

**GUIDANCE SUPPLEMENT**  
**FOR THE**  
**MAINE SUBSURFACE WASTEWATER DISPOSAL RULES**



**Department of Health & Human Services**  
**Maine Center for Disease Control and Prevention**  
**Division of Environmental Health**  
**Drinking Water Program, Subsurface Wastewater Unit**

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**GUIDANCE SUPPLEMENT TO THE  
MAINE SUBSURFACE WASTE WATER DISPOSAL RULES**

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## **CHAPTER 1 - PURPOSE**

### **GENERAL**

This document is a supplement to the Maine Subsurface Wastewater Disposal Rules, CMR 241 (Rules), for the purpose of providing interpretations of certain Sections of the Rules, providing suggested methods for preparing applications for onsite sewage disposal systems, and for implementing various aspects of the Rules including the design of systems and their components. Commonly used forms prescribed by the Department are also included in this document.

### **APPLICABILITY**

This supplement is applicable only to those onsite sewage disposal systems which are regulated under provisions of the Subsurface Wastewater Disposal Rules. This supplement has no applicability to systems licensed pursuant to the rules and statutes administered by the Maine Department of Environmental Protection.

### **INTERPRETATION**

The intent of this manual is to ensure public safety, health, and welfare insofar as they are affected by the installation and maintenance of onsite sewage disposal systems. This supplement should be interpreted so as to assure the proper treatment and installation of onsite sewage disposal systems.

### **DEFINITIONS**

Unless otherwise expressly stated, the following terms shall, for the purpose of this code Supplement, have the meanings set forth below in the Subsurface Wastewater Disposal Rules, CMR 241.

Words used in the present tense include the future tense; words in the masculine gender include the feminine and neuter; the singular number includes the plural, and the plural includes the singular.

Terms not defined in the following Sections or in the Subsurface Wastewater Disposal Rules, CMR 241 shall have ascribed to them their ordinarily accepted meanings such as the context may imply.

## CHAPTER 2 - SOIL PROFILE TERMINOLOGY

### GENERAL

This Chapter explains the terminology and methodology used to describe soil conditions and profiles.

This Chapter is designed to provide acceptable methods for evaluating and reporting site/soil conditions. If other methods are used the site evaluator should be able to demonstrate the methods used are equivalent to this Chapter.

### DRAINAGE MOTTLING

This Section provides a standard procedure to report mottling observed during a site evaluation.

General: Mottling is a color pattern observed in soil consisting of blotches or spots of contrasting color. The term "mottle" refers to an individual blotch or spot. Mottles can result from soil mixing by man or natural causes, such as tree throws or animal, and because of periodic soil saturation where the soil temperature is above 41° F. Mottles that develop due to periodic soil saturation are called "drainage mottles" and are used as an indication of seasonal or periodic and recurring ground water table.

Reporting drainage mottling: When drainage mottling is observed, the site evaluator should report the abundance and contrast of the mottles using the terminology in Subsection "Abundance," and Subsection "Contrast."

Abundance: Abundance may be estimated visually. Abundance of mottles should be classified as follows:

Few: Abundance is "few" where the mottled color occupies less than 2% of the exposed soil surface;

Common: Abundance is "common" where the mottled color occupies from 2 to 20% of the exposed soil surface; or

Many: Abundance is "many" where the mottled color occupies more than 20% of the exposed surface.

Contrast: Mottle contrast means the difference in color between the soil mottle and the background color of the soil. It is described as follows:

Faint: Mottles are "faint" when they may be distinguished only on close examination;

Distinct: Mottles are "distinct" when they are readily seen but not prominent; or

Prominent: Mottles are "prominent" when they are obvious and one of the outstanding features of the soil horizon.

Redoximorphic features (Drainage mottles): Redoximorphic features associated with wetness result from the reduction and oxidation of iron and manganese compounds in soil after saturation with water and desaturation, respectively. The reduced iron and manganese ions are mobile and may be transported by water as it moves through the soil. Certain redox patterns occur as a function of the patterns in which the ion-carrying water moves through the soil, and of the location of aerated zones in the soil. Redox patterns are also effected by the fact that manganese is reduced more rapidly than iron, while iron oxides more rapidly upon aeration. Characteristic color patterns are created by these processes. The reduced iron and manganese ions may be removed from a soil if vertical or lateral fluxes of water occur, in which case there is no iron or manganese precipitation in the soil. Wherever the iron and manganese is oxidized and precipitated, it forms either soft masses or hard concretions or nodules. Movement of iron and manganese as a result of redox process in a soil may result in redoximorphic features that are defined as follows:

Redox concentrations: These are zones of apparent accumulation of Fe-Mn oxides, including:

(1) Nodules and concretions, i.e., firm, irregularly shaped bodies with diffuse boundaries if formed in situ or with sharp boundaries in weathered soil horizons;

(2) Masses, i.e., soft bodies of variable shapes within the matrix; and

(3) Pore linings, i.e., zones of accumulation along pores which may be either coatings on the pore surfaces or impregnations from the matrix adjacent to the pores.

Redox depletions: These are zones of low chroma (2 or less) where either Fe-Mn oxides alone or both Fe-Mn oxides and clay have been stripped out, including:

(1) Iron depletions, i.e., zones which contain low amounts of Fe and Mn oxides but have a clay content similar to that of the adjacent soil matrix.

(2) Clay depletions, i.e., zones which contain low amounts of Fe, Mn and clay.

Reduced matrix: This is a soil matrix that has a low chroma in situ but undergoes a change in hue or chroma within 30 minutes after the soil material has been exposed to air.

## SOIL TEXTURE

This Section provides a standard procedure to report soil texture.

General: The relative amounts of the sizes of mineral particles in a soil are referred to as soil texture. All soils are comprised of sand, silt and clay. The soil texture classification prescribed in this Section is based upon the U.S. Department of Agriculture twelve soil textural classes. However, for the purpose of this code, a site evaluator can adequately describe soil texture based upon the eight general soil textural classes described in this Section.

Ribbon test: A ribbon test is one tool used in quantifying the percentage of silt and clay particles present in a soil sample. The ability to form a ribbon and the type of ribbon formed assist the identification of soil textural class. An acceptable ribbon test is as follows:

Moisten and hand knead: Moisten a marble-size portion of the soil and hand knead it until it is the consistency of putty.

Push into ribbon: Then squeeze the ball of soil between thumb and forefinger, pressing the thumb forward over the forefinger to push the soil into a ribbon.

Reporting texture: The site evaluator should report the soil texture using the terminology in Subsections "Sand" through "Silty clay."

Sand: The texture is "sand" where the soil is loose, single grains. The individual grains can be readily seen and felt.

Dry: Squeezed in the hand when dry, it will fall apart when the pressure is released and does not have enough fines to stain the lines in the palm of the hand.

Moist: Squeezed when moist, it will form a cast or lump that will crumble when lightly touched. Sand does not form a ribbon between the thumb and forefinger.

Loamy sand: The texture is "loamy sand" where the soil is loose, single grains. The individual grains can be readily seen and felt and has enough fines to stain the lines in the palm of the hand.

Dry: Squeezed in the hand when dry, it will fall apart when the pressure is released but has enough fines to stain the lines in the palm of the hand.

Moist: Squeezed when moist, it will form a cast that will crumble when touched and bears very careful handling. Loamy sand does not form a ribbon between the thumb and forefinger but has enough fines to stain the lines in the palm of the hand.

Sandy loam: The texture is "sandy loam" where the soil contains much sand, but has enough silt and clay to make it somewhat sticky. Individual sand grains can be readily seen and felt.

Dry: Dry soil aggregates are easily crushed. Squeezed when dry, it will form a cast that will fall apart. Sandy loam has a very faint velvety feeling initially, but as rubbing is continued, the gritty feeling of sand dominates.

Moist: If squeezed when moist, a cast can be formed that will bear careful handling without falling apart. This soil does not form a ribbon between the thumb and forefinger.

Loam: The texture is "loam" where the soil has a relatively even mixture of sand, silt, and clay. A loam feels somewhat gritty, yet fairly smooth and highly plastic.

Dry: Dry soil aggregates are crushed under moderate pressure; clods or lumps can be quite firm. When pulverized, loam has a velvety feel that becomes gritty with continued rubbing.

Moist: Squeezed when moist, it will form a cast that can be handled quite freely without breaking. Loam has a very slight tendency to ribbon between the thumb and forefinger. The ribbon surface is rough.

Silt loam: The texture is "silt loam" where the soil is medium-textured soil.

Dry: Dry soil aggregates are firm but may be crushed under moderate pressure. Clods are firm to hard. Silt loam may appear cloddy, but the clods are readily broken. It will form casts that can be handled freely without breaking. When pulverized, a smooth, flour-like feel dominates.

Moist: Squeezed when moist, it will form casts that can be handled freely without breaking. Silt loam has a slight tendency to ribbon between the thumb and forefinger. The ribbon has a broken effect or rippled appearance.

Silt: The texture is "silt" where the soil is medium textured and feels floury when dry and nonsticky when moist.

Silty clay loam: The texture is "silty clay loam" when the soil is a fine-textured soil.

Dry: Dry soil aggregates are very firm. Silty clay loam usually breaks into clods or lumps that are hard when dry.

Moist: Squeezed when moist, it will form a thin ribbon that will break readily, barely sustaining its own weight. The moist soil is plastic and will form a cast that will stand considerable handling. When hand kneaded it does not crumble readily, but tends to become a heavy, compact mass. It is sticky when moist.

Silty clay: The texture is "silty clay" where the soil is fine-textured.

Dry: Silty clay usually forms very hard clods or lumps when dry.

Moist: Squeezed when moist, it will form a long flexible ribbon. A silty clay soil leaves a "slick" surface when rubbed with a long stroke and firm pressure. Silty clay tends to hold the thumb and forefingers together, due to its stickiness. When placed between the teeth silty clay has a smooth slick feeling.

Wet: Silty clay is quite plastic and can be very sticky when wet.

## ROCK FRAGMENTS

This Section provides a standard procedure to modify the soil texture description based upon the size and abundance of rock fragments in the soil profile and on the surface of the site.

General: Where the soil profile contains 15 to 35% (by volume) of rock fragments, the soil texture description should be modified using the appropriate adjectives prescribed in Subsection "Rock fragment size," and Subsection "Abundance of rock fragments."

Rock fragment size: The rock-fragment-size terms for modifying the soil texture description are as follows:

Gravelly: The adjective "gravelly" is used where the rock fragments range from 0.1 to 3 inches in diameter (i.e., gravelly sandy loam, gravelly loam, etc.).

Cobbly: The adjective "cobbly" is used where the rock fragments range from 3 to 10 inches in diameter (i.e., cobbly sandy loam, cobbly loam, etc.).

Stony: The adjective "stony" is used where the rock fragments are greater than 10 inches in diameter (i.e., stony sandy loam, stony loam, etc.).

Abundance of rock fragments: Abundance should be estimated visually, by using the volume percentage charts in Table 10-1. Abundance of rocks should be classified as follows:

Very: Where the soil profile contains 36 to 60% by volume of rock fragments, the word "very" is used along with the appropriate rock fragment size term. Both are then used with the textural name (i.e., very gravelly sandy loam, very cobbly sandy loam, very stony sandy loam, etc.).

Extremely: Where the soil profile contains 61 to 90% by volume of rock fragments, the word "extremely" is used along with the appropriate rock fragment size term. Both are then used with the textural name (i.e., extremely gravelly sandy loam, extremely cobbly sandy loam, extremely stony sandy loam, etc.).

Excessive surface stones: Where the surface of the site contains more than 50% by area of large stones (and when these stones are not going to be removed), the site should be considered excessively coarse. Under such conditions the disposal field should be above the stones.

## SOIL CONSISTENCE

This Section provides a standard procedure to report soil consistence during site evaluations.

Soil consistence: For the purposes of this code, consistence is described as "consistence in place." It is not unusual for a soil to be described as "firm in place" but to be friable when crushed between the thumb and forefinger. The soil that is firm in place will restrict the downward movement of septic tank effluent, even though it may be friable when removed. It is important to note that dry soils may exhibit greater resistance to a pocket penetrometer than when moist. If possible, soil consistence should be measured in a moist state.

Reporting consistence: The site evaluator should report the soil consistence using the terminology in Subsections "Loose," through "Cemented."

Loose: The consistence is "loose" where a soil horizon has a single grain structure and offers resistance to a pocket penetrometer of less than 0.25 tons/square foot. Soil does not stick to itself when pressed together.

Friable: The consistence is "friable" where a soil horizon has a granular or crumb structure but may include weak blocky or weak platy structure. Resistance to a pocket penetrometer is 0.25 to 0.75 tons/square foot. Soil sticks to itself when pressed together.

Firm: The consistence is "firm" where a soil horizon has a platy, prismatic, or massive structure. Resistance to a pocket penetrometer is 0.75 to 1.5 tons/square foot.

Very firm: The consistence is "very firm" where a soil horizon has a platy, prismatic, or massive structure. Resistance to a pocket penetrometer is greater than 1.50 tons/square foot.

Cemented: The consistence is "cemented" where a soil horizon has a hardness caused by some cementing substance other than clay minerals. Among these substances are carbonate, silica, oxide, salts, or iron and aluminum. Cementation is usually altered very little by wetting.

## SOIL STRUCTURE

This Section provides a standard procedure to report soil structure. Soil structure refers to the shape of the natural soil aggregates. The structure of the soil has a major impact on the ability of the site to handle waste water. Soil structures are listed here in order of their relative permeability.

Reporting structure: The site evaluator should report the soil structure using the terminology in Subsections "Single grain," through "Massive."

Single grain: The structure is "single grain" where the soil consists of loose individual sand grains that will not bind together into recognizable soil aggregates.

Spherical: The structure is "spherical" where the soil aggregates have more or less equal dimensions and lack sharp corners, sharp edges, or well defined faces. This term includes crumb and granular structure as defined by the U.S. Department of Agriculture.

Subangular blocky: The structure is "subangular blocky" where soil aggregates have more or less equal dimensions and possess well defined flat or somewhat curved faces, but lack sharp corners and sharp edges.

Blocky: The structure is "blocky" where soil aggregates have more or less equal dimensions and have well defined flat or somewhat curved faces, sharp corners and sharp edges.

Prismatic: The structure is "prismatic" where soil aggregates have one axis distinctly longer than the other two and are oriented with the long axis in an upright vertical position.

Platy: The structure is "platy" where soil aggregates have one axis distinctly shorter than other two and are oriented with the short axis in an upright vertical position.

Massive: The structure is "massive" where the soil consists of a dense, compact mass and shows no recognizable natural soil aggregates or structural faces.

## BEDROCK

This Section provides a standard procedure to report the presence of bedrock. Bedrock affects the ability of a system to treat septic tank effluent. It thus plays a significant role in the performance of a system.

Reporting bedrock: The site evaluator should report any bedrock which includes, but is not limited to, any solid and continuous body of rock, with or without fractures.

## EXCESSIVELY COARSE SOIL HORIZONS IN SHORELAND ZONES

This Section provides a standard procedure to report excessively coarse soil horizons within shoreland zone areas. Excessively coarse soil horizons provide less opportunity for the treatment of septic tank effluent. Thus these soil horizons play a significant role in the performance of a system.

Reporting excessively coarse soil horizons: The site evaluator should report the presence of excessively coarse soil horizons when any of the following conditions are found:

Greater than 50% rock fragments: Soil horizons with a rock fragment greater than 3 inches diameter, content greater than 50% by volume;

Coarse to very coarse sands: Sandy textured soil horizons that are composed primarily of coarse to very coarse sand, from 0.5 to 2 millimeters in diameter with less than 2% clay or silt as defined by the U.S. Department of Agriculture.

## HYDRAULICALLY RESTRICTIVE SOIL HORIZONS

This Section provides a standard procedure to report hydraulically restrictive soil horizons. Hydraulically restrictive soil horizons slow down the vertical movement of septic tank effluent. In this way, these soil horizons play a significant role in the performance of a system.

Reporting hydraulically restrictive soil horizons: A site evaluator should report the presence of a hydraulically restrictive soil horizon if any of the following conditions exist:

Silty clay loam: A soil horizon having a silty clay loam or finer texture;

Massive or platy silt loam: A soil horizon having a silt loam texture together with a massive or platy structure;

Firm or very firm silt loam: A soil horizon having a silt loam texture together with a firm or very firm consistence;

Cemented horizons: A cemented soil horizon that remains hard when soaked in water;

Basal tills: A basal till laid down at the bottom of the glacier; or

Firm platy sandy loam to loamy sand: Sandy loam to loamy sands with platy structures that are firm to very firm.

## SOIL COLOR

This Section provides a standard procedure to evaluate soil colors.

General: Soil colors often reveal much about a soil's wetness. Site evaluators examining the soil should report the approximate soil color in accordance with the Munsell soil color chart. The standardized Munsell soil colors are identified by three components: hue, value, and chroma. Hue is related to one of the main spectral colors: red, yellow, green, blue, or purple, or various mixtures of these principal colors. Value refers to the degree of lightness, while chroma indicates the color strength or purity. In the Munsell soil color book, each hue has its own page and the color is further subdivided into units of value (on the vertical axis) and chroma (on the horizontal axis). Because accurate reproductions of soil colors are expensive, the Munsell soil color book contains a limited number of hues, values and chromas. The soil matrix or mottle colors are determined by comparing the soil with individual color chips in the soil color book.

Recognition criteria: Colors are best determined in soils that are, or have been, moistened. The colors of the topsoil are valuable in determining the drainage condition of a site.

Gleying: Gleying (bluish, greenish, or greyish colors) immediately below the A-horizon is an indication of a saturated soil. Gleying can occur in both mottled and unmottled soils. Gleyed soil conditions can be determined by using the gley page of the Munsell Soil Color Charts. Caution: Gleyed conditions normally extend throughout saturated soils. Beware of soils with grey E-horizons due to drainage and not to saturation. These latter soils can often be recognized by bright-colored layers below the E-horizon.

Matrix chromas of 2 or less: When the soil is moist, matrix chromas of 2 or less are considered low chromas and are often diagnostic of soils saturated for long periods.

Iron and manganese concretions: During the oxidation-reduction process, iron and manganese in suspension are sometimes segregated as oxides into concretions or soft masses. Manganese concretions are usually black or dark brown. Iron concretions are usually yellow, orange, or reddish brown.

Sandy soils: Soil color in saturated sandy soils may not be as pronounced.

Bright colored mottles and a low chroma matrix: Soils that have brightly colored mottles and a low chroma matrix are indicative of alternating saturated and unsaturated soil conditions.

## SOIL PROFILE CLASSES

This Section provides the procedure to determine the most appropriate soil profile to be cited from Table 700.1.

Reporting soil profiles associated with basal glacial till: Basal till, also known as "lower or lodgement till," is a unique soil because in many cases it supported the weight of the glacial ice and often is very dense and compact. As the last ice sheet advanced across Maine, it pushed before it, and mixed together, mounds of soils deposited by previous glaciers. The ice sheet had no ability to sort out or grade the soil and it ground up rock fragments as it moved. Therefore, the soil and ground up rock debris pushed by the ice was deposited in a dense, unsorted mixture of angular rock fragments and sandy silts and clay. Basal till generally overlies the bedrock surface. It is usually identified because of its position in relation to bedrock and its unsorted appearance and density. Soil profiles associated with basal tills have the following characteristics:

Soil profile 1: These are loam to silt loam textured soils throughout the entire profile. The lower soil horizons usually have prismatic or platy structures. This profile tends to become more firm, dense, and impervious with depth. Therefore, this profile may have a hydraulically restrictive soil horizon. Angular rock fragments are present. Occasionally, cobbles and stones are present.

Soil profile 3: These are loam to loamy sand textured soils throughout the entire profile. The lower soil horizons usually have well defined prismatic or platy structures that are very compact and difficult to excavate. These lower horizons are considered hydraulically restrictive. Angular rock fragments are present. Occasionally, cobbles and stones are present.

Reporting soil profiles associated with ablation till: Ablation till, also known as "upper till," is a loose, permeable till deposited during the final melting of the glacial ice. Ablation till generally overlies basal till. Lenses of crudely sorted sands and gravels are common. Prior to the establishment of vegetation, the glacial melt waters washed away much of the sands and silts. In this way, cobbles and stones became concentrated at or on the land surface. Soil profiles associated with ablation tills have the following characteristics:

Soil profile 2: These are loam to sandy loam textured soils throughout the entire profile. This profile does not have a hydraulically restrictive horizon. Angular rock fragments are present. Occasionally, cobbles and stones are present.

Soil profile 4: These are sandy loam to loamy sand textured upper soil horizons overlying loamy sand textured lower horizons. This profile tends to be loose and easy to excavate. Lower soil horizons tend not to be firm and are not considered hydraulically restrictive. Angular rock fragments are present along with partially water-worn cobbles and stones.

