around (or horseshoe) the sides of the disposal field or extend downslope, perpendicular to the disposal field trenches. See Figure A14-9 in *Appendix 14* for an example of a typical plan view of an interceptor drain. However, the interceptor drain shall still be configured in such a manner so as to protect all of the primary disposal field area and the platted or designated backup or duplicate sewage disposal field areas.

The interceptor drain shall be installed deep enough so as to intercept all interfering (or potentially interfering) groundwater, divert said groundwater and discharge it to a positive outlet away from the disposal field area or areas. The required minimum depth will be determined either by the depth of the restrictive layer, the depth of the disposal field lines or the depth needed to lower the high water table. Additionally, the drain shall conduct the intercepted water via gravity flow to a positive outlet or discharge point.

Depending upon site conditions, the use of interceptor drains may be required in conjunction with the use of one or more of the other soil drainage improvement practice(s).

(b) Curtain Drain

Curtain drains derive their name from their layout configuration. A curtain drain is an expanded version of an interceptor drain. The curtain drain is designed so as to wrap around (or curtain) the disposal field area on more than one side (i.e., it horseshoes the area), thus providing an additional degree of protection and drainage to a disposal field area.

Curtain drains are identical to interceptor drains except for their layout configuration, which includes an extension of those portions of the drain (i.e. the trench bottom of the drain) that is excavated to minimum required depth before it is allowed to proceed to its required positive outlet. Whereas an interceptor drain only protects the designated area(s) on the upslope side, a curtain drain wraps around the side(s) of the disposal field and extends downslope, perpendicular to the field line trenches. See Figures A1-10 and A1-11 in *Appendix 1* for an examples of typical plan views of curtain drains.

Other than the above-mentioned difference, curtain drains must conform to all provisions outlined in *Subpart (a) of Part 2*.

Depending upon site conditions, the use of curtain drains may be required in conjunction with the use of one or more of the other soil drainage improvement practice(s).

(c) Drawdown Drain

Drawdown drains are designed to lower a localized water table found in an area platted or designated for SSDS use. Drawdown drains are typically specified for use on sites with little or no slope and are configured so as to either completely encircle or to horseshoe the disposal field. The configuration and depth of the drain is designed to create a meniscus effect on the horizontal profile of the top of the water table; thus, lowering the uppermost vertical level of the water table to allow the disposal field to function properly without being inundated. See Figure A1-12A in *Appendix 1* for an example of a typical plan view of a drawdown drain.

Drawdown drains differ from interceptor drains and curtain drains in that their trenches do not contain an impermeable barrier placed on the downslope wall of the trench and along the trench bottom to block the lateral movement of subsurface water. It has an open interface between the gravel and the trench walls (side walls and bottom) to allow free movement of groundwater into the gravel from all sides of the trench. See Figure A1-12B in *Appendix 1* for an example of a typical cross sectional view of a drawdown drain.

The required minimum depth shall be determined either by the depth of the restrictive layer, the depth of the disposal field lines or the depth needed to lower the high water table. Additionally, the drain shall conduct the collected water via gravity flow to a positive outlet or discharge point.

Depending upon site conditions, the use of drawdown drains may be required in conjunction with the use of one or more of the other soil drainage improvement practice(s). For example, in situations where the Department would require the use of a combination interceptor drain and drawdown drain to achieve the required drainage improvement results for a disposal field area site, the placement of the interceptor drain above a disposal field area would be specified so as to intercept water moving downgradient onto the site, while the placement of a drawdown drain would be specified so as to collect and drain water from the base of the slope.

C. Design of Soil Drainage Improvement Practices

1. Berms

Berms shall be designed such that the junction of the up-slope side of the berm with the natural ground surface creates a small channel to collect and direct the water. Placed ten (10) to fifteen (15) feet up-slope of the highest (first) disposal field trench, the berm shall be a minimum of eight (8) to ten (10) inches high with a base of three (3) to six (6) feet wide. See Figure A1-9 in *Appendix 1* for a general conceptual view of a berm. Further, the berm shall be continuous and extend to a length, specified by the Department, so as to ensure adequate protection of the entire disposal field area. Where required, the Department shall specify the berm location and dimensions.

2. V-Ditch

V-Ditches shall be designed so as to create a channel a minimum of fifteen (15) feet up-slope of the highest (first) disposal field trench. The channel shall be a minimum of eight (8) to twelve (12) inches deep at its center and ten (10) to twenty (20) feet wide. See Figure A1-9 in *Appendix 1* for a general conceptual view of a V-ditch. Further, the V-ditch shall be continuous and extend to a length, specified by the Department, so as to ensure adequate protection of the entire disposal field area. The grade on the V-ditch shall be six (6) to twelve (12) inches of fall per one hundred (100) linear feet, so as to minimized silt accumulation. Where required, the Department shall specify the V-ditch location and dimensions.

3. Terrace

For design purposes, the cross section of a broad-base terrace can be considered as a triangular channel (similar to a V-ditch). After smoothing during the construction phase, the terrace will resemble that of Figure A1-9 in *Appendix 1*. The primary purpose of this type of terrace is to intercept and conduct the runoff away from the sewage disposal area to a safe outlet at a non-erosive velocity.

Placed a minimum of fifteen (15) feet up-slope of the highest (first) disposal field trench, the terrace channel shall be a minimum of four (4) to eight (8) inches deep and a minimum of three (3) to six (6) feet wide. The grade on the terrace channel shall be the same as that of a V-ditch. The associated berm, constructed from the excavated channel spoils, shall be a minimum of four (4) to eight (8) inches high with a base of three (3) to six (6) feet wide. See Figure A1-9 in *Appendix 1* for a general conceptual view of a terrace.

Further, the terrace shall be continuous and extend to a length, specified by the Department, so as to ensure adequate protection of the entire disposal field area. Where required, the Department shall specify the terrace location and dimensions.

4. Interceptor Drain

Interceptor drains shall be designed and constructed so as to intercept and divert laterally moving groundwater flow around the disposal field area. Placed a minimum of ten (10) feet from the disposal field trenches *(See Section 13)*, the interceptor drain trench shall be designed at a minimum of eighteen (18) inches wide and excavated to the minimum depth as dictated by the soils map or by a Department Soil Scientist. The design shall configure the interceptor drain in accordance with the provisions as outlined in *Subsection B, Part 2 (a)* of this Appendix.

The design shall be such that the excavated trench bottom maintains the required minimum depth (plus fall at six [6] inches per one hundred [100] linear feet) a minimum distance of ten (10) feet past the disposal field area. This portion of the drain shall contain the impermeable barrier and required gravel. Once this requirement has been met, the drain shall then be extended to the designated and/or approved positive outlet.

On a site where the distance from the end(s) of the drain proper (i.e. that portion of the drain, specified by the Department as requiring the placement of the impermeable barrier and gravel media) to the point of the required positive outlet, exceeds twenty-five (25) feet, that remaining portion of the drain may be designed and constructed, with approval from the Department, as a tight-line (i.e. trench contains no plastic and no gravel). Where the distance between the drain proper and the point of the required positive outlet is less than twenty-five (25) feet, this portion of said drain shall continue with the placement of the impermeable barrier (i.e. plastic) and gravel media. The tight-line trench shall be in accordance with all aforementioned slope and gradient specifications. Said tight-line shall consist of a solid pipe, of a type and diameter as specified in *Appendix 12*, shall extend to the positive outlet of the drain and shall have an outlet end pipe installed in accordance with the provisions of this Appendix.

The drain shall be designed so as to provide gravity flow of the collected water to a positive outlet or discharge point. Thus, the collection line (and any tight-line) must be designed with a downgrade. Where the natural ground contours, on a particular site, do not allow for an appropriate amount of fall to achieve positive drainage, six (6) inches of fall per one hundred (100) linear feet of trench bottom shall be considered necessary to ensure positive flow of the collected water to the point of discharge.

A detailed site assessment, which shall include the information outlined in *Section 26, Part A, Subpart 3 (g)*, is required to prove that a positive outlet can be achieved in accordance with the proposed drainage configuration. The Department shall review and approve said site assessment information prior to drain installation. In accordance with the provisions outlined in *Section 26,* it shall be the responsibility of the registered land surveyor who prepared the plat to provide this site assessment information for all platted lots requiring a soil drainage improvement practice. In accordance with *Subsection C of Section 19*, it shall be the responsibility of the design plan engineer to provide this site assessmet information for all alternative subsurface sewage disposal systems proposed on either vested plats and lots (see *Section 2, Subsection J*) or unplatted parcels of land requiring a soil drainage improvement practice. For conventional subsurface sewage disposal systems proposed on either vested plats and lots (see *Section 2, Subsection J*) or unplatted parcels of land requiring a soil drainage improvement practice, the Department shall be responsible for this site assessment information.

If the drain discharges into a naturally existing drainageway, the drain outlet pipe shall be designed so as to enter the drainageway above its normal flood stage and shall be oriented in the same direction as the natural flow of the drainageway. Placement of the outlet pipe in a drainageway in this manner helps prevent flood waters from blocking the interceptor drain flow or from backing up into the interceptor drain. Further, the drain shall not outlet into a naturally existing closed depression (i.e. sink hole, etc.).

<u>Note:</u> *If it is determined that a positive drainage outlet is not available or cannot be achieved on the lot in question, an off-site easement may be required by the Department.*

The trench design shall contain an impermeable barrier placed on the downslope wall of the trench and along the trench bottom. This impermeable barrier shall be in the form of six (6) to eight (8) mil plastic, or other impermeable material as specified or approved by the Department. The material utilized for the impermeable barrier shall be strong enough to withstand installation conditions and be able to provide a long service life. Where site and soil characteristics so warrant (i.e. sites comprised of soils containing large chert fragments, cobbles, etc.), the Department shall have the authority to specify and require the use of plastic, for the impermeable barrier, having a higher thickness rating.

Additionally, the interceptor drain design shall specify that a pipe be placed in the bottom of the trench to collect the water and conduct it to the outlet. This collection pipe shall be a slotted plastic agricultural-type drain pipe, a minimum of four (4) inches in diameter, strong enough to withstand crushing. On sites where the anticipated amount of water to be collected is great, the Department shall have the authority to specify and require the use and placement of either multiple pipes or a pipe of larger diameter.

The interceptor drain design shall specify the gravel media to be placed in the trench. Media for the interceptor drain trench shall consist of crushed rock, gravel or other suitable material as approved by the Department and in accordance with the provisions as outlined in *Appendix 12*. The trench shall be completely filled with gravel and leveled at the ground surface along the entire length of the drain. No soil shall be placed over the top of the gravel.

The interceptor drain shall be designed so that the excavated spoils be placed and Mounded on the downgrade side of the trench to be used as a surface berm. The berm shall be a minimum of eight (8) to ten (10) inches high with a base of three (3) to six (6) feet wide. The berm shall be shaped and smoothed so as to be one continuous section extending the entire length of the drain. Further, the berm shall be shaped in such a manner that it gradually slopes downgrade away from the drain towards the disposal field area. The berm must be such that it is not only technically functional but also visibly aesthetic.

<u>Note:</u> *Where required, the Department shall specify the interceptor drain location and dimensions.*

5. Curtain Drain

Curtain drains shall be designed in a manner identical to interceptor drains except for their layout configuration. Whereas an interceptor drain is designed to protect the platted or designated disposal field area(s) only on the upslope side, a curtain drain shall be designed so as to protect the sides of the platted or designated disposal field area(s) as well. Thus, its layout design shall wrap around the side(s) of the disposal field and extend downgrade, perpendicular to the field line trenches. The design configuration shall be such that the curtain drain extends a minimum distance of ten (10) feet past the last (lowest) disposal field trench (maintaining its required minimum depth) before an outlet is to be sought or a tight-line to the positive outlet is to be initiated.

Other than the above-mentioned difference, curtain drains shall conform to all provisions outlined in *Part 4 of this Subsection*.

<u>Note:</u> *Where required, the Department shall specify the curtain drain location and dimensions.*

6. Drawdown Drain

Drawdown drains shall be designed in a manner similar to interceptor and curtain drains except for the omission of the impermeable barrier. Whereas interceptor and curtain drains are designed to protect the platted or designated area(s) from lateral groundwater movement, a drawdown drain shall be designed so as to protect said area(s) from vertically moving subsurface water as well. Thus, their design shall not specify an impermeable barrier placed on the downslope wall of the trench or along the trench bottom. It shall be designed such that an open interface between the gravel and the trench walls (side-walls and bottom) exists to allow free movement of groundwater into the gravel from all sides of the trench.

The design of these types of drains shall be configured to either completely encircle the disposal field or to horseshoe it similar to a curtain drain configuration. Drawdown drains also differ from the other drain types in that their trenches shall be designed at a minimum distance of twenty-five (25) feet from the disposal field. See *Section 13*.

Other than the above-mentioned differences, drawdown drains must conform to all provisions outlined in *Parts 4 and 5 of this Subsection*.

<u>Note:</u> *Where required, the Department shall specify the drawdown drain location and dimensions.*

D. Installation of Soil Drainage Improvement Practices

<u>IMPORTANT NOTE:</u> No underground utility lines (i.e. electric lines, water lines, etc.) shall be installed in or routed through any trenches excavated for the purposes of installing a Soil Drainage Improvement Practice. Further, any trenches excavated for said underground utilities shall be a minimum of five (5) feet away from the trenches excavated for a Soil Drainage Improvement Practice.

Prior to installing any soil drainage improvement practice, the installer of said drain shall conform to all preparatory provisions as outlined in *Section 20*. The installation of any soil drainage improvement practice shall strictly conform to all supporting documentation (i.e., permit, soil map, plat, approved alternative system design plans, etc.) associated with said land parcel (i.e. whether a platted or unplatted parcel of land), there being no exceptions.

1. Trench Excavation

   NOTE: Only after the Department inspector has approved the layout of the proposed drainage improvement practice may the trench excavation process begin.

   Soil excavation may be accomplished in a variety of ways depending upon the width, depth and length of the drainage practice to be installed. Typical excavation equipment utilized for these applications include: backhoes, trenchers, bobcats and various manual tools. The sides of the trench shall be cleared of any roots, sharp rocks or other protrusions that might cause hazards or damage the barrier. In the case of placement of an associated berm, the excavated spoils shall be mounded and smoothed on the downgrade side of the trench so as to form the surface berm.

2. Impermeable Barrier Installation (where applicable)

   The impermeable barrier, installed after the trench has been excavated to the specified and required dimensions, shall lie on the trench bottom and continue up the downhill side of the trench wall and over the upper edge of the downgrade trench lip. The plastic barrier shall extend the entire length of the drain. Where more than one piece of plastic is needed in order to extend the entire length of the trench, the abutting ends of the barrier must overlap a minimum of ten (10) feet.

   Additionally, where any subsurface sewage disposal system component breaches the integrity of the plastic barrier (e.g. a tight line or supply line pipe crossing the curtain drain going from tanks to the disposal field), the crossing and proper sealing of the plastic barrier around the intrusion so as to minimizes preferential groundwater flow at this junction shall be as follows:

   (a) At the junction point between the two trenches (i.e. tight line/supply line trench and drain trench) a small slit shall be placed in the plastic barrier for the insertion of the tight line/supply line pipe.

   (b) At this intersection, PVC tape shall be utilized to seal the plastic barrier to the pipe. Said tape shall be in accordance with the specifications outlined in *Appendix 12*. The use of any other type of tape (i.e. duct tape, masking tape, etc.) shall not be utilized.

3. Pipe

   The specified drain pipe(s) shall be placed along the trench bottom on top of the plastic barrier prior to placement of the gravel. All individual sections of pipe, utilized in the construction of a drain, shall be properly joined by the use of the manufactured fittings and couplings, specifically made for the type of pipe being used, in accordance with the manufacturer specifications. The pipe shall be laid in the entire length of the drain.

   Where the Department has authorized the use of a tight-line pipe to extend from the drainage pipe to the point of discharge, the pipes shall be properly joined by the use of manufactured fittings and couplings, specifically made for the type of pipe being connected, in accordance with the manufacturer specifications. Where the use of PVC piping is specified, by the Department, for use in the aforementioned tight-line, the joining of the PVC pipe to the drain pipe shall be in accordance with the specifications outlined in *Appendix 12*.

4. House Gutters

   Where applicable, the gutters from the structure may be tied into the drainage system to further lessen the water load on the subsurface sewage disposal system area. Where this practice is utilized, all excavations, placement of piping and associated fittings and couplings shall be in place prior to requesting the Open Ditch inspection from the Department.

   Where the Department has determined that the site conditions relating to a subsurface sewage disposal system installation (i.e. proximity of the house, structure or any other impermeable surfaces juxtaposed to the platted or designated subsurface sewage disposal system disposal field areas) have the potential to adversely affect the system installation, the Department shall have the authority to mandate this practice.

5. Outlet End Pipe

In each outlet end of a drain, a five (5) foot section of Schedule 40 PVC pipe shall be inserted a minimum of three (3) feet into the drain pipe so as to prevent crushing of the outlet. A metal band-type clamp shall be placed around the outside of the drain pipe, six (6) to eight (8) inches from its end. Once the PVC has been inserted into the drain pipe the required distance, the clamp shall be tightened so as to firmly secure the placement of outlet end pipe. Additionally, the end of the outlet pipe shall be cut at an angle conforming to that of the natural ground surface.

On sites where the drop at the outlet is minor, a grassed area will be sufficient protection from soil erosion. However, where the outlet fall exceeds twelve (12) inches, the placement of extra protection, such as rock/gravel rip-rap, concrete, or a drop outlet, shall be required to prevent soil erosion. Where a drain outlet discharges into a naturally existing drainageway, the drain outlet pipe shall be designed so as to enter the drainageway above its normal flood stage and shall be oriented in the same direction as the natural flow of the drainageway. Further, the drain shall not discharge into a naturally existing closed depression (e.g. sinkhole, etc.). Where an outlet discharges onto a land surface which is either maintained as a lawn or subject to periodic mowing, the terminus of the outlet end pipe shall be cut at an angle parallel to the ground slope at said outlet in order to minimize potential destruction from mowing activities.

6. Inspection – Open Ditch (No Gravel)

After the completion of the first four (4) Parts of this Subsection, the drain shall be subject to an inspection by the Department. The requirements of this inspection are outlined in *Section 20.*

7. Gravel

After the trench, impermeable barrier, pipe and outlet end pipe have been approved during the aforementioned inspection, the trench shall be leveled to the ground surface, along the entire length of the drain, with the appropriately specified gravel media. No soil shall be placed over the top of the gravel.

On subsurface sewage disposal system installation sites where the Department has specified that surface water diversion is not necessary, a thin veneer of soil may be placed over the top of the gravel. However, the Department shall require that a permeable barrier (i.e., straw, builders paper, filter fabric, etc.) be placed between the gravel surface and the soil backfill. The depth of backfill shall be minimal to allow for the establishment of grass. The depth of the backfill over the gravel shall not exceed six (6) inches.

8. Surface Berm and V-Ditch

The soil used for berms and channels shall be smoothed, shaped and graded to allow for easy mowing and maintenance. Additionally, the berm must be such that it is not only technically functional but also visibly aesthetic.

9. Inspection – Final

After the completion of Part 7 of this Subsection, the drain shall be subject to a final inspection by the Department. The requirements of this inspection are outlined in *Section 20.*

E. Erosion and Sediment Control

The determination for the use of erosion and sediment controls shall be made by the Department on a case-by-case, site-specific basis. Where the Department has determined that a site shall require the use of erosion and sediment controls, the Department shall specify the type of controls to be utilized in accordance with the provisions outlined in *Section 23.*

F. Maintenance of Soil Drainage Improvement Practices

For V-ditches, berms, terraces or other surface water diversion structures, maintaining their integrity and preventing silt accumulation is vital to their proper function. For drains to function at their maximum potential, it is crucial that their associated berm on the lower side be left in place, and that the gravel media remain open at the ground surface and not be covered with dirt. Additionally, the outlet pipe must remain open so that water may exit freely as it enters the trench.

APPENDIX 6

CONSTRUCTION PERMIT APPLICATION PROCESS & PROCEDURES

The information in this Appendix outlines the general process involved in permitting the installation of *new* subsurface sewage disposal systems for *new* single-family dwelling structures. The permitting process for other types of structures and/or facilities (e.g. commercial, institutional, industrial, etc.) may be similar, however the specific and/or unique subsurface sewage disposal system requirements for said structures and/or facilities will necessitate an individualized permitting process. Individualized permitting processes shall be outlined by the Department on a case by case basis.

A. Platted Parcels of Land (e.g. Subdivision Lots)

The processes presented in this Subsection assumes that all provisions of these regulations regarding the platting of land parcels have been successfully completed.

Prior to the issuance of a Construction Permit for a platted parcel of land, the following conditions must be met:

1. The applicant must obtain and submit a valid *Application for Zoning Certificate*. This Certificate is obtained from the Williamson County Community Development Department.

2. The applicant must pay the appropriate fee for the Construction Permit as a part of the application process. Fees are assessed in accordance with the provisions outlined in *Section 33*.

   IMPORTANT NOTE: Payment of the fees is not an assurance nor a guarantee that a Construction Permit will be issued by the Department.

3. The applicant must complete an Affidavit For Certification of Proposed Dwelling Capacities Concerning Maximum Tub Sizes.

4. The applicant must obtain and submit a manufacturers' specification sheet for any bathing fixture that exceeds thirty (30) U. S. Gallons.

5. The applicant must complete an Affidavit For Certification of Proposed Dwelling Capacities Concerning Number of Bedrooms.

6. The applicant must complete an Affidavit For Certification of Initial and Reserve Subsurface Sewage Disposal System Installation Areas.

7. The proposed house location, lot corners and platted subsurface sewage disposal system areas shall be field-staked and clearly identified by a Surveyor licensed in the State of Tennessee. Additionally, the platted disposal field areas shall be cordoned-off in accordance with the provisions outlined in *Appendix 10*.

8. A representative of the Department will visit the site to verify that the platted disposal field areas have been properly staked, identified, cordoned-off and have not been disturbed or altered from the original approval conditions.

   IMPORTANT NOTE: Regarding Alternative Systems – Where it has been determined by the Department, or denoted on the recorded plat, that an Alternative Subsurface Sewage Disposal System will be required to serve a property, the application process can not begin until engineered design plans (prepared in accordance with the provisions outlined in Section 19) are approved by the Department.

   NOTE: Any fees charged by private consultants (surveyors, engineers, soil scientists) are separate and apart from the Department fees.

   Upon the successful completion of the aforementioned application process, the Department's verification of the status of the platted subsurface sewage disposal system areas (i.e. finding that the disposal field areas are undisturbed), and the applicant's submittal of any other required information, a permit will be issued by the Department in accordance with the provisions of *Section 7, Subsection A*.

B. Unplatted Parcels of Land

The process for obtaining a Construction Permit for unplatted parcels of land differs from platted parcels of land in that the task of Land Assessment is completed as a part of the platting process. Thus, platted lots have areas of soil designated for the placement of the subsurface sewage disposal system. Unplatted land parcels have not necessarily had this type work completed. Therefore, the task of Land Assessment will have to be completed to verify that the applicant's property will support the installation of a subsurface sewage disposal system, in accordance with the provisions of these regulations.

1. No Land Assessment Work Has Been Performed

The following process outline assumes that there has not been any prior Land Assessment work (i.e. soil mapping or percolation testing, previous Individual Lot Assessment information shall not apply) preformed upon the land parcel, the property is in excess of five (5) acres in size and that the single-family dwelling is being built for the property owner.

Prior to the issuance of a Construction Permit for an unplatted parcel of land (e.g. large acreage tract), the following conditions must be met:

(a) The applicant must obtain and submit a valid *Application for Zoning Certificate*. This Certificate is obtained from the Williamson County Community Development Department.

(b) The applicant has taken possession of the property by deed of record in the Office of the Register of Deeds, Williamson County, Tennessee.

(c) The applicant must pay the appropriate fee for the Construction Permit as a part of the application process. Fees are assessed in accordance with the provisions outlined in *Section 33*.

<u>IMPORTANT NOTE:</u> Payment of the fees is not an assurance nor a guarantee that a Construction Permit will be issued by the Department.

(d) The applicant must complete an Affidavit For Certification of Proposed Dwelling Capacities Concerning Maximum Tub Sizes.

(e) The applicant must obtain and submit a manufacturers' specification sheet for any bathing fixture that exceeds thirty (30) U. S. Gallons.

(f) The applicant must complete an Affidavit For Certification of Proposed Dwelling Capacities Concerning Number of Bedrooms.

(g) The applicant must complete an Affidavit For Certification of Initial and Reserve Subsurface Sewage Disposal System Installation Areas.

(h) The proposed house location must be field-staked and clearly identified. Additionally, the locations of any other proposed structures (e.g. utility lines of any type, water well locations, out buildings, detached garages, barns, swimming pools, driveway locations, any type of excavations, etc.) are to be clearly staked for the purposes of Department's site investigation.

Once the application process is initiated by the permit applicant, the task of Land Assessment is to be completed. See *Subsection C* of this Appendix.

2. Some Type of Land Assessment Work Has Been Performed

Where a land parcel has been subject to either Percolation Testing or Soil Mapping (i.e. previous Individual Lot Assessment information shall not apply), the following procedures are in addition to the steps presented previously in *Part 1, in Subparts (a) through (g)* of this Subsection.

(a) Land Parcels That Have Been Percolation Tested

<u>IMPORTANT NOTE:</u> All percolation test documentation shall be in accordance with the provisions outlined in Section 27 and Appendix 2.

In order for the Department to consider any percolation test documentation, the following tasks shall be completed:

(1) The applicant shall provide to the Department:

(i) The original percolation test data sheet prepared by the consultant that conducted the test.

(ii) A blue-line (or blueprint) copy of the original plat, prepared by a licensed surveyor in accordance with the provisions outlined in *Appendix 2, Subsection K*, showing the actual location of the percolation test site on the property.

(2) Upon the submission of this documentation, the Department shall assess and compute the results of the percolation test data. The Department assessment of said data will determine whether or not the tested site will support the installation of a subsurface sewage disposal system that would accommodate the number of bedrooms and any oversized bathing fixtures requested by the applicant.

(3) The applicant is to ensure that the actual field-staking marking the location of the percolation test is in place prior to the Department's field investigation of the test site. Said percolation test area shall be field-staked and clearly identified by a Surveyor licensed in the State of Tennessee. Additionally, the staked percolation test area(s) shall be cordoned-off in accordance with the provisions outlined in *Appendix 10*.

(4) A representative from the Department will visit the site to determine that the percolation test area has not been disturbed from its natural state. The Department will also determine that the house and any other property improvements, are maintained the proper distance from the percolation site. See the provisions outlined in *Section 13*.

NOTE: Construction permits issued under the method of Percolation Test are not transferable.

(b) Land Parcels That Have Been Soil Mapped

IMPORTANT NOTE: All soil mapping documentation shall be in accordance with the provisions outlined in Section 27 and Appendix 1.

In order for the Department to consider any soil mapping documentation, the following tasks shall be completed:

(1) The applicant shall provide to the Department an original soil map prepared by the consultant that performed the mapping work.

(2) Upon the submission of this documentation, the Department shall verify the results of the information. The Department assessment of said information will determine whether or not the mapped site will support the installation of a subsurface sewage disposal system that would accommodate the number of bedrooms and any oversized bathing fixtures requested by the applicant.

(3) The applicant is to ensure that the actual grid staking used in the preparation of the soil map is in place prior to the Department's field investigation of the test site. Said grid staking shall be re-established on the property and clearly identified by a Surveyor licensed in the State of Tennessee.

(4) A representative from the Department will visit the site to determine that the soil mapped area has not been disturbed from its natural state. The Department will also determine that the house and any other property improvements are maintained the proper distance from the soil area to be designated for subsurface sewage disposal system use. See the provisions outlined in *Section 13*.

(5) Once a location within the mapped area has been designated by the Department as a subsurface sewage disposal system area(s) for the purposes of issuing a Construction Permit, those area(s) shall be cordoned-off in accordance with the provisions outlined in *Appendix 10*.

NOTE: Construction permits issued under the method of Soil Mapping are not transferable.

(c) Permit Issuance

IMPORTANT NOTE: Regarding Alternative Systems – Where it has been determined by the Department that an Alternative Subsurface Sewage Disposal System will be required to serve a property, the application process cannot continue until engineered design plans (prepared in accordance with the provisions outlined in Section 19) are approved by the Department.

NOTE: Any fees charged by private consultants (surveyors, engineers, soil scientists) are separate and apart from the Department fees.

Upon the completion of the application process outlined in Section B, Part 1, subparts (a)-(h) of this Appendix, the Department's verification of the status of percolation test site or soil mapped site to be designated as the subsurface sewage disposal system area(s), and the applicant's submittal of any other required information, a permit will be issued by the Department in accordance with the provisions of *Section 7, Subsection A*.

C. Land Assessment Options

These regulations provide an applicant with three (3) options regarding Land Assessment. The approved methods of land assessment are discussed in *Section 27*.

In the case where the permit applicant is seeking a permit for a parcel of land that has never been subject to an approved land assessment procedure, the Department will conduct, at the applicant's request, an *Individual Lot Assessment*. The conducting of Individual Lot Assessments is a service offered by the Department. The Department does not require that this service be utilized by each and every applicant.

The Department shall require that when the Individual Lot Assessment service is requested, the property owner has completed all of the tasks outlined in *Part 1 of Subsection B*, of this Appendix. Additionally, should the permit applicant not be the actual property owner, said applicant shall have a *Right of Entry* form completed by the property owner and submit the signed original of said form to the Department. Until this task is completed, the Department staff will not go onto the applicant's property.

The areal extent of an Individual Lot Assessment investigation will typically be limited to an area of land, of approximately two (2) to four (4) acres in size, in the immediate vicinity of the indicated house site. The Department shall not be obligated to assess an entire land parcel, and the extent as to how much land area will be assessed (or practically assessed) shall be at the discretion of the Department's staff upon witnessing the conditions (i.e. vegetative, topographic, soils, etc.) of the land parcel.

The scope of this service is limited to assessing a property for the installation of conventional subsurface sewage disposal systems. Should the Individual Lot Assessment investigation reveal the presence of an area of soil capable of supporting the installation of a conventional subsurface sewage disposal system in accordance with the provisions outlined in these regulations, said area shall be delineated and a Construction Permit issued for said property.

In the event that the Department is unable to find an area of the property that will meet the criteria to support a conventional system, a Construction Permit will not be issued. The Department staff will, after having assessed the property, determine which Land Assessment method will be appropriate for further soil investigations on said property. Ultimately, if (via percolation testing or soil mapping) an area of land is verified or determined to be suited for use for a type of subsurface sewage disposal system approved for use by the Department, and being in accordance with the provisions outlined in these regulations, a permit may be issued.

<u>IMPORTANT NOTE:</u> Regarding Alternative Systems – Where it has been determined by the Department that an Alternative Subsurface Sewage Disposal System will be required to serve a property, the application process cannot continue until engineered design plans (prepared in accordance with the provisions outlined in Section 19) are approved by the Department.

<u>NOTE:</u> Any fees charged by private consultants (surveyors, engineers, soil scientists) are separate and apart from the Department fees.

APPENDIX 7

FLOW RATES FOR SUBSURFACE SEWAGE DISPOSAL SYSTEM DESIGN

A. Residential Structures

Projected wastewater flow rates from single-family dwellings are divided into two (2) categories. The first category (*Category One*) outlines the projected wastewater flow rates for those single-family dwellings utilizing only standardized plumbing fixtures and containing no oversized bathing fixtures. The second category (*Category Two*) outlines the projected wastewater flow rates for those single-family dwellings utilizing or containing one or more of any type of oversized bathing fixtures (i.e. any type of bathing fixture, regardless of its moniker, that will physically hold an amount of water exceeding 30 US gallons, either to the level of the fixture's overflow drain or as its maximum capacity).

1. Residential Waste Flow - *Category One*

For subsurface sewage disposal systems serving residential single-family dwellings, containing no oversized bathing fixtures, the projected daily wastewater flow shall be based solely on the number of bedrooms proposed or that can be anticipated for said dwelling. For design purposes, the estimated daily wastewater flow shall be 150 gallons per day (gpd) for each bedroom (BDR) contained within said dwelling.

<u>Example</u>*:*

The projected daily wastewater flow calculation for a four (4) bedroom single-family dwelling containing no oversized bathing fixture(s) is as follows:

Q = BDR x EDWF
Q = (4 bdr) x (150 gpd/bdr)
Q = 600 gpd

Where:

Q =	Projected Daily Wastewater Flow (gpd)
BDR =	Number of Bedrooms in dwelling (bdr)
EDWF =	Estimated Daily Wastewater Flow (i.e. 150 gpd/bdr)

Therefore, the projected daily wastewater flow from this dwelling would be 600 gallons per day.

2. Residential Waste Flow - *Category Two*

For subsurface sewage disposal systems serving residential single-family dwellings utilizing oversized bathing fixtures, the projected daily wastewater flow shall be calculated so as to account for the additional projected wastewater discharge they produce. For design purposes, the projected daily wastewater flow from such dwellings shall be based, not only on the number of proposed (or anticipated) bedrooms at 150 gallons per day per bedroom (gpd/bdr), but also on the additional estimated daily wastewater flow produced by said fixtures. The following formula shall be used to calculate the projected daily wastewater flow from such structures:

Q = [(OSBFC - 30) x (BDR)] + (EDWF x BDR)

Where:

Q =	Projected Daily Wastewater Flow (gpd)
OSBFC =	Oversized Bathing Fixture Capacity (gpd/bdr)
30 =	Standard Bathing Fixture Capacity (gpd/bdr)
BDR =	Number of Bedrooms in dwelling (gpd)
EDWF =	Estimated Daily Wastewater Flow (i.e. 150 gpd/bdr)

<u>Example 1</u>*:*

The projected daily wastewater flow calculation for a subsurface sewage disposal system serving a four (4) bedroom single-family dwelling containing one 80 US gal. oversized bathing fixture is as follows:

Q = [(OSBFC - 30) x (BDR)] + (EDWF x BDR)
Q = [(80 gpd/bdr - 30 gpd/bdr) x 4 bdr] + (4 bdr x 150 gpd/bdr)
Q = [(50 gpd/bdr) x (4 bdr)] + (600 gpd)
Q = 200 gpd + 600 gpd
Q = 800 gpd

Therefore, the projected daily wastewater flow from this dwelling would be 800 gallons per day.

Note: Where a single-family dwelling contains more than one (1) oversized bathing fixture, the projected daily wastewater discharge produced from each such fixture shall be accounted for.

Example 2:

The projected daily wastewater flow calculation for a subsurface sewage disposal system serving a four (4) bedroom single-family dwelling containing one 80 US gal. oversized bathing fixture and one 75 US gal. oversized bathing fixture is as follows:

Q = [{(OSBFC - 30) + (OSBFC - 30)} x (BDR)] + (EDWF x BDR)
Q = [{(80 - 30) + (75 - 30)} x (4)] + (150 x 4)
Q = [{(50) + (45)} x (4)] + (600)
Q = [(95) x (4)] + (600)
Q = 380 + 600
Q = 980 gpd

Therefore, the projected daily wastewater flow from this dwelling would be 980 gallons per day.

B. Structures Other Than Residential

The flow rates set forth in Table A7-1 will be utilized for establishing a *design flow rate* (DFR) for various types of facilities or establishments (i.e. structures or buildings erected to serve a particular purpose), other than residential single-family dwellings, based upon their use.

Table A7-1

Type of Establishment	Design Unit (DUN)	Design Flow Rate (DFR) (US gallons/design unit/day)
Churches	-----	-----
Church	Per Seat	5
Church with Kitchen Facility	Per Seat	8
Church with Child Daycare Facilities	See Note 1	-----
Church Facility with Multiple Buildings	See Note 1	-----
Commercial/Industrial Facilities	-----	-----
Airports, Bus or Rail Depots (without food service facilities)	Per Passenger	5
Barber Shop	Per Chair	100
Beauty Salon	Per Chair	125
Bowling Alley	Per Lane	75
Child Day-care Facility (operated within a dedicated building)	Per Person (children and adults)	20
Child Day-care Facility (operated within an existing dwelling)	Per Bedroom	170
Temporary Construction Offices/Work Camp (without shower facilities)	Per Person	40

Table A7-1, continued

Type of Establishment	Design Unit (DUN)	Design Flow Rate (DFR) (US gallons/design unit/day)
Factory or Plant (without shower facilities)	Per Employee	20
Temporary Construction Offices/Work Camp (with shower facilities)	Per Person	80
Convenience Store or Market	See Note 2	-----
Equestrian Related Business (i.e. horse barn, stables, etc.)	See Note 3	-----
Factory or Plant (with shower facilities)	Per Employee	40
Grocery Store (without any food service facilities)	Per Toilet Room (i.e. male and female)	200
Interstate or Highway Rest Areas or Visitor Centers	See Note 2	-----
Laundry, Self Service	Per Machine	500
Marina (without bathing facilities)	Per Boat Slip	25
Marina (with bathing facilities)	Per Boat Slip	50
Office Buildings (having either single or multiple offices)	Per Total Number of Employees	20
Individual Retail Store (i.e. other than Shopping Center or Mall)	Per Toilet Room (i.e. male and female)	400
Vehicle Service Station (without any food service or public toilet facilities)	Per Employee	20
Shopping Center or Mall	Per 1000 Sq. Ft. of Building Space	150
Stadium, Auditorium, Theater (any type)	Per Seat	5
Dwelling Units	-----	-----
Apartment (Apt.) Buildings	-----	-----
For Each – One Bedroom Apt.	Per Apt. Unit	250
For Each – Two Bedroom Apt.	Per Apt. Unit	300
For Each – Three Bedroom Apt.	Per Apt. Unit	350
Bed & Breakfast Establishment	Per Bedroom in Dwelling Rented	175
Boarding or Rooming House (no meals served)	Per Bedroom in Dwelling Rented	175
Boarding or Rooming House (meals served)	Per Bedroom in Dwelling Rented	200
Hotels or Motels (with private bathrooms; no over sized bathing fixtures)	Per Room	150

Table A7-1, continued

Type of Establishment	Design Unit (DUN)	Design Flow Rate (DFR) (US gallons/design unit/day)
Food Service and/or Drinking Establishments	-----	-----
Ordinary Restaurant (not subject to 24 hr. operations)	Per Seat	40
Restaurant Operating 24 Hrs./Day (not subject to US Hwy. or Interstate access)	Per Seat	80
Restaurant Operating 24 Hrs./Day (subject to US Hwy. or Interstate access)	Per Seat	150
Drive-in or Take-out Restaurant	Per Hour Open for Business	70
Tavern, Bar, Lounge, Etc. (having no food service)	Per Seat	40
Tavern, Bar, Lounge, Etc. (having restricted food service)	Per Seat	60
Catering Business – Banquet Facilities	Per Person	30
Institutions	-----	-----
Assembly Halls, Public Buildings	Per Seat	5
Home for the Aged	Per Bed	125
Medical Hospital	Per Bed	300
Mental Hospital	Per Bed	180
Nursing Home	Per Bed	180
Prison or Jail	Per Bed	125
Schools – Any Type	See Note 4	-----
Recreational Establishments	-----	-----
Camps – Daytime Use Only (having permanent toilet facilities – serving no meals)	Per Person	15
Camps – Daytime Use Only (having permanent toilet facilities and serving meals)	Per Person	25
Fairgrounds or Mass Gathering Facility (based upon peak daily attendance figure)	Per Person	3
Golf Course Clubhouse (based upon peak daily attendance figure)	Per Person	10
Park – Public Restroom Facility	Per Parking Space	5
Swimming Pool with Bathhouse (based upon peak seasonal attendance figure)	Per Person	10
Travel Trailer Park (i.e. having water, and sewer hook-ups or disposal site)	Per Trailer Space	100
Travel Trailer Park (i.e. with no water, and sewer hook-ups or disposal site)	Per Trailer Space	75
Miscellaneous	-----	-----
Veterinary Hospital (any type)	See Note 2	-----

As discussed in *Section 4*, the Department cannot possibly address or define each and every possible scenario where the use of a subsurface sewage disposal system may be required. Thus, Table A7-1 cannot list each and every type of structure, and its associated use, so as to establish a design flow rate for such. Therefore, the Department reserves the right to amend, adjust, modify or alter the design flow rates presented in this Appendix so as to establish an appropriate, case/site specific, design flow rate where deemed necessary.

Where a type of establishment is proposed to be constructed, that is not listed in Table A7-1 of this Appendix, the Department shall have the authority to require the submittal of any additional or supplementary information or documentation (i.e. this information is in addition to what would already be required, as shown in Table A7-1, such as seating capacities, patron capacities, etc.) from the developer (i.e. person, persons, companies, consultants representing the developer, etc.) proposing to use a parcel of land for any of the aforementioned classifications (i.e. commercial, industrial, etc.) of establishments. Such information or documentation shall be utilized by the Department to establish a design flow rate for a proposed structure. The types of information or documentation that the Department shall require includes, but is not limited to:

- Water use documentation from existing, similar types of establishments from other locations.
- Any documented subsurface sewage disposal system information from existing, similar types of establishments from other locations.
- The hours of business operations.
- The number of employees that will occupy the proposed establishment.

Where the Department utilizes documented water use records in establishing an appropriate design flow rate for any facility, the Department will assess the records for the peak water use/output and establish an appropriate design flow rate.

<u>IMPORTANT NOTE:</u> Under no circumstances shall the <u>mean</u> or <u>average</u> of such water use data be utilized as the design flow rate or in the calculation of a projected daily wastewater flow (Q) for any proposed structure.

Additionally, an established design flow rate shall never be less than seventy-five (75) percent of a documented (i.e. shown in the submitted water use data) peak flow rate or water use unit.

<u>NOTE 1</u>

Church facilities containing multiple buildings and/or providing child day-care services require detailed and thorough planning by the Department when establishing the subsurface sewage disposal system requirements for such facilities. Additional information regarding the nature of operation of a child day-care (i.e. number of children, days of operation, hours of operation, preparation and serving of meals, etc.) is necessary for the Department to determine the appropriate design flow rate for the proposed church facility. The day-care information is assessed and subsequently combined with the design flow rating for the church so as to provide an accurate total design flow rate for the facility.

Multiple buildings planned for church facilities shall have individual subsurface sewage disposal systems serving each building in accordance with the provisions outlined in *Section 4.* Said subsurface sewage disposal systems shall be planned and specified in accordance with the provisions of these regulations.

<u>NOTE 2</u>

Establishing design flow rates for these facilities (or other like establishments) shall require the submittal to and the review of water use records from like establishments by the Department. The Department shall require that the water use records, from said like establishment, covering an eighteen (18) month period be submitted for review.

<u>NOTE 3</u>

Equestrian related business facilities containing either single or multiple buildings require detailed and thorough planning by the Department when establishing the subsurface sewage disposal system requirements for such facilities. Additional information regarding the nature of operation of these types of businesses (i.e. number of employees, number of horse stables, days of operation, hours of operation, presence of public restroom facilities, presence of interior horse washing facilities, etc.) is necessary for the Department to determine the appropriate design flow rate for such establishments. Subsequent subsurface sewage disposal system requirements shall be set forth in accordance with the provisions of *Section 4.*

<u>NOTE 4</u>

The use of subsurface sewage disposal systems as the primary means of sewage disposal for either private or public school facilities (i.e. boarding schools, church schools, elementary schools, middle schools, high schools, colleges, universities, etc.) shall not be approved by the Department.

APPENDIX 8

DISPOSAL FIELD AREA REQUIREMENTS

The information set forth in this Appendix, shall be utilized in the planning and design of all subsurface sewage disposal system areas for all parcels of land subject to being platted (i.e. as in the creation of a subdivision). Table A8-1 is for use in establishing the number and size of the disposal field areas that will be required on a platted parcel of land so as to support a single-family dwelling containing the number of bedrooms shown. Table A8-1 shall not be utilized for the design of any other types of subsurface sewage disposal system disposal field areas (i.e. platted commercial, institutional or industrial use land parcels, etc.).

Table A8-1

Number & Minimum Size (ft^2) of Disposal Field Areas						
Soil MPI Rates	**System Type**	**Slopes**	**1-2 Bedrooms**	**3 Bedrooms**	**4 Bedrooms**	**5 Bedrooms**
30 – 45 MPI Soils	Conventional	0-5%	2 @ 3,000	2 @ 4,000	2 @ 5,000	2 @ 6,000
		5-15%	2 @ 3,500	2 @ 5,250	2 @ 6,500	2 @ 8,000
		15-25%	2 @ 4,000	2 @ 6,000	2 @ 8,000	2 @ 10,000
	Alternative	0-5%	2 @ 3,000	2 @ 3,000	2 @ 4,000	2 @ 5,000
		5-15%	2 @ 3,500	2 @ 3,750	2 @ 4,500	2 @ 5,500
		15-25%	2 @ 4,000	2 @ 5,000	2 @ 6,000	2 @ 8,000
60 MPI Soils	Conventional	0-5%	3 @ 3,500	3 @ 4,500	3 @ 5,500	3 @ 6,500
		5-15%	3 @ 4,250	3 @ 5,500	3 @ 6,800	3 @ 8,250
		15-25%	3 @ 5,000	3 @ 6,500	3 @ 8,250	3 @ 9,750
	Alternative	0-5%	2 @ 3,250	2 @ 3,800	2 @ 4,500	2 @ 5,500
		5-15%	2 @ 3,750	2 @ 4,000	2 @ 5,000	2 @ 6,000
		15-25%	2 @ 4,750	2 @ 5,000	2 @ 7,000	2 @ 9,000
75MPI Soils	Alternative Systems ONLY*	0-5%	2 @ 3,500	2 @ 5,000	2 @ 5,500	2 @ 7,500
		5-15%	2 @ 4,000	2 @ 6,000	2 @ 6,500	2 @ 8,000
		15-25%	2 @ 5,000	2 @ 6,500	2 @ 7,500	2 @ 8,500

Note: *The use of conventional subsurface sewage disposal systems on 75MPI soils on platted parcels shall not be allowed. Where such soils are indicated upon a soil map, their use shall be restricted to alternative system use only.*

<u>IMPORTANT NOTE</u>: The disposal field area sizes noted in Table A8-1 do not allocate any additional land/soil area to accommodate the use of oversized bathing fixtures.

APPENDIX 9

DESIGNATED SOIL MPI RATES AND CORRESPONDING CONVENTIONAL DISPOSAL FIELD LINEAR FOOTAGE AND DISPOSAL FIELD AREA REQUIREMENTS

Table A9-1

Absorption/Percolation Rates (Minutes Per Inch)	Absorption Factor (AF) (Square Feet Per Gallon)	Required Amount of Trench Bottom Area (TBA) (Square Feet Per Bedroom)
30	1.8	270
45	2.1	315
60	2.4	360
75	2.7	405
80	3.0	450
85	3.3	495
90	3.6	540
95	3.9	585
100	4.2	630
105	4.5	675

NOTE: The absorption rates established in percolation test data shall always be rounded up to the next highest increment of five (5).

IMPORTANT NOTE: In any case where soil absorption data is obtained, and established, via the conducting of percolation tests, the minimum required amount of trench bottom area shall be 405 square feet.

A. Calculation Formulas

This Subsection outlines the formulas to be utilized in the calculation of the variables necessary to determine the disposal field trench linear footage requirements and total disposal field area requirements for conventional subsurface sewage disposal systems only.

IMPORTANT NOTE: The Department reserves the right to amend, adjust, modify or alter the design flow rates presented in this Appendix so as to establish an appropriate, case/site specific, projected daily wastewater flow figure where deemed necessary.

1. Required Linear Footage

(a) Single-family Dwellings

(1) No Over Sized Bathing Fixtures in Dwelling

There are two methods that may be used to calculate the required linear footage for a conventional subsurface sewage disposal system.

(i) For this method, the two main variables to be ascertained are the number of bedrooms (BDR) and square feet of trench bottom area (TBA). Information regarding the number of bedrooms is provided on the Construction Permit application information and the TBA is provided in Table A9-1 of this Appendix. The width conventional field line trench to be used is three (3) feet. Once the variables are determined, the following equation is used:

Required Linear Footage = ((BDR) x (TBA)) ÷ (width of conventional field line trench)

(ii) For this method, the two main variables to be ascertained is the projected daily wastewater flow (Q) and absorption factor (AF). Information regarding Q is calculated as shown in *Appendix 7, Subsection A, Part 1* (Residential Waste Flow - *Category One*) and the AF is provided in Table A9-1 of this Appendix. The width conventional field line trench to be used is three (3) feet. Once the variables are determined, the following equation is used:

Required Linear Footage = ((Q) x (AF)) ÷ (width of conventional field line trench)

(2) Over Sized Bathing Fixtures in Dwelling

(i) One Over Sized Bathing Fixture

For this method, the two main variables to be ascertained is the projected daily wastewater flow (Q) and absorption factor (AF). Information regarding Q is calculated as shown in *Appendix 7, Subsection A, Part 2, Example 1* (Residential Waste Flow - *Category Two*) and the AF is provided in Table A9-1 of this Appendix. The width conventional field line trench to be used is three (3) feet. Once the variables are determined, the following equation is used:

Required Linear Footage = ((Q) x (AF)) ÷ (width of conventional field line trench)

(ii) More Than One Over Sized Bathing Fixture

For this method, the two main variables to be ascertained is the projected daily wastewater flow (Q) and absorption factor (AF). Information regarding Q is calculated as shown in *Appendix 7, Subsection A, Part 2, Example 2* (Residential Waste Flow - *Category Two*) and the AF is provided in Table A9-1 of this Appendix. The width conventional field line trench to be used is three (3) feet. Once the variables are determined, the following equation is used:

Required Linear Footage = ((Q) x (AF)) ÷ (width of conventional field line trench)

(b) Structures Other Than Single-family Dwellings

The following equation is used to calculate the linear footage requirements for structures other than single-family dwellings. There are three important variables to be ascertained for this equation; they are the design flow rate (DFR), the design unit (DU) and the absorption factor (AF). The DU information will typically be obtained from the Construction Permit application information or applicant. The DFR is provided in Table A7-1 in *Appendix 7, Subsection B*. The AF is provided in Table A9-1 of this Appendix.

Required Linear Footage = ((DFR x DU) x (AF) ÷ (width of conventional field line trench)

2. Total Disposal Field Area Requirement

Once the disposal field linear footage requirement is determined, the amount of physical land area necessary to install the system and its required duplicate or secondary area must be determined. Since this calculation determines the *total disposal field area requirement*, the sum of this equation is divided by two to provide the square footage of land space necessary to install one disposal field.

The following equation is used to calculate the total disposal field area requirements (i.e. the primary installation area and the duplicate or secondary area):

Total Disposal Field Area Requirement = ((Required Linear Footage) x (installation factor*)) x 2

*The *installation factor* is defined as the amount of land surface area, in terms of square footage, associated with the installation of each linear foot of the disposal field trench. For each slope classification (i.e. 0-5% slopes, 5-15% slopes, 15-25% slopes), a minimum number of square feet is necessary to install said disposal field trench. The following numbers are to be utilized, however the Department shall have the authority to increase the amount of the installation factor for sites where the designated disposal field area is determined by the Department, to have such unusual land surface configuration characteristics (i.e. a highly variable topography), that a greater amount of land surface area would be necessary to install a prescribed amount of conventional disposal field trenches. The installation factors for the slope classifications are:

Table A9-2

0-5% slopes	10
5-15% slopes	13
15-25% slopes	16

B. Examples

The following examples illustrate the use of the figures in Table A9-2 for the calculation of the required amount of linear footage of disposal field trench in a conventional system only.

Example 1, Part A:

The soil absorption rate has been established at 80MPI from an approved set of percolation test data. A four (4) bedroom house, utilizing no oversized bathing fixtures, is proposed to be constructed on the property. Using the information from Table A9-1, at an 80MPI rate, the table shows that 450 square feet of trench bottom area per bedroom is required.

The following equation is used:

Required Linear Footage = ((number of bedrooms) x (square feet of trench bottom area)) ÷ (width of conventional field line trench)

Thus: Required Linear Footage = (4 x 450) ÷ 3
= 1800 ÷ 3
= 600

Once the required amount of disposal field linear footage is determined, the amount of physical land area necessary to install the system and its required duplicate or secondary area must be determined.

The following equation is used to calculate the total disposal field area requirements (i.e. the primary installation area and the duplicate or secondary area):

Total Disposal Field Area Requirement = ((Required Linear Footage) x (installation factor)) x 2

For this example (i.e. Example 1, Part A), the disposal field area site has a slope of 11%.

Thus: Total Disposal Field Area Requirement = (600 x 13) x 2
= 7800 x 2
=15600
or 16000 Sq. Ft.

Example 1, Part B:

Should an oversized bathing fixture be proposed for the dwelling in this example, the method of calculation differs. The first step in such cases is to determine the value of Q (or the projected daily wastewater flow rate) for the four (4) bedroom house containing, for this example, a 65 gallon over sized bathing fixture. Then the next calculation will use the established variable of Q for the house with the over sized bathing fixture to allow for the determination of the Required Linear Footage for said house.

The following equation is used to calculate Q (i.e. the equation from *Appendix 7, Subsection A, Part 2, Example 1*) :

Thus: Q = [(OSBFC - 30) x (BDR)] + (EDWF x BDR)
Q = [(65 - 30) x 4] + (150 x 4)
Q = [(35) x (4)] + (600)
Q = 140 + 600
Q = 740 gpd

To complete the calculation for the disposal field linear footage requirements for the four (4) bedroom house containing the over sized bathing fixture, use the following equation:

Required Linear Footage = (Q x AF) ÷ (width of conventional field line trench)

Thus: Required Linear Footage = (740 x 3.0) ÷ 3
= 2220 ÷ 3
= 740

The four (4) bedroom dwelling with the 65 gallon oversized bathing fixture having 80MPI soils requires the installation of 740 linear feet of disposal field trench line.