Reporting soil profiles associated with stratified glacial drift: As the ice sheet thinned and became stagnant, melt water flowed off the eroded channels and hill sides. Silt, sand, gravel, cobbles, and stones were carried away by the melt waters. Materials carried by the melt waters and deposited near or adjacent to the ice sheet are called ice contact deposits (Soil profile 6). Materials carried by the melt waters and deposited some distance from the ice sheet are called outwash deposits (Soil profile 5). When these streams and rivers reached the ocean, they lost their velocity. As the velocity decreased, the gravel size fragments settled out first. Further on, the sands settled out. Last of all, the silt-clays settled to the bottom in calm, deeper waters. Soil profiles associated with stratified glacial drift have the following characteristics:

Soil profile 5: These are loam to loamy sand textured upper horizons overlying fine and medium sand parent materials. Stratified soil horizons of water-sorted materials may be present. The lower soil horizons tend to be granular or massive. The entire profile tends to be loose except that saturated horizons may be cemented (and therefore firm) and are considered hydraulically restrictive. Soil horizons with over 25% water-worn rock fragments are common. Some soil horizons may have many water-worn cobbles and stones. These deposits may display an extreme range, and frequent and abrupt changes, in grain size.

Soil profile 6: These are loamy sand to sandy textured soil horizons overlying stratified coarse sands and gravel parent material. Stratified soil horizons of very-well-water-sorted materials are present. The entire profile tends to

be very loose, except that saturated horizons may be cemented (and therefore firm) and are considered hydraulically restrictive. Soil horizons with over 25% water-worn rock fragments are common. Some soil horizons may have many water-worn cobbles and stones. There is a wide range of grain size. The average grain size of the outwash diminishes as the distance from the glacier increases.

Reporting soil profiles associated with mixed geological origins: This profile typically occurs in areas where outwash deposits were deposited over marine silt and clay deposits. Soil profiles associated with mixed geological origins have the following characteristics:

Soil profile 7: These are 15 or more inches of sandy loam to loamy sand glacial till or loamy sand to medium sand stratified drift parent material overlying marine or lacustrine deposited silt to silty clay or 15 or more inches of loamy sand to medium sand stratified drift parent material overlying firm basal till. The upper soil horizons tend to be granular in structure. The lower soil horizons tend to be firm and massive in structure and are considered to be hydraulically restrictive. Rock fragments may be present in the upper soil horizons, but they are usually absent in lower soil horizons.

Reporting soil profiles associated with lacustrine deposits: As the melt water flowed over the ice sheet, temporary fresh-water lake basins were formed in the ice. In these basins, thick deposits of well-sorted silt and clay particles settled out in the very quiet waters. This resulted in thin or thick alternating layers of well-sorted silts and clayey silts, or silts and fine sands. The soil profile associated with lacustrine and marine deposits have the following characteristics:

Soil profile 8: These are loam to fine sandy loam textured upper soil horizons overlying firm silt loam to silt textured lower soil horizons. The upper horizons tend to be granular in structure. The lower horizons tend to be firm and massive in structure and are considered to be hydraulically restrictive. Stratified lenses of fine sand and sandy loam may be present in the lower horizons. Rock fragments are usually absent throughout the entire profile.

Reporting soil profiles associated with marine deposits: Our current coastal wetlands and coastal river basins were covered by the ocean at the time the ice sheet started to retreat. As the melt water flowed from the ice sheet and reached the ocean, thick deposits of well-sorted silt and clay particles settled out. The building of the tidal flats at the mouth of the Presumpscot River is an example of a similar type of deposition in action today. The soil profiles associated with lacustrine and marine deposits have the following characteristics:

Soil profile 9: These are silt loam textured upper soil horizons overlying silt loams to clay textured lower soil horizons. The lower soil horizons tend to be very firm and are considered to be hydraulically restrictive. Rock fragments are usually absent throughout the entire profile. Thin lenses of very fine sand to silt may be present in the lower horizons.

Reporting soil profiles associated with organic deposits: Since the ice sheets retreated, organic materials have been accumulating in tidal marshes and other wetlands, swamps, bogs, and marshes. Organic matter also accumulates on higher elevations and some coastal locations where year-round cold air temperatures retard biological breakdown. Soil profiles associated with organic deposits have the following characteristics:

Soil profile 10: These are partially decomposed organic materials.

Reporting soil profiles associated with alluvial, dune, and beach deposits: These soils are very young geologically and exhibit very little weathering. The alluvial soils are formed by repeated flooding. Each flood deposits a new thin layer of silt, sand, or other soil. Alluvial soils tend to be associated with flood plains and terraces along present rivers. The beaches and dunes are very unstable and consist of very clean uniformly sorted sands with no weathering or developed soil horizons. Soil profiles associated with alluvial deposits should be reported as follows:

Soil profile 11: These soils have no typical profile. Thus, the soil profile 1 to 9 that best describes the observed profile should be used for disposal field sizing.

Non-conforming soil profiles: In situations where the observed soil conditions do not exactly fit one of the 11 general soil profile classes, use the soil profile class that best describes the observed soil texture and most limiting soil horizons.

## SOIL CONDITION CLASSES

This Section provides a standard procedure to report a soil condition class to be used.

General: Soil condition classes describe drainage and bedrock conditions. Maine soils should be placed into classes AI, AII, AIII, B, C, D, and E.

Reporting bedrock conditions: Site conditions associated with bedrock should be reported as follows:

Bedrock condition AI: Soils that have less than 12 inches of natural undisturbed soil over bedrock are classified as bedrock condition "AI."

Bedrock condition AII: Soils that have 12 inches to 15 inches of natural undisturbed soil over bedrock are classified as bedrock condition "AII."

Bedrock condition AIII: Soils that have 15 to 48 inches of natural undisturbed soil over bedrock are classified as bedrock condition "AIII."

Reporting soil drainage conditions: Site conditions associated with a soil drainage should be reported as follows:

Drainage condition B: Soil drainage condition B soils are well, somewhat excessively, or excessively drained. Water is easily removed from the soil. These soils usually have the following characteristics: they occupy gently sloping to very steep sites; they usually have bright colors in the upper horizons of the soil profile; and soil mottles indicative of seasonal ground water tables begin at depths greater than 48 inches below the mineral soil surface.

Drainage condition C: Soil drainage condition C soils are moderately well drained. Water is removed from soil somewhat slowly. Moderately well drained soils usually have the following characteristics: these soils occupy gently sloping to moderately steep slopes; they have bright uniform colors in the upper soil horizons; and soil mottles indicative of seasonal ground water tables begin at depths of 15 to 48 inches below the mineral soil surface.

Drainage condition D: Soil drainage condition D soils are somewhat poorly to poorly drained. Water is removed from the soil so slowly that the seasonal ground water table is 7 to less than 15 inches below the mineral soil surface. These soils usually have the following characteristics: they occupy nearly level to sloping sites; they may have a dark-colored surface soil horizon with greyish colored sub-horizons; and soil mottles indicative of seasonal ground water tables begin at depths of 7 to less than 15 inches below the mineral soil surface. However, mottles may be masked, due to organic matter accumulations, and may not be evident until the base of the A or Ap horizon. These soils may be ponded for short periods of time and have a dark-colored surface soil horizon with greyish-colored sub-horizons. On any potential poorly drained site or where the "A" or "Ap" horizon is 6 inches thick or thicker, the Maine Association of Professional Soil Scientists (MAPSS) Drainage Key should be used. See Table 10-1.

Drainage condition E: Soil drainage condition E soils are poorly to very poorly drained. Water is removed from the soil so slowly that the seasonal ground water table remains at or near the mineral soil surface for a significant period of the year. Poorly and very poorly drained soils are classified as hydric soils and often indicate the presence of a wetland. They have the following characteristics: these soils occupy level or depressed sites and are frequently ponded; they have a thick black or dark grey surface horizon with grey lower soil horizons; and soil mottles indicative of seasonal ground water tables may not be evident above 7 inches due to masking organic matter or thick A-horizons.

Caution: Beware of poorly or very poorly drained problem soils that may not reflect these color patterns. On any potential poorly drained site or where the "A" or "Ap" horizon is 6 inches thick or thicker, the Maine Association of Professional Soil Scientists (MAPSS) Drainage Key should be used. See Table 10-1.

Reporting soil profiles with both bedrock and soil drainage limitations: Soil profiles with both bedrock and seasonal ground water table limitations should be reported, using both of the soil conditions describing bedrock and seasonal ground water table (i.e., AI/D, AII/B, etc.).

TABLE 3-1 KEY TO DRAINAGE CLASSES

Maine Association of Professional Soil Scientists

Use this key starting at the first drainage class listed (very poorly drained). If the soil being evaluated does not exhibit the soil morphological features for that drainage class, go to the next drainage class. Continue through each drainage class until the soil being evaluated meets the soil morphological features for a particular drainage class.

DRAINAGE CLASS AND MOISTURE REGIME	DRAINAGE CRITERIA OPTIONS
<b>Very Poorly Drained</b>	1) Has organic soil materials that extend from the surface <sup>1</sup> to a depth of 16 inches or more. (Histosols) <sup>2</sup> or,
	2) Has organic soil materials that extend from the surface to a depth of 8 to 16 inches. (Histic Epipedon) <sup>3</sup> or,
	3) Has organic soil materials that extend from the surface to a depth of 4 to 8 inches and the cambic horizon has a low chroma matrix <sup>4</sup> or,
	4) Mineral soils with sulfidic materials within 20 inches of the mineral soil surface; Alluvial soils with an umbric epipedon, or,
<b>Poorly Drained</b>	1) Has an albic horizon that has texture of loamy fine sand or coarser that lies just above an illuvial horizon having a texture of loamy fine sand or coarser; and has redoximorphic features in the albic horizon or in the upper part of an illuvial horizon that is less than 7 inches below the mineral soil surface. or,
	2) Has an Ap horizon that is 7 inches thick or greater with a value of 3 or less and chroma of 2 or less and a texture in all subhorizons within 20 inches of the mineral soil surface of loamy fine sand or coarser and have redoximorphic features directly beneath the Ap horizon. or,
	3) Has a low chroma matrix within 20 inches of the mineral soil surface and redoximorphic features that are less than 7 inches below the mineral soil surface. or,
	4) Has an "Ap" horizon that is 7 inches thick or greater with value of 3 or less and chroma 2 or less and has a low chroma matrix within 20 inches of the mineral soil surface and has redoximorphic features or a low chroma matrix directly beneath the Ap horizon. or,
<b>Somewhat poorly drained</b>	1) Has redoximorphic features at a depth of 7 inches to less than 16 inches below the mineral soil surface. or
<b>Moderately well drained</b>	Has redoximorphic features at a depth of 16 inches to less than 40 inches below the mineral soil surface. or,
<b>Well drained</b>	Soil depth is at least 20 inches to bedrock and has a texture of loamy very fine sand or finer and redoximorphic features, if present, are greater than 40 inches below the mineral soil surface. <sup>5</sup> or
<b>Somewhat excessively drained</b>	1) Soil depth is 10 to 20 inches to bedrock with a loamy or loamy-skeletal particle-size class. 2) Soil depth is 20 inches or greater to bedrock with a sandy or sandy-skeletal particle-size class with a loamy cap 10 inches thick or greater.
<b>Excessively well drained</b>	1) Soil depth is less than 10 inches to bedrock. 2) Sandy or sandy-skeletal particle-size class with a loamy cap less than 10 inches thick.

Notes:

1 Surface excludes loose leaves, needles, and twigs.

2 Twenty-four inches or more if 75 percent or more of the volume is sphagnum fibers. Organic soil excludes Folists in this key.

3. Eight to 24 inches if 75 percent or more of the volume is sphagnum fibers.

4. Low chroma matrix is defined as matrix with chroma of 2 or less.

5. Soils that are coarse-loamy over sandy or sandy-skeletal and lack redoximorphic features within 40 inches of the mineral soil surface also are well drained.

Note: Folists soils need on-site evaluation for drainage class determination.

POSITION IN THE LANDSCAPE	COMMON PLANT SPECIES
Level or nearly level; occupies lowest position in the landscape. Commonly in depressions and is seasonally ponded or flooded..	Rushes, cattails, sedges, sphagnum moss, tamarack, willow, black spruce, northern white cedar, and red maple.
Level to gently sloping; sideslopes, toe slopes, depressions and seepage areas.	Sedges, alder, willow, red mable, grey birch and aspen
Level to strongly sloping; long smooth side slopes, broad depressions and seepage areas.	Red osier dogwood, alders, willow, spruce, balsn fir, red mable, elm, aspen, grey and yellow birch.
Level to steep; crests and upper part of long smooth slopes and broad terraces.	Northern hardwoods, white and red pine, hemlock and grasses.
Level to very steep; knolls, complex slopes and terraces.	Northern hardwoods, white and red pine, hemlock and grasses.
Level to very steep; knolls, convex slopes and terraces.	Northern hardwoods, white and red pine, white and red spruce, hemlock, and grasses.
Level to very steep; knolls, convex slopes and terraces.	Northern hardwoods, white and red pine, white and red spruce, hemlock and grasses. Vegetation also includes shrubs, ferns, mosses, and lichens.

## CHAPTER 3 - HOW TO DETERMINE THE SEASONAL HIGH GROUNDWATER

### TABLE FOR SITE EVALUATION

Routine Site Conditions: Traditionally, for the State Subsurface Wastewater Disposal Program, determining the depth to seasonal groundwater table has involved looking for drainage mottles, now called redoximorphic features, in the soil profile. Redoximorphic features develop as a result of soils alternating between being aerobic and anaerobic during the time of year that soil micro-organisms are active (soil temperatures are at or above 41 degrees F). Microorganisms need oxygen to decompose organic matter in the soil and they get it from the air in soil pores if the soil is not saturated. If the soil becomes saturated for long enough at the time of year when microbes are active so that all of the oxygen in it is used up, soil microbes get their oxygen by removing it from the rusted iron and manganese (iron and manganese oxides) in the soil. When that happens, the iron and manganese becomes mobile and moves around in the soil until it is exposed to air again. It then re-oxidizes (rusts) and becomes redox concentrations (yellowish or reddish spots) and the spots where the iron leached from becomes redox depletions (grey spots). The longer the soil is wet the more this process can take place. In soils with a short duration seasonal groundwater table, the soil is brownish with small red and grey spots. In soils with a long duration seasonal groundwater table, the soil is mostly grey and has red, yellow and/or brown spots. Soils that are wet most of the growing season can become bluish or greenish and are considered to be gleyed. In some of these soils the iron is still present but just has not been able to oxidize. If exposed to air, such as being excavated for a soil pit, the excavated soil will rust after a short time.

Challenging Site Conditions: Determining the depth to the seasonal groundwater table by looking for redoximorphic features as described above works well for fine textured soils and soils in a relatively flat position in the landscape. They do not work as well for soils that are 1. coarse textured, 2. coarse to medium textured soils on long continuous slopes, 3. soils with a seasonal groundwater table at or near the ground surface and; 4. soils that have spodic development. In these soils, you may need to look for other indicators of wetness such as the accumulation of organic matter on or in the soil and horizons with organic streaking or two or more colors. When making seasonal groundwater determinations for these soils it is important to make sure the soil is moist and then use a Munsell Color Book to identify if a specific soil horizon or other features such as organic streaking in a two colored horizon meets a color requirement specified in the Key. The soil needs to be moist for making color determinations because those with high organic content tend to be quite dark when moist but are light colored when dry. Subsoil horizons that are olive when moist often look grey when dry. The Munsell Color Book is the International standard method for consistency when determining soil color. One color chip can make the difference in determining whether an Ap horizon has enough organic matter accumulation in it to indicate it is poorly drained or not or if a subsoil horizon is grey or olive.

1. Coarse textured soils do not show the typical redoximorphic features as well as the finer textured soils do because they lack capillary pores and fine soil particles (silt and clay) where iron and manganese become attached. They do form redox concentrations but redox depletions can be hard to find and they rarely develop an overall grey color if wet for very long periods of time. They may even have reddish or yellowish colors but they are dusky, not bright like the better drained soils, and they often have multiple colors in one or more horizon. If more than one color is present in a horizon, one of the colors is usually quite dark due to the presence of organic matter. This is sometimes referred to as organic streaking. Due to these soils being quite permeable, organic matter and iron can move into them from directly above and upslope (as groundwater moves laterally through the soil).
2. Coarse to medium textured soils on long slopes can have a high seasonal groundwater table but since the groundwater is moving along the slope gradient, it contains oxygen and therefore does not usually create an anaerobic environment necessary for the formation of redoximorphic features. Soils with an oxygenated groundwater table near enough to the mineral soil surface to be Soil Drainage Condition E (poorly drained) can be identified by the presence of dark soil colors (value 3 or less and chroma 2 or less, moist) that extend from immediately below the organic duff layer to a subsoil horizon that has two or more colors in it. The horizon that has two or more colors in it has at least one color that is dark (value 3 or less, chroma 2 or less, moist). This is due to differential organic matter accumulation in the horizon. The other color(s) is/are usually brown or olive brown but may also be dark (value 3 or less and chroma 2 or less, moist). The two or more colors in these horizons usually create a streaked pattern or a pattern where there is a differential

accumulation of organic matter. Soil horizons which have more than one color due to the presence of redoximorphic features have a pattern of spots or blotches of red, yellow, or grey interspersed in the primary or background soil color. That is because of iron being reduced and re-oxidized as compared to organic matter accumulation in a diffuse pattern for soils with an oxygenated groundwater table. For somewhat poorly drained or better soils with an oxygenated groundwater table (soil drainage condition D or C), the soil horizon immediately above the horizon with two or more colors is not dark (value 3 or less and chroma 2 or less, moist). In addition, in the horizon with two or more colors, there is no requirement for one or more of the colors to be dark (value 3 or less and chroma 2 or less, moist). In forested settings, soils that do not have a seasonal groundwater table at or near the surface do not usually have an A horizon unless the area was once a farm and is now reverting back to a forest. In wetter soils however, an A horizon does often develop due to the slower rate of organic matter decomposition. This is true even for soils with an oxygenated groundwater table. Though the groundwater contains oxygen, it is not the equivalent to a soil with free air in many of the soil pores so organic matter decomposition is slowed down. The organic duff layer is also generally thicker than the organic duff layer found on better drained soils

3. Soils with a seasonal groundwater table at or near the soil surface may have redoximorphic features evident in the lower part of the soil profile but they can be masked by organic matter accumulations in the upper soil horizons. These soils typically have very dark upper soil horizons (value 3 or less and chroma 2 or less, moist) overlying soil horizons where redoximorphic features are evident. Most of the time, you can not see redoximorphic features in the A or Ap horizon but sometimes redox concentrations are evident or oxidized rhizospheres. Oxidized rhizospheres are areas immediately surrounding living root channels where oxygen escapes from the living roots and causes iron in the soil to oxidize. Instead of being spots or blotches of color in the soil they follow the outline of a plant root. Soils that do not have a seasonal groundwater table at or near the surface usually do not have an A horizon in forested settings, but if they do because of previous farming activity, the A horizons are usually thinner and they are less dark (more brown than black). In field settings, the color of the Ap horizon is usually quite dark (value 3 or less and chroma 2 or less, moist) for wet soils and browner for soils that have deeper seasonal groundwater tables. Soil structure is also a good indicator of how wet a soil is. Better drained soils have strong and well developed granular structure whereas wetter soils tend to be massive or structure less but may have weak platy structure.
4. Soils which classify as Spodosols have a grey layer, called an Albic or E horizon because iron, aluminum, organic matter and other minerals have been eluviated from it that forms just below the organic duff in forests, particularly softwood forests. Immediately below the Albic horizon these soils have a layer that is reddish, yellowish or sometimes blackish which is called a spodic horizon. The term "Spodic" was derived from the Greek word "Spodos" for wood ashes. This makes sense as the Albic horizon does look like wood ashes. The Albic horizon does not develop due to anaerobic conditions but forms as a result of intense leaching. As rainfall and snowmelt move through the organic duff layer on the mineral soil surface it becomes acidic. The thicker the organic duff layer, the more acid it becomes. The acid water bleaches the first layer of mineral soil it encounters causing it to become white or grey in color. This is best expressed in softwood forest soils because the needles of softwood trees (especially hemlock trees) are more acid producing than the leaves of hardwood trees. The layer immediately below the Albic horizon is where all of the iron, aluminum and other leachable metals and organic matter accumulate giving it its color. This layer is called the Bh or Bhs horizon meaning B horizon with humus and metals (sesquioxides). The thickness and color of this horizon is a direct function of the thickness of the organic duff layer on the soil surface. As the organic duff layer becomes thicker, the Bh or Bhs horizon usually becomes thicker and darker. Anything that slows down the rate of organic matter decomposition will cause an increase in thickness and darkness of the B or Bhs horizon. Most of the time, microbial activity in the soil is slowed down by a lack of oxygen in the soil due to saturation but can also be due to cold temperatures found along the downeast coast, some coastal islands and in high elevation areas. Sometimes the Bh or Bhs horizons become cemented due to aluminum and organic matter precipitating out at the top of the groundwater table. Many times, water perches on top of these cemented layers forming a perched groundwater table over the apparent groundwater table below. Except for the cold climate parts of the state, a dark (value of 3 or less and chroma 2 or less, moist) Bh or Bhs of more than 2" thickness always means the soil has a seasonal high groundwater table at or near the surface (unless artificially drained). Thick and dark Bh or Bhs horizons are usually continuous in wet soils as compared to better drained soils where the Bh or Bhs horizon is often alternately thick and thin or broken. In wet areas, the organic duff layer is more uniformly thick than it is for upland sites that are so cool that microbial activity is

slowed down. In upland areas the organic matter thickness will vary with thicker layers found in slightly lower parts of the normally undulating topography and thinner layers being found on the higher parts. Below the Bh or Bhs horizon are usually other B horizons with less accumulation until it fades into the C horizon which has no bright colors. Soils which are Spodosols can be confusing to people who are not experienced (it is even difficult for experienced people) because of the unique soil forming processes. Any soil disturbance (including logging and plowing) can mix pieces of the E horizon into other horizons making them look like redox depletions. If the E and B horizons are mixed, it can look like typical redoximorphic features. It is therefore important to look below the layer where this possible mixing has occurred to see if there are redoximorphic features present. Indications of Spodosol soils with a seasonal groundwater table at or near the surface include:

- a. Thicker organic duff layers (than surrounding upland areas).
- b. Thicker E horizons (than surrounding upland areas).
- c. E horizons which are dull grey instead of nearly white for better drained soils.
- d. Redoximorphic features and/or organic streaking in the E horizon.
- e. Thick and dark colored Bh or Bhs horizons (not due to cold temperatures).
- f. Horizons below the Bh or Bhs horizon with 2 or more colors where one is value 3 or less and chroma 2 or less, moist.