The Total Disposal Field Area Requirement would then be calculated as shown in *Part A* of this Example.

Example 2:

The soil absorption rate has been established at 60MPI from an approved soil map prepared on a parcel of land. A small commercial office building, utilizing no oversized bathing fixtures, is proposed to be constructed on the property. From information obtained from the developer, the business operation in the office building will have a maximum of 20 employees, with standard daily business hours (i.e. 9:00 a.m. to 5:30 p.m.).

From Table A7-1 in *Appendix 7*, two variables are established. Under the heading of *Type of Establishment*, find the appropriate or closest match to the propose type of establishment – thus, Office Buildings. The corresponding design unit number (DUN) and the design flow rate (DFR) are identified. The number of employees in the business becomes the DUN and the DFR is the rate to use to complete this calculation.

Thus, the variables are determined to be 20 gallons/person/day for the DFR and 20 employees for the DUN. From Table A9-1 in this appendix, at a 60MPI rate, the Absorption Factor (AF) is 2.4 (i.e. 2.4 square feet of trench bottom area is required to absorb one gallon of water per day). The width of conventional field line trench is 3 feet.

The following equation is used:

Required Linear Footage = ([DFR x DUN] x (AF)) ÷ (width of conventional field line trench)

Thus: Required Linear Footage = ([20 x 20] x (2.4)) ÷ 3
= (400 x 2.4) ÷ 3
= 960 ÷ 3
= 320

The Total Disposal Field Area Requirement would then be calculated as shown in *Part A of Example 1* in this Subsection.

IMPORTANT NOTE: The methods and calculations presented shall be utilized for conventional subsurface sewage disposal systems only. Where the Department has determined, through the use of said calculations, that there is insufficient soil area to allow for the use of a conventional system, the use of alternative systems shall be required.

APPENDIX 10

IDENTIFICATION AND PROTECTION REQUIREMENTS FOR DISPOSAL FIELD AREAS

Prior to the issuance of a Construction Permit for any parcel of land, platted or designated disposal field areas shall be identified and protected. These requirements shall be implemented to ensure that said areas are not disturbed (i.e. cut, filled, compacted, etc.) prior to and subsequent to the installation of the required subsurface sewage disposal system. Said protective fencing shall remain in place for the duration of all construction activities on the parcel of land.

A. Disposal Field Area Identification

1. Platted Disposal Field Areas

   (a) All platted disposal field areas shall be field-staked by a Registered Land Surveyor in accordance with the recorded plat information. The staking of disposal field areas by any other individuals shall not be acceptable.

   (b) The stakes set by the surveyor shall be set at each corner of the platted disposal field area. Where any disposal field area has curving or oddly configured perimeters, the surveyor shall place stakes at ten (10) to fifteen (15) foot intervals to clearly define said configurations.

   (c) Upon the field stakes, the surveyor shall write the assigned identification of the platted disposal field area. Where two (2) disposal field areas abut one another, the stakes along the common perimeter line are to be turned so as to allow the identification of the area on the side of the stake facing said area.

2. Unplatted Disposal Field Areas

   (a) Percolation Test Areas

      (1) All percolation test areas shall have been field located and plotted upon a plat so as to be in accordance with the provisions outlined in *Appendix 2, Subsection K*.

      (2) All plotted percolation test areas shall be field-staked by a Registered Land Surveyor in accordance with the plat information prepared for a specific percolation tested site. The staking of percolation test areas by any other individuals shall not be acceptable.

      (3) The stakes set by the surveyor shall be set at each corner of a plotted percolation test area(s). Where any percolation test area(s) has curving or oddly configured perimeters, the surveyor shall place stakes at ten (10) to fifteen (15) foot intervals to clearly define said configurations.

      (4) Upon the field stakes, the surveyor shall write the words *percolation test site* or *PT site* to identify the purpose of said stakes. Where two (2) or more percolation test sites exist upon a land parcel, the surveyor shall also identify, in writing upon the field stakes, the number that would correspond to the information on the percolation test data sheet. For example, one site may be identified as *PT site #1* and another site on the same property would be *PT site #2*.

      <u>NOTE:</u> The Department shall require that percolation test areas on unplatted parcels of land be field located and plotted on a plat by a Registered Land Surveyor. Such areas will be viewed as being equivalent to a platted disposal field area, and thus will be treated in the same manner.

   (b) Other Designated Disposal Field Areas

      Where disposal field areas are not platted, they are designated by the Department. Such disposal field areas are established as a result of the completion, in accordance with the provisions of these regulations, of an Approved Land Assessment procedure. Designated subsurface sewage disposal system areas shall be viewed and treated in the same manner as are platted disposal field areas.

      Designated subsurface sewage disposal system areas will be field identified by the Department. Once the perimeters of such disposal field areas are field identified by the Department, they shall be subject to the same procedures for protection as outlined in *Subsection B* of this Appendix.

B. Disposal Field Area Protection

When the platted or designated disposal field areas have been identified in accordance with the provisions outlined in the previous Subsection, said areas shall be cordoned-off, or *quarantined*, to prevent encroachment of any unauthorized vehicles or construction equipment.

The Department shall require that a fencing arrangement be utilized to cordon-off the disposal field area. Standard six (6) foot steel fence posts shall be utilized for the vertical supports in the fencing arrangement. Said posts shall be set a minimum of five (5) feet above the ground surface. The posts shall be spaced so as to completely encircle all subsurface sewage disposal system areas.

The actual fence is to be constructed of a highly visible and sturdy material strung between and connected to all steel fence posts. Bright orange plastic mesh construction fencing, black geotextile silt fencing material or other standard fencing material shall be utilized. Brightly colored wide plastic tape (e.g. *caution tape*), string, wire, rope or other similar materials shall not be considered as acceptable.

C. Department Verification of Identification and Protection

The Department shall verify that the provisions of this Appendix have been met prior to the issuance of a Construction Permit for any parcel of land (i.e. platted or unplatted).

APPENDIX 11

CONTROLLED DISTRIBUTION DEVICES

This Appendix specifies the two types of controlled distribution devices approved for use in Williamson County. They are the Pressure Distribution Manifold (PDM) and the Distribution Box (D-Box).

A. Distribution Box

Refer to Figures A11-1 and A11-2 for a conceptual view of a typical concrete distribution box.

1. Department Approval

   (a) All manufactured concrete distribution boxes shall meet the requirements outlined in *Part 2* of this Subsection and shall be approved for use by the Department prior to its installation.

   (b) In lieu of a concrete distribution box, a pre-manufactured type (e.g. plastic, fiberglass, etc.) of distribution box may be considered for use by the Department. However, all product specifications and documentation regarding the distribution box shall be submitted to the Department for review and approval.

   In addition to meeting all of the installation and setup criteria outlined in *Part 3* of this Subsection, all pre-manufactured type of distribution boxes shall conform to the manufactures installation recommendations.

2. Construction

   (a) All distribution boxes (including the lid) shall be constructed of concrete. The type of concrete utilized shall meet the same specifications as the concrete used in the manufacture of septic tanks.

   (b) The type of distribution box used in a conventional subsurface sewage disposal system installation, when its use is specified by the Department, may be either a manufactured (i.e. pre-cast) or built on-site (i.e. cast-in-place).

   (c) For pre-cast (i.e. manufactured) distribution boxes, the bottom, ends, sides, lid and baffle (where applicable) of a distribution box shall have a minimum thickness of two and one-half (2½) inches. Only where knockouts are constructed shall the thickness be less than the required two and one-half (2½) inches.

   (d) The distribution box, during manufacture, shall be properly vibrated and rodded prior to curing so as to ensure the prevention of any type of honeycomb effect in the concrete.

   (e) For cast-in-place (i.e. built on-site) distribution boxes, the bottom, ends, sides, lid and baffle (where applicable) of a distribution box shall have a minimum thickness of four (4) inches.

   (f) Cast-in-place distribution boxes shall always utilize pre-manufactured plastic pipe sealing device (i.e. such as those used in septic tank manufacture) or four (4) inch Schedule 40 PVC pipe couplings (i.e. said couplings shall be in accordance with the specifications outlined in *Appendix 12*).

   (g) The inlet invert of the distribution box shall be a minimum of one (1) inch, preferably three (3) inches, above the liquid level of the box (i.e. the liquid level of a distribution box being the level of the inverts of all the outlet ports in said box, where said box is set upon a level plane).

   (h) There shall be sufficient distance of separation between the inlet wall of the distribution box and the outlet ports so as to allow for the placement of a PVC *turn-down pipe*, inside a box having no internal baffle. See Figure A11-3.

   (i) There shall be a minimum separation distance of six (6) inches between the bottom of the distribution box and the inverts of the outlet ports.

   (j) The inverts of the outlet ports shall all have the same amount of separation from the bottom of the distribution box.

   (k) The inlet and outlet ports shall be constructed so as to allow the insertion of four (4) inch Schedule 40 PVC pipe.

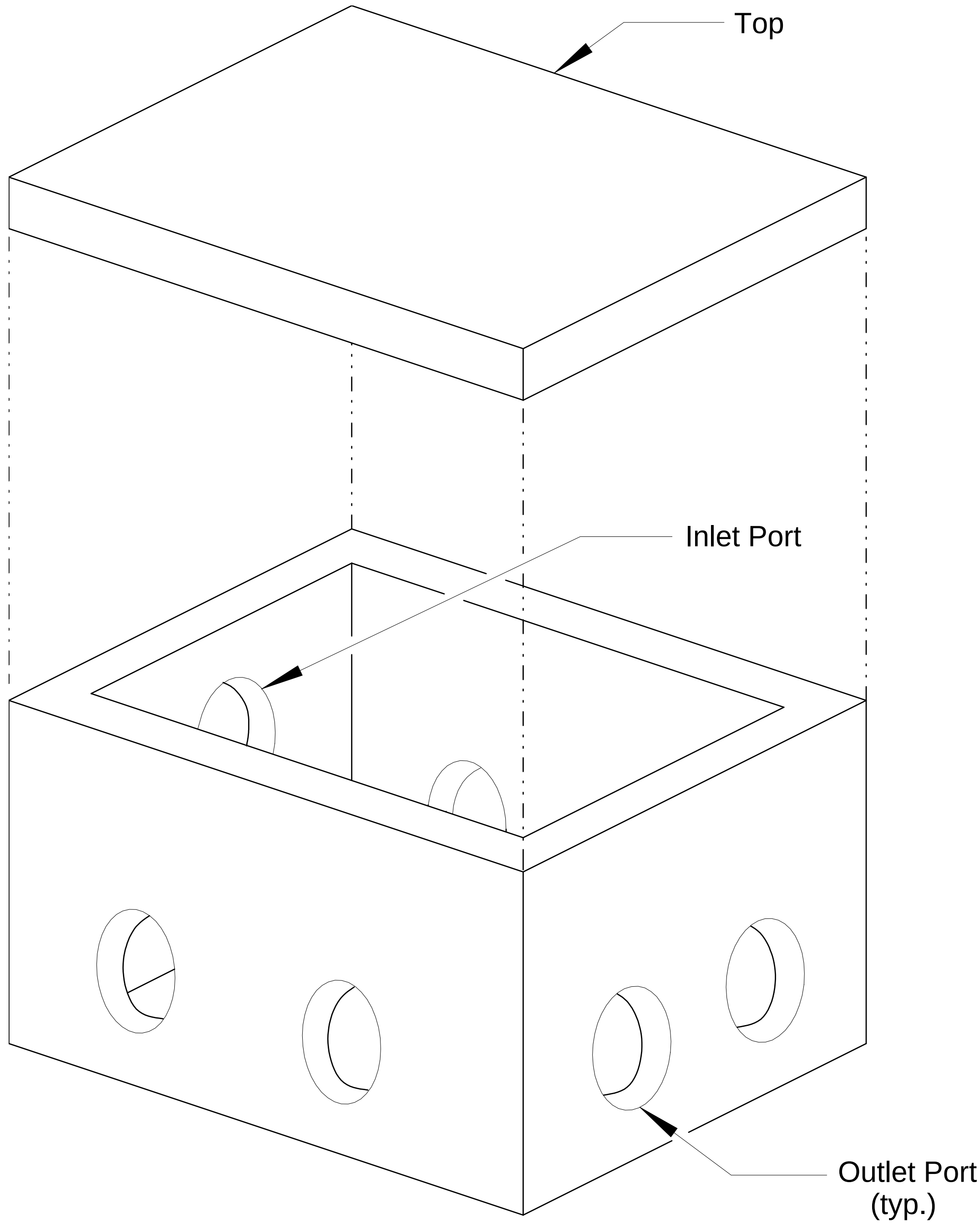


Figure A11-1. Diagram of a generalized Distribution Box.

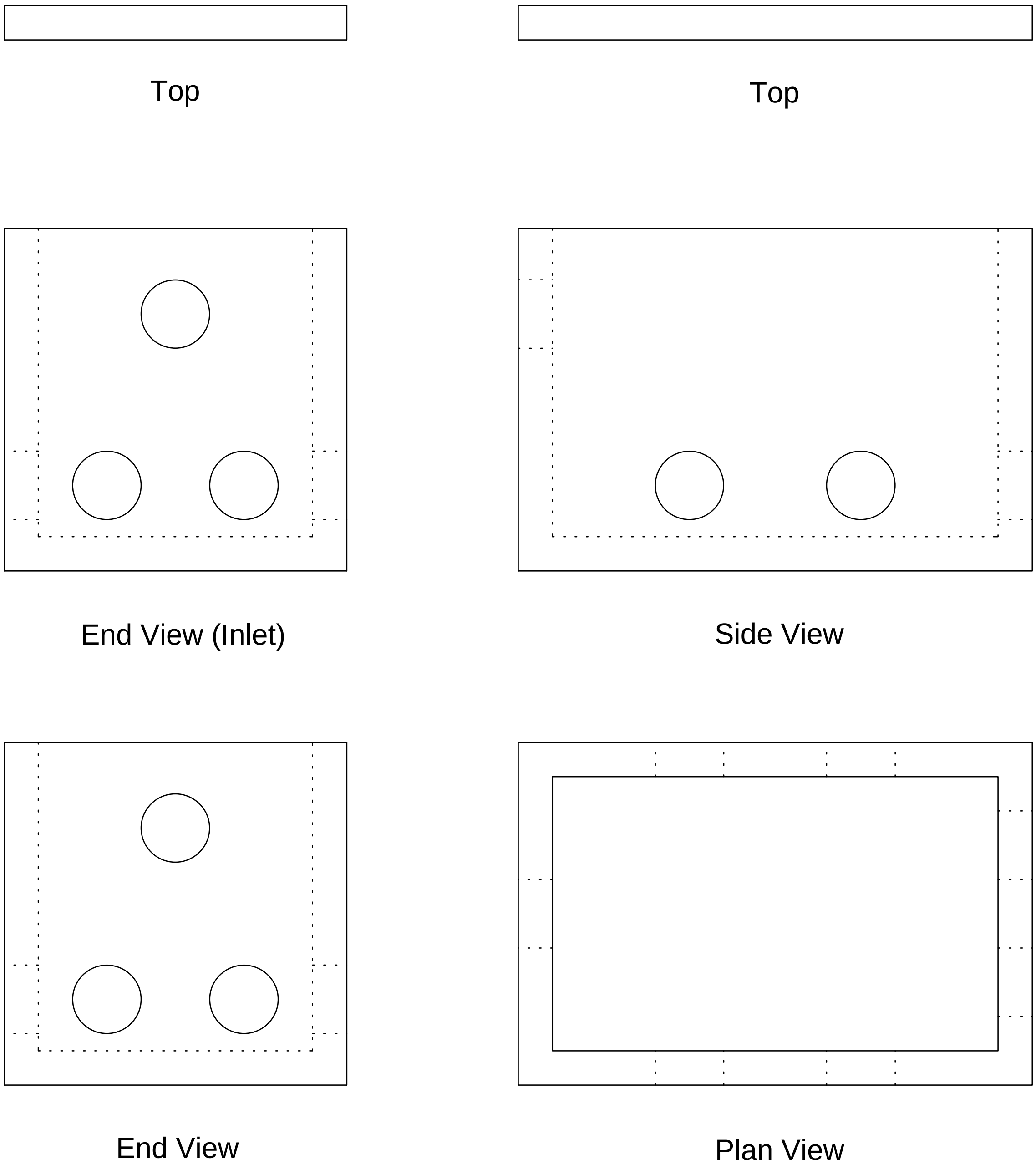


Figure A11-2. Generalized Distribution Box Design.

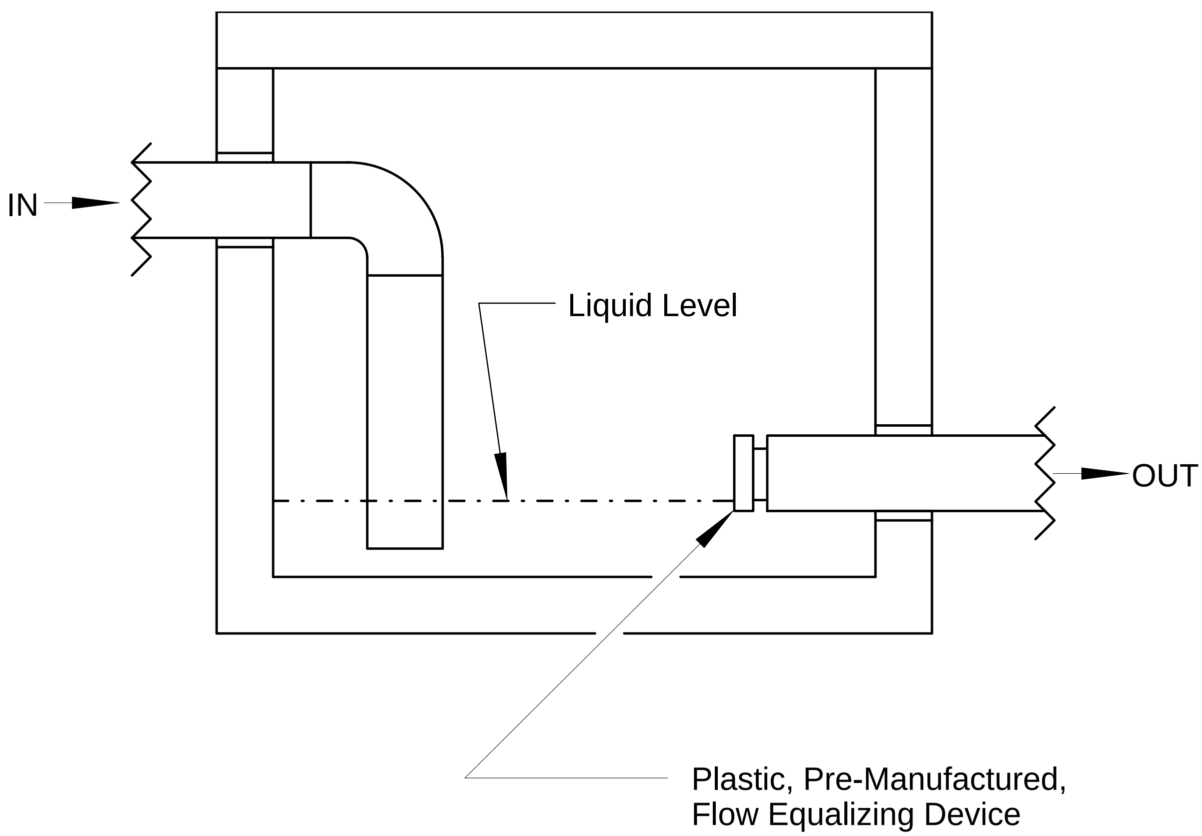


Figure A11-3. Setup of piping and related components inside the Distribution Box.

(l) The construction of the inlet and outlet ports may utilize *knockouts* (i.e. as described in *Section 10*), a pre-manufactured plastic pipe sealing device (i.e. such as those used in septic tank manufacture) or four (4) inch Schedule 40 PVC pipe couplings (i.e. said couplings shall be in accordance with the specifications outlined in *Appendix 12*).

(m) The distribution box lid shall have a handle constructed of either steel reinforcing rod (i.e. rebar) or other non-corrosive material. The handle shall be configured so as to allow for an individual to fully grip said handle.

3. Installation and Setup

<u>IMPORTANT NOTE:</u> *All piping to and from the distribution box shall be Schedule 40 PVC pipe in accordance with the provisions outlined in Appendix 12*.

(a) The positioning of the distribution box, in relation to the conventional disposal field area, shall be such so as to allow for the piping network extending from said box to effectively dose each disposal field trench. See Figure A11-4 for an example conventional system layout utilizing a distribution box.

(b) Where a conventional subsurface sewage disposal system is required to utilize a distribution box, all disposal field trenches shall be of equal length so as to reduce the potential for hydraulic overloading.

(c) The piping leading out of the distribution box shall be four (4) inch pipe. At a point, being no less than thirty-six (36) inches from the distribution box and with the use of the appropriate manufactured fitting (e.g. reducer, bushing, boot, etc.), the pipe size may be reduced so as to allow the use of three (3) inch pipe as the conduit to route the effluent to each individual disposal field trench.

(d) The connection of the individual supply line pipes (i.e. the pipes from the distribution box) to the corrugated plastic pipe in the disposal field trench shall be made only with an appropriate manufactured fitting. In lieu of the use of fittings, the pipe connections may be made as shown in Figure A11-5.

(e) The distribution box shall be set upon firm, undisturbed earth in the excavation prepared for said box.

(f) The distribution box shall be level. If the excavation prepared for the placement of the box is not level, loose soil material shall not be replaced into said excavation to create a level pad on which the box will set. To create a level pad on which the box will sit, either:

(1) more soil material shall be removed from the bottom of the excavation,

(2) a thin layer (i.e. not to exceed four inches in depth) of thoroughly compacted crusher-run type gravel (i.e. gravel containing fines so as to allow for complete compaction) shall be placed on the bottom of the excavation, or

(3) a concrete pad, of not less than three (3) inches in thickness, shall be poured in the bottom of the excavation.

(g) All piping leading from the distribution box to the disposal field trenches shall be bedded upon firm earth.

(h) All pipe connections made to the distribution box shall be grouted with concrete, except where PVC couplings have been used in the distribution box construction. Connections to said couplings, with the individual supply line pipes, shall be in accordance with the provisions outlined in *Appendix 12*.

(i) As many PVC pipe fittings as a site requires shall be utilized to properly construct and route the individual supply line pipes from the distribution box to each of the disposal field trenches. Excessive flexing of piping (i.e. the bending of the PVC piping in an attempt to avoid the use of fittings) shall not be approved.

(j) The lid of the distribution box shall be secured and sealed so as to be water-tight where it adjoins to said box. A sealant specifically manufactured for use with concrete shall be utilized for this purpose.

B. Pressure Distribution Manifold

1. As discussed in *Section 15*, the pressure distribution manifold is constructed and setup in the same manner as the manifold of an LPP system. See Figure A11-6.

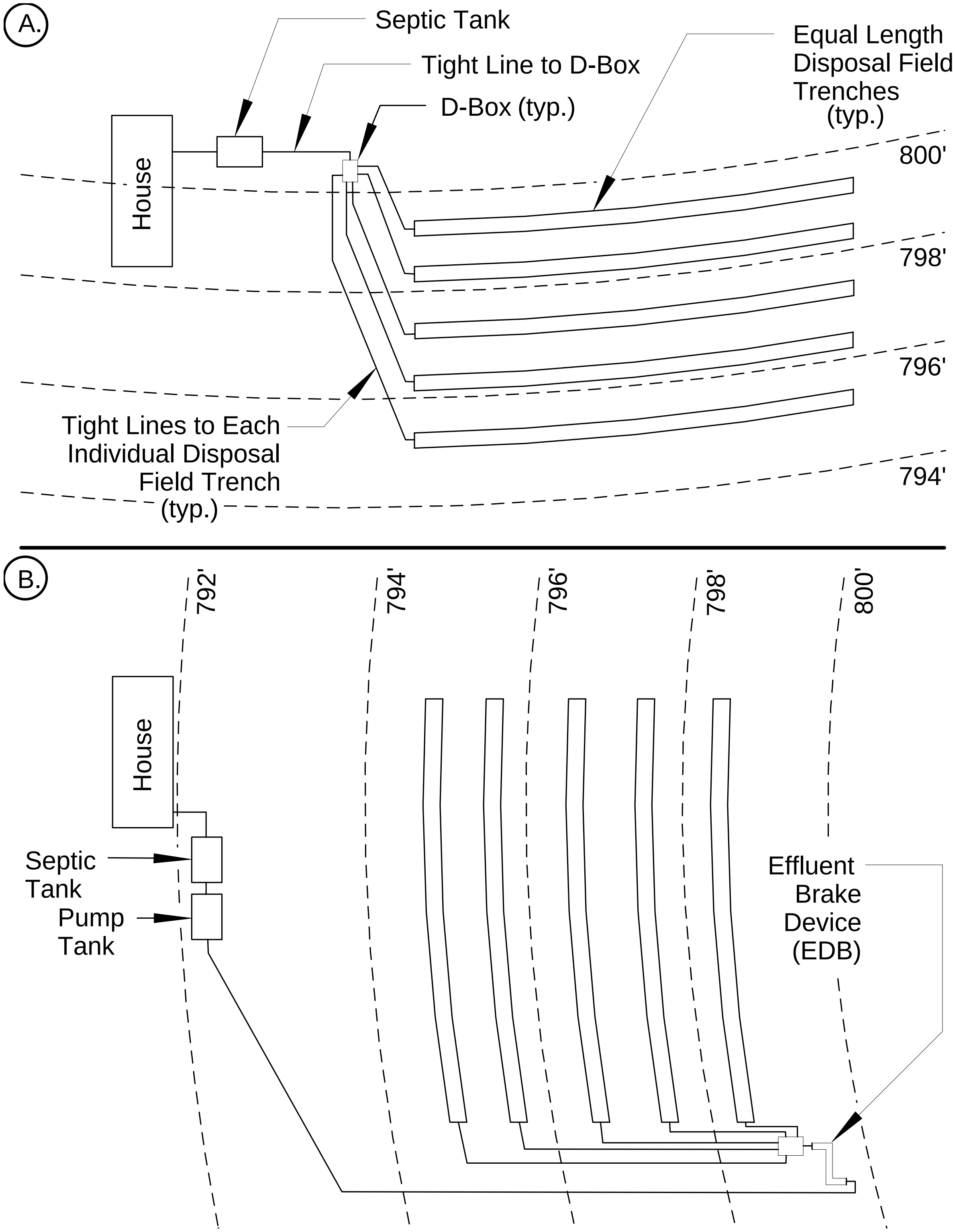


Figure A11-4. Examples of conventional system setups utilizing Distribution Boxes.

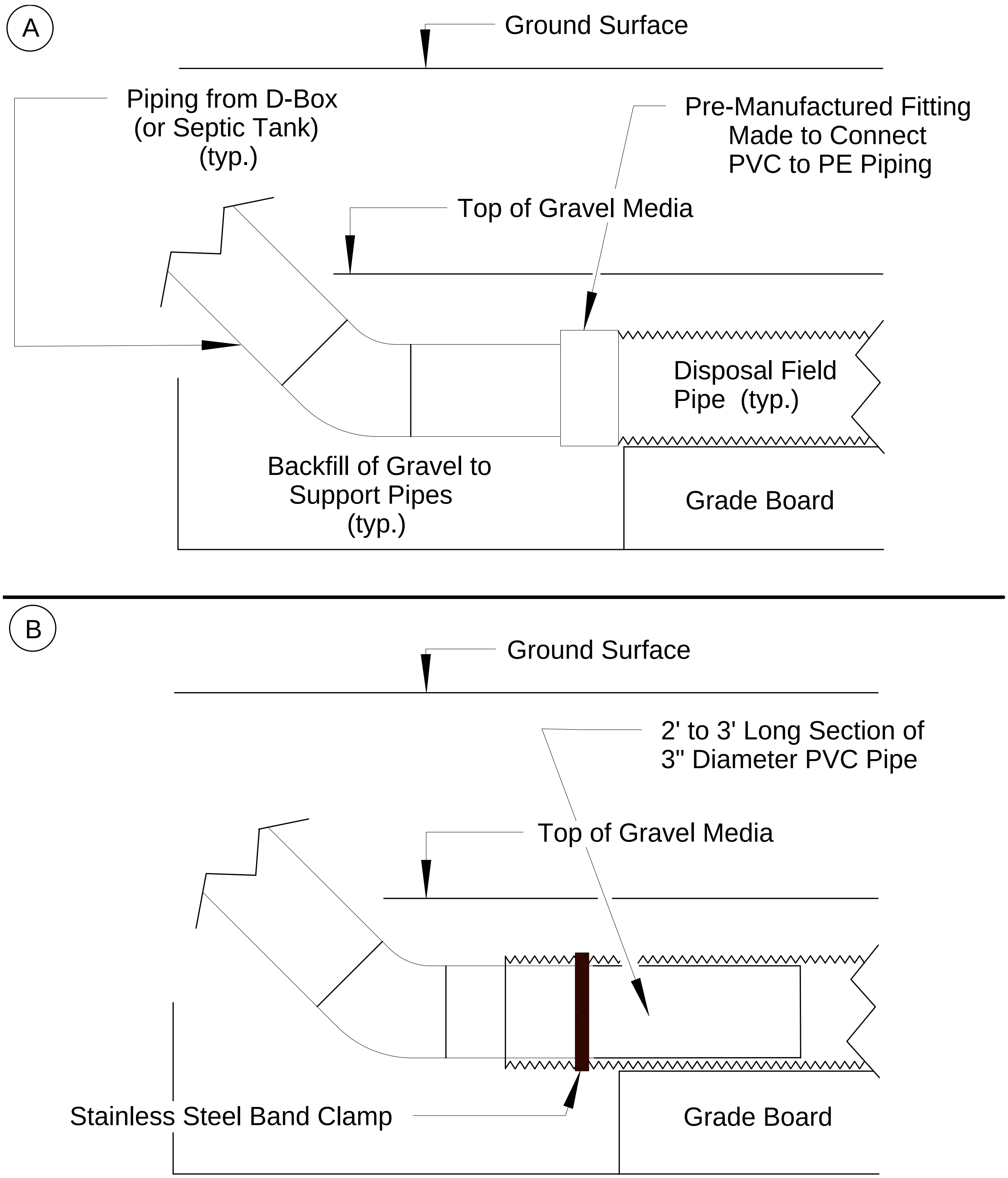
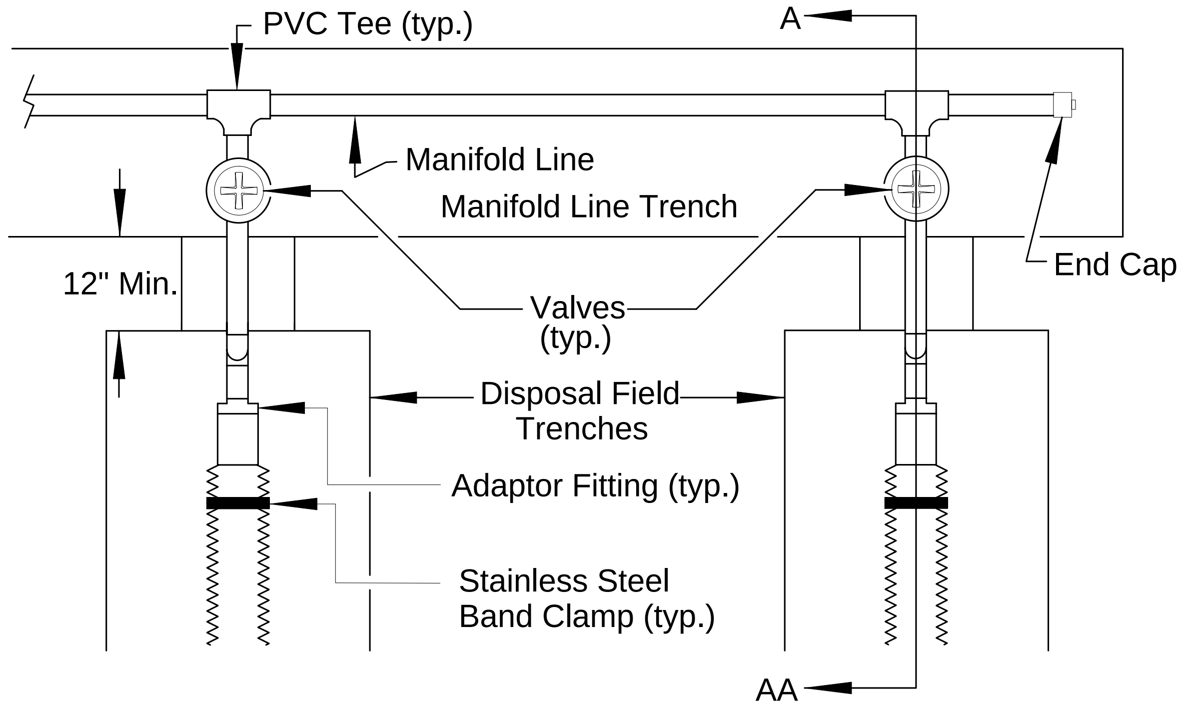


Figure A11-5. Examples of piping connections.

PDM Plan View



PDM Cross Section View, A - AA

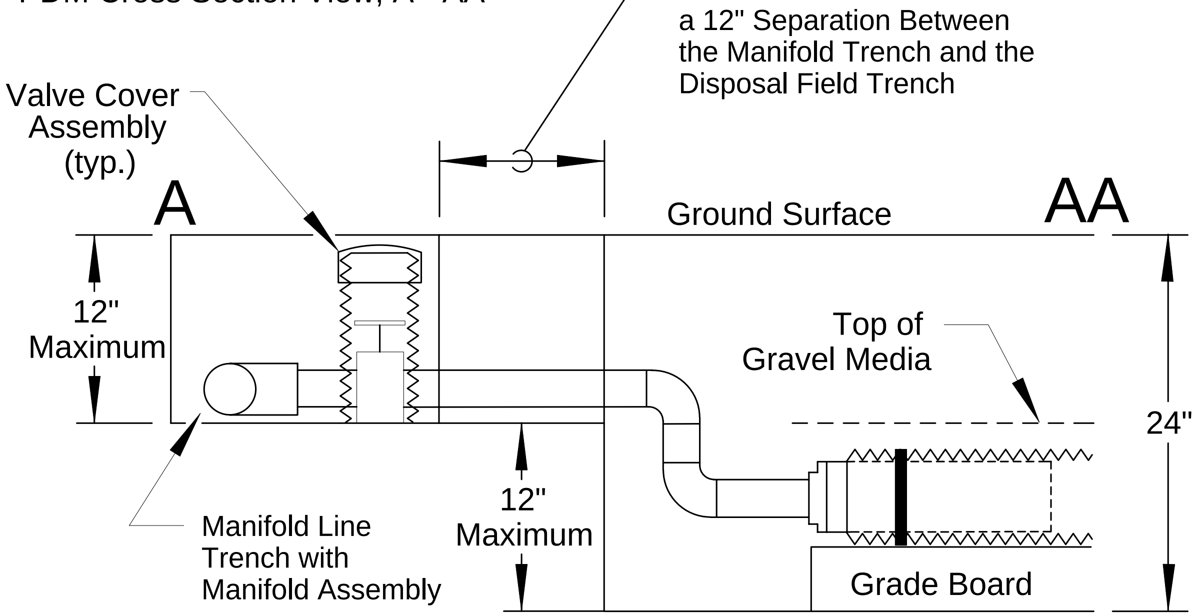


Figure A11-6. Diagram showing the setup of a Pressure Distribution Manifold.

2. Where the use of a pressure distribution manifold is specified by the Department, the Department shall indicate on the Construction Permit, the required sewage/effluent pump and pipe (i.e. supply line, manifold line, piping to and from the valves, etc.) specifications for the construction of the said manifold, and whether or not the use of a check valve will be required.

3. The positioning of the pressure distribution manifold, in relation to the conventional disposal field area, shall be as shown in Figure A11-7. The pressure distribution manifold shall be to one side of the disposal field area and the trench excavated for the manifold line shall be a minimum of twelve (12) inches from the ends of the conventional disposal field trenches.

4. The connection of the three (3) inch pipe to the corrugated plastic pipe in the disposal field trench shall be made only with an appropriate manufactured fitting. In lieu of the use of fittings, the pipe connections may be made as shown in Figure A11-6.

5. The pressure distribution manifold shall always be constructed so that it is dosed from the highest elevation of the disposal field trench area. See Figure A11-7.

6. Where a conventional subsurface sewage disposal system is required to utilize a pressure distribution manifold, all disposal field trenches shall be of equal length so as to reduce the potential for hydraulic overloading.

7. All piping leading to and from the pressure distribution manifold shall be bedded upon firm earth.

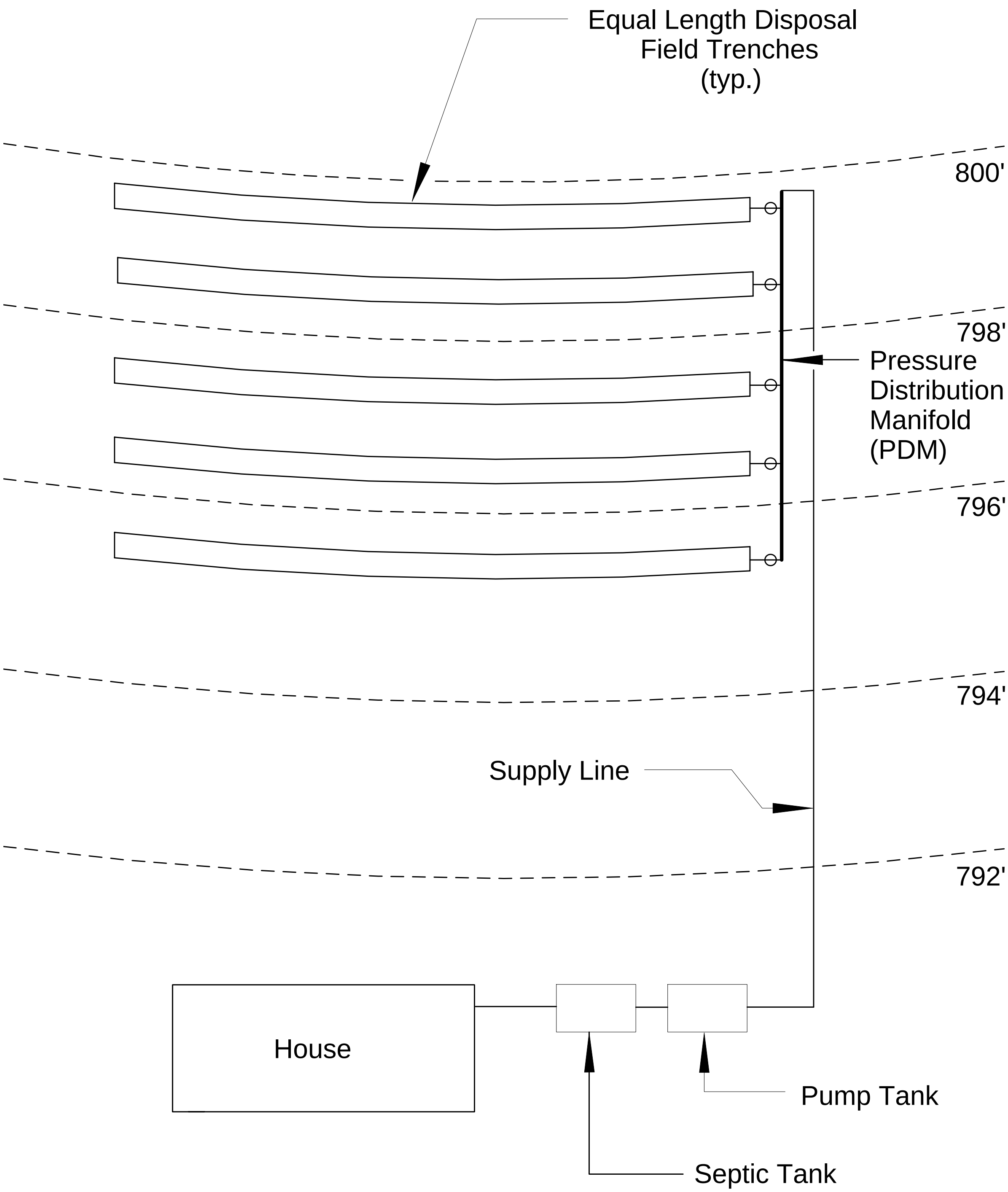


Figure A11-7. Diagram showing the setup of a Pressure Distribution Manifold.

APPENDIX 12

MATERIALS SPECIFICATION

A. Conventional Systems

1. Disposal field pipe shall be four (4) inch corrugated polyethylene (PE) pipe perforated with one-half (½) inch holes and conform to or exceed the standards of ASTM F405, D1248 and D3350.

2. Gravity flow tight-line (where applicable) from the septic tank to the disposal field shall be three (3) inches diameter (minimum) Schedule 40 PVC DWV-rated pipe conforming to or exceeding the standards of ASTM D1784, D1785 and D2665.

3. Pressurized supply line (where applicable) from the pump tank to the disposal field shall be three (3) inches diameter (minimum) Schedule 40 PVC Pressure-rated pipe conforming to or exceeding the standards of ASTM D1784, D1785 and D2241.

4. Crossovers: All crossover piping between trenches shall be three (3) inches diameter (minimum) Schedule 40 PVC DWV-rated pipe conforming to or exceeding the standards of ASTM D1784, D1785 and D2665. All crossover fittings shall be sized the same as the piping being served and shall be Schedule 40 PVC DWV-rated conforming to or exceeding the standards of ASTM D1784, D2466 and D2665.

5. The gravel media in the disposal field trenches shall consist of crushed limestone rock and shall be size number 2, 3, 4 or 24 coarse aggregate, as defined by ASTM D448 and AASHTO M43. The material shall be washed and free from dust, sand, clay or excessive fines. At least 90 percent of the material must pass a two an one-half (2½) inch screen and not more than five (5) percent may pass a one-half (½) inch screen.

6. The covering over the disposal field media shall be untreated builders paper, straw (four [4] inches thick) or other suitable material (geosynthetic or geotextile conforming to or exceeding the standard specifications as outlined in AASHTO M288), as approved by the Department, which will allow water movement yet restrict soil movement and minimize silt accumulation within the gravel media.

7. Pipe-to-pipe connections shall be as follows:

   (a) Corrugated PE - to - PVC (e.g., crossovers):

   PVC pipe shall be connected to corrugated polyethylene pipe either via special rubber shear gasket couplers (boots) with stainless steel compression band clamps designed for such purpose or via stainless steel compression band clamps. No other method of connection shall be allowed. The couplers shall be appropriately sized to fit the pipe in question.

   (b) Corrugated PE - to - Corrugated PE:

   Only couplers specifically designed to join pieces of corrugated polyethylene pipe together shall be used. Such fittings include, but are not limited to, polyethylene split couplers, polyethylene snap couplers, polyethylene internal couplers and rubber gasket-type couplers with stainless steel compression band clamps. No other method of connection shall be allowed. The couplers shall be appropriately sized to fit the pipe in question. All polyethylene couplers shall conform to or exceed the standards of ASTM F405 and F667.

   (c) PVC -to- PVC:

   Consecutive lengths of PVC pipe shall be joined via the solvent welding technique in accordance with or exceeding the standard practices as established in ASTM D2855 and F402. All PVC materials shall be properly primed with purple PVC primer conforming to or exceeding the standards of ASTM F656. Clear PVC cleaners shall not be considered an acceptable substitute for purple PVC primer. All PVC materials, once properly primed, shall be joined via solvent cement conforming to or exceeding the standards of ASTM D2564. Multi-purpose type pipe cement shall not be considered an acceptable substitute.

8. All pipe used to sleeve other pipe for the purpose of providing extra protection shall be of the next larger nominal pipe size and consist of a continuous section of Schedule 80 (minimum) PVC pipe or equivalent conforming to or exceeding the standards of ASTM D1784 and D1785.

9. All grade boards shall be constructed from one-by-six (1"x6") inch lumber.

10. All PVC pipe fittings shall be Schedule 40 and shall be sized and rated in accordance with the particular specification of PVC pipe to which they are to be connected (i.e. fitting size shall be the same as the nominal pipe size); DWV-rated fittings shall be installed on DWV-rated pipe applications and pressure-rated fittings shall be installed on pressure-rated pipe applications) and shall conform to or exceed the standards of ASTM D1784, D2464 and D2466.

11. All corrugated polyethylene pipe fittings shall be sized in accordance with the particular specification of corrugated PE pipe being served (i.e., fitting size shall be the same as the nominal pipe size) and shall conform to or exceed the standards of ASTM F405 and F667.

12. Where pressure distribution manifolds are utilized, the valves contained within said device shall be brass or bronze gate or ball valves of the same size as the nominal pipe size being served and shall be rated at a minimum of 100psi for water or gas. These valves shall conform to or exceed the standard of ANSI/ASME B16.15-85 R94 for cast bronze threaded fittings.

13. All valves shall have ground level access risers and covers. The risers shall be constructed from appropriate continuous lengths of four (4) inch diameter corrugated polyethylene pipe covered with appropriately sized polyethylene snap end-caps. All corrugated polyethylene pipe risers and snap end-caps shall conform to or exceed the standards of ASTM F405 and F667.

14. All PVC pipe and socket-type fittings shall be joined via the solvent welding technique in accordance with or exceeding the standard practices as established in ASTM D2855 and F402. All PVC materials shall be properly primed with purple PVC primer conforming to or exceeding the standards of ASTM F656. Clear PVC cleaners shall not be considered an acceptable substitute for purple PVC primer. All PVC materials, once properly primed, shall be joined via solvent cement conforming to or exceeding the standards of ASTM D2564. Multi-purpose type pipe cement shall not be considered an acceptable substitute.

15. Teflon® tape or other acceptable pipe thread sealant, as recommended by the manufacturer for approved use on PVC applications, shall be utilized for all threaded pipe fitting connections.

B. Low Pressure Pipe Systems

1. Supply line pipe and manifold pipe shall be of the same nominal pipe size and shall be a minimum of two (2) inch nominal pipe size diameter, Schedule 40 PVC pressure-rated pipe conforming to or exceeding the standards of ASTM D1784, D1785 and D2241. Lateral line pipe shall be a minimum of one (1) inch nominal pipe size diameter Schedule 40 PVC pressure-rated pipe conforming to or exceeding the standards of ASTM D1784, D1785 and D2241.

2. Lateral line to manifold line connections shall be constructed via either crosses or tees of the same nominal size as the pipe diameter being served. These fittings shall be Schedule 40 PVC pressure-rated fittings conforming to or exceeding the standards of ASTM D1784 and D2466. See Figure A3-10 in *Appendix 3* for proper lateral - to - manifold connections.

3. All other necessary pipe fittings shall be Schedule 40 PVC pressure-rated fittings conforming to or exceeding the standards of ASTM D1784, D2464 and D2466. The lone exception to this rule shall be the threaded galvanized iron end-cap on the turn-up assembly. This threaded galvanized iron end-cap shall be appropriately sized in accordance with the lateral line pipe size being served and shall be a Class 150 Standard Malleable Iron Pipe Fitting conforming to or exceeding the standards set forth in ASTM A197, A153, A165 and ANSI/ASME B16.3.

4. All lateral line valve assemblies and lateral line turn-ups shall be constructed in strict accordance with Figure A3-10 in *Appendix 3*.

5. All valves shall be either brass or bronze, gate or ball valves of the same size as the nominal pipe size being served (i.e., the same size as the lateral line nominal pipe diameter; Example: one-inch valve used on one- inch diameter lateral line pipe). They shall also be rated at a minimum of 100 pounds per square inch (psi) for water or gas. Note: the minimum valve size shall be one (1) inch. These valves shall conform to or exceed the standard of ANSI/ASME B16.15-85 R94 for cast bronze threaded fittings.

6. All valves shall have ground level access risers and covers. The risers shall be constructed from appropriate continuous lengths of four (4) inch diameter corrugated polyethylene pipe covered with appropriately sized polyethylene snap end-caps. All corrugated polyethylene pipe risers and snap end-caps shall conform to or exceed the standards of ASTM F405 and F667.

7. All PVC pipe and socket-type fittings shall be joined via the solvent welding technique in accordance with or exceeding the standard practices as established in ASTM D2855 and F402. All PVC materials shall be properly primed with purple PVC primer conforming to or exceeding the standards of ASTM F656. Clear PVC cleaners shall not be considered an acceptable substitute for purple PVC primer. All PVC materials, once properly primed, shall be joined via solvent cement conforming to or exceeding the standards of ASTM D2564. Multi-purpose type pipe cement shall not be considered an acceptable substitute.

8. Teflon® tape or other acceptable pipe thread sealant, as recommended by the manufacturer for approved use on PVC applications, shall be utilized for all threaded pipe fitting connections.

9. The gravel media in the lateral line trenches shall consist of crushed limestone rock and shall be size number 5, 6 or 56 coarse aggregate, as defined by ASTM D448 and AASHTO M43. The material shall be washed and free from dust, sand, clay or excessive fines. At least 90 percent of the material must pass a one (1) inch screen and not more than five (5) percent may pass a three-eighth ($^{3}/_{8}$) inch screen.

10. The covering over the lateral line trench media shall be untreated builders paper or other suitable material (geosynthetic or geotextile conforming to or exceeding the standard specifications as outlined in AASHTO M288), as approved by the Department, which will allow water movement yet restrict soil movement and minimize silt accumulation within the gravel media. Straw shall not be allowed as covering for gravel media in LPP systems.

11. All pipe used to sleeve other pipe for the purpose of providing extra protection shall be of the next larger nominal pipe size and consist of a continuous section of Schedule 80 (minimum) PVC pipe or equivalent conforming to or exceeding the standards of ASTM D1784 and D1785.

C. Mound Systems

1. All material specifications outlined in for LPP Systems shall apply to Mound Systems, with the exception of the valve covers. Although ground level access covers over the valves is a recommended practice for Mound systems, it is not a requirement.

2. Additionally, the imported fill material shall consist of a predominantly ($\geq$50%) USDA Classified medium sand texture (0.50 to 0.25 mm particle size) with no more than twenty (20) percent fine sand (0.25 to 0.10 mm particle size) and be free from silt and clay. The sand fill shall be washed and screened to the aforementioned specifications. Additionally, proof of the use of such sand shall be supplied to the Department, by the Mound installer, in accordance with the provisions outlined in *Part 2 (c) of Subsection M of Section 20* of these regulations. Furthermore, the sand shall be composed of stable materials and not subject to chemical deterioration.

3. The material utilized for the clay cap shall consist of natural soil material with a soil textural classification of clay. Clay, as defined by the USDA – Soil Survey Manual, is a soil comprised of the following ratio of soil separates: forty (40) percent or more clay; forty-five (45) percent or less sand; less than forty (40) percent silt. The clay particle constituent shall not be of a shrink-swell type of clay and the sand particle constituent shall not exceed the size limits of a very coarse sand (i.e. particle size diameter being 2.0 – 1.0 mm).

   Further, all soil materials proposed to be utilized for the construction of a clay cap shall be field inspected, verified for content and approved (either at the source site or on the Mound construction site) for use by a Department Soil Scientist in accordance with the provisions outlined in *Section 20*. Said soil materials shall not be contaminated by nor contain any man-made materials (e.g. glass, plastics, metal debris, etc.), shall be free from excessive amounts of organic materials (e.g. grass, leaves, woody materials, etc.), shall be homogenous in its content (i.e. not mixed with other types of soil materials) and shall not contain over fifteen (15) percent fragments, whether natural or man-made products, as defined (i.e. in description and quantity measuring methodologies) by the USDA – Soil Survey Manual (i.e. those pieces of rock being greater than 2.0 mm in diameter).

D. Soil Drainage Improvement Systems

1. The pipe placed in interceptor, curtain and/or drawdown drain trenches shall be a minimum of four (4) inches in diameter (nominal pipe size). The pipe shall be slotted corrugated polyethylene (PE) pipe and conform to or exceed the standards of ASTM F405, D1248 and D3350. The circular slotted perforations shall be placed in the outside valleys of the corrugations and have minimum dimensions of one-eighth (⅛") inch wide by seven-eighths (⅞") inch long.

2. All sections of tight-line pipe shall be either non-perforated Schedule 40 PVC DWV-rated pipe or non-perforated corrugated polyethylene (PE) pipe, a minimum of four (4") inches in diameter (nominal diameter). The non-perforated Schedule 40 PVC DWV-rated pipe shall conform to or exceed the standards of ASTM D1784, D1785 and D2665. The non-perforated corrugated polyethylene (PE) pipe shall conform to or exceed the standards of ASTM F405, D1248 and D3350.

3. Drain outlet pipe shall be non-perforated Schedule 40 PVC DWV-rated pipe, a minimum of four (4") inches in diameter (nominal diameter) and conforming to or exceeding the standards of ASTM D1784, D1785 and D2665.

4. All pipe-to-pipe connections shall be the same as outlined in *Subsection A* of this Appendix.

5. All sleeved sections of drainage system pipe shall be in accordance with those provisions outlined *Subsection A* of this Appendix.

6. The impervious barrier utilized in curtain drains and interceptor drains shall be in the form of six (6) to eight (8) mil plastic liner or other suitable impermeable material as approved by the Department. The material shall be strong enough to withstand installation conditions and be able to provide a long service life.

7. The sealing of a breached impervious barrier shall be accomplished with PVC tape specifically made for bonding or repairing plastic materials.