#### PROCESS FOR DETERMINING THE SEASONAL HIGH GROUNDWATER TABLE

Look at the position in the landscape where the soil pit has been dug. How much contributing watershed does it have? What is the position in the landscape, is it a convex knoll, long side slope, concave position or lowland? Could the site be one that has an oxygenated groundwater table? Position in the landscape sets the stage for what to expect when you evaluate the soil profile.

Look at the vegetation. Is it upland vegetation or vegetation that likes to grow in wet areas? If forested, are tree roots below the ground surface or growing on the ground surface. If so, is it because of bedrock or a shallow hardpan or could it be due to a shallow groundwater table? This is another factor which helps set the stage for what to expect when you excavate a soil pit.

Look at the thickness of the organic duff layer, if in the woods. Compare to surrounding areas that are obvious dry and wet areas. That will tell you something about the hydrology of the area where your pit has been dug.

What is the first mineral soil horizon you see? Is it an A horizon. If so, is it more than 7" thick and is it a value 3 or less and chroma 2 or less, moist, color? If in a forest, do obvious upland soils have an A horizon? Are they as thick and as dark colored? If in a field, is it darker colored than obvious upland soils? Does the A or Ap horizon have redox concentrations or oxidized rhizospheres? What is the structure of the A or Ap horizon?

Look at the horizon immediately below the A or Ap horizon. Are there redoximorphic features in it? Are they redox concentrations or redox depletions? Redox depletions (for fine textured soils) are the best indications that anaerobic conditions are present in a soil due to wetness during the growing season. Does the horizon have more than one color in a streaked pattern or with differential organic matter accumulation? Is one or more of the colors dark (value 3 or less and chroma 2 or less, moist)?

Is there an E horizon immediately beneath the organic duff layer? If so, is it thin and white or thick (more than 2") and dull grey? How does it compare to obviously upland soils and obviously wetland soils? Does it have organic streaking or redoximorphic features in it? What is the color of the horizon immediately beneath the E horizon? Is it black or nearly black and thick (more than 2") and is it continuous? Is it cemented? Does the horizon immediately

below the dark horizon have 2 or more colors in a streaked pattern or with differential accumulation with one being value 3 or less and chroma 2 or less, moist or does it have redoximorphic features?

Look at rooting depth of plants, especially woody roots of trees, if present. Plant roots do not like to grow below the seasonal groundwater table, unless it is an oxygenated groundwater table.

Do the soil horizons follow a logical sequence or does the soil show evidence of alteration or disturbance? If the soil has been altered or disturbed, features in it may be the result of that disturbance and not the natural soil development process.

Are there any indications of the soil having been drained (ditches, under drains, culverts, etc.)?

## KEY FOR DETERMINING DEPTH TO THE SEASONAL GROUNDWATER TABLE

### **In a field area or a forest area with an A or Ap horizon:**

If the A or Ap horizon is not dark (value more than 3 and/or chroma more than 2, moist) and is any thickness, measure the depth to where 2% or more redoximorphic features are first encountered or to the top of a subsoil horizon with 2 or more colors in a streaked pattern or with differential organic matter accumulation to determine depth to seasonal groundwater table.

If the A or Ap horizon of any thickness is dark (value 3 or less and chroma 2 or less, moist), measure the depth to where you first encounter 2% or more redoximorphic features or oxidized rhizospheres in it for the depth to seasonal groundwater table. If there are no redoximorphic features or oxidized rhizospheres in the A or Ap horizon, look at the horizon that immediately underlies it. The soil is Drainage Condition E (poorly drained) if the upper part of the horizon immediately below the dark A or Ap horizon:

- a. has 2% or more of any kind of redoximorphic features if the soil is loamy fine sand or coarser or redox depletions for soils that are loamy fine sand or finer; or
- b. has 2 or more colors in a streaked pattern or with differential organic matter accumulation where one or more of the colors is dark (value of 3 or less and chroma 2 or less, moist); or
- c. has an E horizon with 2% or more redoximorphic features or organic streaking overlying a 2''\* thick or thicker dark (value 3 or less and chroma 2 or less, moist) Bh or Bhs horizon that is continuous (unless altered by tree throw or human activity); or
- d. has a 2''\* thick or thicker dark (value 3 or less and chroma 2 or less, moist) Bh or Bhs horizon that is continuous (unless altered by tree throw or human activity)

If the A or Ap horizon is dark (value of 3 or less and chroma 2 or less, moist) and the horizon immediately underlying it does not meet a-d above, measure the depth to where you first encounter 2% or more redoximorphic features or to the top of a subsoil horizon with 2 or more colors in a streaked pattern or with differential organic matter accumulation to determine depth to seasonal groundwater table.

### **In a forested area where there is no A or Ap horizon:**

The soil is Drainage Condition E (poorly drained) if the upper part of the first mineral soil horizon immediately below the organic duff layer:

- a. has 2% or more redoximorphic features or organic streaking in the E horizon which is immediately underlain by a 2''\* thick or thicker dark (value 3 or less and chroma 2 or less, moist) Bh or Bhs horizon that is continuous (unless altered by tree throw or human activity); or
- b. has a two or more colors in a streaked pattern or with differential organic matter accumulation where one or more of the colors is dark (value 3 or less and chroma 2 or less, moist)

If the soil does not meet a or b above, measure the depth to where you encounter 2% or more redoximorphic features or to the top of a horizon with two or more colors in a streaked pattern or with differential organic matter accumulation to determine depth to seasonal groundwater table.

\* A 2'' thick or thicker Bh or Bhs horizon can form under thick organic accumulations due to cold temperatures (not wetness) such as in higher elevations, in the northern part of the state or downeast coastal areas. These indicators should only be used when the organic accumulation and the thick Bh or Bhs horizon development is due to wetness.

## CHAPTER 4 - DISPOSAL FIELD DESIGN THEORY

### GENERAL

The purpose of a system: The effluent from a septic tank is delivered to a disposal field where it leaches into the soil under unsaturated flow conditions. The purpose of a disposal field is to remove pollutants from the septic tank effluent. The removal processes include physical filtration of bacteria, absorption of virus and bacteria by clay and organic matter, biological destruction of pathogens by soil microorganisms, chemical fixation or precipitation of phosphorous, biochemical transformations of nitrogen compounds, and biological assimilation of nitrogen and phosphorous.

**Clogging mat:** Continuous or frequent ponding of septic tank effluent on the bottom of the disposal field results in the growth of a biological layer that filters out more and more solid particles and dissolved pollutants from the septic tank effluent. A clogging mat is formed at the point of infiltration into the soil. This mat normally penetrates 1/2 to 6 centimeters into the soil. It consists of a slimy mass of septic tank effluent solids, mineral precipitates, microorganisms, and the by-products of decomposition. Microorganisms in the mat feed on septic tank effluent nutrients to produce slimes, polysaccharides, carbon dioxide, etc. Filtered-out cellulose, undigested food residues, etc., hydrolyze and biodegrade slowly. Mineral precipitates, such as ferrous sulfide, etc., also contribute to the clogging mat.

The clogging mat is in constant flux, that is, building, degrading, and creeping downward into the soil as a viscous fluid where it is dispersed. The process is self-cleaning; otherwise, disposal fields could not last more than a few years. This self-cleaning property, along with a constant septic tank effluent load, allows a properly designed disposal field to be passive and function without maintenance. The clogging mat develops at a rate dependent upon the septic tank effluent load. As the clogging mat matures, the septic tank effluent infiltration rate through the clogging mat decreases. A clogging mat's average infiltration rate, or disposal field application rate, is usually reached after a period of 3 to 36 months.

**Disposal field application rate:** The clogging mat acts as a hydraulically restrictive soil horizon. Its limited permeability is accounted for in the disposal field application rates used for designing systems. The acceptance rate of the clogging mat is dependent on the texture, structure, and consistence of the soil. This rate typically ranges somewhere between 0.2 to 0.8 gallons per day per square foot of bottom and sidewall area.

**Treatment in the clogging mats:** Once the clogging mat is established, the organisms in the mat are extremely effective in stabilizing organic waste, removing particulates, and removing pathogenic organisms. Bacterial indicators of pathogenic contamination are total coliforms, fecal coliforms, and fecal streptococci. Total coliforms concentrations of 57,000 colonies per milliliter within the disposal field are typically reduced to less than 200 colonies per milliliter at or beyond a foot of the clogging mat. Fecal coliforms concentrations of 19,000 colonies per milliliter within the disposal field are typically reduced to less than 2 colonies per milliliter at or beyond a foot of the clogging mat. Fecal streptococci concentrations of 1,600 colonies per milliliter within the disposal field are typically reduced to less than 2 colonies per milliliter at or beyond a foot of the clogging mat. The clogging mat typically removes approximately 10% of the nitrogen but is less effective in removing phosphates.

**Zone of treatment:** This code requires a minimum 12 inch zone of treatment in the soil column below the bottom of the disposal field. This allows a reaction time as the partially treated septic tank effluent passes through the soil under unsaturated conditions and assures adequate treatment. This 1 foot of suitable soil, or fill material, below the level of the bottom of the disposal field removes pollutants from the septic tank effluent by physical filtration and biological activity.

**Movement through the clogging mat:** The movement of septic tank effluent through the clogging mat is due to the hydrostatic or gravity head pushing the septic tank effluent down through the clogging mat, and the capillary tension force or matrix potential pulling the septic tank effluent through the clogging mat.

**Maximize the sidewall area:** In many soils the capillary potential of the soil itself is more effective than the small hydrostatic heads in forcing the septic tank effluent through the clogging mat. Therefore, an effort should be made to design disposal fields with as much sidewall possible for any given bottom area, such as found in a trench system. This type of design takes maximum advantage of the capillary rise in the soil and evapotranspiration.

Shallow disposal fields: All disposal fields should be installed as shallowly as practical to; take advantage of seasonal evapotranspiration potentials; stay in the generally more permeable upper soil horizons; and stay as far as possible above the seasonal ground water table.

Disposal field configuration: Long, narrow disposal fields should be used whenever possible. Such designs increase the sidewall area to bottom area ratio. This reduces the potential for water mounding under the disposal field and, by spreading out the septic tank effluent plume, increases the potential for dilution as the plume travels down slope.

Vehicular traffic: Except where site limitations make it unavoidable, no driveway, or parking or turning area, should be located over any disposal field. Disposal fields located under vehicular traffic tend to be compacted by the traffic and in many cases are paved. The paving essentially eliminates all upward capillary and evapotranspiration potential.

Bottom of the disposal field: The bottom of each disposal field should be excavated and/or maintained to a level grade. In both stone and proprietary disposal fields, the bottom of the disposal field serves as an integral part of and is the final stage of the distribution network within a disposal field.

Infiltration: Rain, surface, and subsurface water should not be drained into any component of a system or the disposal field will become overloaded and fail.

## SEPTIC TANK TREATMENT

Primary treatment: The primary function of a septic tank is to retain fats, grease, and other solids. Primary treatment of sewage takes place within the tank, where anaerobic bacteria digest these materials. The indigestible portion remains in the tank and is disposed of when the tank is pumped. The effluent which leaves the tank for secondary treatment in the disposal field is, ideally, free of suspended fats, grease, and other solids. However, it does contain organic materials, bacteria, and viruses.

Those solids that are stabilized settle to the bottom of the septic tank where they form a sludge blanket. Fats and greases rise to the top of the septic tank forming a scum blanket. The sludge and scum blankets shall be removed periodically to preserve the liquid capacity necessary for satisfactory solids removal.

These are further broken down and deactivated in the disposal field. Septic tank cleaners or degreasers are designed to liquefy or emulsify the fats, grease, and solids in the septic tank in order to reduce or eliminate the need for pumping the tank. These preparations defeat the septic tank's purpose. Instead of remaining in the tank, the liquefied or emulsified fats, grease, and solids leave the tank in the effluent and enter the field. Much of this material now entering the field is not subject to bacterial breakdown and can significantly shorten the life of the field by reducing soil permeability. Furthermore, some of these cleaners and degreasers themselves have the potential to pollute the ground water.

Typical treatment: A typical septic tank removes about 40 to 50% of the 5-day biochemical oxygen demand, 50 to 70% of the total suspended solids, 20 to 30% of the nitrogen, and up to 30% of the phosphates. Disease organisms do not multiply in the septic tank; they can only survive or be reduced.

## CHAPTER 5 - SLOPE MODIFICATIONS

### GENERAL

Scope: This chapter provides guidance on altering slopes only for replacement disposal fields when there is no practical alternative.

Limitations: Disposal fields should not be located in an area having a slope greater than 20%. Disposal fields should be located a minimum of 10 feet from the crown of land having a slope greater than 20% except when the top of the disposal field stone or proprietary disposal devices are at or below the bottom of an adjacent roadside ditch.

Altering slopes: Areas with slopes exceeding 20% may be graded and reshaped to provide disposal field sites. Care should be taken when altering natural landscapes. Any disposal field installed on an altered slope should comply with the following:

Adequate soil depth: A complete site evaluation should be performed after the alteration of the site. Observation hole data should show that a sufficient depth of suitable soil material is present to provide the required amount of soil over bedrock and the seasonal ground water table;

Altered site: The disposal field should be installed in the cut of an altered site. The area of fill on an altered site may be used as a portion of the required 10 foot separating distance from the crown of a critical slope. There should be a minimum of 5 feet of natural soil between the edge of the disposal field and the down-slope side of the altered area; and

Surface water drainage: All altered slope areas should be altered such that surface water drainage will be diverted away from the disposal field. In some cases, this may require the use of grassed waterways or other means of diverting surface waters. All disturbed areas should be seeded or sodded with grass and appropriate steps should be taken to control erosion.

## CHAPTER 6 – BACKFILL CALCULATIONS

### GENERAL

The number of inches of fill required from the top of the final grade to the existing grade is calculated and reported on page 3 of the HHE-200 Form. The depth of fill required is determined using the slope gradient, size of disposal area, depth of disposal area, soil profile description (i.e. limiting factor, restrictive layers, ground water table) and the minimum separation distances from bottom of bed to limiting factor.

EXAMPLE:      10% = Slope  
                    12'    = Width of proposed disposal bed  
                    24'    = Depth of proposed disposal bed  
                    5C     = Soil Conditions  
                    42"    = Depth to limiting factor (seasonal high groundwater table)

Depth of fill on uphill side of bed can be calculated using the following formula:

$$F(\text{up}) = D + S - L$$

F(up)    =        Depth of fill uphill side

D        =        Depth of Disposal System (24 inches)

L        =        Depth to limiting factor (ground water table, restrictive layer, bedrock)

S        =        Separation Distance (12 or 24 inches)

For Sample Calculation

$$F(\text{up}) = 24' + 24' - 42''$$

$$F(\text{up}) = 6''$$

Depth of fill downhill side of bed can also be calculated using the following:

$$F(\text{dn}) = (12' \times W \times G) + F(\text{up})$$

F(dn)    =        Depth of fill downhill side

W        =        Width of Disposal System (feet)

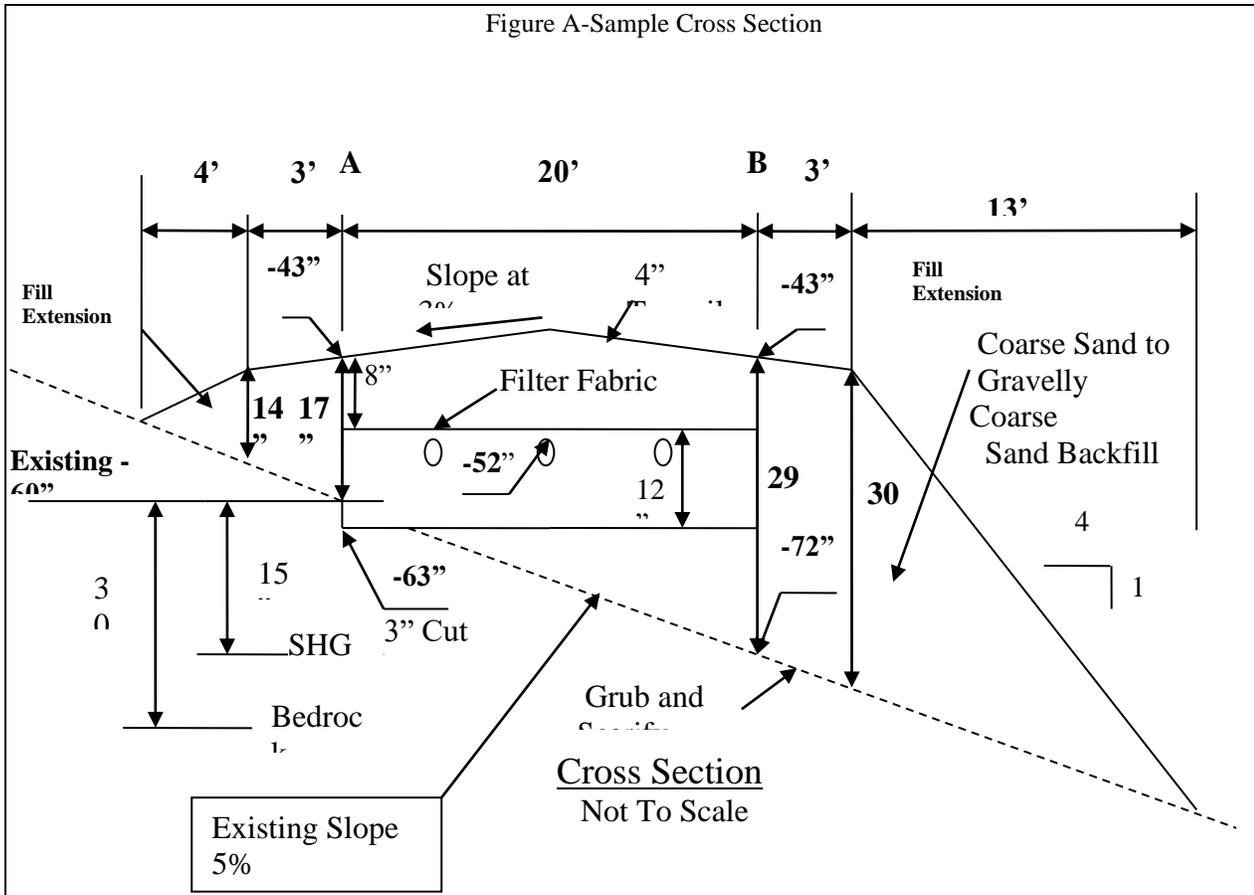
G        =        Gradient .00 to .20 (0 to 20%)

For Sample Calculation

$$F(\text{dn}) = (12' \times 12 \times .10) + 16'$$

$$F(\text{dn}) = 20'$$

Figure A-Sample Cross Section



## **CHAPTER 7 - CURTAIN DRAINS**

### **GENERAL**

The provisions of this chapter provide guidance on the design and installation of curtain drains. A site evaluator may otherwise choose to use this chapter if it seems applicable.

**Background:** Seasonal high ground water tables that can severely limit the proper functioning of system may be effectively lowered by the installation of curtain drains in certain situations. Curtain drains are particularly effective at intercepting perched seasonal ground water tables on sites with large contributing drainage areas.

### **SITE LAYOUT**

**Requirements:** Curtain drains shall be up-slope of the disposal field, approximately perpendicular to the flow of ground water, intercepting and diverting ground water away from the disposal field.

**Setbacks:** The minimum distance between the disposal field and a curtain drain shall be as follows:

**Setback up-slope:** A minimum setback distance of 10 feet shall be maintained between a curtain drain and the up-slope edge of a disposal field. The curtain drain shall be located beyond the toe of the uphill fill extension if the uphill extension is greater than 10 feet and constructed so that the curtain drain is located to prevent any underdrain of the disposal field.

**Setback cross slope:** A minimum setback distance of 15 feet shall be maintained between a curtain drain and the ends of a disposal field and constructed so that the curtain drain is located to prevent any underdrain of the disposal field.

### **CONDITIONS WHERE CURTAIN DRAINS MAY WORK**

**General:** For curtain drains to function properly, certain site and soil conditions shall be present. These include a friable, permeable top soil underlain by a firm, impervious subsoil on a sloping site where the contributing up-slope drainage area is sufficient to create a seasonal perched water table. Soils that are saturated for prolonged periods or that have very slow permeabilities and sites that are level or that have artesian aquifers are not practical to drain.

**Soil profiles 1, 3, and 7:** Soil profiles that are the most practical to drain are those having shallow perched ground water tables with lateral ground water flow on moderate slopes.

**Soil profile 8:** Curtain drains may also be used effectively on soil profile 8 soils in cases where the topsoil layer contrasts sufficiently with the subsoils to create a laterally flowing perched seasonal ground water table.

**Soil profile 5:** Curtain drains can be used on soil profile 5 soils with a cemented soil horizon located on sloping sites. For a curtain drain to be effective on profile 5 soils, the cemented layer shall be continuous, have created a perched seasonal ground water table above it, and the excavation for the curtain drain shall not extend below the cemented soil horizon.

### **EXCAVATION**

**Requirements:** The curtain drain excavation shall be carried out as follows:

**Minimum depth:** The excavation for the curtain drain shall extend into, but not through, the entire thickness of the hydraulically restrictive soil horizon.

**Minimum width:** The excavation for the curtain drains shall be a minimum of 2 feet wide for the entire length of the curtain drain.

Drain discharge extensions: To accommodate the drain discharge pipes the excavation shall extend, on each end of the disposal field, beyond the extent of the curtain drain; it shall go from the down-slope side of the disposal field to free-flowing, stabilized outlets.

#### DRAINAGE PIPE

Drainage pipe shall be laid throughout the entire length of the excavation and shall be placed immediately above the barrier fabric at the bottom of the excavation and midway between the sides.

Curtain drain piping: Up-slope of the up-slope side and on the cross slope ends of the disposal field, where the excavation is filled with curtain drain stone, the pipe shall be perforated.

Curtain drain extension piping: Down-slope of the down-slope side of the disposal field, and beyond the extent of the curtain drain stone, the pipe shall be non-perforated.

Minimum pipe size: The size of the pipe shall be large enough to handle the expected volume and in no case shall the pipe diameter be less than 6 inches.

Type of pipes: The following materials are acceptable for the drainage pipe in curtain drains:

Acrylonitrile-Butadiene-Styrene (ASTM D-2751); Polyvinyl Chloride (ASTM D-2729, D-3034); Styrene-Rubber (ASTM D-2852, D-3298); or Polyethylene, straight wall (ASTM D-1248).

#### CURTAIN DRAIN STONE

Requirements: That portion of the curtain drain excavation that will accommodate the drain pipe shall be filled with stone to a depth that is a minimum of 12 inches higher than the top of the perched seasonal ground water table that is to be drained. Stone used for this purpose shall:

Cleanliness: Be washed gravel or crushed stone, free of fines, dust, ashes, or clay; and

Size: No smaller than 3/4 inch and no larger than 2 1/2 inches in size.

Specifications: A site evaluator may define a more stringent standard for stone size for any particular system.

#### BARRIER MATERIAL

Hay barrier: A minimum of two (2) inches of compressed hay shall be placed immediately above stone if hay is used; or

Filter fabric barrier Filter fabric shall consist of continuous layers of non-woven fabric and should be placed throughout the entire length of the curtain drain, above, below, and along the sides of the curtain drain stone. The following requirements shall be met:

Overlapping fabric: The edges of adjacent sheets of non-woven fabric shall be overlapped by a minimum of 6 inches.

Type of fabric: The type of non-woven fabric used shall be specified in the system design. It shall have adequate tensile strength to prevent ripping during installation and back-filling, adequate permeability to allow unimpeded passage of water, and adequate particle retention to prevent migration of soil particles into the curtain drain stone. The minimum physical properties for the fabric shall be 1.5 ounces per square yard (per ASTM D-3776) and a flux (or rate or transfer of water) of 100 gallon per square foot per minute. (per ASTM D-4491).

#### FREE-FLOWING OUTLETS

Requirements: Free-flowing outlets shall be provided down-slope of the curtain drain extensions. Outlets shall meet the following requirements:

Discharge point: Outlets may empty into a drainage swale discharging to a surface water body, a ground water recharge basin, or a gravel bed;

Outlet design: Outlets shall be designed, installed, located, and maintained in a manner that does not cause soil erosion, surface flooding, or damage to adjacent properties, does not create a public nuisance, and does not violate any applicable Federal, State, or local laws or regulations; and

Rodent control: Adequate measures shall be taken to protect each outlet from the entry of rodents or other small animals.

#### FILL

Requirements: Fill material over the curtain drain discharge pipes shall be of earth of a texture that is similar to or coarser than that found at the site and free of large stones, stumps, broken masonry, or other waste construction material.

## **CHAPTER 8 - LOW PRESSURE DOSING**

### **BACKGROUND**

This Chapter is one suggested way of sizing the distribution pipe and manifold diameters for various hole diameters, hole spacing, distribution pipe lengths, and manifold lengths.

This Chapter is based upon plastic pipe with a Hazen-Williams coefficient of  $C = 150$ . The orifice equation for shape-edged orifices (discharge coefficient = 0.6) was used to compute discharge rates through each orifice. The maximum distribution pipe length for a given hole size and spacing was defined as that length at which the difference between the rates of discharge from the distal end and the supply end orifices reach 10% of the distal orifice rate.

### **DESIGN PROCEDURE**

Fields with the same elevation: Use the appropriate tables in the EPA's Onsite Wastewater Treatment System Manual.

Fields at different elevations: If a multiple disposal field system is proposed where the bottoms of the disposal fields will not be at the same elevation in all fields, the site evaluator should demonstrate by means of appropriate calculations, that all portions of all disposal fields will receive equal hydraulic loading. One way of accomplishing this would be to divide the disposal system into sections consisting of individual disposal fields or groups of disposal fields that are at the same elevation and that are dosed individually in conformance with the requirements of the Subsurface Wastewater Disposal Rules.

## **CHAPTER 9 - PRE-TREATMENT, POST-TREATMENT, AND SEPTIC TANK FILTERS**

### **PRE-TANK TREATMENT**

Sand filters: Pre-treatment sand filters should be designed, installed and maintained in conformance with the guidelines set forth in the United States Environmental Protection Agency's Design Manual On-site Wastewater Treatment and Disposal Systems, EPA-625/1-80-012.

The specific guidance Sections are:

Intermittent sand filters:EPA-625/1-80-012 Section 6.3.

Buried sand filters:EPA-625/1-80-012 Section 6.3.

Free Access sand filters (Non-recirculating):EPA-625/1- 80-012 Section 6.3.

Recirculating sand filter:EPA-625/1-80-012 Section 6.3.

### **POST-TANK TREATMENT**

Post septic tank filters perform two basic functions; retention of the solids in the effluent and lowering the BOD<sub>5</sub>, TSS, and other parameters. Post-tank filters are comprised of two major types: peat modules and filter media devices. A potential purchaser is advised to obtain information pertaining to the recommended model, relative cost, availability, installation and maintenance procedures and flow rates from the manufacturer or distributor.

### **IN-TANK SEPTIC TANK FILTERS**

In-tank septic tank filters perform two primary functions; retention of the solids in the tank and lowering of the BOD and TSS. A potential purchaser is advised to obtain information pertaining to the recommended model, relative cost, availability, installation and maintenance procedures and flow rates from the manufacturer or distributor.

### **DESIGN AND INSTALLATION**

The filters should be designed, installed and maintained per the manufacturer's department -approved instructions or EPA specifications, as appropriate.

## **CHAPTER 10 - WORK ADJACENT TO WETLANDS AND WATER BODIES**

### **GENERAL**

In order to prevent runoff which may carry sediment from the disturbance activity from directly entering water bodies the standards in this Chapter apply to all ground disturbance occurring within 100 feet of a coastal wetland,

Permits required: Soil disturbance activities that cannot meet all of the following standards are subject to permit requirements under the Natural Resources Protection Act administered by the Maine Department of Environmental Protection.

### **REQUIRED BUFFER STRIPS AND RUNOFF DIVERSION**

Sites with slopes of less than 20%: Where sustained slopes are less than 20%, a 25 foot setback should be maintained between the normal high water line or upland edge of a coastal wetland, freshwater wetland, great pond, or water course (whichever is more restrictive) and any soil disturbance activity; and

Sites with slopes exceeding 20%: Where sustained slopes exceed 20%, a 100 foot setback should be maintained between the normal high water line or upland edge of the coastal wetland, freshwater wetland, great pond, or water course (whichever is more restrictive) and any soil disturbance activity; and

Runoff diverted: Upland surface water runoff should be diverted around the soil disturbance activity.

Replacement systems: The setback requirements for removal, replacement or maintenance of waste water disposal systems, authorized by this code, can be waived when no practical alternative exists and the LPI agrees.

## BUFFER STANDARDS

Buffers with vegetation: Existing vegetation within the 25 foot setback zone should remain undisturbed except when removal is required for the maintenance, repair or installation of a replacement system.

Buffers with no vegetation: For soil disturbance activities where the setback from the protected natural resource is not vegetated and the slope between the activity and the protected natural resource is 3% or greater, a row of hay bales or silt fencing should be installed between the activity and the edge of the setback. The hay bales or silt fencing should be maintained until the activity area is fully stabilized.

Wetland disturbance: Wetlands vegetation should not be destroyed or permanently removed. If wetlands vegetation should be disturbed during the project, it should be reestablished immediately upon completion of the work and should be maintained. This standard should not apply to fill or disposal areas required for replacement of waste water disposal systems.

Wet soils: No soil should be disturbed during any period when soils are saturated due to rain or snow melt, except for repair or installation of a replacement system in accordance with the Subsurface Wastewater Disposal Rules.

Erosion control barriers: Prior to the start of a soil disturbance activity, erosion control measures such as staked hay bales, or silt fence should be properly installed and adequately maintained for the duration of the project, to prevent the wash of materials into the resource.

Time limit: All soil disturbance activities should start and finish within a one month time frame.

## SITE STABILIZATION

Disturbed soil should be immediately stabilized, upon activity completion or if the area is not to be actively worked for more than one week, using temporary or permanent measures such as placement of riprap (in accordance with this code), sod, mulch or erosion control blankets, or other comparable measures.

Mulch: Hay or straw mulch, where used, should be applied at a rate of at least one bale per 500 square feet (1 1/2 to 2 tons per acre)

Mulch anchoring: Mulch should be anchored with netting, peg and twine, or other suitable method and should be maintained until a catch of vegetation is established over the entire disturbed area.

Additional: In addition to placement of riprap, sod, erosion control blankets or mulch, additional steps should be taken where necessary, in order to prevent sedimentation of the water. Evidence of sedimentation includes visible gully erosion, discoloration of water by suspended particles and slumping of banks. Silt fences, staked hay bales and other sedimentation control measures, where planned for, should be in place prior to commencement of work, but should also be installed whenever necessary due to sedimentation.

Note: The discharge of sediment to a water body violates Title 38 M.R.S.A. § 413.

Duration of temporary erosion control: Mulch or other temporary erosion control measures should be maintained until the site is permanently stabilized with vegetation or other permanent control measures.

Final vegetative cover: Permanent revegetation or seeding of all disturbed areas should occur, immediately upon project completion or, if temporary stabilization measures were used, within 30 days from the time the areas were last actively worked except where precluded by the type of activity (e.g. riprap, road surfaces, etc.). For fall or winter activities, in addition to other temporary erosion controls, all disturbed areas should be covered with a layer of mulch. A row of hay bales or silt fence should also be installed between the activity and the upland edge of the wetland or normal high water line (whichever applies). Permanent revegetation measures should be undertaken by

June 15th. Temporary erosion and sedimentation controls (e.g. mulch, hay bale barriers, etc.) should be maintained in the interim. The vegetative cover should be maintained.

Lime and fertilizer: Lime and fertilizer may be applied based on requirements determined through a soil test; or in lieu of a soil test, application rates should not exceed the following:

- Ground limestone: 3 tons/acre (130 lbs./1000 Square feet.)
- Fertilizer, 10-10-10 or equivalent: 600 lbs./acre (14 lbs./1000 Square feet.)

Fertilizer should not be applied before the start of the growing season, nor after September 30th. Fertilized areas should be mulched to reduce off-site transport of nutrients until used by vegetative growth.

Note: Erosion and sedimentation control measures should comply with Soil Conservation Service/Soil and Water Conservation District specifications.

## **CHAPTER 10 - STABILIZATION OF DISTURBED SOIL AREAS BY PERMANENT SEEDING OF GRASS**

Furnished by the Maine Soil and Water Conservation Commission

### **GENERAL**

The following steps are presented as a guide for protecting bare soil areas that do not have severe limitations for erosion and sedimentation by establishing permanent seedings of grass. This does not imply that grass is the only or the best method of stabilizing disturbed soil areas (other vegetative and non-vegetative measures may be equally or, in some cases, more effective) but it is the most commonly used and is generally quite effective. For sites that have severe limitations, such as very poorly drained soil areas or very steep slopes, you should contact an expert in this field. Your local Soil and Water Conservation District may be of help.

**Final grades:** Shape all disturbed areas which are to be revegetated to final design grade, including installation of all measures to provide surface and subsurface drainage and need erosion and sediment control measures.

**Topsoil placement:** On those sites where the exposed and underlying soil material will not support vegetation apply a minimum of 4-6 inches of topsoil as part of construction.

**Clean topsoil:** Topsoil should be friable loamy material and should be free of debris, trash, stumps, rocks, roots, noxious weeds, etc. Topsoil material may be created by mixing compost with subsoils which would not otherwise support vegetation.

**Site preparation:** The surface of areas to be topsoiled should be loosened to a depth of two inches and the topsoil mixed within this depth to insure bonding of the topsoil and subsoil.

**Site condition:** Topsoil should not be placed which in a frozen or muddy condition, when subgrade is excessively wet, or in a condition that may otherwise be detrimental to proper grading or seeding.

**Topsoil compaction:** Compact the topsoil enough to insure good contact with underlying soil and smooth to allow seedbed preparation. Avoid compaction that will increase runoff and erosion, deter seed germination or prevent proper anchoring of mulch.

### **Seedbed Preparation**

**Scarification:** After construction is completed, the seedbed should be worked or loosened to a depth of 4". For those areas that are not accessible by equipment or where the use of equipment should be avoided (such as subsurface waste water disposal fields) scarification should be done by hand.

**Repack the seedbed:** Pack the seedbed, which has been loosened by equipment, prior to seeding to break up large clods and firm the seedbed. The entire prepared seedbed shall be soft enough to permit covering the seed and anchoring mulch, yet firm enough to prevent burying seeds too deep. For example, the soil should be firm enough to support the weight of a person without sinking into the soil more than one-half inch.

**Lime and Fertilizer:** Ideally, soil tests should be used and recommendations for lime and fertilizer followed.

However, this is not usually practical due to the length of time it takes to get results.

In lieu of soil tests:

**Type of fertilizer:** Apply 900 lbs of 5-10-10 or 10-10-10 (N-P205-k20) fertilizer or equivalent per acre (20 lbs. per 1000 Sqft.). In sensitive lake watersheds, use low phosphorous fertilizer such as 10-5-10.

**Application rate:** Apply ground limestone at a rate of three tons per acre, or 140 lbs. per 1000 square foot. As practical, work lime and fertilizer into the soil, either before or during final seedbed preparation. Raking is a good way of doing this.

### **PLANT SELECTION, SEEDING RATES AND SEEDING DATES**

General: Select vegetative mixture for the purpose and site conditions. Listed below are a few general purpose examples of permanent grass seed mixes which, when applied to a properly prepared seed bed, will provide for permanent stabilization of disturbed soil areas (temporary stabilization measures may also be necessary, especially in sensitive lake watersheds). There are other equally effective mixes available. However, care should be taken when selecting a mix to avoid high percentages of annual grasses and high percentages of weeds. The user should also be sure to select a mix which is well suited for the intended use; do you want a lawn or are you simply interested in stabilizing the area? Is the area wet or droughty, shaded or sunny?

#### Lawn mixes:

For well drained and full sun areas: Species, lbs of seed/acre, lbs of seed/1000 Sqft.

Kentucky Bluegrass, 30, 0.94  
Creeping Red Fescue, 40, 0.94  
Red Top, 5, 0.12  
Total, 85, 2.0

For moist and shaded areas: Species, lbs of seed/acre, lbs of seed/1000 Sqft.

Creeping Red Fescue, 40, 0.94  
Roughstalk Bluegrass, 40, 0.94  
Redtop, 5, 0.12  
Total 85, 2.0

#### Non-lawn mixes:

For moist to well drained and full sun areas: Species, lbs of seed/acre, lbs of seed/1000 Sqft.

Tall Fescue (ky.31), 20, 0.50  
Creeping Red Fescue, 20, 0.45  
Red Top, 20, 0.05  
Total, 42, 1.0

For moist to well drained and shaded areas:

Tall Fescue (KY.31), 30, 0.70  
Creeping Red Fescue, 50, 1.30  
Total, 80, 2.0

Application: Seed should be uniformly broadcast over the surface and soil rolled or packed where slope conditions permit. Where rolling or packing is not feasible, the seed should be raked into the top one-quarter inch of soil.

Dates: Seed may be applied as dormant seeding if not applied in time to germinate before the first killing frost. If applied as dormant seeding, increase recommended rate 25%.

#### MULCHING

General: Mulching is an important step in establishing vegetation. Properly applied, mulch will help hold moisture, protect soil from erosion, hold seed in place, keep soil temperature more constant, prevent surface compaction or crusting, control weeds and prevent birds from eating the seed.

Hay or straw: The most commonly used and readily available mulch material is hay or straw. When using this mulch material, care should be taken to avoid using sources which have high amounts of weed seeds.

Application rate: Apply at a rate of 90-100 bales per acre or 2 bales per 1000 sq. feet so that 75%-90% of the surface is lightly covered.

Anchoring: Since hay and straw are subject to wind blowing, unless kept moist, anchoring may be necessary. This is especially true for: areas prone to high velocity winds; areas which are environmentally sensitive, such as lake watersheds, and 3.) areas which were not seeded in time to establish vegetative cover before the first killing frost and would otherwise be bare until the next growing season. Mulch should cover 100% of the surface for these areas and be at least 2" thick. Suitable methods of anchoring hay or straw mulch include:

Peg and twine: After mulching, divide area into blocks approximately one square yard in size. Drive 4-6 pegs per block to within 2" - 3" of the soil surface. Secure mulch to surface by stretching twine between pegs in a crisscross pattern on each block. Secure around each peg with two or more turns. Drive pegs flush with soil where mowing is planned.

Staples: Use the same procedure as described above in peg and twine to divide area after mulching. Insert 4-6 staples over twine in each block. Twine should be placed in a crisscross pattern.

Soil: Cut hay or straw mulch into soil surface with square edged shovel. Make cuts in contour rows spaced 18" apart.

Jute mats: Jute mats or mulch netting may also be used. It can be purchased in rolls and anchored by stapling.

Hydroseeding: Hydroseeding is another alternative mulch which includes seed, fertilizer and lime in a sprayed-on slurry.

## MAINTENANCE

General: While the vegetation is becoming established, it will be necessary to periodically inspect disturbed soil sites and re-stabilize any areas which show evidence of erosion, or where vegetation fails to catch. Areas where heavy mulch applications were used for late fall and winter stabilization will need to be raked so that mulch lightly covers 75% - 90% of the surface, as described in the previous Section on mulching. If mulch is too thick, vegetation will have difficulty becoming established.

New lawns: New seedlings should be treated chemically or mowed to control weeds. Mowers should be set to cut no closer than 2" above ground level.