8. The gravel media in the drainage trenches (i.e., curtain drain, interceptor drain and drawdown drain) shall be consistent with the gravel media specified for conventional disposal field trenches. Thus, it shall consist of crushed limestone rock and shall be size number 2, 3, 4 or 24 coarse aggregate, as defined by ASTM D448 and AASHTO M43. The material shall be washed and free from dust, sand, clay or excessive fines. At least 90 percent of the material must pass a two an one-half (2½) inch screen and not more than five (5) percent may pass a one-half (½) inch screen.

E. Pump Installation Components

This includes all piping and other components located inside the pump tank, required to properly connect the pump to the supply line as it exits the side of the pump tank. See Figure A14-6 in *Appendix 14* for an assembly diagram of pump tank components.

1. The pump shall rest on two eight (8") inch (minimum) concrete blocks set tightly side-by-side, or a concrete pad of equivalent dimensions, on the bottom of the tank.

2. All piping components (i.e., pipe and fittings) shall be sized in accordance with the supply line nominal pipe diameter (i.e., all piping components shall be of the same nominal size as the supply line nominal pipe diameter). Bushings or reducers may be required to adapt the pump discharge flange size to the supply line size. Additionally, all piping components, with the exception of the threaded union (or similar device) and all valve(s), shall be Schedule 40 pressure-rated PVC conforming to or exceeding the standards of ASTM D1784, D1785, D2241, D2464 and D2466.

   The gate, globe or ball valve shall be either brass or bronze, and shall be rated at a minimum of 100 pounds per square inch (psi) for water or gas. These valves shall conform to or exceed the standard of ANSI/ASME B16.15-85 R94 for cast bronze threaded fittings.

   The check valve shall be either PVC, brass or bronze, and shall be appropriately sized for the intended application. These valves shall conform to or exceed the standards of ASTM D1784, D2464 and D2467, for PVC, or conform to or exceed the standards of ANSI/ASME B16.15-85 R94 for cast bronze threaded fittings.

   The threaded union shall be, as a minimum, Schedule 40 pressure-rated PVC conforming to or exceeding the standards of ASTM D1784 and D2466. All Schedule 80 pressure-rated PVC threaded unions, and all Schedule 80 PVC components of threaded unions, shall conform to or exceed the standards of ASTM D1784, D2464 and D2467. In lieu of PVC threaded unions, all other similar connecting devices shall be approved by the Department on an individual basis, prior to its use.

3. All PVC pipe and socket-type fittings shall be joined via the solvent welding technique in accordance with or exceeding the standard practices as established in ASTM D2855 and F402. All PVC materials shall be properly primed with purple PVC primer conforming to or exceeding the standards of ASTM F656. Clear PVC cleaners shall not be considered an acceptable substitute for purple PVC primer. All PVC materials, once properly primed, shall be joined via solvent cement conforming to or exceeding the standards of ASTM D2564. Multi-purpose type pipe cement shall not be considered an acceptable substitute.

4. Teflon® tape or other acceptable pipe thread sealant, as recommended by the manufacturer for approved use on PVC applications, shall be utilized for all threaded pipe fitting connections.

5. The pump control system shall be adjustable to meet recommended loading rates for different sizes and shapes of pump tanks. The controls shall also be sealed against entry of corrosive effluent and/or corrosive/explosive gases from the effluent and should have NEMA (National Electrical Manufacturing Association) approval. Further, the pump controls shall be either sealed mercury float switches or sealed, self-contained mechanically-activated float switches. Mercury switches are activated by a sealed float which contains a tube of mercury in contact with power leads. The only approved mechanically-activated type switches shall be of the same design principle as that of the mercury-type switches. Instead of a tube of mercury, these mechanical switches employ a steel ball to activate the electrical contacts. Diaphragm switches or vertically rising mechanical-type float switches shall not accepted. All float switches shall be of a sufficient quality and material so as to perform under turbulent conditions and be resistant to the corrosive nature of the waste water.

6. Non-corrodible clamps or brackets shall be utilized to securely fasten the pump control cables to the pump outlet standpipe.

F. Pumps

1. The pump shall be UL-listed and shall be rated for effluent or sewage applications by the manufacturer.

2. The pump shall be submersible.

3. The pump shall have a cast iron housing around the motor.

4. The motor shall be oil filled and hermetically sealed with automatic reset thermal overload protection.

5. All exposed fasteners shall be a minimum of 300-series stainless steel or brass.

6. The pump shall be independently supported by legs.

7. The pump shall not contain screened or strained inlets.

8. The pump shall be capable of passing a one-half (1/2) inch spherical solid.

9. The pump shall be a minimum of 0.3 horsepower (Hp).

10. The pump shall be sufficiently sized so as to meet and/or exceed the design capacity (i.e., the flow and total dynamic head requirements) stipulated for the specific system and site it is intended to serve.

11. All power cords shall be water resistant and UL-listed.

12. The on/off pump activation device (i.e. float controls) shall be adjustable to meet the specific application requirements (i.e., it shall not be an integral part of the pump; it must be separate from the pump); See Subsection E of this Appendix.

13. The pump shall be covered by a manufacturer’s warranty for a period of at least one year from the date of installation.

<u>Important Note</u>: The Department retains the authority to require the use of a different pump (i.e., regarding size, horsepower, pumping capacity, etc.), for a site/installation, in lieu of any previously specified or installed pump, as it deems necessary.

G. Tank Components

1. All piping entering, exiting and connecting tanks, with the exception of the pressure piping exiting a pump tank (refer to *Subsections A and E* of this Appendix), shall be unobstructed and shall be, as a minimum, three (3) inch diameter (i.e., minimum effective cross-sectional area of 7.4 in^2) Schedule 40 PVC DWV-rated pipe conforming to or exceeding the standards of ASTM D1784, D1785 and D2665.

2. All pipe fittings shall be sized the same as the piping being served and shall be Schedule 40 PVC DWV-rated conforming to or exceeding the standards of ASTM D1784 and D2665 or D2466.

3. All PVC pipe and socket-type fittings shall be joined via the solvent welding technique in accordance with or exceeding the standard practices as established in ASTM D2855 and F402. All PVC materials shall be properly primed with purple PVC primer conforming to or exceeding the standards of ASTM F656. Clear PVC cleaners shall not be considered an acceptable substitute for purple PVC primer. All PVC materials, once properly primed, shall be joined via solvent cement conforming to or exceeding the standards of ASTM D2564. Multi-purpose type pipe cement shall not be considered an acceptable substitute.

4. Teflon® tape or other acceptable pipe thread sealant, as recommended by the manufacturer for approved use on PVC applications, shall be utilized for all threaded pipe fitting connections.

5. All materials and methodologies/techniques used in sealing the pipes entering and exiting the tank openings shall provide a watertight seal and shall be approved by the Department.

6. All ground-level access risers and their covers (or lids) shall be approved by the Department.

H. Electrical Components

All electrical components shall conform to the provisions as set forth in *Section 16*.

I. Alternating Valves

Alternating valves shall conform to the provisions as set forth in *Section 15, Subsection D, Part 6.*

J. Effluent Brake Devices

Effluent brake devices shall be constructed of Schedule 40 pressure-rated PVC pipe and fittings conforming to or exceeding the standards set forth in ASTM D1784, D1785, D2241, D2464 and D2466 and shall conform to the provisions as set forth in *Section 15, Subsection D, Part 5*.

APPENDIX 13

CHARTS & TABLES

Scour Velocity:

For systems requiring the use of a pump it shall be necessary to ensure that there is sufficient flow velocity to carry any solids, that may be present in the effluent, through the supply line pipe and prevent the settling of those solids in said pipe. This requires a scour velocity of at least 2.5 feet per second ($^{ft}/_{sec}$) to minimize settling. Thus, the minimum pump capacity is that rate of flow necessary to prevent the deposition of any solids present in the effluent. So, the acceptable flow rate is that which will ensure scour velocity in the pipe. The minimum flow necessary to achieve acceptable scour velocities is dependent upon pipe diameter and can be found in Table A13-1.

Table A13-1. Minimum Scour Velocity

Minimum Scour Velocity	
Nominal Pipe Size (O. D.) (inches)	Minimum Flow Rate (gpm)
1	6.73
1¼	11.7
1½	15.9
2	26.2
2½	37.3
3	57.7
4	99.4
5	224.7
6	389.7

Table A13-2. PVC Pipe Friction Head Loss

Friction Head Loss in Feet Per 100 Feet of Schedule 40 PVC Pipe								
Flow (gpm)	Nominal Pipe Size (O.D.) in Inches							
	1	1¼	1½	2	2½	3	4	6
1	0.09	0.02						
2	0.32	0.08	0.04					
3	0.67	0.18	0.08	0.02				
4	1.15	0.30	0.14	0.04				
5	1.73	0.46	0.22	0.06	0.03			
6	2.43	0.64	0.30	0.09	0.04			
7	3.23	0.85	0.40	0.12	0.05			
8	4.13	1.09	0.52	0.15	0.06			
9	5.14	1.36	0.64	0.19	0.08			
10	6.24	1.65	0.78	0.23	0.10	0.03		
11	7.44	1.97	0.93	0.27	0.12	0.04		
12		2.31	1.09	0.32	0.14	0.05		
13		2.68	1.27	0.37	0.16	0.05		
14		3.08	1.45	0.43	0.18	0.06		
15		3.50	1.65	0.49	0.21	0.07		
16		3.94	1.86	0.55	0.23	0.08		
17		4.41	2.08	0.61	0.26	0.09		
18		4.90	2.31	0.68	0.29	0.10		
19		5.41	2.56	0.75	0.32	0.11		
20		5.95	2.81	0.83	0.35	0.12		
25			4.25	1.25	0.53	0.18		
30			5.95	1.75	0.74	0.26	0.07	
35				2.33	0.99	0.34	0.09	
40				2.98	1.26	0.44	0.12	
45				3.71	1.57	0.55	0.15	
50				4.51	1.91	0.66	0.18	
60				6.32	2.67	0.93	0.25	
70					3.56	1.23	0.33	
80					4.55	1.58	0.42	0.06
90					5.66	1.97	0.52	0.07
100					6.88	2.39	0.64	0.09
125						3.61	0.96	0.13
150						5.06	1.35	0.18
175						6.73	1.79	0.25
200							2.29	0.31
225							2.85	0.39
250							3.46	0.48
275							4.13	0.57
300							4.85	0.67
325							5.63	0.77
350							6.45	0.89
375							7.33	1.01

Table A13-2. Continued.

Friction Head Loss in Feet Per 100 Feet of Schedule 40 PVC Pipe								
Flow (gpm)	Nominal Pipe Size (O.D.) in Inches							
	1	1¼	1½	2	2½	3	4	6
400								1.14
425								1.27
450								1.41
475								1.56
500								1.72
550								2.05
600								2.40
650								2.79
700								3.20
750								3.63
800								4.09
850								4.58
900								5.09
950								5.62

NOTE: The data in Table A13-2 was computed using the Hazen-Williams Equation for pipe friction headloss, assuming the friction factor C = 140 for "design" purposes.

$$h_f = 10.44L \{Q^{1.85} / (C^{1.85})(d^{4.8655})\}$$

Where: h_f = headloss (ft)
L = pipe length (ft)
Q = flow (gpm)
C = friction factor (140)
d = pipe inside diameter (inches)

APPENDIX 14

FIGURES

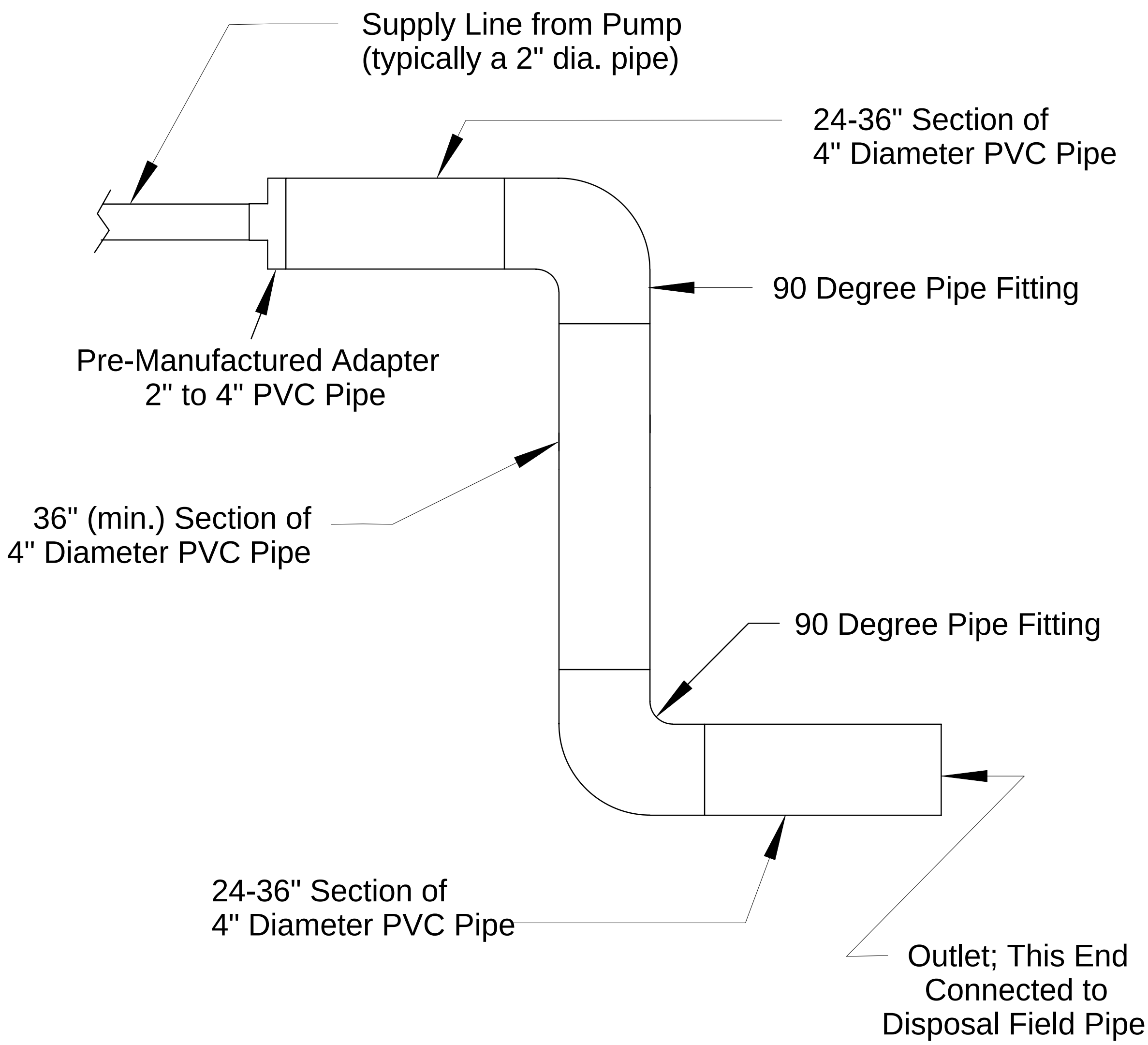


Figure A14-1A. Effluent Brake Device.

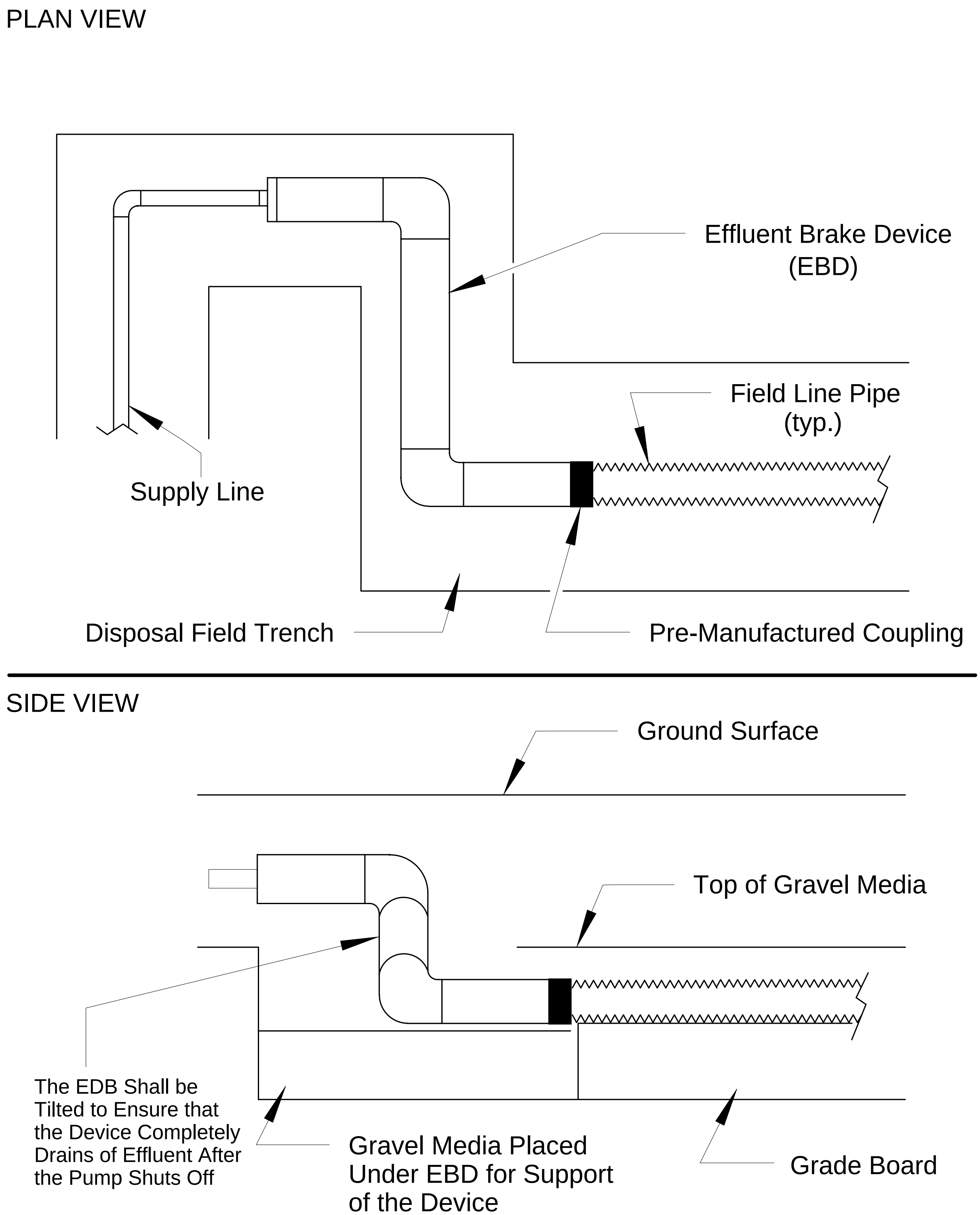


Figure A14-1B. Setup of the Effluent Brake Device.

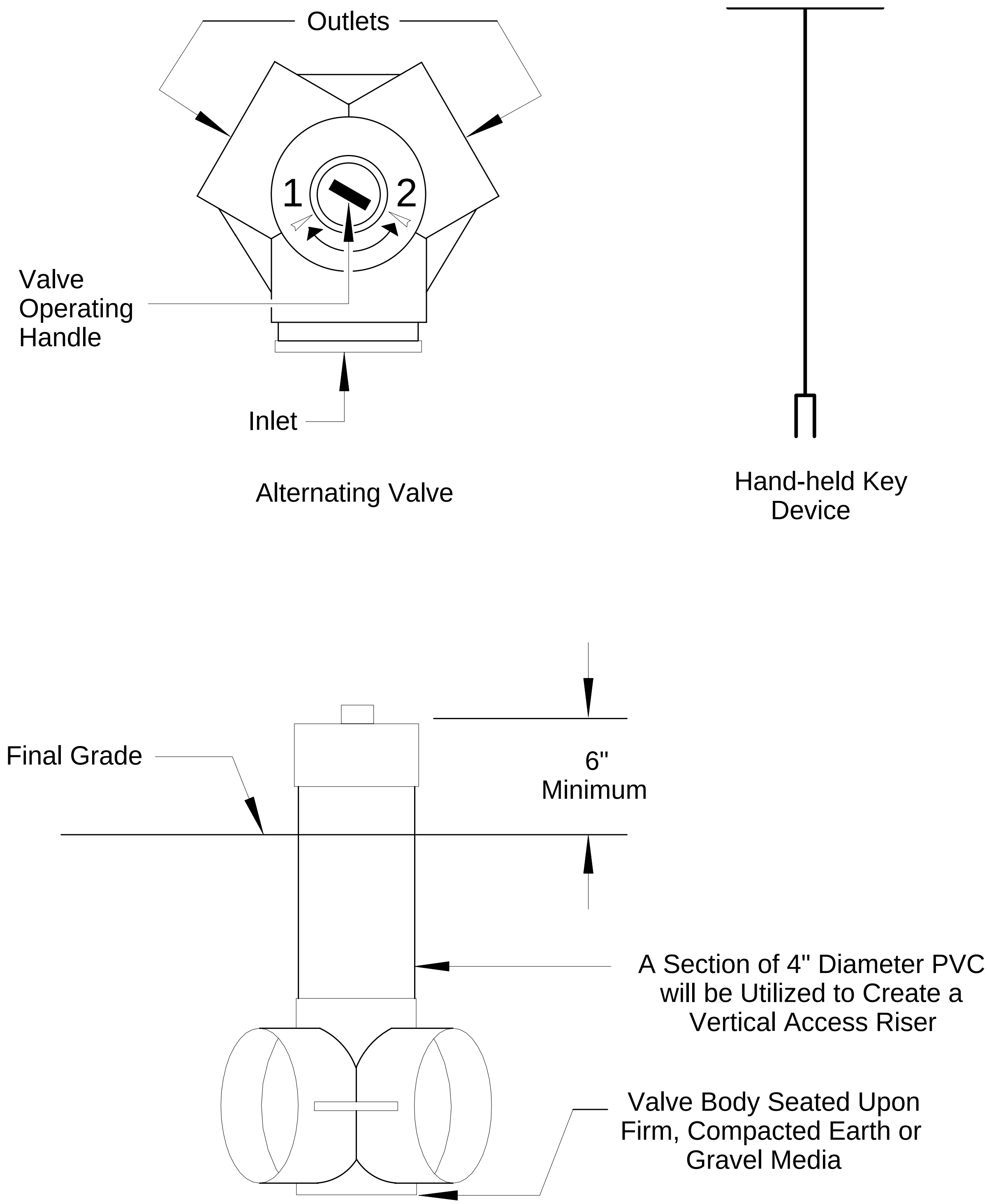


Figure A14-2A. Alternating Valve.

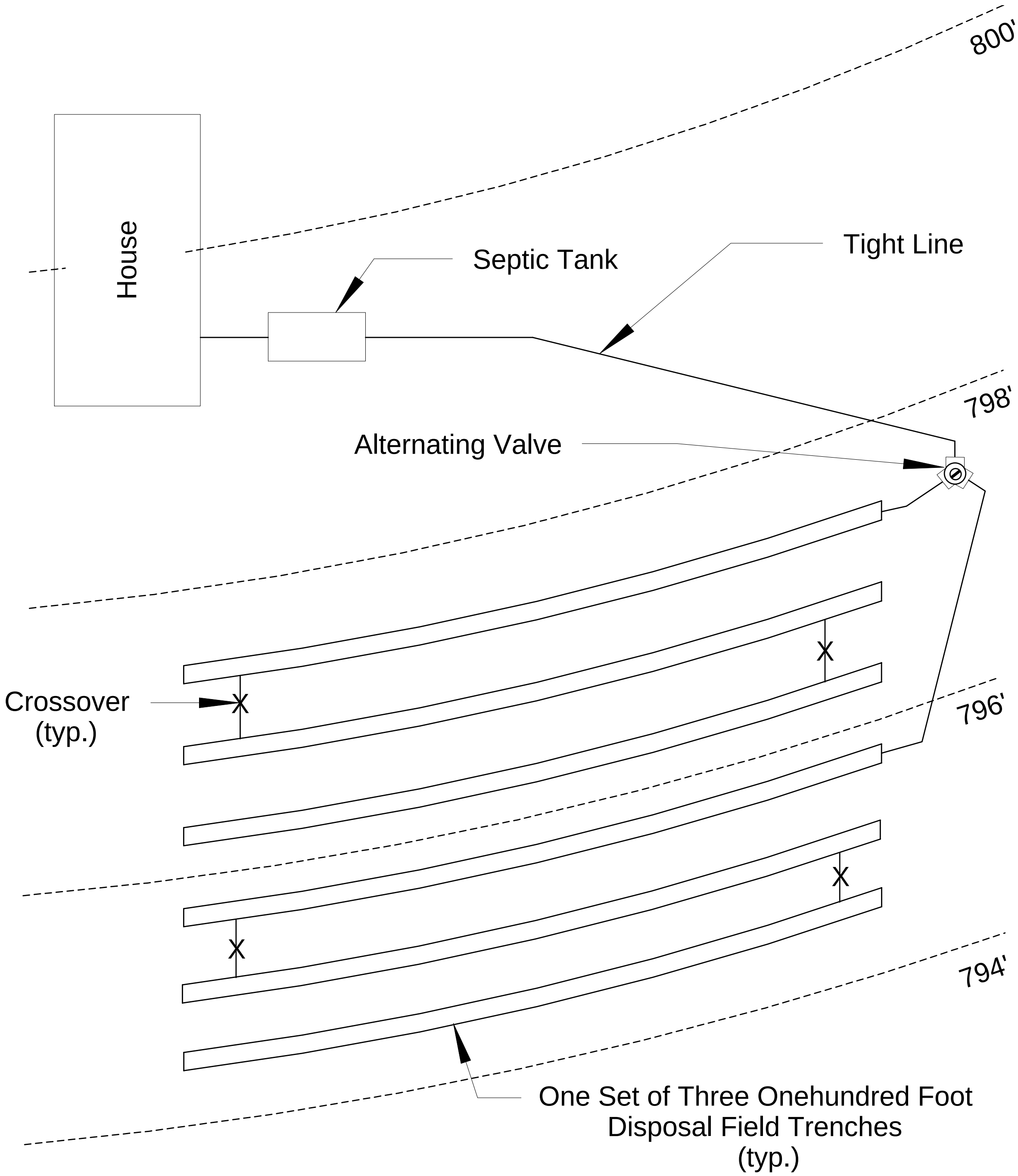
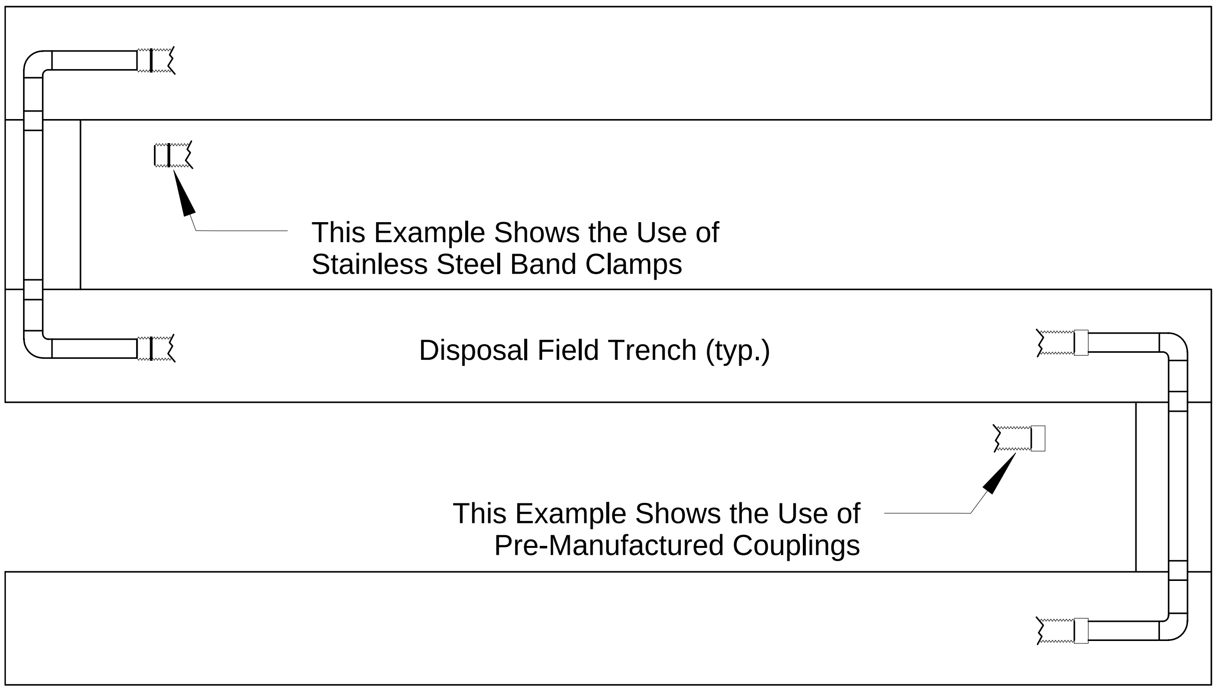


Figure A14-2B. Example of conventional system setup utilizing an Alternating Valve.