Older lawns: To maintain a healthy lawn, soil tests should be periodically taken and recommendations followed. This is particularly important in sensitive watersheds where excess fertilizer may end up in surface water bodies or over sole source aquifers where groundwaters may be impacted. In lieu of soil tests, annual applications of at least 45 pounds of elemental nitrogen (N) per acre or one pound per 1000 sq. feet, 25 pounds of phosphate (P205) per acre or one-half pound per 1000 sq. feet and 25 pounds of potash (K20) per acre or one-half pound per 1000 sq. feet. Ground limestone should be applied periodically to maintain a soil pH of at least 6.0.

For additional information: For information on how to take soil samples for soil fertility tests, contact your local Soil and Water Conservation District or Cooperative Extension Service or write to:

Maine Soil Testing Service  
25 Deering Hall  
University of Maine  
Orono, ME 04473

## CHAPTER 11 - WASTEWATER MOUNDING IMPACT ANALYSIS

### GENERAL

The intent of this chapter is to provide a simple screening method for determining whether a site-specific modeling of waste water mounding is required. These processes apply to engineered systems with design flows of 2,000 gpd or greater.

Site evaluators may otherwise choose to use this chapter if it seems applicable. Care must be taken when applying this chapter to assure that test holes used are truly representative of the site. Results should be compared to textbook values for permeability. Much of this information was adapted from Healy & May Seepage and Pollutant Renovation Analysis for Land Treatment, Sewage Disposal Systems (1982).

### SLOPING SITES

General: It should be shown that the waste water effluent will not mound under the disposal field and surface within 50 feet down slope of disposal field(s) using the screening analysis in this Section.

Step 1: Determine the approximate location of the proposed disposal field(s).

Step 2: Locate the top of the watershed or the property line up slope of the proposed disposal field, whichever is closer to the disposal field. Dig an observation hole. Call this hole, "U."

Step 3: Based on mottling or standing groundwater, determine the depth in inches of perched seasonal water above any hydraulically restrictive horizon present in pit "U." Call this depth, "Tu."

Step 4: Dig an observation hole down slope from the disposal field, at 50 feet away or at the property line, whichever is closer to the disposal field. Call this pit, "D."

Step 5: Based on mottling or standing groundwater, determine the depth in inches of perched seasonal water above any hydraulically restrictive horizon present in pit "D." Call this depth, "Td."

Step 6: At observation hole "D," determine the depth of the seasonal water below the surface of the ground. Call this depth, "BG."

Step 7: Determine the distance in feet between the up-slope observation hole, "U," and the down slope observation hole, "D." Call this distance, "X."

Step 8: Compare "Tu" and "Td." If "Tu" is greater than or equal to "Td," the site passes the screening. If "Tu" is less than "Td," there is an increase in the perched seasonal water table (SWTI). Continue with the following steps.

Step 9: Using TABLE 15-1 determine the hydrologic soil group that best represents the soils near the proposed disposal field. (See "Assumption 15," for an explanation of how to use TABLE 15-1.)

Step 10: Using the hydrologic soil group determined in Step 9 above the average slope between observation holes "U" and "D," and TABLE 15-3 determine the wet season infiltration rate in gpd/sqft. Call the infiltration rate, "RI." Thus, for a hydrologic soil group B on a 10% slope, RI = 0.38 gpd/sqft.

Step 11: Using Equation 15-1, calculate the number of gallons per day falling on a one-foot-wide strip from hole "U" to hole "D." Call the result of the calculation, "Qp."

Equation 15-1

$$Q_p = (X \text{ ft})(RI)$$

Step 12: Use Equation 15-2 to calculate how much additional waste water, in gpd/linear foot across the slope, the site can be expected to handle. Call the additional waste water, "WWf."

**Table 11 -1**  
**Hydrologic soil groups vs soil profile and soil conditions**

Soil Profile	Soil Conditions					
	AI	AII	B	C	D	E
1	D	C	B	C	C	D
2	D	C	B	B	C	D
3	D	C	C	C	C	D
4	D	C	B	B	C	D
5	D	C	B	B	C	D
6	D	C	A	B	C	D
7	D	C	C	C	C	D
8	D	C	B	C	C	D
9	D	C	C	C	C	D
11	D	C	B	B	C	D

Equation 15-2

$$WWf = (BG)(Qp)/(SWTI)$$

Step 13: Using the waste water loading rate, determine the linear feet (L) of disposal field, parallel to the topological contour, that will be needed to handle the design flow (DF) in gallons per day, using Equation 15-3.

Equation 15-3

$$L = DF/WWf$$

Questionable sites: If the design flow exceeds the waste water loading rate determined in the screening procedure, a site- specific hydrological study is needed.

**FLAT SITE**

General: A flat site shall have the capacity to transmit the septic tank effluent for an adequate distance without surfacing or mounding. On flat sites, there is a greater tendency toward effluent mounding. Most health agencies agree that travel through 50 feet of most soils will provide adequate treatment.

Screening procedure: It should be shown that the waste water effluent will not mound under the disposal field(s) using the flat-site screening analysis in this Section.

Step 1: Determine the approximate location of the disposal field.

Step 2: Locate the center of the proposed disposal field. Dig an observation hole and call this hole, "C."

Step 3: Determine the length and width of the disposal field in feet. Call the length, "L," and the width, "W."

Step 4: Use Equation 15-4 to determine the area immediately under and within 50 feet of the disposal field (A) in square feet.

Equation 15-4

$$A=(L+100)(W+100)$$

Step 5: Based on mottling or on standing groundwater, determine the depth of perched seasonal water in inches above any hydraulically restrictive horizon present in observation hole "C." Call the depth of perched seasonal water, "PSW."

Step 6: Also at observation hole "C," determine the depth in inches of the seasonal water below the surface of the ground. Call the depth of the seasonal water table, "BG."

Step 7: Using TABLE 11-1 determine the hydrologic soil group that best represents the soils near the proposed disposal field.

Step 8: Using the hydrologic soil group determined in Step 7 above and TABLE 15-2 determine the wet-season infiltration rate in gpd/sqft. Call the infiltration rate, "RI." For example, a hydrologic soil group B has a wet-season infiltration rate of 0.50 gpd/sqft.

**TABLE 15-2**

**Wet season infiltration vs hydrologic soil groups on flat sites**

Hydrologic soil group	Wet season infiltration
A	0.060 gpd/sqft
B	0.050 gpd/sqft
C	0.040 gpd/sqft
D	0.030 gpd/sqft

Step 9: Using the wet season infiltration rate (RI) from TABLE 15-2 above, calculate the number of gallons per day (Qp) falling on and within 50 feet of the disposal field, using Equation 15-5.

Equation 15-5

$$Qp=(A)(RI)$$

Step 10: Use Equation 15-6 to calculate the additional waste water, "WW," in gallons per day that the disposal field and the site can be expected to handle.

Equation 15-6

$$WW=(BG)(Qp)/(PSW)$$

Questionable sites: If the proposed design flow exceeds WW determined in this screening procedure, a site-specific hydrological study is needed.

**ASSUMPTIONS USED**

General: These mounding screening analysis are based on the assumptions in this Section.

Assumption 1: The approach is a simple mass balance model assuming shallow ground water in the "interflow" and "throughflow" regime.

Assumption 2: A fraction of the annual precipitation infiltrates the soil and creates temporary perched water tables. That fraction depends on ground cover, land usage, hydrologic soil group, and the amount and duration of precipitation. Most of these factors will vary on any given site.

Assumption 3: Sloping sites with hydraulically restrictive horizons shall have the capacity to transmit the septic tank effluent for an adequate distance without surfacing or breaking out. Most health agencies agree that travel through 50 to 100 feet of most soils will provide adequate treatment.

Assumption 4: The observed differences in the depths of perched zones of saturation over hydraulically restrictive horizons are directly proportional to the volume of precipitation infiltrating the site and the ability of the zones to handle and transport the infiltrating precipitation.

Assumption 5: The model assumes that the maximum elevation in the perched zones of saturation occur in early spring.

Assumption 6: The percentage of springtime precipitation that infiltrates the soil can be used as a gauge to evaluate how a specific site handles water. The percentage of precipitation is determined by the types of surficial geologic deposits, or by the hydrologic soil group as defined by the U.S. Soil Conservation Service. These percentages are prescribed in Tables 8-2 and TABLE 15-3.

Assumption 7: The average annual precipitation rate is 42 inches per year.

Assumption 8: This model assumes that 100% of the precipitation falling on the entire site infiltrates into the soil, resulting in an elevation of the seasonal zone of perched saturation.

Assumption 9: The average daily infiltration resulting in an elevation of the perched zone of saturation during wet seasons of the year is determined from Tables 8-2 and 8-3 .

**TABLE 15-3**

**Wet season infiltration (gpd/square fteet) vs hydrologic soil group on sloped sites**

Slope	Hydrologic soil group			
	A	B	C	D
<b>0-8%</b>	.060	.050	.040	.030
<b>8-15%</b>	.048	.038	.037	.027
<b>15-25%</b>	.038	.032	.032	.023
<b>&gt;25%</b>	.028	.027	.027	.020

## CHAPTER 12 - MALFUNCTIONING DISPOSAL SYSTEMS

### GENERAL

This chapter provides guidance and methods for identifying, inspecting, diagnosing, and correcting malfunctioning systems.

### IDENTIFICATION OF MALFUNCTIONS

Indicators: Indications that a system is malfunctioning include, but are not limited to, the following:

Bacterial contamination: Contamination of nearby water wells or surface water bodies by waste water or septic tank effluent.

Surface ponding: Ponding or breakout of waste water or septic tank effluent onto the surface of the ground;

Seepage into structures: Seepage of waste water or septic tank effluent into portions of structures below ground; or

Backup into structure: Back-up of waste water into the structure served, when the backup is not caused by a physical blockage of the plumbing within the structure.

### INFORMATION TO BE RECORDED

General: The extent of an investigation of a malfunctioning system is dependant upon factors such as the age of a system, the type of system, and the amount of information already available about the system. The investigator needs to gather and record as much of the information requested in this Section as possible.

Symptoms: Symptoms of system failure such as: discharge to the surface of the ground; a polluted water well, based on bacteriological samples and dye testing; and/or a backup of waste water in the building sewer.

Type and age of system: Type of system in use and when it was installed. (The original application for a subsurface waste water disposal system on file with the municipality can be very useful.)

Type of maintenance: Last time the septic tank was cleaned or serviced.

Frequency of problems: Frequency of the malfunction: continuous; increases in wet weather; decreases in dry weather; and/or gradual increase over several years.

Previous repairs: Any previous repairs to the system.

Years the system functioned satisfactorily: Years of use without a malfunction.

Type of use: System usage information: family size; major waste water generating appliances - dishwashers, water softeners, garbage grinders, clothes washers; daily flow pattern - periods of high water use may cause peak flows that can drastically overload system components and cause failure; use of chemicals to "clean" or "improve" system performance; addition of other water into the system - sump pumps, rain spouts, surface diversion ditches, foundation drains; and abrupt increases in water consumption - leaking plumbing fixtures, weekend guests, new water-using appliances.

Plot plan: Draw a layout of the lot and all surface features that may have caused or contributed to the malfunction.

Conditions during construction: Conditions during the installation of the system: type of equipment used - back-hoe, bulldozer, and front end loader; weather conditions that may have allowed compaction or smearing of the soil; construction completion date; and installer's name for more specific information.

## SEPTIC TANK AND BUILDING DRAIN

Diagnosis steps: After the on-site investigation of the problem, all the information gathered should be reviewed. The following is an outline of recommended diagnosis procedures and suggested actions.

Step 1: If the septic tank was not pumped and checked as part of the initial investigation, it should be pumped and cleaned for inspection. Never enter the tank.

Step 2: If the malfunction is a backup in the building sewer or a discharge from the septic tank, the building sewer or dosing tank may be the source of the problem. Check the septic tank size, baffles, slope of building sewer, and outlet line.

Step 3: If the problem is contamination of ground water, check the septic tank closely for cracks, leaks, and loose inlet or outlet connections. Check for breaks in lines outside the tank or breaks in the building sewer with the discharge running to and down the outside of the septic tank.

Step 4: If there is no septic tank, or if an undersized septic tank is in use, a new tank should be installed.

Step 5: If an aerobic tank is in use, check the tank for proper operation and maintenance. Contact the manufacturer or distributor for operation and maintenance requirements.

Step 6: In some cases, it is likely that solids have been discharged into the distribution box, header pipe, or disposal field due to an inadequate or improperly maintained septic tank.

Suggested corrective actions: Once the septic tanks and/or lines have been repaired, either wait for a period of time to see if these repairs were sufficient to stop the malfunction, or continue immediately with an evaluation of the rest of the system if no problems were observed in the tank or lines. The problem may be in the distribution network or the disposal field.

Suggested septic tank pumping criteria: The contents of the septic tank should be removed by pumping whenever either of the following conditions is noted during the course of inspection:

Scum layer: The bottom of the scum layer is within 3 inches of the bottom of the outlet baffle; or

Sludge layer: The top of the sludge layer is within 8 inches of the bottom of the outlet baffle.

Measuring the bottom of the scum layer: The bottom of the scum layer and the bottom of the outlet baffle can be measured using a stick to which a weighted flap has been hinged. When the end of the stick with the hinged flap is forced down through the scum level, the hinged flap falls into a horizontal position. Raise the stick gently until the flap hooks on the bottom of the outlet baffle. Hold the stick in place and make a mark on the stick at the point where it comes out of the tank. Lower the stick so that it unhooks from the baffle. Move it away from the baffle and raise the stick slowly until the hinged flap touches the bottom of the scum layer (the scum layer will resist the flap a little). Again, hold the stick in place and make a mark on it where it comes out of the tank. The distance between the two marks shows how close the bottom of the scum layer is to the bottom of the outlet baffle.

Measuring the depth of the sludge layer: Wrap a long stick with a rough, white towel. Lowered to the bottom of the tank, the stick will show the depth of the sludge and the liquid in the tank. The stick should be lowered behind the outlet baffle to avoid scum particles. After several minutes, remove the stick carefully. The sludge line can be distinguished by sludge particles clinging to the towel.

Frequency: Septic tanks should be checked after the first year. The pumper can advise how often the septic tank needs to be pumped based upon what he finds at this inspection (typically a septic tank will need to be pumped every two to five years. Keep in mind pumping frequency may need to be adjusted to coincide with changes in use of the system.

## GREASE INTERCEPTOR

Suggested inspection frequency: Grease interceptors should be inspected and cleaned often to prevent the volume of grease from exceeding the grease interceptor's retention capacity. Grease should be removed whenever 75% of the grease retention capacity has been reached. Grease interceptors serving restaurants may require pumping as often as once a week or once every two or three months.

Suggested dosing tank maintenance: Dosing tanks and associated pumps, siphons, switches, alarms, electrical connections, and wiring should be maintained in proper working order. Any solids that accumulate in the dosing tank should be removed and disposed of in a sanitary manner.

## DISTRIBUTION NETWORK

General: Proper installation of individual system components determines whether the system operates at its maximum potential. Improperly-leveled distribution pipes and distribution boxes may cause unequal loading of the disposal field, resulting in premature failure. A soil auger is useful for probing the gravel or gravel-less disposal field in several places to determine whether the entire system is being loaded evenly or whether a portion of the system is not receiving septic tank effluent and, thus, the other portions are overloaded.

Diagnosis: If such a problem is noted, the distribution box or header should be checked. Distribution boxes that are not level, have clogged or broken outlets, or have missing or broken baffles may cause such system malfunctions. Headers that are not level or have been partially clogged can also cause unequal distribution.

Suggested actions: Once repairs have been made to improve distribution, either wait for a period of time to see if the repairs were sufficient to stop the malfunction, or continue immediately with an evaluation of the disposal field.

## DISPOSAL FIELD

General: The disposal field depends mostly upon the movement of septic tank effluent downward into the soil, along with the movement through the distribution pipes. Subsurface water competes with the disposal field for the hydraulic capability of the soil. Bedrock and hydraulically restrictive soil horizons severely restrict drainage and may cause perched zones of saturation. Fractured bedrock presents a potential for ground water contamination.

Suggested actions: Using the information obtained during the soils testing, determine if the site evaluated can be used or if another site should be found.

Suggested maintenance: The following suggestions will help maintain a disposal field so it operates at its maximum potential.

Free of encroachments: The area of the disposal field should be kept free of encroachments from driveways, patios, accessory buildings, additions to the main building, and trees or shrubbery whose roots may cause clogging of any part of the system.

Surface grading: Grading should be maintained in a condition that will promote run-off of rainwater and prevent ponding.

Other water: Drainage from roofs, footing drains, ditches, or swales should be diverted away from the disposal field.

Erosion control: Mulching or vegetation should be maintained to prevent soil erosion, except in driveways.

Vehicular traffic: Vehicular traffic should be kept away from the area of the disposal field unless the field is designed for vehicular traffic.

## OTHER FACTORS THAT MAY CAUSE MALFUNCTIONS

Ground and surface water: It is important that the disposal field be located in an area of unrestricted drainage. Location of a disposal field near the base of a hill, down the hydraulic gradient of a drainage area, or in a swale

frequently results in overloading of the soil's hydraulic capacity. Locating the system adjacent to a barrier to subsurface water movement, such as a road, also results in soil saturation. These types of sites are frequently characterized by periodic malfunctions during the wet season of the year, with relief occurring in dry periods.

**Improperly sized disposal fields:** Disposal field design should take into consideration the volume of waste water, soil characteristics, and site limitations. If the soil evaluation shows suitable soil, the system should be closely checked for design problems. Under-sized septic tanks and disposal fields will lead to system overload and malfunction. Properly-sized disposal fields that are abused, through either peak daily overloads or continual overloads, will malfunction. Check the usage information to determine if the disposal field is being overloaded.

**Improper installation:** Disposal field failures are commonly due to poor construction techniques. Of particular concern are disposal field excavation, installation, and covering. Excavation during periods of high soil moisture may result in unnatural soil compaction and smearing. This reduces the hydraulic capacity of the disposal field's bottom and sidewalls. The installation of dirty stone in a disposal field can reduce the application rate of the soil below the field.

**Age of the system:** While there is rarely an established design life for a system, most standards and site evaluators consider 10 years to be a minimum life expectancy. System malfunction in fewer than 10 years generally reflects a failure in the site selection, system design, or construction methods, or it reflects unplanned system usage. Systems that have functioned properly for longer than 10 years may be considered to be successful, and failures occurring in such systems are usually due to natural processes. Although the initial process of soil pore clogging equalizes after the first few months, over a long period of time additional soil clogging is inevitable. This clogging is accelerated by high total suspended solids and biochemical oxygen demand of the septic tank effluent combined with saturated anaerobic conditions in the disposal field.

## CORRECTION ALTERNATIVES

**Options:** A large number of options are available for the repair of malfunctioning systems. Each alternative is dependent upon the specific problems observed at the site and should be considered in light of its chances of success. If more than one alternative exists, or if a major decision should be made between a number of alternatives, the property owner should be provided with all the options and should decide which option to use. This CHAPTER discusses a number of options and the conditions under which those options can be used.

**Disposal field enlargement:** Additional square footage can be added to an existing disposal field when:

If an inadequate design is found: The volume of waste water being generated is greater than the design flow used for the original design; and/or

If improper soil profile identification: The investigation discloses that the soils are slower than originally reported but they still demonstrate acceptable levels of permeability.

**The distribution box:** If the investigation reveals unequal waste water distribution, the distribution box or header can be leveled or replaced.

**Septic tank:** If an undersized or improperly designed septic tank is discovered, it can be replaced.

**System restoration:** Recent studies and experiences have shown that the normal soil clogging process that occurs in all systems can be reversed by natural and artificial oxidation of the inhibiting clogging mat. This can be done by:

**Allowing the disposal field to rest:** Allow the disposal field to rest by pumping out the disposal field and keeping the septic tank pumped as long as possible (with a minimum of one to three months) to permit restoration of aerobic conditions and to allow oxidation of the biological slime layer on the disposal field's bottom and sidewalls.

**Chemical oxidants not recommended:** The use of hydrogen peroxide-type chemicals to provide oxidation of an impermeable slime layer is not recommended.

Reduction of hydraulic loading: There is a variety of readily available water reduction devices (such as low-volume shower heads) which can be used in an existing plumbing system. These are capable of reducing waste water volume by approximately 20%.