Plan View



End View

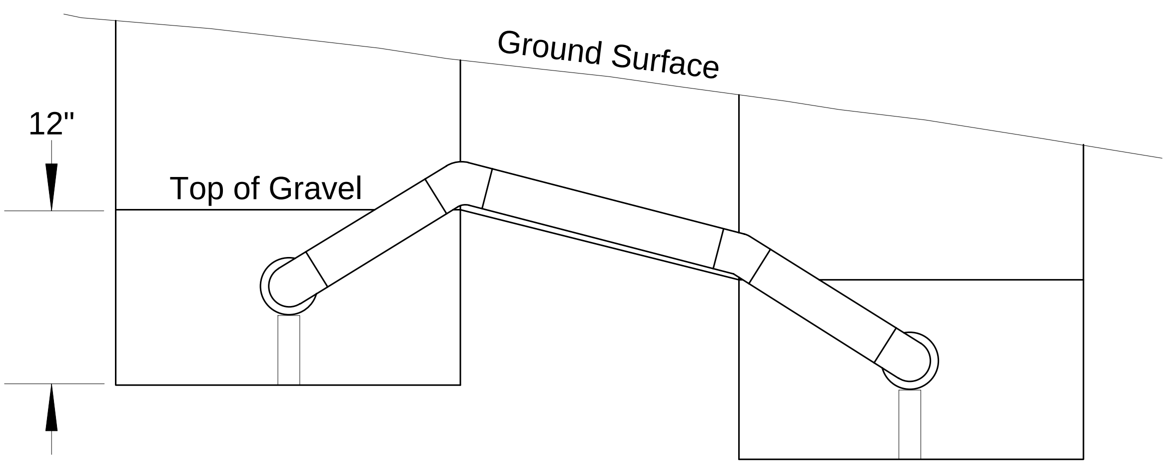


Figure A14-3. Crossover setup for conventional systems utilizing serial distribution.

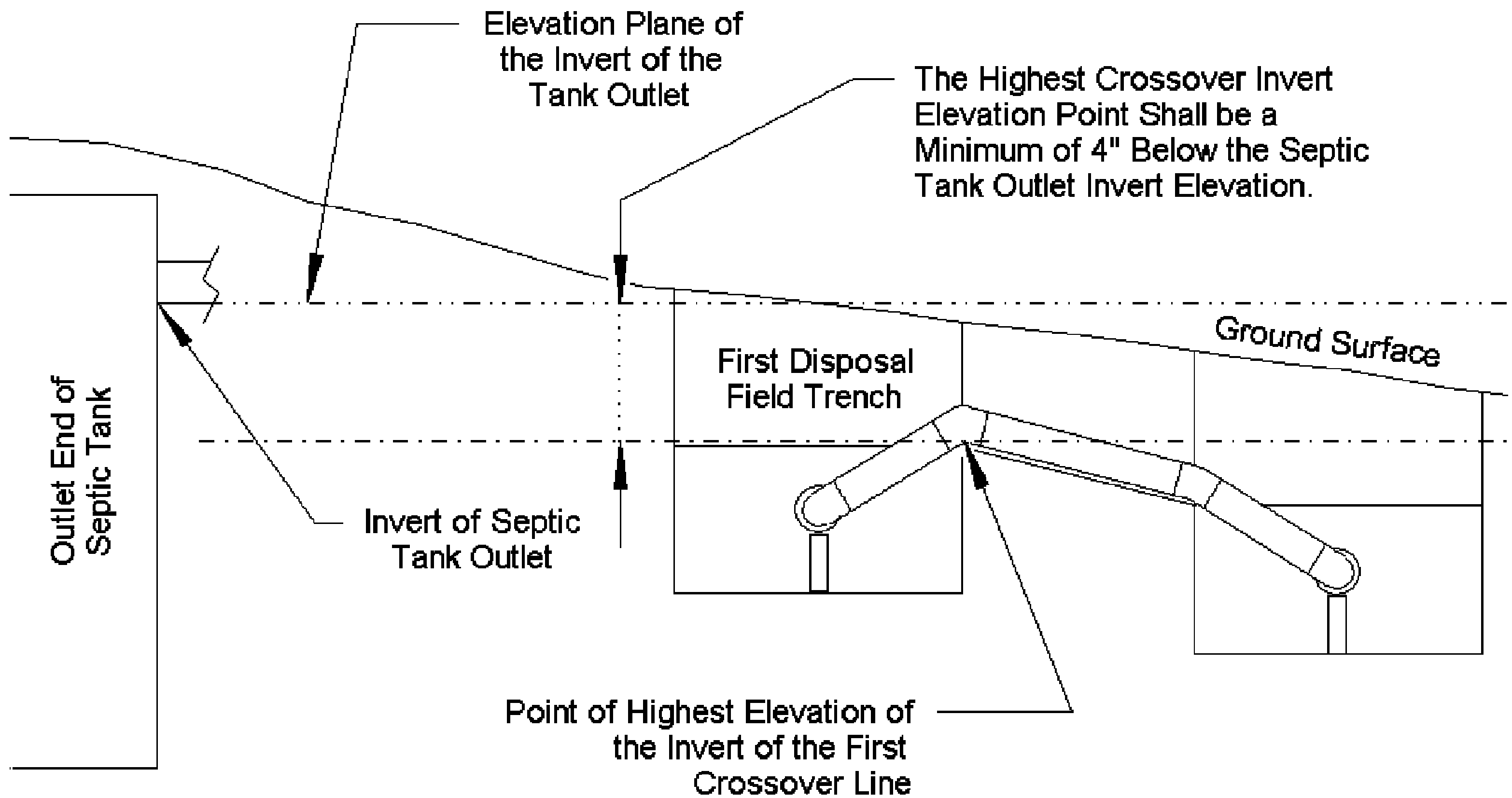


Figure A14-4. Diagram showing the required elevation of the first crossover in relation to the septic tank outlet.

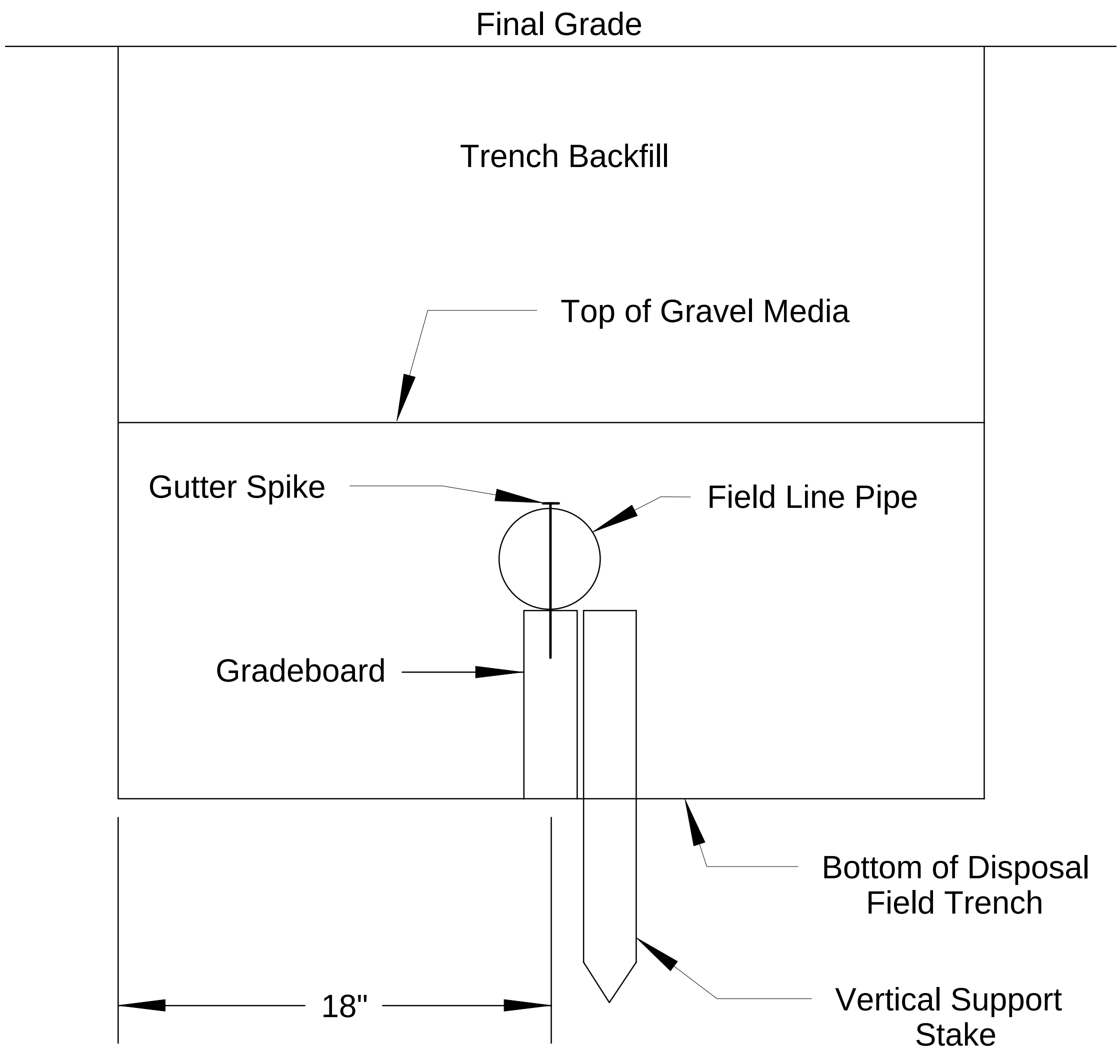


Figure A14-5. Setup of a Grade Board in a conventional system disposal field trench.

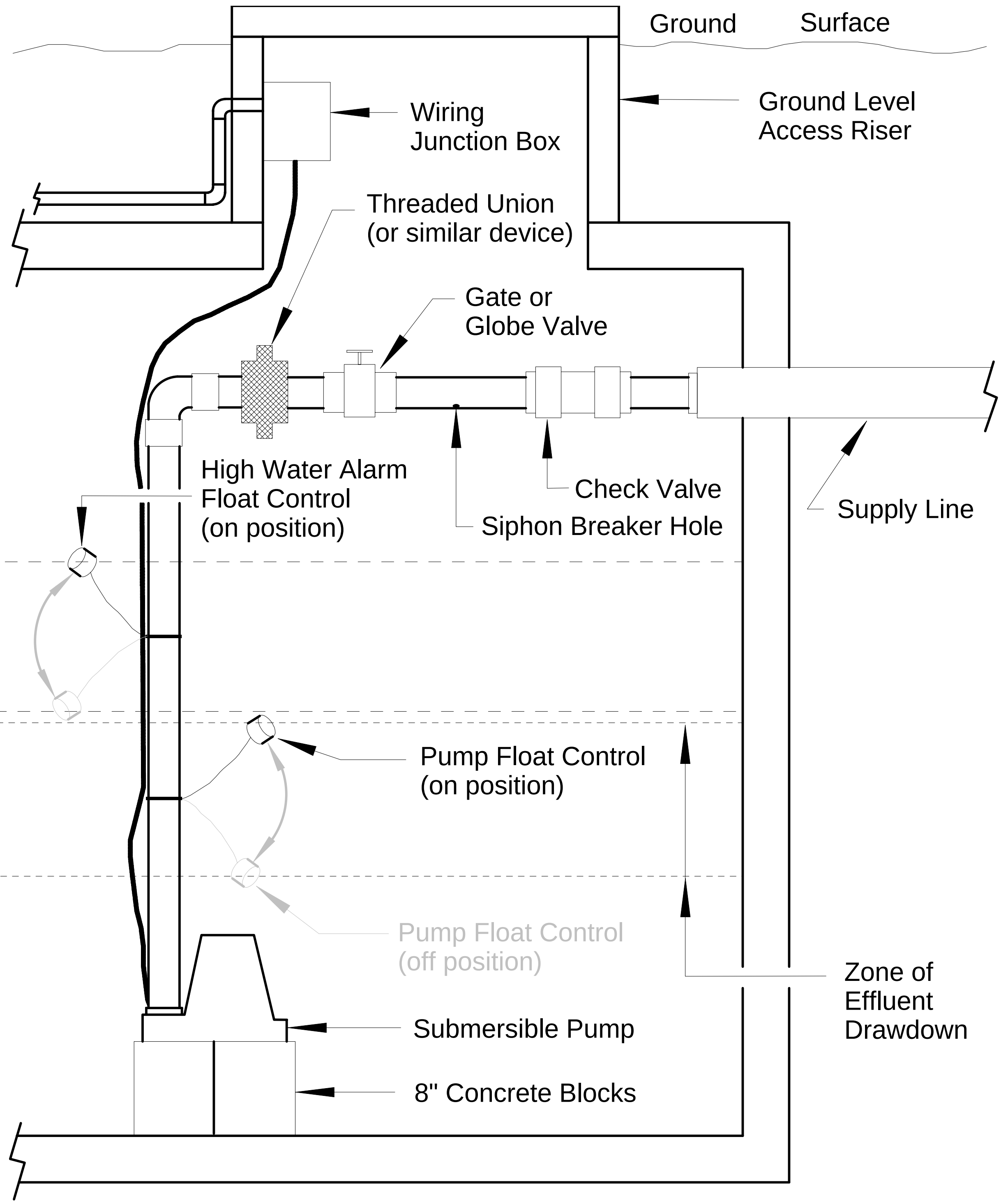


Figure A14-6. Diagram showing the general setup of the components in a pump tank.

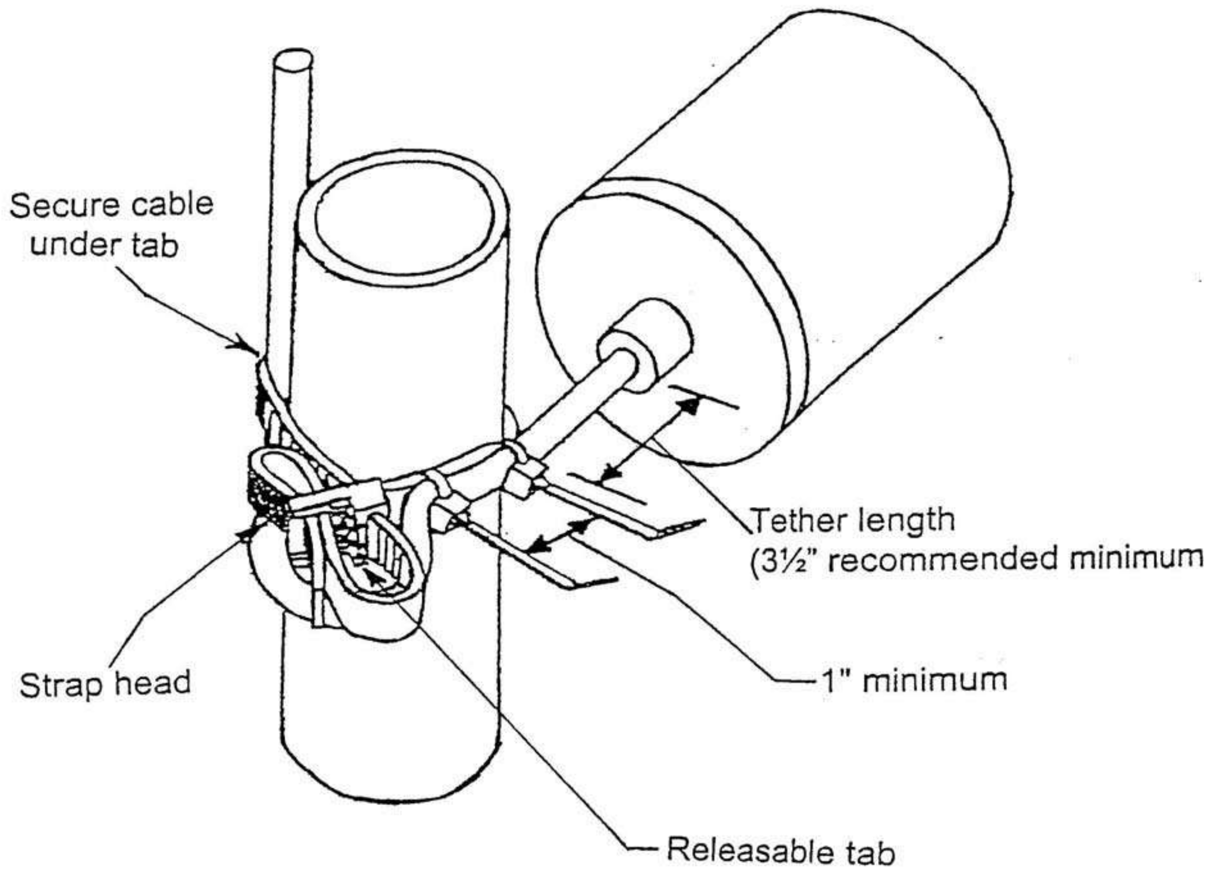


Figure A14-7. Diagram showing the method of attachment of the float control(s) to the standpipe so as to ensure against slippage.

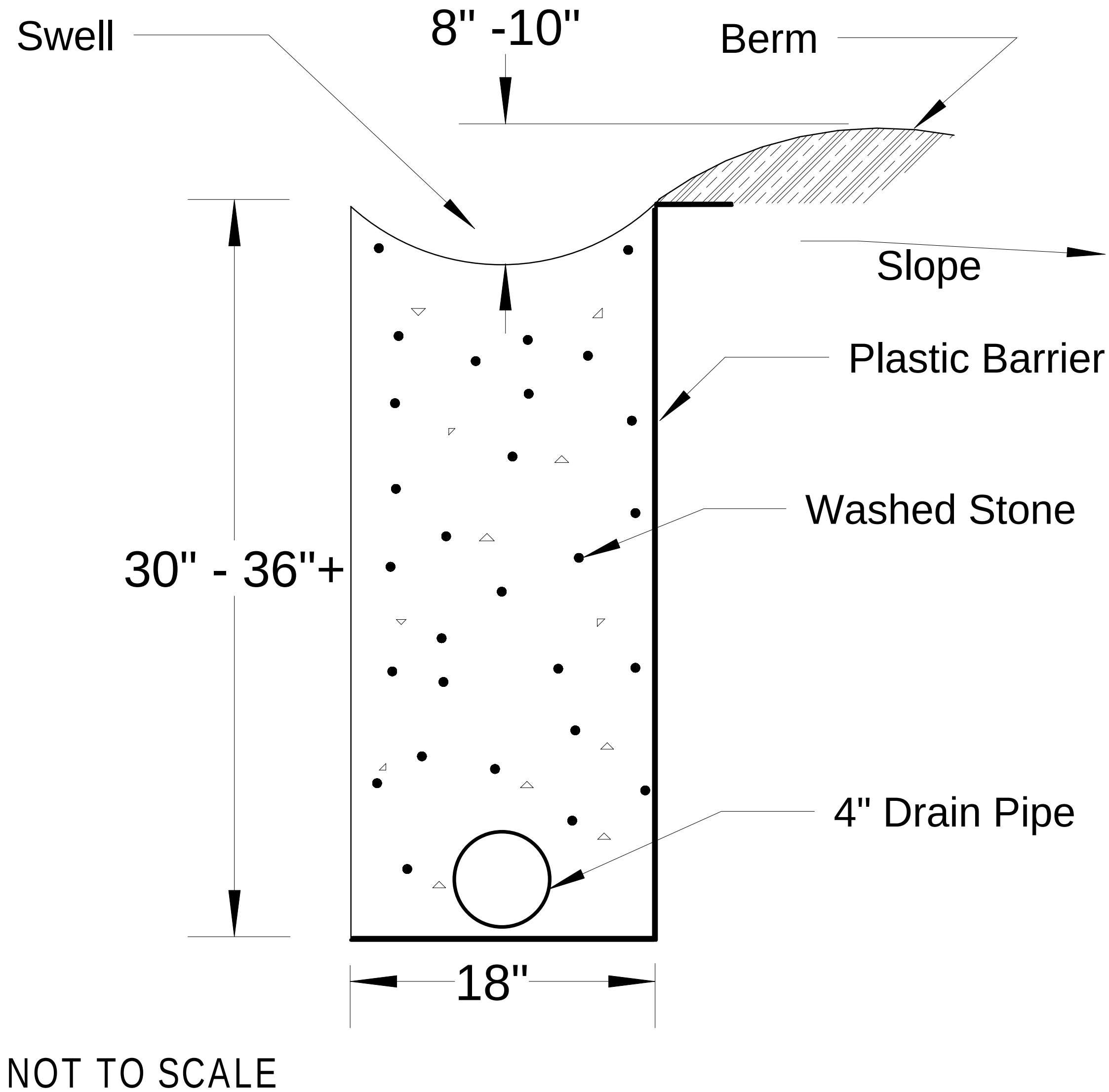


Figure A14-8. Cross sectional view of a Curtain Drain or Interceptor Drain. Additionally, the cross sectional view of a Drawdown Drain would be the same with the exception of the plastic barrier.

Plan View

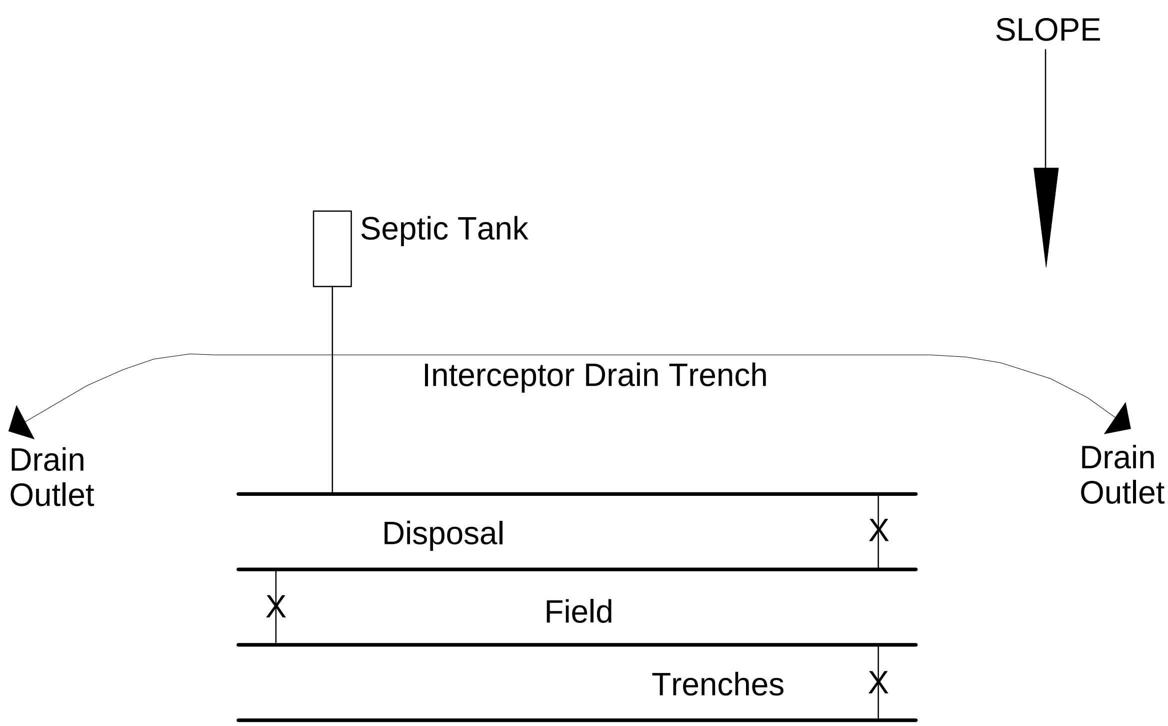


Figure A14-9. Example of a typical Interceptor Drain layout.