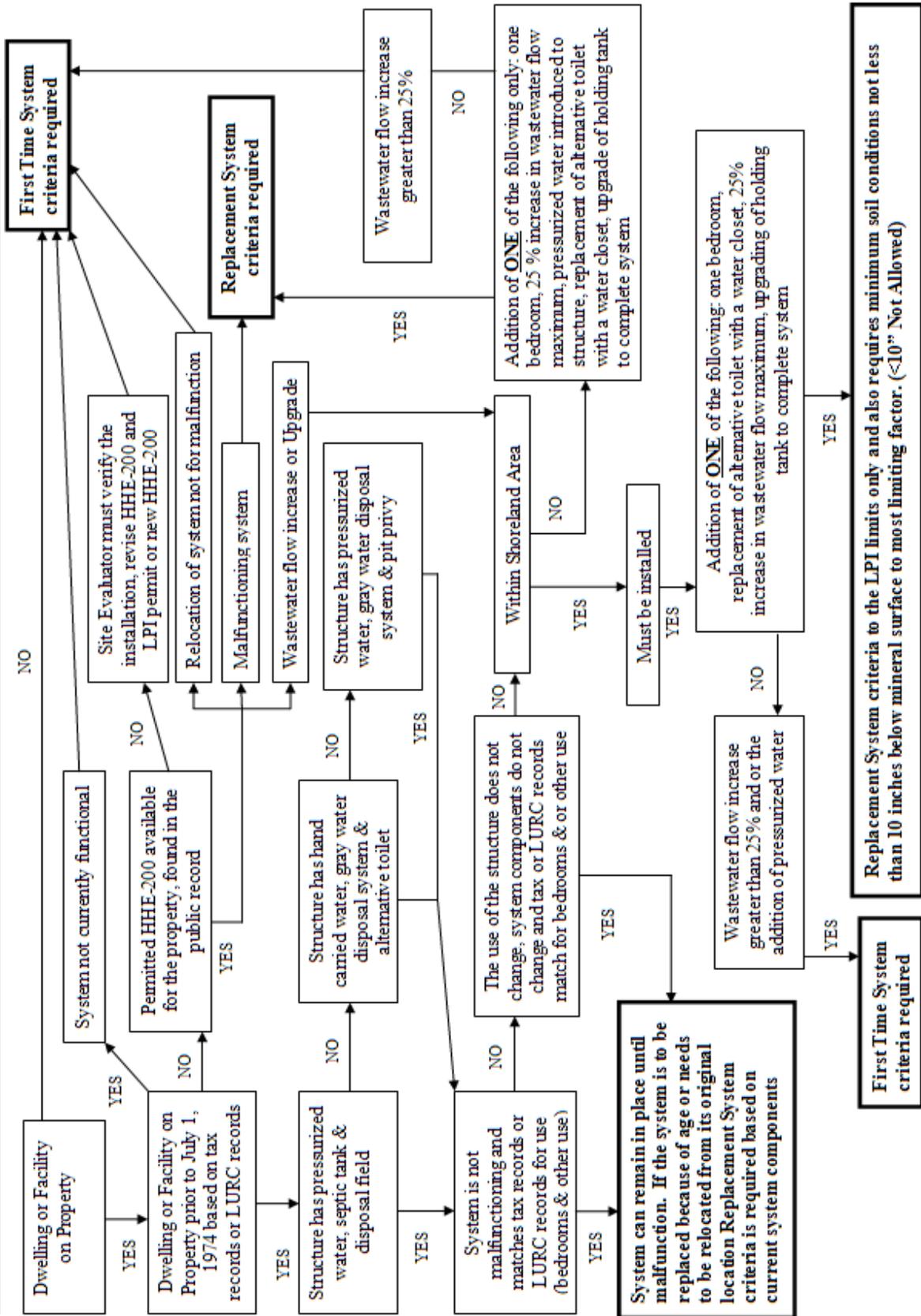
Water conservation devices: In severe cases, more extreme water conservation devices, such as alternative toilets, can be used to reduce water consumption by as much as 50%.

Reduction of organic loading: The addition of a second septic tank has been shown to provide superior treatment compared to that of a single compartment septic tank. Most of the sludge is trapped in the first compartment or tank. This results in a significantly reduced scum and sludge layer in the second tank or compartment. The resulting "cleaner" septic tank effluent has less biochemical oxygen demand and total suspended solids. Thus less food is available for the bacteria in the clogging zone to feed on.

Significant amounts of solids are raised from the septic tank sludge when anaerobic bacteria form gas bubbles. Deflection of the bubbles by the use of a gas baffle results in significant reductions of total suspended solids in the septic tank effluent.

Replace the disposal field: If all else fails, the final alternative is to install a replacement disposal field.

**Proposed Flow Chart for Subsurface Wastewater Disposal System Design Criteria – by: Doug Coombs, 06-14-2010**



## CHAPTER 13-APPROVED PRODUCTS LIST

This list includes all products related to subsurface wastewater disposal for which the Department has granted approval, for use in Maine. Because installation and owner maintenance has a significant effect on the working order of onsite sewage disposal systems, including their components, the Department makes no representation or guarantee as to the efficiency and/or operation of specific product. Further, registration of a specific product for use in the State of Maine does not represent Department preference or recommendation for that product over similar or competing products.

Category	Product	Company
Accessory	16-RIS Safety Pan	Tuf-Tite Inc.
Accessory	20-RIS Safety Pan	Tuf-Tite Inc.
Accessory	24-RIS Safety Pan	Tuf-Tite Inc.
Accessory	24-RISLID Safety Pan Riser Lid	Tuf-Tite Inc.
Advanced Treatment Retrofit	RetroFAST	Bio-Microbics, Inc.
Advanced Treatment Retrofit	Aquaworx Remediator	Infiltrator Systems Inc.
Advanced Treatment Retrofit	White Knight	Knight Treatment Systems
Advanced Treatment Retrofit	Pirana	Piranaco
Advanced Treatment Retrofit	SludgeHammer S-46, S-86, S-400, & S-600	SludgeHammer Group Ltd.
Advanced Treatment Units	OXYPRO (N/F OXYMAX)	Aeration Systems LLC
Advanced Treatment Units	Model AT-500, AT-600, AT-750, AT-1000, AT-1500	AeroTech
Advanced Treatment Units	Alliance 500 ATU	Alliance Wastewater Treatment Systems
Advanced Treatment Units	Lotus Wastewater Treatment System	Aquapoint, Inc.
Advanced Treatment Units	Model 400	Aquarobic
Advanced Treatment Units	AWT Bioclere	AWT Environmental Inc.
Advanced Treatment Units	FAST	Bio Microbics Inc
Advanced Treatment Units	Bio-Microbics FAST Systems	Bio-Microbics, Inc.
Advanced Treatment Units	FAST System, 75 Per Cent Reduction	Bio-Microbics, Inc.
Advanced Treatment Units	MicroFAST 0.5 Wastewater Treatment System	Bio-Microbics, Inc.
Advanced Treatment Units	BN-400 - BN-2650	BIONEST Technologies, Inc.
Advanced Treatment Units	SOLO TO-40 Wastewater Treatment System	BIONEST Technologies, Inc.
Advanced Treatment Units	CA 5/12/15/25/30/50/60/100/120/150	Chromaglass Corporation
Advanced Treatment Units	Chromaglass Wastewater Treatment Systems	Chromaglass Corporation
Advanced Treatment Units	Whitewater Home ATUs, DF Series	Delta Environmental Products, Inc.
Advanced Treatment Units	ECOPOD Series	Delta Environmental Products, Inc.
Advanced Treatment Units	H-TWO-O Series 35T Wastewater Treatment System	Desoto Concrete Products, Inc.
Advanced Treatment Units	Aqua Aire	Ecological Tanks, Inc.
Advanced Treatment Units	Aqua Safe	Ecological Tanks, Inc.
Advanced Treatment Units	Amphidrome Wastewater Treatment System	F. R. Mahony & Associates, Inc.
Advanced Treatment Units	Mighty Mac ATU	H. E. McGrew Inc
Advanced Treatment Units	ANR-, H-, and LA- Series	Hoot Aerobic Systems, Inc.
Advanced Treatment Units	CMS ROTORDISK	Huron Environmental
Advanced Treatment Units	Hydro-Action AP-500	Hydro-Action Inc.
Advanced Treatment Units	Interseptic Systems	Interseptic Systems of New England
Advanced Treatment Units	Single Home FAST Treatment Plant	J & R Engineered Products Inc
Advanced Treatment Units	Jet Aeration	Jet Aeration Company
Advanced Treatment Units	BAT Series, J-600, J-750, J-1000, J-1250, J-1500	Jet, Inc.
Advanced Treatment Units	Jet Model J-500	Jet, Inc.
Advanced Treatment Units	Interseptic Systems	Micro Waste National Inc.
Advanced Treatment Units	EnviroServer	MicroSepTec
Advanced Treatment Units	The Answer	Nyadic Sciences Inc.
Advanced Treatment Units	AdvanTex Treatment System	Orenco Systems, Inc.
Advanced Treatment Units	PL-500	Proline Wastewater, LLC
Advanced Treatment Units	BUSSE GmbH BioMir	S & B Global

Category	Product	Company
Advanced Treatment Units	SeptiTech	SeptiTech, Inc.
Advanced Treatment Units	BioDisc Model BB	Waste Water Solutions International, Inc.
Advanced Treatment Units	Seapoint Wastewater Treatment System	WASTECH International, Inc.
Advanced Treatment Units	WASTECH	WASTECH International, Inc.
Advanced Treatment Units	The Clean Solution, 75% reduction	Wastewater Alternatives, Inc.
Advanced Treatment Units	Multi-Flow	Water Products Inc.
Advanced Treatment Units	ZF450 Wastewater Treatment System	Zoeller Pump Co.
Advanced Treatment Units	AK6PT Wastewater Treatment System	AquaKlear, Inc.
Aerobic Treatment Units	Septic Rejuvenator	IMET Corporation
Disinfection Device	Jet-Chlor Tablet Chlorinator	Jet, Inc.
Disposal Area, plastic aggregate tube	Flowtech, various sizes	ICC Technologies, LLC
Disposal Area, plastic aggregate tube	EZflow Systems	RING Industrial Group
Disposal Area, Tube	Multi-Pipe Drainfield System	Plastic Tubing Industries, Inc.
Disposal Chamber, Concrete	Flowdiffusor	American Concrete Industries
Disposal Chamber, Concrete	Permaleach Type B	County Concrete & Construction Co.
Disposal Chamber, Concrete	Ameration Chamber	Del R. Gilbert & Sons
Disposal Chamber, Concrete	Leaching Chamber	G. E. Goding & Son, Inc
Disposal Chamber, Concrete	S Flo-Duc Dissipator	G. E. Goding & Son, Inc.
Disposal Chamber, Concrete	Ameration Chamber	Gagne & Son, Inc.
Disposal Chamber, Concrete	Flo-Duc Dissipation	Gagne & Son, Inc.
Disposal Chamber, Concrete	Flowage Distribution	Genest Brothers Inc.
Disposal Chamber, Concrete	Tru-Vap	Precast Concrete Products of Maine
Disposal Chamber, Concrete	Flowdiffusor	Superior Concrete Company
Disposal Chamber, Plastic	Phoenix Composting Toilet	Advanced Composting Systems
Disposal Chamber, Plastic	ARC 36, ARC 36HC, ARC 36 LP Chambers	Advanced Drainage Systems Inc.
Disposal Chamber, Plastic	Tripdrain	Bill Baptista Sales
Disposal Chamber, Plastic	Contactor/Tripdrain	Cultec, Inc
Disposal Chamber, Plastic	Contactor & Recharger	Cultec, Inc.
Disposal Chamber, Plastic	Envirochamber	Hancor, Inc.
Disposal Chamber, Plastic	Equalizer 24 (EQ 24)	Infiltrator Systems Inc.
Disposal Chamber, Plastic	Infiltrator	Infiltrator Systems Inc.
Disposal Chamber, Plastic	Quick4 Plus High Capacity, Quick4 Plus 8 & 12 Endcaps	Infiltrator Systems Inc.
Disposal Chamber, Plastic	Quick 4 Plus Chambers	Infiltrator Systems Inc.
Disposal Chamber, Plastic	Quick 4 Chambers	Infiltrator Systems, Inc.
Disposal Chamber, Plastic	Bio Diffuser	PSA, Inc.
Disposal Chamber, Plastic	BioDiffuser Bio 2 and Bio 3	PSA, Inc.
Distribution Box	4HD2	Tuf-Tite Inc.
Distribution Box	6HD2	Tuf-Tite Inc.
Distribution Box	7HD2	Tuf-Tite Inc.
Distribution Box	9HD2	Tuf-Tite Inc.
Distribution Boxes	Distribution Boxes	G. E. Goding & Son, Inc.
Distribution Boxes	Rila	Rila Precast Concrete Products
Drip Irrigation	Aquaworx Subsurface Wastewater Drip System	Infiltrator Systems, Inc
Drip Irrigation	Geoflow WASTEFLOW	Geoflow, Inc.
Drip Irrigation	Perc-Rite	American Manufacturing Company, Inc.
Drip Irrigation	Porous Drip Hose System	SeptiTech, Inc.
Drop Box	Various	Tuf-Tite Inc.
Effluent Aerator	SoilAir	Geomatrix LLC
Erosion Control Systems	Erosion Control Systems	Erosion Controls Systems Inc
Filter Fabric	AMOCO (Propex) 4545	Amoco Fabrics Company
Filter Fabric	Drain-Sleeve	Carriff Corporation
Filter Fabric	Trevira 1114	Contech Construction Products
Filter Fabric	Permatex 200,300,706,40	JDR Enterprises
Filter Fabric	Mirafi 1160 N	Mirafi Inc.

Category	Product	Company
Filter Fabric	Mirafi 140 N	Mirafi Inc.
Filter Fabric	Mirafi Miramat	Mirafi Inc.
Filter Fabric	Models 4NP, 5NP, & 8NP	New England Seal Coating Co.
Grease Trap	Grease Trap	Superior Concrete Company
Grease Trap	Proceptor Oil, Grease, and Solids separators	Tower Hill Sales Associates, Inc.
Leaching Devices, Fabric Covered	Mound Buster, Revised Sizing	Aeration Systems LLC
Leaching Devices, Fabric Covered	OxyPro Mound Buster	Aeration Systems LLC
Leaching Devices, Fabric Covered	Eljen GP5-24	Eljen Corporation
Leaching Devices, Fabric Covered	Geotextile Sand Filter (formerly, In-Drain)	Eljen Corporation
Leaching Devices, Fabric Covered	MiniMax 4070 and 4120	Eljen Corporation
Leaching Devices, Fabric Covered	Geo-Flow	Geo-flow, Inc.
Leaching Devices, Fabric Covered	GeoMat, Models 600, 1200, and 3900	Geomatrix LLC
Leaching Devices, Fabric Covered	SB2	Hancor, Inc.
Leaching Devices, Fabric Covered	Multi-Level Leaching System	Presby Environmental Inc
Leaching Devices, Fabric Covered	Advanced Enviro-Septic	Presby Environmental Inc.
Leaching Devices, Fabric Covered	Enviro-Septic	Presby Environmental Inc.
Miscellaneous	OxyBoost	Aeration Systems LLC
Miscellaneous	Septic Sentry	Aeration Systems LLC
Miscellaneous	Septic Sentry	Aeration Systems LLC
Miscellaneous	Control Panels	Aerobic & Pump Controls, Inc
Miscellaneous	Conseal 101	Concrete Sealants Inc
Miscellaneous	ConWrap	Concrete Sealants Inc
Miscellaneous	Universal Liner	Miller Environmental Products, Inc.
Miscellaneous	Presby De-Nyte	Presby Environmental, Inc.
Miscellaneous	Ruck System	Ruck Systems
Miscellaneous	Septi-chip Tire Chips	Septi-chip LLC
Miscellaneous	pumper truck	SNS Group Inc.
Miscellaneous	TerraLift	Terralift Inc.
Miscellaneous	Z-200 and Z-200D Flow Director	Zabel Environmental Technology
Miscellaneous	Z-200 and Z-200D Flow Dividers	Zabel Environmental Technology
Peat Filters	Puraflo Peat Biofilter	Bord Na Mona
Peat Filters	Eco-Pure 300 Series Peat Moss Biofilter	Eco-Pure Waste Water Systems
Pipe, ABS Foam Core	Foam Core	Borg-Warner Chemicals
Pipe, ABS Foam Core	Foam Core	Emerson-Swan Inc.
Pipe, Plastic	ADS-3000	Advanced Drainage Systems Inc.
Pipe, Plastic	ADS-3000 Triple Wall Pipe	Advanced Drainage Systems Inc.
Pipe, Plastic	Bovac PVC	Bovac Plastics Ltee
Pipe, Plastic	Z-46 Prime	Carlton
Pipe, Plastic	Drosstube	Drossback N.A., Inc.
Pipe, Plastic	ES Pipe	Hancor, Inc.
Pipe, Plastic	Insul-Seal Insulated PVC Pipe	Insul-Seal Insulated PVC
Pipe, Plastic	Rionite	Orion Fitting Inc.
Pipe, Plastic	Poly-molding smooth wall	Poly Molding Pipe Corporation
Pipe, Plastic	polyethylene pipe	Progressive Plastic Extrusion Inc
Pipe, Plastic	REHAU PEX	REHAU Incorporated
Pipe, Plastic	schedule 40 pipe	Reliance Plastics Co
Pipe, Plastic	Royal Doublewall	Royal Pipe Limited
Pipe, Plastic	ASTM D3309-81	Shell Chemical Company
Pipe, Plastic	Ecolotube	Tuyaux Duchesne Ltee
Pipe, Plastic	Ecolotube	Tuyaux Duchesne Ltee
Pit Privies	Backcountry Toilet	Bureau of Public Lands
Riser Lid	12-RISL	Tuf-Tite Inc.
Riser Lid	16-RISL	Tuf-Tite Inc.
Riser Lid	20-RISL	Tuf-Tite Inc.

Category	Product	Company
Riser Lid	24-RISL	Tuf-Tite Inc.
Separated Waste Treatment	Clearwater Water and Wastewater Treatment System	AlasCan
Septic Tank Baffles	modified concrete st	Downeast Concrete Company
Septic Tank Baffles	EFS 12	Flowlink Manufacturing Co
Septic Tank Effluent Filter	Presby Maze	Presby Environmental Inc
Septic Tank Effluent Filter	GAG Sim/Tech outlet filte	Sim/Tech Filter
Septic Tank Effluent Filter	EF-4	Tuf-Tite Inc.
Septic Tank Effluent Filter	EF-6	Tuf-Tite Inc.
Septic Tank Effluent Filter	Tuf-Tite	Tuf-Tite Inc.
Septic Tank Effluent Filter	Zabel	Zabel Environmental Technology
Septic Tank Effluent Filters	FRICKle Filter	Albert Frick Associates, Inc.
Septic Tank Effluent Filters	Bio Wier In Tank Filter	Bio Weir Inc
Septic Tank Effluent Filters	EF 235	Bowco Industries
Septic Tank Effluent Filters	Bio-Kinetic BK 2000	NORWECO
Septic Tank Effluent Filters	Biotube Filter	Orenco Systems, Inc.
Septic Tank Effluent Filters	Polylok 625 Effluent Filter	Polylok, Inc.
Septic Tank Effluent Filters	Polylok PL-525 Effluent Filter	Polylok, Inc.
Septic Tank Effluent Filters	Polylok PL-68 Effluent Filter	Polylok, Inc.
Septic Tank Effluent Filters	Polylok Septic Tank Filter	Polylok, Inc.
Septic Tank Effluent Filters	Ecoflex EFX 400 and 400B Peat Filters	Premier Tech Environment
Septic Tank Effluent Filters	Premier Tech EFT-80	Premier Tech Environment
Septic Tank Effluent Filters	Preby De-Nyte, revised	Presby Environmental, Inc.
Septic Tank Effluent Filters	SimTech Bristle Filter	SimTech Filter
Septic Tank Effluent Filters	A100/300 filters	Zabel Environmental Technology
Septic Tank Effluent Filters	AeroCell and SCAT Systems	Zabel Environmental Technology
Septic Tank Effluent Filters	PDS-PF-1.5/2.0 Pressure Filter	Zabel Environmental Technology
Septic Tank Effluent Filters	"WW" Residential Effluent Filter P/N 170-0078	Zoeller Pump Co.
Septic Tank Effluent Filters	Effluent Filters	Zoeller Pump Co.
Septic Tank, Aerobic	Scienco/Fast	J & R Engineered Products Inc
Septic Tank, Concrete	concrete septic tank	County Concrete & Construction Co.
Septic Tank, Concrete	concrete septic tanks	Downeast Concrete Company
Septic Tank, Concrete	Septic Tank	G. E. Goding & Son, Inc.
Septic Tank, Concrete	concrete septic tanks and flow diffusers	Gagne & Son, Inc.
Septic Tank, Concrete	Del Zotto 1,500 Gallon Septic Tank	Glidden Construction & Foundations
Septic Tank, Concrete	septic tank	Mattingly Products Co.
Septic Tank, Concrete	concrete septic tank	Pine Tree Concrete Products Inc
Septic Tank, Concrete	precast septic tanks	Wardwell Construction and Trucking Company
Septic Tank, Fiberglass	Ladig	Ladig Fiberglass Products Inc
Septic Tank, Fiberglass	FRP Septic Tank	Orenco Systems, Inc.
Septic Tank, Fiberglass	Smith & Wesson	Smith & Wesson
Septic Tank, Plastic	AK Industries	AK Industries, Inc.
Septic Tank, Plastic	Big "O"	Big "O" Inc.
Septic Tank, Plastic	Models 500, 1000, and 1500	Coon Manufacturing, Inc.
Septic Tank, Plastic	Ace Roto-Mold Septic Tank, AST-1000-2	Den Hartog Industries, Inc.
Septic Tank, Plastic	Plastic Septic Tank Kits	EZ Tanks, Inc.
Septic Tank, Plastic	Plastech Plastic Septic Tanks	FRALO Plastech
Septic Tank, Plastic	Hancor polyethylene	Hancor, Inc.
Septic Tank, Plastic	TW Series Septic Tanks	Infiltrator Systems Inc.
Septic Tank, Plastic	Norwesco	Norwesco, Inc
Septic Tank, Plastic	Manutank	Plasti-Drain Ltee
Septic Tank, Plastic	polyethylene septic tanks	Plasti-Drain Ltee
Septic Tank, Plastic	Roth MultiTank	Roth Global Plastics, Inc.
Septic Tank, Plastic	Model TK 750 and Model TK 1250 Plastic Septic Tanks	Snyder Industries, Inc.
Septic Tank, Plastic	Wedco	Waterfall Distributors Inc