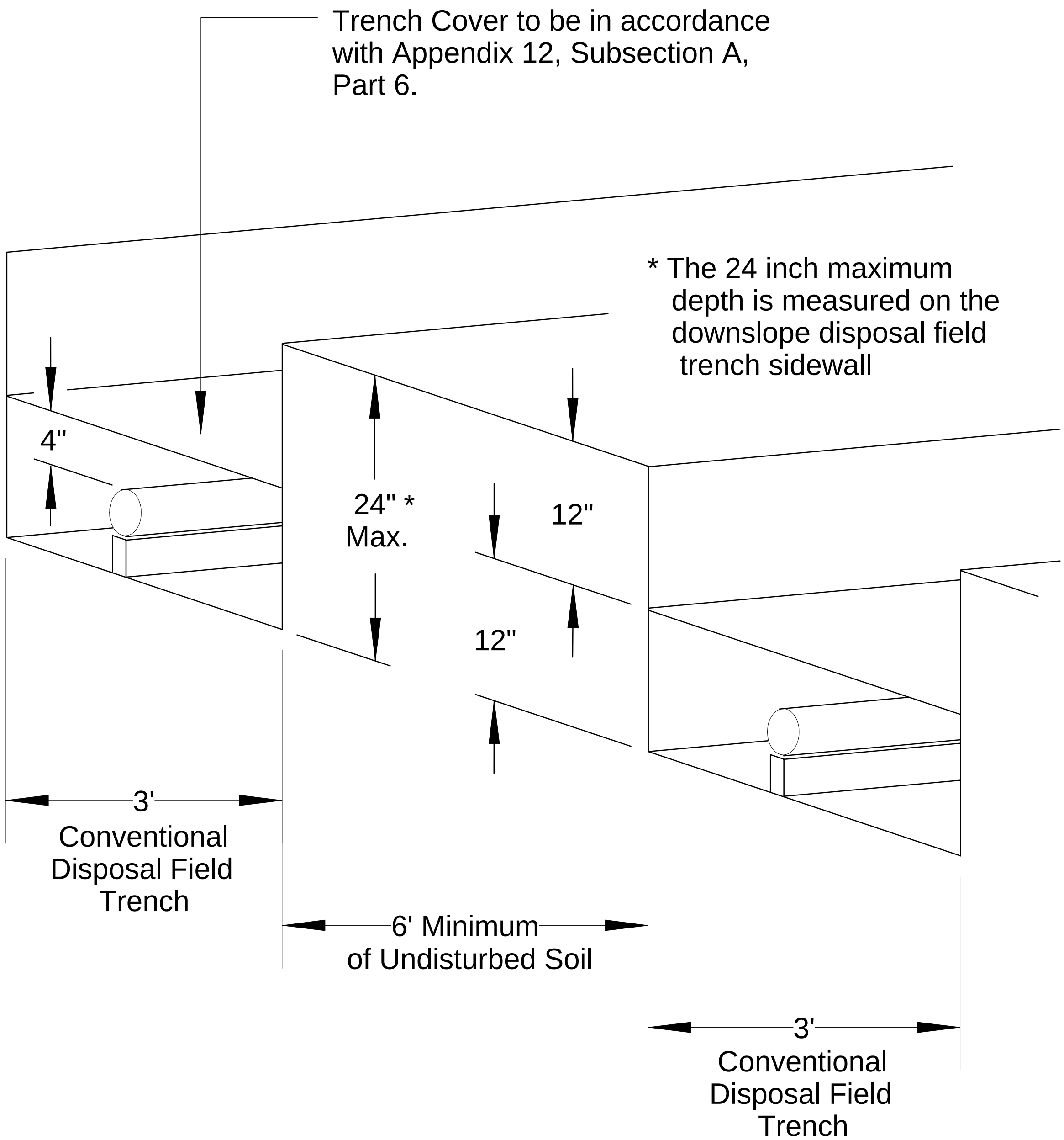


Figure A14-10. Cross section diagram of typical conventional system disposal field trench arrangement.

APPENDIX 15

AS-BUILT DOCUMENTATION FORM

As a part of the required as-built documentation, outlined in *Section 20, Subsection M*, the form provided in this appendix shall be utilized by all licensed installers.

<u>*NOTE:*</u> *The last page of this Appendix is the blank form provided for licensed installer use.*

A. Completion of the Form

The form is to be completed in its entirety, including the placement of the required attachments (where applicable), for each and every subsurface sewage disposal system installation.

The second page of this Appendix shows an example of a properly completed As-Built documentation form.

B. Preparation of the Field Sketch

The field sketch of the subsurface sewage disposal system installation shall be drawn in the provided space on the form. Field sketches drawn in any other manner shall not be accepted by the Department. Should a larger drawing space be needed, use the back of the form.

The field sketch is not required to be at any specific scale, however it shall be in proportion to its point of reference.

The point of reference always shall be the structure for which the subsurface sewage disposal system was constructed to serve. Thus, the location and configuration of the subsurface sewage disposal system components will be shown in the manner in which they relate to the structure.

The field sketch shall show, as a minimum, the following items where applicable to a specific system installation:

1. The approximate configuration of the structure or dwelling (i.e. the building perimeter),
2. Location and route of the driveway,
3. Location and route of the water line serving the structure or dwelling where the water line is within 25 feet of a system installation,
4. The location of the tank(s),
5. The routing of electrical lines for all EAS/Pump systems,
6. The routing of all piping to said tank(s),
7. Distance (in feet) to the tank(s) from the structure,
8. Routing of the tight line or supply line to a D-Box, Alternating Valve, PDM or EBD,
9. The routing and length (in feet) of all piping leading from a D-Box, Alternating Valve or PDM,
10. Routing of the tight line or supply line to the disposal field trenches, lateral lines or mound site,
11. Length (in feet) of the tight line or supply line,
12. Configuration of the disposal field trenches, lateral lines or mound at the system installation site,
13. Length (in feet) of all disposal field trenches or lateral lines,
14. Locations of crossovers, where present on a conventional system,
15. Basal dimensions of a mound,
16. The routing and length (in feet) of any soil drainage improvement practice (i.e. curtain drains, drawdown drains, etc.).

WILLIAMSON COUNTY DEPARTMENT OF SEWAGE DISPOSAL MANAGEMENT
AS-BUILT DOCUMENTATION FORM

Construction Permit Issued to:

JOHN SMITH

Subdivision Name and Lot Number:

WILLIAMSON ACRES, LOT 4

Complete and Full Address of SSDS Installation Site:

2219 MIMOSA ST.

Name of Licensed Installer (Print):

JOE BACKHOE

For All EAS Systems, List Pump Specifications and Pump Manufacturer:

THE INSTALLER SHALL ATTACH TO THIS FORM:
For All EAS System Installations; Attach a Copy of Receipt for Pump Purchase
For All EAS System Installations; Attach State Electrical Inspection Tag/Form
For Mound System Installations; Attach a Copy of Receipt for All Sand Purchases

Type of Subsurface Sewage Disposal System Installed:

Conventional System (check all that apply to said system):

- [X] Gravity Flow,
- [ ] EAS/Pump System,
- [ ] Distribution Box (D-Box),
- [ ] Pressure Distribution Manifold (PDM),
- [ ] Effluent Brake Device (EBD).
- [X] Serial Distribution,
- [ ] Recirculating,
- [X] Alternating Valve,

LPP System

- [ ] Standard
- [ ] Modified

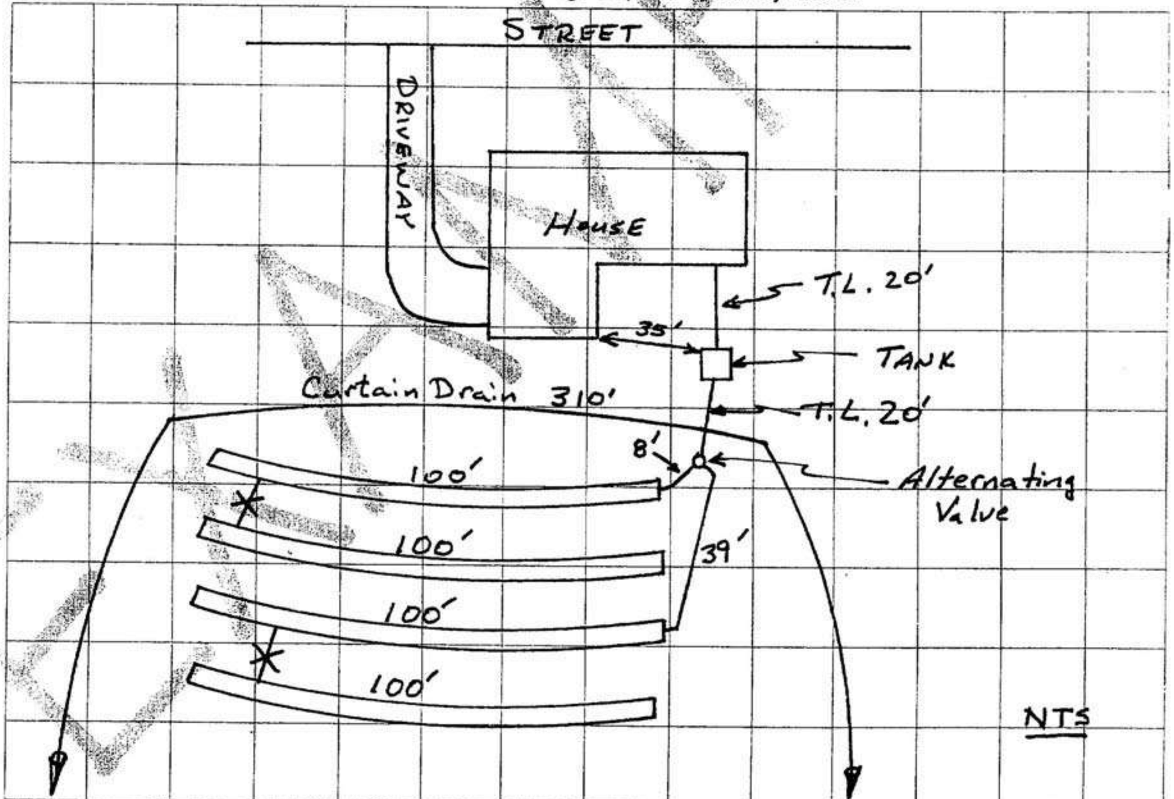
Mound System

- [ ] Standard
- [ ] Modified/Experimental

Tank Information

Septic Tank	Pump Tank
Liquid Capacity of Tank: 1000 gal.	Liquid Capacity of Tank: N/A
Manufactured by: Septic Tank Co.	Manufactured by: N/A

Sketch of Subsurface Sewage Disposal System by Installer



The Subsurface Sewage Disposal System Described on this Form was Constructed by:

Joe Backhoe — 11-13-98

(Signature of Licensed Installer) (Date)

WILLIAMSON COUNTY DEPARTMENT OF SEWAGE DISPOSAL MANAGEMENT
AS-BUILT DOCUMENTATION FORM

Construction Permit Issued to:	Type of Subsurface Sewage Disposal System Installed:
Subdivision Name and Lot Number:	Conventional System (check all that apply to said system): ☐ Gravity Flow, ☐ Serial Distribution, ☐ EAS/Pump System, ☐ Recirculating, ☐ Distribution Box (D-Box), ☐ Alternating Valve, ☐ Pressure Distribution Manifold (PDM), ☐ Effluent Brake Device (EBD).
Complete and Full Address of SSDS Installation Site:	LPP System ☐ Standard ☐ Modified
Name of Licensed Installer (Print):	Mound System ☐ Standard ☐ Modified/Experimental
For All EAS Systems, List Pump Specifications and Pump Manufacturer:	Tank Information
THE INSTALLER SHALL ATTACH TO THIS FORM: For All EAS System Installations; Attach a Copy of Receipt for Pump Purchase For All EAS System Installations; Attach State Electrical Inspection Tag/Form For Mound System Installations; Attach a Copy of Receipt for All Sand Purchases	

Septic Tank	Pump Tank
Liquid Capacity of Tank:	Liquid Capacity of Tank:
Manufactured by:	Manufactured by:

Sketch of Subsurface Sewage Disposal System by Installer

The Subsurface Sewage Disposal System Described on this Form was Constructed by:

________________________________ ________________

(Signature of Licensed Installer) *(Date)*

APPENDIX 16

SUBDIVISION OF LAND PARCELS – ASSOCIATED INFORMATION

STANDARD NOTES FOR PLATS SUBMITTED TO THE WILLIAMSON COUNTY DEPARTMENT OF SEWAGE DISPOSAL MANAGEMENT

The following information outlines the types of notes that are required to be placed on plats submitted to the Department for review.

<u>IMPORTANT NOTE:</u> Additional notes or modifications to the following notes may be required, for site specific cases or purposes, at the discretion of the Department.

The note block placed upon a plat shall be entitled – *Williamson County Department of Sewage Disposal Management Notes*

A. Notes Always Required

The following are standard notes regarding septic systems and shall be placed on all plats.

1. Any cutting, filling, compaction or disturbance from their natural state, of the soil areas reserved for sewage disposal, shall result in revocation of the lot approval. Additionally, the Department shall have the authority to refuse to grant an Construction Permit or may revoke a Construction Permit where the integrity of the proposed subsurface sewage disposal system areas has been compromised.

2. All septic systems must be installed by an installer licensed by Williamson County to construct alternative or conventional septic systems.

3. No bathing fixtures exceeding standard capacity (30 US gallons), including, but not limited to, oversized bathtubs, spa-tubs, hot-tubs, whirlpools, or jacuzzis, etc., shall be allowed unless specifically approved by the Department of Sewage Disposal Management.

4. No utilities (i.e. gas, water, or electric) or their easements, above or below ground, shall be allowed to encroach within 10 feet of the boundaries of the soil areas reserved for sewage disposal.

5. Curtain/interceptor/drawdown drains may be required on any or all lots.

6. No cutting, filling, compaction or any disturbance of the areas reserved for sewage disposal shall be permitted.

7. The limits of all excavations greater than 18 inches in depth, made for the purpose of house construction (or any other type of building construction), shall be kept 25 feet or more away from the platted or designated sewage disposal areas.

8. The limits of all excavations, made for the purpose of house construction (or any other type of building construction), shall be kept within the confines of the platted building envelope.

9. No part of the house or any of its related appendages (including, but not limited to - detached garages, porches, decks, sidewalks, etc.), or any portion of a driveway shall encroach on, through, or within 10 feet of the platted or designated sewage disposal areas.

10. No construction of patios, swimming pools, accessory buildings, etc. shall be allowed on any lot served by a subsurface sewage disposal system, unless approved by the Department of Sewage Disposal Management.

11. Water service lines must be separated from sewage disposal areas or platted disposal field areas by a minimum of 10 feet.

B. Other Required Notes

The following are additional notes regarding septic systems, that shall be placed on all plats at the direction of the Department. The individual preparing a plat shall have contacted the Department prior to placing any note to ascertain whether or not any of these notes shall be required.

<u>NOTE:</u> Where any notes contain blank spaces, the individual preparing a plat shall be required to contact the Department to obtain the appropriate information place upon the plat so as to replace the blank spaces, prior to submitting said plat to the Department.

1. All plumbing fixtures to be of the water conservative type, including low volume flush toilets (4 quarts or less), 1.5 to 2.0 gallons per minute shower heads, and faucet aerators.

2. Curtain/interceptor drains shall be required on each lot.

3. No water source, wells or springs are to be drilled or constructed within 50 feet of any portion or component of the septic system or the designated or platted sewage disposal field areas.

4. Designated sewage disposal areas plotted in accordance with acceptable soil areas field mapped by __________________________, private consulting soil scientist, on ______________ .

5. Designated sewage disposal areas plotted in accordance with acceptable percolation test area, located on a plat by a licensed surveyor, and approved by the Department. Percolation test conducted by ____________________________________, on ______________ .

6. All lots are restricted to one, _____ bedroom, single-family dwellings, with no oversized bathing fixtures, unless otherwise noted.

7. Lot _____ is restricted to one, _____ bedroom, single-family dwelling, with no oversized bathing fixtures.

8. Lot _____ is restricted to one, _____ bedroom, single-family dwelling, with one, _____ gallon oversized bathing fixture.

9. All tracts are restricted to one, _____ bedroom, single-family dwellings, with no oversized bathing fixtures, unless otherwise noted.

10. Tract _____ is restricted to one, _____ bedroom, single-family dwelling, with no oversized bathing fixtures.

11. Tract _____ is restricted to one, _____ bedroom, single-family dwelling, with one, _____ gallon oversized bathing fixture.

12. Lot _____ is restricted to one, _____ bedroom, single-family dwelling, with no oversized bathing fixtures in accordance with original subsurface sewage disposal system permit issued on the date of _____________ , permit I.D. #_____________ .

13. Lot _____ is restricted to a maximum of one, _____ bedroom, single-family dwelling, as per information obtained from the current property owner ______________________.

14. No soils information or percolation test data for lot #_____ is available in the Department of Sewage Disposal Management files due to the age of the existing structure.

15. No record of a final inspection of the septic system for lot #_____ is available in the Department of Sewage Disposal Management files due to the age of the existing structure.

16. LPP denotes that this lot is served by a Low Pressure Pipe system, which is an alternative means of sewage disposal.

17. MLPP denotes that this lot is served by a modified Low Pressure Pipe system, which is an alternative means of sewage disposal. MLPP systems require 6 to 10 inches of compatible soil fill material to be incorporated onto the designated or platted sewage disposal area, under Department of Sewage Disposal Management supervision.

18. Mound system denotes that this lot is served by a Mound system, which is an alternative means of sewage disposal.

19. Modified Mound system denotes that this lot is served by a modified Mound system, which is an alternative means of sewage disposal. modified Mound systems require 6 to 12 inches (or more, if specified by a Department Soil Scientist) of compatible soil fill material to be incorporated onto the designated/platted sewage disposal area, under Department of Sewage Disposal Management supervision.

20. Before a permit to construct a _____________ septic system can be issued, detailed site and design plans for the ___________ system shall be submitted to the Department of Sewage Disposal Management for review and approval. These plans shall be prepared by an engineer licensed in the state of Tennessee.

21. All platted sewage disposal areas shall be field-staked by a licensed surveyor and fenced off, to protect the areas from all construction traffic, by the property owner or building contractor. The areas then shall be field checked and verified by the Department of Sewage Disposal Management prior to the issuance of the septic permit.

22. The type of septic system necessary to serve this lot/tract will be determined at the time an application for a septic permit is made at the Department of Sewage Disposal Management.

SIGNATURE BLOCK

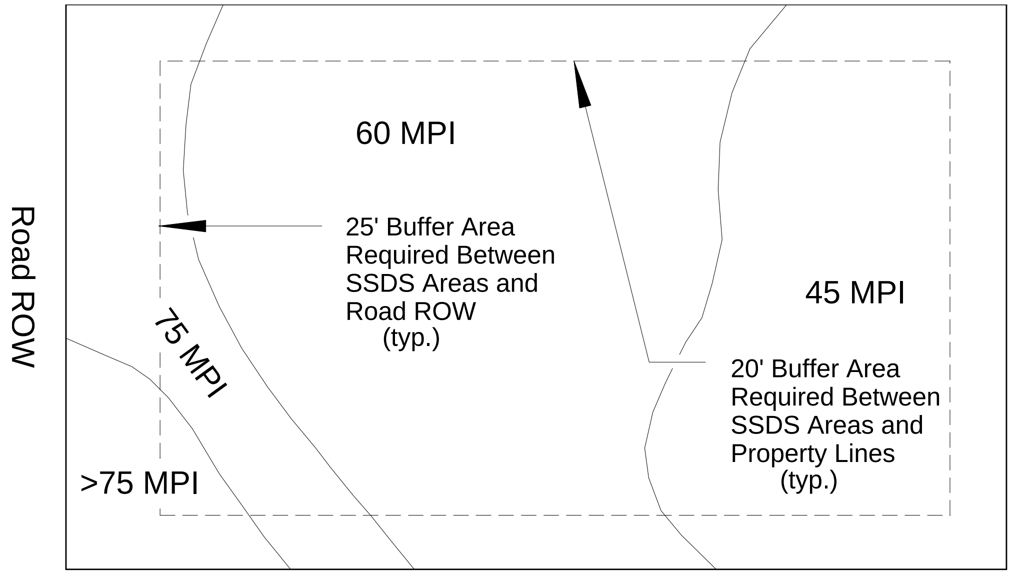
Where any plat is required to have Department approval, as outlined in these regulations or the regulations of any other government entity (i.e. Williamson County Planning Commission, incorporated town or city within the boundaries of Williamson County, etc.), the following signature block shall be placed upon said plat(s).

Certification of General Approval for Installation of Subsurface Sewage Disposal Systems with Restrictions

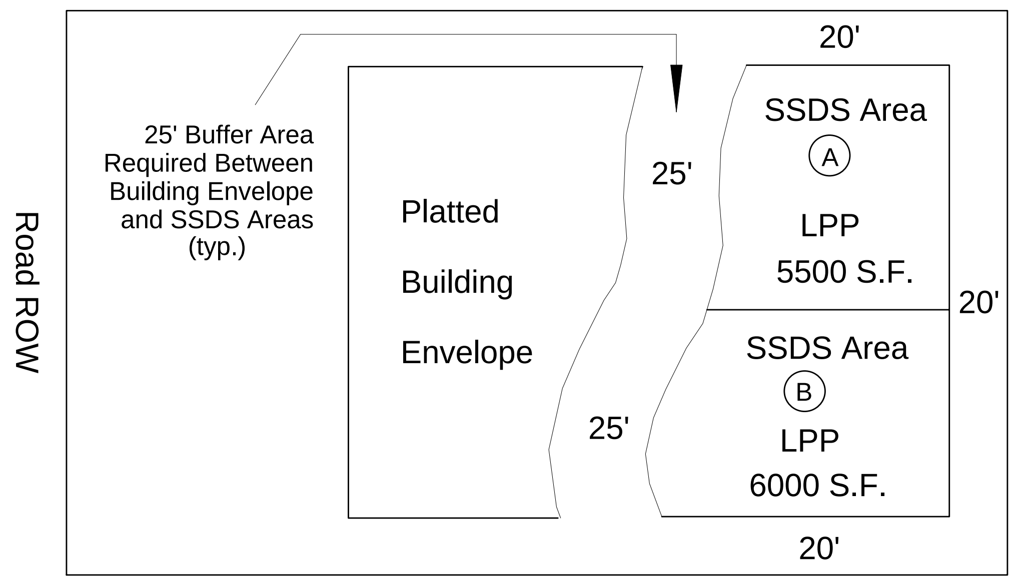
General approval is hereby granted for lots proposed hereon as being suitable for subsurface sewage disposal with the listed and/or attached restrictions.

Before the initiation of construction, the location of the house or other structure and plans for the subsurface sewage disposal system shall be approved by the local health authority.

_________________ , ____________________________________
Date Local Health Authority

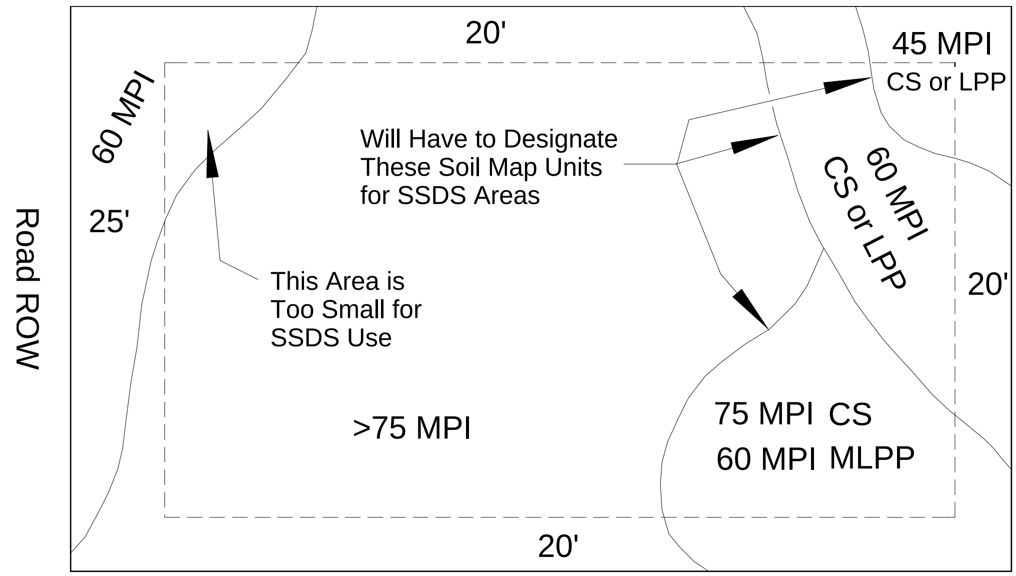


Soil Map Information



Disposal Field Areas Plotted Within the 45MPI Soil Map Unit

Figure A16-1. Designation of disposal field areas within single soil map unit.



Soil Map Information

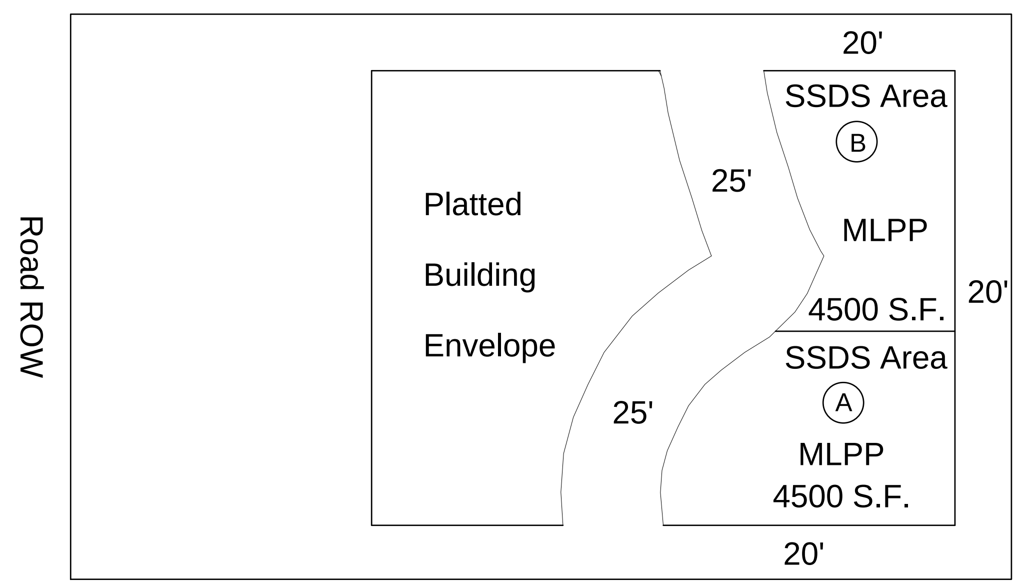


Figure A16-2. Designation of disposal field areas bridging multiple soil map units.