Category	Product	Company
Septic Tank, Plastic	Wedco Plastic Septic Tanks	Waterfall Distributors Inc
Septic Tank, Plastic	WEDCO WP 5700	Waterfall Distributors Inc
Septic Tank, Plastic	Xactic	Waterfall Distributors Inc
Septic Tank, Plastic	1,060 Gallon Septic Tank	Infiltrator Systems Inc.
Septic Tank, Pump Station	CSI Control	CSI Controls
Septic Tank, Pump Station	FPV 100 Filtered Pump Vault	Zabel Environmental Technology
Sewage Appliance	Pump John	Pump John Mfg., Inc.
Sewage Appliance	Storburn	Storburn USA Inc.
Sewage Appliance	Sump & Sewage Basins	Topp Industries
Shallow-Depth Irrigation	Limited Flow System	Albert Frick Associates, Inc.
Swimming Pool Equipment	Chlorinators	Chemicals Group
Swimming Pool Equipment	Clearicin	Rolfite Products Inc.
Swimming Pool Equipment	Model CUIP	Superior Aqua Enterprises
Swimming Pool Equipment	Recirculating Gutter Syst	The Miller Anderson Pool Co.
Tank Riser	12-RIS	Tuf-Tite Inc.
Tank Riser	12x12-RIS	Tuf-Tite Inc.
Tank Riser	16-RIS	Tuf-Tite Inc.
Tank Riser	16x12-RIS	Tuf-Tite Inc.
Tank Riser	20-RIS	Tuf-Tite Inc.
Tank Riser	20x12-RIS	Tuf-Tite Inc.
Tank Riser	24-RIS	Tuf-Tite Inc.
Tank Riser	24x12-RIS	Tuf-Tite Inc.
Toilet, Composting	Biolet	BIOLET USA, Inc.
Toilet, Composting	Clivus-Multrum	Clivus-Multrum USA
Toilet, Composting	Airflush	Composting Toilet Systems Inc.
Toilet, Composting	Humus	ECOS Inc.
Toilet, Composting	Gap Mountain Permaculture Mouldering	Gap Mountain Permaculture
Toilet, Composting	Mother's Compost Commode	Mother Earth News
Toilet, Composting	Envirolet	SANCOR Industries Ltd.
Toilet, Composting	Sun-Mar Centrex and Excel Models	Sun-Mar Corp.
Toilet, Composting	Carousel	unknown distributor
Toilet, Composting	Mullbank/Ecolet	unknown distributor
Toilet, Incinerating	SWD Mark I	Babcock & Wilcox
Toilet, Incinerating	Crouse	Crouse Corporation
Toilet, Incinerating	ETS CVF	GATX
Toilet, Incinerating	Incinomode	Incinomode Sales Co.
Toilet, Incinerating	Vacu-Burn	Jered Industries, INC.
Toilet, Incinerating	Destroilet	La Mere Industries, LTD
Toilet, Incinerating	Thermox	N-Com Systems Company, Inc.
Toilet, Incinerating	prototype	Ocean System
Toilet, Incinerating	Incinolet	Research Products/Blankenship
Toilet, Incinerating	Thermajon	Tekmar Corporation
Toilet, Recirculating	Cycle-Let	Thetford Systems Inc
Wastewater Recycling	Equaris	AlsaCAN
Water Saving Devices	Water Mizer	Water Mizer
Water Treatment	Pool-trol (Chlorination)	Tuf-Tite Inc.

## **CHAPTER 18-COMMONLY USED FORMS**

- HHE-200 Subsurface Wastewater Disposal System Application
  - Page 1
  - Page 2
  - Page 2 with extra test pit logs
  - Page 3
- HHE-204 Variance Request
- HHE-233 Application/Agreement for Holding Tank Installation
- HHE-234 Notice of Intent to Install a Subsurface Wastewater Disposal System
- HHE-236 Application for Variance to the Minimum Lot Size Law Requirements
- HHE-238A Statement of Compliance
- HHE-238B Affidavit of Site Preparation
- HHE-238C Inspection Checklist
- HHE-300 Holding Tank Deed Covenant
- HHE-306 Well Setback Release
- Notice of Permit

# SUBSURFACE WASTEWATER DISPOSAL SYSTEM APPLICATION

Maine Dept. Health & Human Services  
 Div of Environmental Health , 11 SHS  
 (207) 287-5672 Fax: (207) 287-3165

<b>PROPERTY LOCATION</b>		<b>&gt;&gt; CAUTION: PERMIT REQUIRED - ATTACH IN SPACE BELOW &lt;&lt;</b>
City, Town, or Plantation		The Subsurface Wastewater Disposal System <b>shall not</b> be installed until a Permit is attached HERE by the Local Plumbing Inspector. The Permit shall authorize the owner or installer to install the disposal system in accordance with this application and the Maine Subsurface Wastewater Disposal Rules.
Street or Road		
Subdivision, Lot #		
<b>OWNER/APPLICANT INFORMATION</b>		
Name (last, first, MI) <span style="float: right;"><input type="checkbox"/> Owner <input type="checkbox"/> Applicant</span>		
Mailing Address of Owner/Applicant		
Daytime Tel. #		Municipal Tax Map # _____ Lot # _____
<b>OWNER OR APPLICANT STATEMENT</b> I state and acknowledge that the information submitted is correct to the best of my knowledge and understand that any falsification is reason for the Department and/or Local Plumbing Inspector to deny a Permit.		<b>CAUTION: INSPECTION REQUIRED</b> I have inspected the installation authorized above and found it to be in compliance with the Subsurface Wastewater Disposal Rules Application. _____ (1st) date approved  _____ (2nd) date approved
Signature of Owner or Applicant	Date	Local Plumbing Inspector Signature

## PERMIT INFORMATION

<b>TYPE OF APPLICATION</b> <input type="checkbox"/> 1. First Time System <input type="checkbox"/> 2. Replacement System Type replaced: _____ Year installed: _____ <input type="checkbox"/> 3. Expanded System <input type="checkbox"/> a. <25% Expansion <input type="checkbox"/> b. >25% Expansion <input type="checkbox"/> 4. Experimental System <input type="checkbox"/> 5. Seasonal Conversion	<b>THIS APPLICATION REQUIRES</b> <input type="checkbox"/> 1. No Rule Variance <input type="checkbox"/> 2. First Time System Variance <input type="checkbox"/> a. Local Plumbing Inspector Approval <input type="checkbox"/> b. State & Local Plumbing Inspector Approval <input type="checkbox"/> 3. Replacement System Variance <input type="checkbox"/> a. Local Plumbing Inspector Approval <input type="checkbox"/> b. State & Local Plumbing Inspector Approval <input type="checkbox"/> 4. Minimum Lot Size Variance <input type="checkbox"/> 5. Seasonal Conversion Permit	<b>DISPOSAL SYSTEM COMPONENTS</b> <input type="checkbox"/> 1. Complete Non-engineered System <input type="checkbox"/> 2. Primitive System (graywater & alt. toilet) <input type="checkbox"/> 3. Alternative Toilet, specify: _____ <input type="checkbox"/> 4. Non-engineered Treatment Tank (only) <input type="checkbox"/> 5. Holding Tank, _____ gallons <input type="checkbox"/> 6. Non-engineered Disposal Field (only) <input type="checkbox"/> 7. Separated Laundry System <input type="checkbox"/> 8. Complete Engineered System (2000 gpd or more) <input type="checkbox"/> 9. Engineered Treatment Tank (only) <input type="checkbox"/> 10. Engineered Disposal Field (only) <input type="checkbox"/> 11. Pre-treatment, specify: _____ <input type="checkbox"/> 12. Miscellaneous Components
<b>SIZE OF PROPERTY</b> <input type="checkbox"/> SQ. FT. <input type="checkbox"/> ACRES	<b>DISPOSAL SYSTEM TO SERVE</b> <input type="checkbox"/> 1. Single Family Dwelling Unit, No. of Bedrooms: _____ <input type="checkbox"/> 2. Multiple Family Dwelling, No. of Units: _____ <input type="checkbox"/> 3. Other: _____ (specify) Current Use <input type="checkbox"/> Seasonal <input type="checkbox"/> Year Round <input type="checkbox"/> Undeveloped	<b>TYPE OF WATER SUPPLY</b> <input type="checkbox"/> 1. Drilled Well <input type="checkbox"/> 2. Dug Well <input type="checkbox"/> 3. Private <input type="checkbox"/> 4. Public <input type="checkbox"/> 5. Other
<b>SHORELAND ZONING</b> <input type="checkbox"/> Yes <input type="checkbox"/> No		

## DESIGN DETAILS (SYSTEM LAYOUT SHOWN ON PAGE 3)

<b>TREATMENT TANK</b> <input type="checkbox"/> 1. Concrete <input type="checkbox"/> a. Regular <input type="checkbox"/> b. Low Profile <input type="checkbox"/> 2. Plastic <input type="checkbox"/> 3. Other: _____ CAPACITY: _____ GAL.	<b>DISPOSAL FIELD TYPE &amp; SIZE</b> <input type="checkbox"/> 1. Stone Bed <input type="checkbox"/> 2. Stone Trench <input type="checkbox"/> 3. Proprietary Device <input type="checkbox"/> a. cluster array <input type="checkbox"/> c. Linear <input type="checkbox"/> b. regular load <input type="checkbox"/> d. H-20 load <input type="checkbox"/> 4. Other: _____ SIZE: _____ sq. ft. <input type="checkbox"/> lin. ft.	<b>GARBAGE DISPOSAL UNIT</b> <input type="checkbox"/> 1. No <input type="checkbox"/> 2. Yes <input type="checkbox"/> 3. Maybe If Yes or Maybe, specify one below: <input type="checkbox"/> a. multi-compartment tank <input type="checkbox"/> b. _____ tanks in series <input type="checkbox"/> c. increase in tank capacity <input type="checkbox"/> d. Filter on Tank Outlet	<b>DESIGN FLOW</b> _____ gallons per day BASED ON: <input type="checkbox"/> 1. Table 4A (dwelling unit(s)) <input type="checkbox"/> 2. Table 4C (other facilities) SHOW CALCULATIONS for other facilities  <input type="checkbox"/> 3. Section 4G (meter readings) ATTACH WATER METER DATA
<b>SOIL DATA &amp; DESIGN CLASS PROFILE CONDITION</b> _____ / _____ at Observation Hole # _____ Depth _____" of Most Limiting Soil Factor	<b>DISPOSAL FIELD SIZING</b> <input type="checkbox"/> 1. Medium---2.6 sq. ft. / gpd <input type="checkbox"/> 2. Medium---Large 3.3 sq. ft. / gpd <input type="checkbox"/> 3. Large---4.1 sq. ft. / gpd <input type="checkbox"/> 4. Extra Large---5.0 sq. ft. / gpd	<b>EFFLUENT/EJECTOR PUMP</b> <input type="checkbox"/> 1. Not Required <input type="checkbox"/> 2. May Be Required <input type="checkbox"/> 3. Required Specify only for engineered systems: DOSE: _____ gallons	<b>LATITUDE AND LONGITUDE</b> at center of disposal area Lat. _____ d _____ m _____ s Lon. _____ d _____ m _____ s if g.p.s, state margin of error: _____

## SITE EVALUATOR STATEMENT

I certify that on \_\_\_\_\_ (date) I completed a site evaluation on this property and state that the data reported are accurate and that the proposed system is in compliance with the State of Maine Subsurface Wastewater Disposal Rules (10-144A CMR 241).

_____	_____	_____
Site Evaluator Signature	SE #	Date
_____	_____	_____
Site Evaluator Name Printed	Telephone Number	E-mail Address

Note : Changes to or deviations from the design should be confirmed with the Site Evaluator.

# SUBSURFACE WASTEWATER DISPOSAL SYSTEM APPLICATION

Maine Dept. Health & Human Services  
 Division of Environmental Health  
 (207) 287-5672 Fax: (207) 287-3165

Town, City, Plantation \_\_\_\_\_

Street, Road, Subdivision \_\_\_\_\_

Owner's Name \_\_\_\_\_

## SOIL DESCRIPTION AND CLASSIFICATION (Location of Observation Holes Shown Above)

Observation Hole \_\_\_\_\_  Test Pit  Boring  
 \_\_\_\_\_ " Depth of Organic Horizon Above Mineral Soil

Depth Below Mineral Soil Surface (inches)	Texture	Consistency	Color	Mottling
0				
10				
20				
30				
40				
50				

Soil Classification _____ Profile    Condition	Slope _____%	Limiting Factor _____"	<input type="checkbox"/> Ground Water <input type="checkbox"/> Restrictive Layer <input type="checkbox"/> Bedrock <input type="checkbox"/> Pit Depth
--	-----------------	---------------------------	---

Observation Hole \_\_\_\_\_  Test Pit  Boring  
 \_\_\_\_\_ " Depth of Organic Horizon Above Mineral Soil

Depth Below Mineral Soil Surface (inches)	Texture	Consistency	Color	Mottling
0				
10				
20				
30				
40				
50				

Soil Classification _____ Profile    Condition	Slope _____%	Limiting Factor _____"	<input type="checkbox"/> Ground Water <input type="checkbox"/> Restrictive Layer <input type="checkbox"/> Bedrock <input type="checkbox"/> Pit Depth
--	-----------------	---------------------------	---

## SOIL DESCRIPTION AND CLASSIFICATION (Location of Observation Holes Shown Above)

Observation Hole \_\_\_\_\_  Test Pit  Boring  
 \_\_\_\_\_ " Depth of Organic Horizon Above Mineral Soil

Depth Below Mineral Soil Surface (inches)	Texture	Consistency	Color	Mottling
0				
10				
20				
30				
40				
50				

Soil Classification _____ Profile    Condition	Slope _____%	Limiting Factor _____"	<input type="checkbox"/> Ground Water <input type="checkbox"/> Restrictive Layer <input type="checkbox"/> Bedrock <input type="checkbox"/> Pit Depth
--	-----------------	---------------------------	---

Observation Hole \_\_\_\_\_  Test Pit  Boring  
 \_\_\_\_\_ " Depth of Organic Horizon Above Mineral Soil

Depth Below Mineral Soil Surface (inches)	Texture	Consistency	Color	Mottling
0				
10				
20				
30				
40				
50				

Soil Classification _____ Profile    Condition	Slope _____%	Limiting Factor _____"	<input type="checkbox"/> Ground Water <input type="checkbox"/> Restrictive Layer <input type="checkbox"/> Bedrock <input type="checkbox"/> Pit Depth
--	-----------------	---------------------------	---

Site Evaluator Signature \_\_\_\_\_

SE # \_\_\_\_\_

Date \_\_\_\_\_

Page \_\_\_ of \_\_\_  
 HHE-200 Rev. 05/08

# SUBSURFACE WASTEWATER DISPOSAL SYSTEM APPLICATION

Maine Dept. of Health & Human Services  
 Division of Environmental Health, STS 11  
 (207) 287-5338 FAX (207) 287-3165

Town, City, Plantation

Street, Road, Subdivision

Owner or Applicant Name

## SITE PLAN

Scale: 1" = \_\_\_\_\_ ft.

SITE LOCATION MAP  
 (Attach map from Maine Atlas  
 for First Time System Variance)

## SOIL PROFILE DESCRIPTION AND CLASSIFICATION

(Location of Observation Holes Shown Above)

Observation Hole # \_\_\_\_\_  Test Pit  Boring

\_\_\_\_\_ " Depth of organic horizon above mineral soil

Depth below mineral soil surface (inches)	Texture	Consistency	Color	Mottling
	0			
6				
12				
18				
24				
30				
36				
42				
48				

Soil Profile	Classification Condition	Slope Percent	Limiting Factor Depth	<input type="checkbox"/> Groundwater <input type="checkbox"/> Restrictive Layer <input type="checkbox"/> Bedrock
--------------	--------------------------	---------------	-----------------------	--

Observation Hole # \_\_\_\_\_  Test Pit  Boring

\_\_\_\_\_ " Depth of organic horizon above mineral soil

Depth below mineral soil surface (inches)	Texture	Consistency	Color	Mottling
	0			
6				
12				
18				
24				
30				
36				
42				
48				

Soil Profile	Classification Condition	Slope Percent	Limiting Factor Depth	<input type="checkbox"/> Groundwater <input type="checkbox"/> Restrictive Layer <input type="checkbox"/> Bedrock
--------------	--------------------------	---------------	-----------------------	--

Site Evaluator Signature \_\_\_\_\_

SE # \_\_\_\_\_

Date \_\_\_\_\_

# SUBSURFACE WASTEWATER DISPOSAL SYSTEM APPLICATION

Maine Dept. of Health & Human Services  
Division of Environmental Health, STS 11  
(207) 287-5338 FAX (207) 287-3165

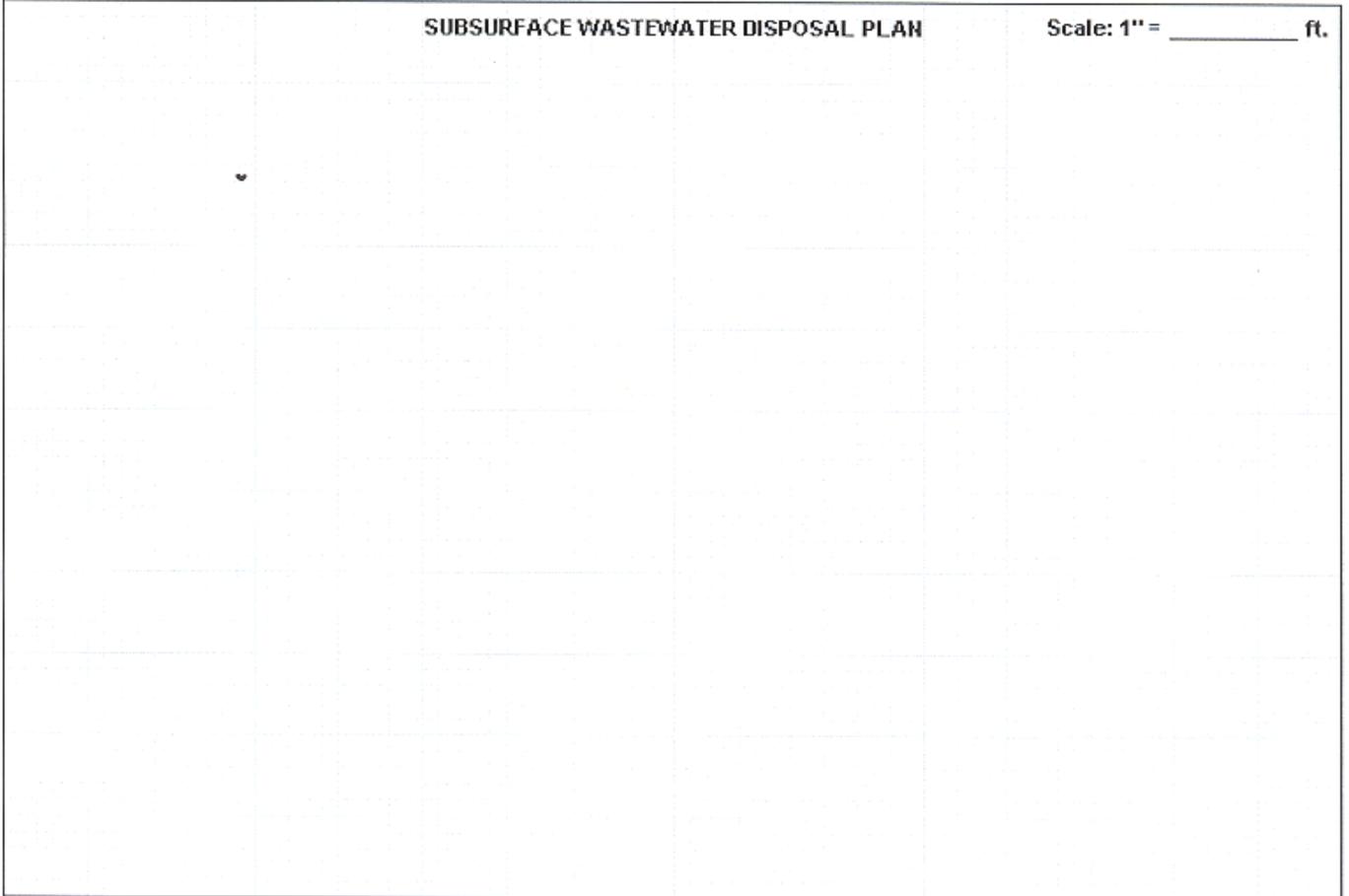
Town, City, Plantation

Street, Road, Subdivision

Owner or Applicant Name

## SUBSURFACE WASTEWATER DISPOSAL PLAN

Scale: 1" = \_\_\_\_\_ ft.