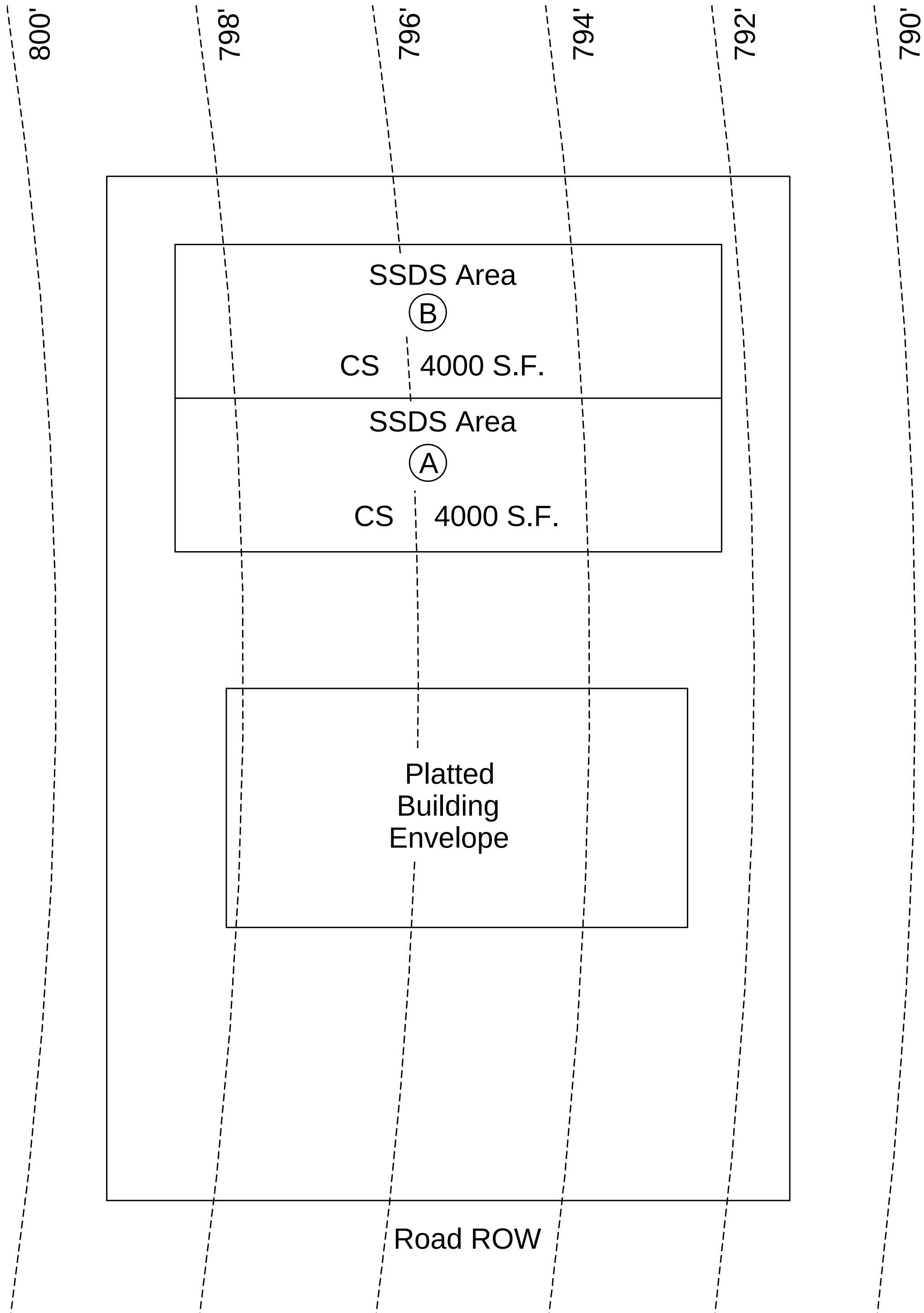


Figure A16-3. Example of installation restrictive characteristics. The entire lot contains 45 mpi soils and a conventional system has been proposed for use. However, due to poor area configuration for conventional system, the use of a LPP system would be required.

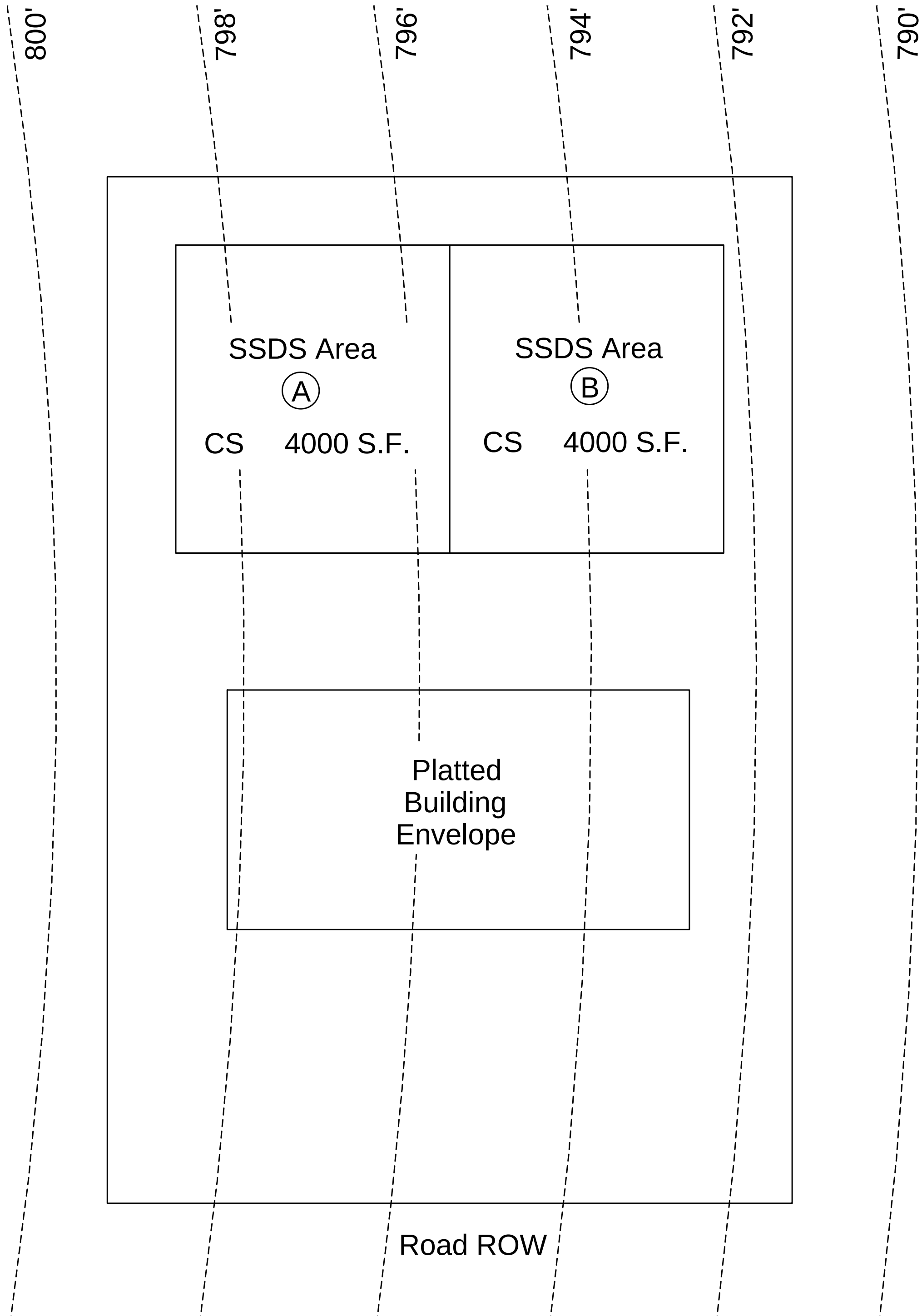


Figure A16-4. Example of an area layout that has been configured so as to allow for a more efficient conventional subsurface sewage disposal system layout and installation.

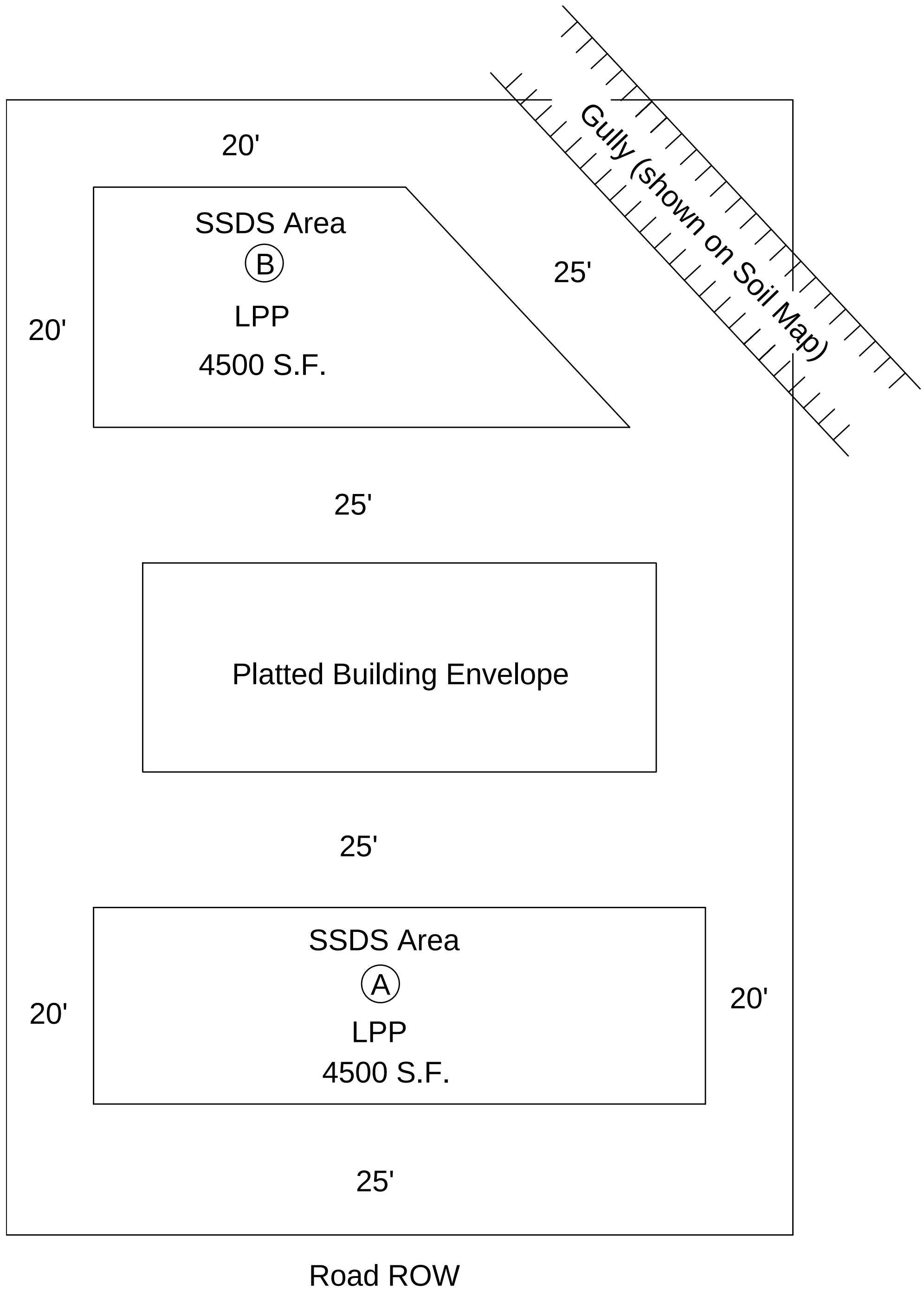


Figure A16-5. Example showing typical setbacks for subsurface sewage disposal system disposal field areas. The entire lot contains 60 mpi soil (i.e. 60 mpi for CS or LPP) and is on 0-5% slopes.

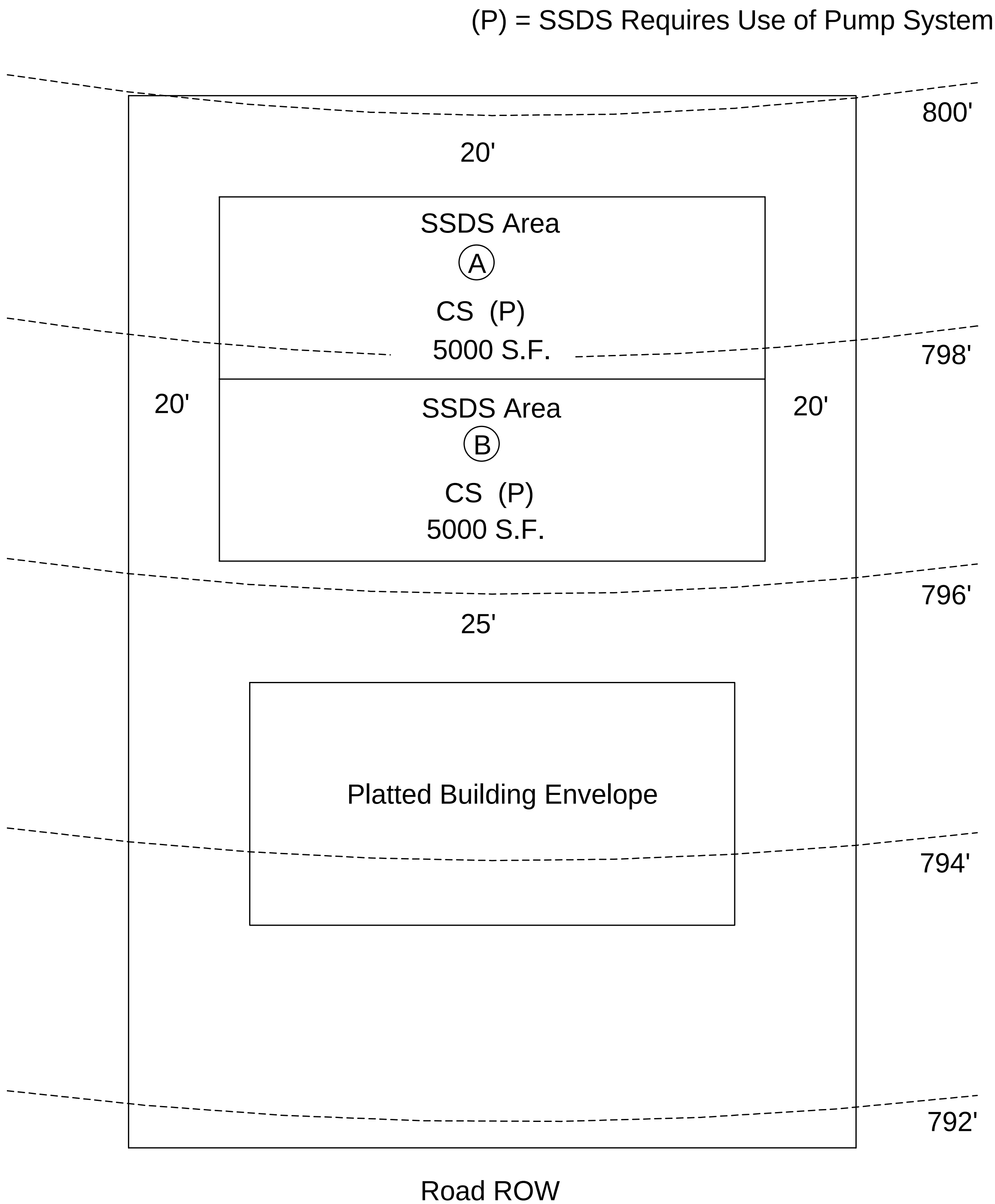
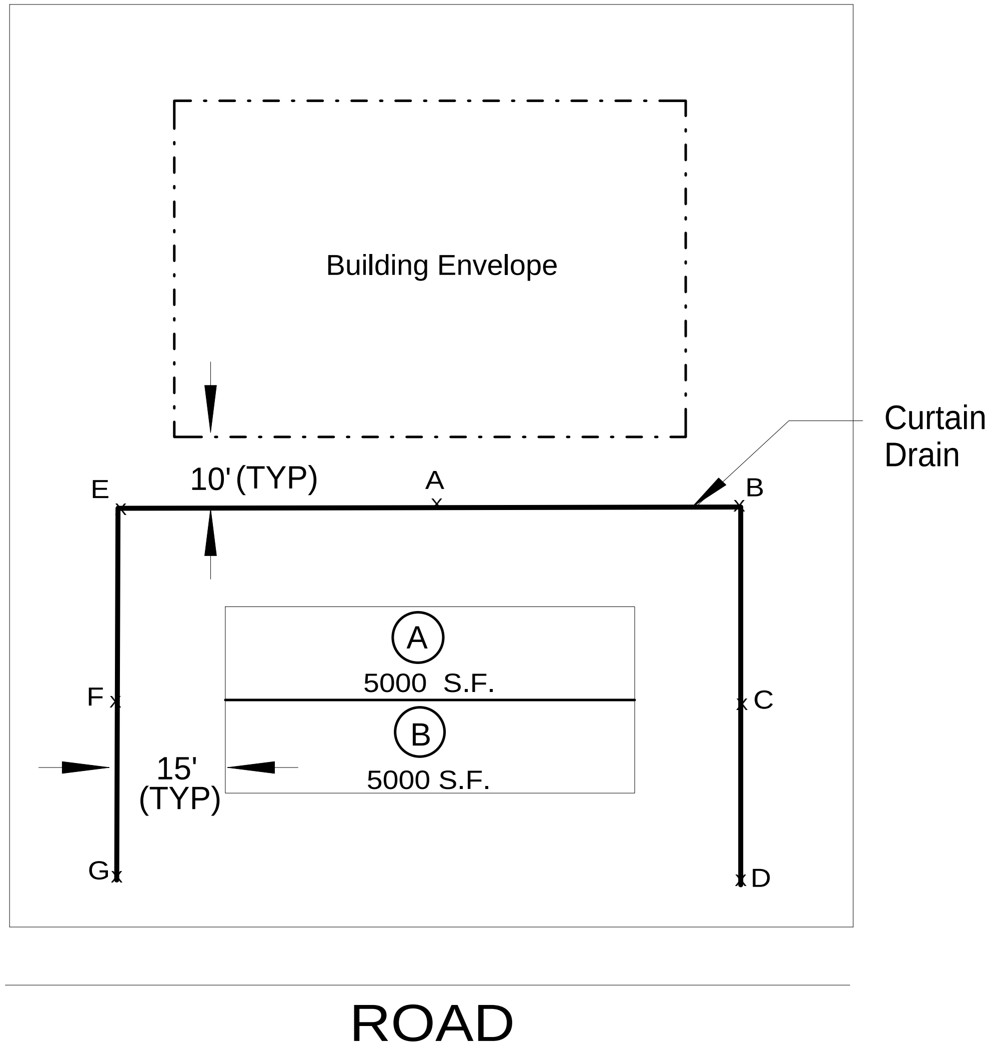


Figure A16-6. Example where the rear half of the lot contains 45 mpi soil (i.e. 45 mpi for CS or LPP system) and is on 5-15% slopes.



Curtain Drain Elevation Schedule Table									
LOT	Min. Depth		A	B	C	D	E	F	G
1	36"	Gnd. Elev.	732.8	732.1	731.0	729.5	732.0	731.2	729.3
		Inv. Elev.	729.8	729.1	728.0	OUTLET	729.0	728.2	OUTLET

Figure A16-7. Example of a platted lot showing the location and entire route of the required soil drainage improvement practice (a curtain drain in this particular case). Elevation points are shown along the drain route at regular intervals sufficient to adequately define its profile and to ensure a positive flow discharge outlet. Accompanying the drawing is a simple elevation schedule table. In addition to specifying the required minimum depth of the drain, this table gives both the ground and invert elevations corresponding to each and every point.

APPENDIX 17

PLUGGING AND ABANDONING AN EXISTING WATER WELL

Water wells shall be plugged and abandoned on any site where any portion of a subsurface sewage disposal system disposal field area, septic tank or pump tank, is proposed to be less than fifty (50) feet from an existing well (e.g. a water well used for any purpose, an old well not being used, etc.). However, where a well has been properly plugged and abandoned, there shall be a minimum of fifteen (15) feet of separation between the aforementioned components of a subsurface sewage disposal system and said well.

The purpose of plugging and abandoning an existing water well is to permanently seal the bore-hole (i.e. well shaft) to prevent the possible infiltration of sewage effluent into said bore-hole thus eliminating a potential source of groundwater contamination. Thus, the well must be filled the entire length of the bore-hole with a material that is less permeable than the earth materials surrounding said bore-hole.

All well plugging activities shall be monitored by the Department.

A. Persons Authorized to Plug Wells

Well plugging shall be done by a:

- well drilling contractor,
- well pump installation contractor,
- Professional Geologist (PG), or
- Professional Engineer (PE).

The aforementioned individuals will be referred to as *contractor* in this Appendix only.

All contractors shall be currently licensed, in the manner appropriate to each type of professional, by the State of Tennessee. The Department shall have the authority to require that the consultant provide proof of their credentials by providing a photocopy of their license to the Department.

B. Procedures

1. Prior to Plugging the Well

   (a) Secure the services of a contractor (i.e. an individual meeting the provisions outlined in Subsection A of this Appendix) to conduct all plugging activities.

   (b) The contractor chosen to conduct the well plugging procedure shall be required to identify the subsurface construction of the well to be plugged in accordance with the following procedures:

      (1) The contractor shall be required to assess the well to be plugged and abandoned and complete the *Well Plugging Information Sheet* for said well. Parts A, B and D of the *Well Plugging Information Sheet* shall be completed in full, while Part C is to be completed as accurately as possible.

      (2) The contractor shall utilize the *Well Plugging Information Sheet* form prepared by the Department.

      NOTE: For properties containing more than one well that will be plugged and abandoned, the well plugging contractor shall complete and send one Well Plugging Information Sheet for each individual well.

      (3) Said contractor shall send this information to the State of Tennessee Well Water Program. The *Well Plugging Information Sheet* is to be mailed to:

      Division of Water Supply
      Well Water Program
      6th Floor, L & C Tower
      401 Church Street
      Nashville, TN 37243 -1549

      (4) Once the contractor has forwarded this information to the State, no actions regarding the plugging of a well shall be taken. The contractor is to wait to receive information and authorization from the Department before proceeding with these procedures.

2. To Plug the Well

The Department shall review the *Well Plugging Information Sheet* when it is received from the State Water Well Program. The Department shall establish the requirements (i.e. disinfecting requirements, methodology, etc.) for plugging the well in question and issue said requirements to the contractor in writing.

When the contractor has received the written well plugging requirements, said contractor is to contact the Department in order to advise the Department as to when the well plugging activities will begin. The Department shall require that the contractor provide such notice a minimum of a five (5) working days prior to beginning a well plugging procedure.

There are four (4) steps to follow in all well plugging procedures. They are as follows:

(a) The pump and all associated wiring and drop line shall be removed from the well.

(b) The well shall be cleared of any obstructions along the entire length of the bore-hole.

(c) The well shall be disinfected prior to the placement of the backfill material (i.e. well plugging material) into the well shaft. See *Subsection D* of this Appendix.

(d) The plugging material shall be placed into the well. See *Subsection E* of this Appendix.

The written requirements will specify the amount of disinfectant to be applied to the well and the method to be utilized for plugging the well.

3. After Plugging the Well

Upon the satisfactory completion of all well plugging activities, the Department will document that the well has been properly plugged and abandoned.

Additionally, the Department shall have the authority to require that a written affidavit, prepared by the contractor that completed the plugging procedure, be submitted to the Department as verification that said well was plugged and abandoned in accordance with the provisions outlined in this Appendix.

C. Effect on Construction Permits

Where the Department has determined that the presence of an existing well is such that its proximity to a platted or designated subsurface sewage disposal system area necessitates that it be plugged and abandoned, the Department shall not issue a Construction Permit, for either new septic system construction or for septic system repairs, to any individual.

The issuance of a Construction Permit shall only be considered upon the satisfactory completion of the well plugging procedures outlined in this Appendix.

D. Well Disinfection Procedure

A well shall be disinfected with a minimum of a one hundred (100) parts per million chlorine solution. Ordinary laundry bleach is an acceptable source of chlorine. So as to ensure the minimum of a one hundred (100) parts per million chlorine solution in the well, one (1) quart of chlorine bleach shall be added for each one hundred (100) gallons of water present in the well.

Based upon the information documented on the *Well Plugging Information Sheet* (i.e. the static water level and the total well depth), the Department shall determine the amount of water present and specify (i.e. in the written well plugging requirements) the amount of chlorine bleach the contractor will be required to place in the well.

The number of gallons in a standing column of water (i.e. volume of water in a well) is calculated by using the following formula:

Gallons of Water = $[(d_w^{\,2} \times .7854) \times H_c\,] \div 231$

H_c = height of water column (in inches)
d_w = diameter of well (in inches)
231 = number of cubic inches in a gallon of water

E. Well Plugging Procedure

Based upon the information documented on the *Well Plugging Information Sheet* (i.e. the nature of the subsurface construction of the well), the Department shall determine and specify (i.e. in the written well plugging requirements) which of the following methods of plugging shall be utilized for a particular site.

1. Method A

   This method may be utilized for plugging wells of any depth.

   Fill the well using a cement grout (i.e. the backfill material) consisting of a mixture of Portland cement, sand and water in proportions of not more than two (2) parts by weight of sand to one (1) part of cement, with not more than seven (7) gallons of clean water per ninety pound sack of cement. Bentonite or other approved collodial reagent in the amount equal to one and one half (1.5%) percent by volume of cement may be used as an additive.

   The grout shall be piped directly to the point of application by a tremie or dump bailer so as to avoid segregation or dilution of the backfill material. The grout fill material shall extend from the bottom of the well (i.e. bore-hole) to within two (2) feet of the existing ground surface.

   The well casing may be cut off at or down to two (2) feet below the existing ground surface (i.e. to the top of the backfill material) and the area covered over by natural fill material.

2. Method B

   This method may only be utilized for plugging wells less than three hundred (300) feet in depth.

   This method involves the use of commercially processed and prepared granular bentonite materials marketed specifically for the purpose of plugging wells.

   These products generally consist of granular bentonite (i.e. a naturally occurring clay material) which can be used to seal water wells up to three hundred feet deep. These products are designed to be poured directly into the well from land surface provided an adequate amount of time is allowed for the bentonite chips to fall by gravity to the bottom of the well.

   IMPORTANT NOTE: The Department shall require that, where these products are utilized, the contractor strictly adhere to the manufacturer recommendations and/or methodologies concerning the use of their product.

   Specific product names will not be listed, however the Department will require that where these types of products are authorized for use, the contractor advise the Department, when scheduling well plugging activities, of the specific type of product that they intend to utilize. The Department shall have the authority to require that said contractor provide technical data and product information for the Department to review prior to its use.

Well Plugging Information Sheet – Williamson County, Tennessee

A. Contractor Information –			
Name of Well Plugging Contractor:			
Business Name:			
Business Address:			
Business Phone Number:			
Any other phone numbers (fax, pager, mobile, etc.):			
Contractors License Number:			
Expiration Date of Contractors License:			
B. Property Owner Information –			
Current Property Owner:			
Complete Mailing Address:			
Phone Number:			
C. Other Pertinate Well Information –			
Property Owner that had Well Drilled (if different from current property owner):			
Date Well was Drilled (approximate date if exact date unknown):			
Name of Well Driller (or suspected driller if actual driller is unknown):			
D. Well Assessment Information –			
Property Location (name of road):			
Date Plugging Contractor made Well Assessment:			
Total Depth of Well:	Feet;	Measured	Reported
Amount of Casing:	Feet;	Measured	Reported
Static Water Level:	Feet;	Measured	Reported
Casing Diameter:	Inches;	Measured	Reported

Well Water Program Staff:
The services of the noted contractor have been secured to plug the well described in the information on this form. In the effort to further identify the nature of the subsurface construction of the well, this data (documented by said contractor) is being submitted to the Well Water Program. The Williamson County Department of Sewage Disposal Management respectfully requests that your office review the data presented. Should your office possess any documented well information, please note and/or outline any additional requirements or specifications that shall be necessary to ensure the proper plugging and subsequent abandonment of this well.

Please forward this form and any additional information, upon the completion of your review, to the Department of Sewage Disposal Management, Soils & Technical Staff, Suite 411, 1320 West Main Street, Franklin, Tennessee, 37064.