### BACKFILL REQUIREMENTS

Depth of Backfill (upslope)

"

Depth of Backfill (downslope)

"

DEPTHS AT CROSS-SECTION (shown below)

### CONSTRUCTION ELEVATIONS

Finished Grade Elevation

"

Top of Distribution Pipe or Proprietary Device

"

Bottom of Disposal Field

"

### ELEVATION REFERENCE POINT

Location & Description: \_\_\_\_\_

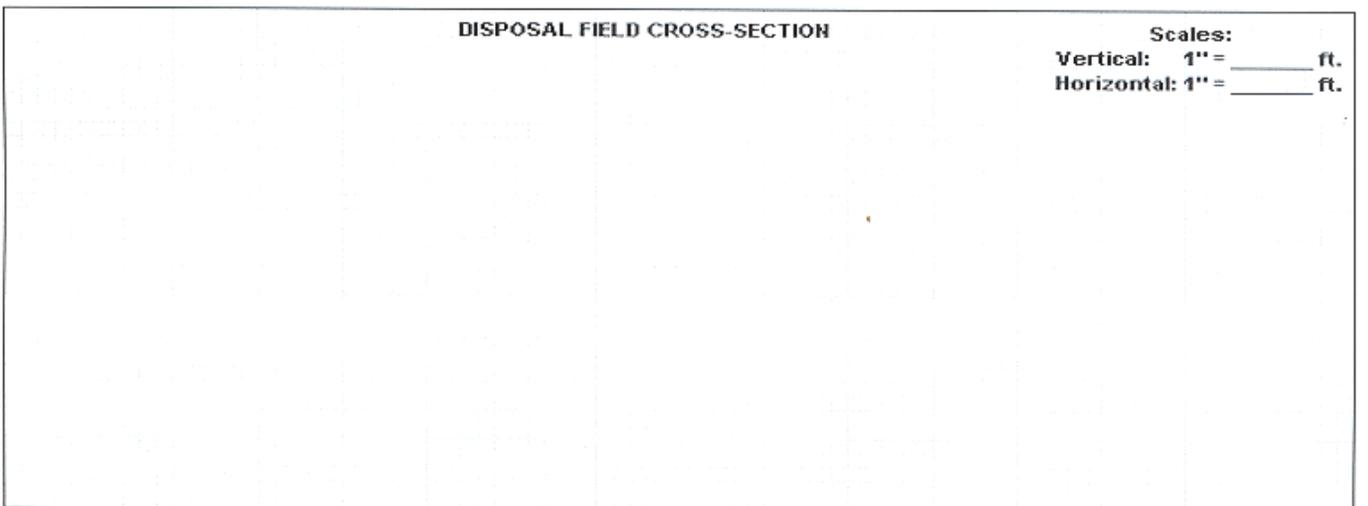
Reference Elevation is: 0.0" or: \_\_\_\_\_

## DISPOSAL FIELD CROSS-SECTION

Scales:

Vertical: 1" = \_\_\_\_\_ ft.

Horizontal: 1" = \_\_\_\_\_ ft.



Site Evaluator Signature

SE #

Date

Page 3 of 3  
HHE-200 Rev. 10/02



**SUBSURFACE WASTEWATER DISPOSAL SYSTEM VARIANCE REQUEST**

This form must accompany an application (HHE-200) for a proposed subsurface wastewater disposal system which requires a variance to provisions of the Subsurface Wastewater Disposal Rules. The local plumbing inspector must not issue a permit for the installation of a subsurface wastewater disposal system requiring a variance from the Department of Health & Human Services until approval has been received from them.

<b>GENERAL INFORMATION</b>		Town/City of _____
Property Owner's Name: _____		Tel. No.: _____
System's Location: _____		
Property Owner's Address: _____		
(if different from above) _____		ZIP Code _____
Property Owner's Telephone Number: _____	E-mail Address: _____	

The onsite sewage disposal system design for the subject property requires a  replacement system variance  first time system variance to the Subsurface Wastewater Disposal Rules. This variance requires  local approval only  local and state approval.

<b>SPECIFIC VARIANCE REQUESTED</b> (To be filled in by Site Evaluator. Use Additional Sheets, if needed.)	<b>SECTION OF RULE</b>
1. _____	_____
2. _____	_____
3. _____	_____
<b>SITE EVALUATOR</b>	
When a property is found to be unsuitable for subsurface wastewater disposal by a Licensed Site Evaluator, the Evaluator shall so inform the property owner. If the property owner, after exploring all other alternatives, wishes to request a Variance to the Rules, and the Evaluator in his/her professional opinion feels the variance request is justified and the site limitations can be overcome, he/she shall document the soil and site conditions on the Application. The Evaluator shall list the specific variances necessary plus describe below the proposed system design and function. The Evaluator shall further describe how the specific site limitations are to be overcome, and provide any other support documentation as required prior to consideration by the Department. Attach a separate page if necessary.	
_____ _____ _____	
I, _____, S.E., certify that a variance to the Rules is necessary since a system cannot be installed which will completely satisfy all the Rule requirements, and no practical alternative is available. Specifically: _____ _____ _____	
_____ SIGNATURE OF SITE EVALUATOR	_____ DATE

<b>PROPERTY OWNER</b>	
I, _____, am the <input type="checkbox"/> owner <input type="checkbox"/> agent for the owner of the subject property. I understand that the installation on the Application is not in total compliance with the Rules. Should the proposed system malfunction, I release all concerned provided they have performed their duties in a reasonable and proper manner, and I will promptly notify the Local Plumbing Inspector and make any corrections required by the Rules. By signing the variance request form, I acknowledge permission for representatives of the Department to enter onto the property to perform such duties as may be necessary to evaluate the variance request.	
_____ SIGNATURE OF <input type="checkbox"/> OWNER <input type="checkbox"/> AGENT FOR THE OWNER	_____ DATE

*Caring..Responsive..Well-Managed..We are DHHS.*

**LOCAL PLUMBING INSPECTOR - Approval at local level**

The local plumbing inspector shall review all First Time System Variance requests prior to rendering a decision.

I, \_\_\_\_\_, the undersigned, have visited the above property and find that the variance request submitted by the applicant does not conform with certain provisions of the wastewater disposal rules. The variance request submitted by the applicant is the best alternative for a subsurface wastewater disposal system on this property. The proposed system (  does  does not) conflict with any provisions controlling subsurface wastewater disposal in the shoreland zone. Therefore, I (  do  do not) approve the requested variance. I (  will  will not) issue a permit for the system's installation as proposed by the application.

\_\_\_\_\_  
LPI Signature

\_\_\_\_\_  
Date

**LOCAL PLUMBING INSPECTOR - Referral to the Department of Health and Human Services**

The local plumbing inspector shall review all First Time System Variance requests prior to forwarding to the Division of Environmental Health.

I, \_\_\_\_\_, the undersigned, have visited the above property and find that the variance request submitted by the applicant does not conform with certain provisions of the wastewater disposal rules. The variance request submitted by the applicant is the best alternative for a subsurface wastewater disposal system on this property. The proposed system (  does  does not) conflict with any provisions controlling subsurface wastewater disposal in the shoreland zone or local ordinances controlling such disposal.

Therefore, I (  do  do not) recommend the issuance of a permit for the system's installation as proposed by the application.

\_\_\_\_\_  
LPI Signature

\_\_\_\_\_  
Date

**FOR USE BY THE DEPARTMENT ONLY**

The Department has reviewed the variance(s) and (  does  does not) give its approval. Any additional requirements, recommendations, or reasons for the Variance denial, are given in the attached letter.

\_\_\_\_\_  
SIGNATURE OF THE DEPARTMENT

\_\_\_\_\_  
DATE

Note: 1. Variances for soil conditions may be approved at the local level as long as the total point assessment is at least the minimum allowed. (See Section 701.2 for Municipal Review.)

2. Variances for other than soil conditions or soil conditions beyond the limit of the LPI's authority are to be submitted to the Department for review. (See Section 701.1 for Department Review.) The LPI's signature is required on these variance requests prior to submission to the Department.

**SOIL, SITE AND ENGINEERING FACTORS FOR FIRST TIME SYSTEM VARIANCE ASSESSMENT  
WITH LIMITING SOIL DRAINIANGE CONDITIONS (SEE TABLES 700.3 to 700.13)**

	CHARACTERISTIC	POINT ASSESSMENT
Soil Profile		
Depth to Groundwater/Restrictive Layer		
Terrain		
Size of Property		
Waterbody Setback		
Water Supply		
Type of Development		
Disposal Area Adjustment		
Vertical Separation Adjustment		
Additional Treatment		
<b>TOTAL POINT ASSESSMENT:</b>		

Minimum Points (Check one): Outside Shoreland-50  Inside Shoreland-65  Subdivision-65

**DEPARTMENT OF HEALTH & HUMAN SERVICES  
MAINE CENTER FOR DISEASE CONTROL AND PREVENTION  
DIVISION OF ENVIRONMENTAL HEALTH**

**APPLICATION/AGREEMENT FOR HOLDING TANK INSTALLATION  
PROPERTY OWNER INFORMATION**

Name \_\_\_\_\_  
Mailing Address \_\_\_\_\_  
City/Town \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_  
Daytime telephone number \_\_\_\_\_ - \_\_\_\_\_ - \_\_\_\_\_

**PROPERTY LOCATION**

Street, Road, Route \_\_\_\_\_  
City/Town \_\_\_\_\_ Zip \_\_\_\_\_

**APPLICATION FOR (check one)**

- First Time Installation (If this is checked, give Town's **Ordinance** adoption date \_\_\_\_ / \_\_\_\_ / \_\_\_\_)
- First Time Installation, non-residential only, less than 100 gpd or 500 gal/week
- Replacing an existing overboard discharge, surface wastewater discharge or malfunctioning subsurface wastewater system
- Replacing an **existing** holding tank

**CONDITIONS FOR APPROVAL**

- \* The installation of a conventional disposal system is not possible due to **unacceptable** site and/or soil conditions, lot configuration, or other constraints
- \* Public sewer is not available.
- \* All existing or proposed plumbing fixtures must be installed or modified for water conservation and all water closets must meet the Federal standard of 1.6 gallons per flush.

**REQUIREMENTS FOR APPROVAL**

- A Completed Application consists of:
- \* This form (HHE-233) completed with all signatures.
  - \* A completed *Subsurface Wastewater Disposal System Application* (HHE-200) prepared by a Licensed Site Evaluator.
  - \* Holding Tank Deeds Covenant Form, HHE-300 3/97
  - \* Replacement System Variance Request Form, as necessary.

**PROPERTY OWNER INFORMATION AND REQUIREMENTS**

- I (we), \_\_\_\_\_ own the property described in this Application/Agreement.
1. Holding tanks require regular pumping by a licensed pumper. The owner must pay this service.
  2. The holding tank will be pumped at least once a year by the pumper listed on this application. Another pumper may be used if the listed pumper is notified and the LPI approves the change. The new pumper will then be listed on an attachment to this agreement.
  3. A water meter must be installed at the owner's expense if required by the LPI.
  4. All records of pumping and water use (if required) must be kept for at least three years and must be made available to the LPI or other official if requested.
  5. A holding tank for new construction can only be replaced by a system meeting first time system requirements.
  6. Once approved this form must be recorded at the Registry of Deeds, cross referenced to the owner's deed.
  7. We agree to comply with any additional requirements of the Town.

We state that all the information presented with this application is true and accurate, we acknowledge the foregoing items and agree to comply with all the requirements.

Property Owner(s) Signature \_\_\_\_\_ Date \_\_\_\_\_  
Property Owner(s) Signature \_\_\_\_\_ Date \_\_\_\_\_

**SITE EVALUATOR STATEMENT**

I, \_\_\_\_\_, state that I have evaluated the subject property and found that a subsurface wastewater disposal system is not practical. Secondly, I have completed a *Subsurface Wastewater Disposal System Application* (HHE-200) proposing a holding tank installation for the property’s wastewater disposal.

Site Evaluator’s Signature \_\_\_\_\_ Date \_\_\_\_\_

**HOLDING TANK PUMPER INFORMATION**

Business owner’s name \_\_\_\_\_ License # \_\_\_\_\_

Business name \_\_\_\_\_

Mailing address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Business telephone \_\_\_\_\_ - \_\_\_\_\_ - \_\_\_\_\_

Max. truck hauling capacity \_\_\_\_\_ gallons

Can pump: \_\_\_\_\_ seasonally \_\_\_\_\_ year round

DEP licensed disposal site location \_\_\_\_\_ Site # \_\_\_\_\_

**HOLDING TANK PUMPER STATEMENT**

I, \_\_\_\_\_, own and operate a septage pumping business named in this **Application/Agreement**, and have contracted with the property owner(s) to pump and properly dispose of the tank’s waste. I further state that the tank, and that the wastewater will be disposed of at a Department of Environmental Protection licensed disposal location.

Holding Tank Pumper’s Signature \_\_\_\_\_ Date \_\_\_\_\_

**Municipal Officers Statement**

I (we) have reviewed the information submitted in support of this application.

I (we) find that the installation of the holding tank will not violate any local ordinances.

I (we) will authorize the LPI to enforce the requirements of this agreement, the Subsurface Wastewater Disposal Rules and any local ordinances, including recordkeeping and required pumping.

I (we) recommend that the LPI issue the necessary permits for the installation of the holding tank.

Signature \_\_\_\_\_ Title \_\_\_\_\_ Date \_\_\_\_\_

Signature \_\_\_\_\_ Title \_\_\_\_\_ Date \_\_\_\_\_

Signature \_\_\_\_\_ Title \_\_\_\_\_ Date \_\_\_\_\_

**Local Plumbing Inspector's Statement**

I have reviewed this application and find that the issuance of a permit for the holding tank complies with the Subsurface Wastewater Disposal Rules and all pertinent local ordinances.

Additional Requirements: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Signature \_\_\_\_\_ Date \_\_\_\_\_

Division of Environmental Health  
#11 State House Station  
Augusta ME 04333  
Tel: (207)287-5672  
Fax: (207) 287-4172

Make check payable to:  
"Treasurer of State"  
Appropriation #  
014-10A-2426-01-2615

**APPLICATION FOR  
VARIANCE TO THE MINIMUM LOT SIZE LAW REQUIREMENTS  
(12 MRSA §4807-B, 4807-C)**

PLEASE TYPE OR PRINT:

Name of Applicant: \_\_\_\_\_

Address: \_\_\_\_\_

Telephone Number: \_\_\_\_\_

Local Agent (Name, Address and Tel. #) \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

**LOT LOCATION**

Name of Project: \_\_\_\_\_

Street or Route Number: \_\_\_\_\_

Municipality or Township: \_\_\_\_\_

County: \_\_\_\_\_

By signing this application, the applicant certifies that he/she has (1) sent a copy of the notice form to the owners of property abutting the land upon which the project is located; (2) sent a copy of the public notice form to the chief municipal officer, chairperson of the municipal planning board and the Local Plumbing Inspector, and (3) filed a duplicate of this application in the municipal office.

DATE: \_\_\_\_\_

\_\_\_\_\_  
Signature of Applicant

\_\_\_\_\_  
(If signature is other than the applicant,  
attach letter of agent authorization.)

\_\_\_\_\_  
Print name and title

PROJECT SUMMARY - MINIMUM LOT SIZE

1. Size of lot: \_\_\_\_\_ square feet or acres.

2. Dimensions of lot: \_\_\_\_\_ ' X \_\_\_\_\_ ' X \_\_\_\_\_ ' X \_\_\_\_\_ '.

3. Is the lot owner the owner of adjacent property? (check one) [ ] YES [ ] NO

4. If the answer to question No. 3 is "YES":

(a) Give dimensions of total parcel owned, which includes the lot being applied for:

\_\_\_\_\_ X \_\_\_\_\_ X \_\_\_\_\_ X \_\_\_\_\_

(b) Give description of present use of adjacent property:

\_\_\_\_\_  
\_\_\_\_\_

(c) Attach a plan showing ENTIRE parcel owned, including lot described in 1 & 2 above, if the entire parcel is not described on the licensed site evaluator's report (HHE-200 form).

(d) Give plans for future use, of any adjacent land owned:

\_\_\_\_\_  
\_\_\_\_\_

5. Attach a copy of deed, lease, option or other legal document establishing applicant's title, right or interest in the land described in 1, 2 and 4 above.

6. Is this lot a part of a subdivision? (check one) [ ] YES [ ] NO

7. If the answer to Question No. 6 is "YES" give name of subdivision, date plan filed, and registry location:

\_\_\_\_\_  
\_\_\_\_\_

8. If lot is located within 1/2 mile of any lake, pond, stream, river, tidal area, swamp or marsh:

(a) Give approximate distance: \_\_\_\_\_ feet to water.

(b) Give name of water body: \_\_\_\_\_

(c) If abutting, give length of shoreline covered by lot: \_\_\_\_\_ feet.



NOTE: Use this form or one containing identical information:

**NOTICE**

(to owners of abutting property, municipal officials, and local plumbing inspector)

Please take notice that \_\_\_\_\_  
(Name of Applicant)

\_\_\_\_\_  
(Address of Applicant)

is filing an application for a Waiver of Minimum Lot Size Law Requirements with the Department of Health and Human Services, Division of Environmental Health pursuant to the provisions of 12 MRSA Sections 4807-B and 4807-C for permission to

\_\_\_\_\_  
\_\_\_\_\_  
(State specifically what is to be done)

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

will be filed for public inspection at the Department's office in Augusta and at the municipal offices of  
\_\_\_\_\_ on \_\_\_\_\_.  
(Name of Municipality) (Date of Filing)

Written comments from any interested persons must be sent to the Division of Environmental Health, #11 State House Station, Augusta, Maine 04333 within 14 days of filing of the application to receive consideration.

**DEPARTMENT OF HEALTH & HUMAN SERVICES  
MAINE CENTER FOR DISEASE CONTROL AND PREVENTION  
DIVISION OF ENVIRONMENTAL HEALTH**

**STATEMENT OF RULE COMPLIANCE**

I, \_\_\_\_\_ (please print), am the  septic system installer,  
 site evaluator, or  professional engineer, and state that I either  installed the septic system in compliance, or  
 inspected the system's installation for compliance with the *Maine Subsurface Wastewater Disposal Rules* and the  
*Subsurface Wastewater Disposal System Application*, a.k.a. the HHE-200 form completed by \_\_\_\_\_  
\_\_\_\_\_. SE license number \_\_\_\_\_, prepared by same on \_\_\_\_  
\_\_\_\_/\_\_\_\_/\_\_\_\_.

The property owner's name is: \_\_\_\_\_

The location of the property is: \_\_\_\_\_  
\_\_\_\_\_

The SSWW Disposal System *permit number* is: \_\_\_\_\_

Signature of either system installer, SE, or PE \_\_\_\_\_

Date signed: \_\_\_\_/\_\_\_\_/\_\_\_\_

**MAINE CENTER FOR DISEASE CONTROL AND PREVENTION  
DIVISION OF ENVIRONMENTAL HEALTH**

**AFFIDAVIT OF SITE PREPARATION**

This affidavit is to be completed by a certified system installer and submitted to the Local Plumbing Inspector to document compliance with Section 111.5.1 of the Maine Subsurface Wastewater Disposal Rules, 144 CMR 241. Permission to utilize this document in lieu of a site preparation inspection by the Local Plumbing Inspector must be verified when the permit is issued. This affidavit is not to be utilized in place of the system inspection described in Section 111.5.2 of the Rules.

**Please Print.**

INSTALLER NAME: \_\_\_\_\_

CERTIFICATION NUMBER: \_\_\_\_\_ SSWD PERMIT NUMBER: \_\_\_\_\_

PERMIT ISSUE DATE: \_\_\_\_\_

PROPERTY OWNER NAME: \_\_\_\_\_

PROPERTY ADDRESS: \_\_\_\_\_

MUNICIPALITY: \_\_\_\_\_

By signing and submitting this document to the Local Plumbing Inspector, I certify that all construction activities noted in Section 111.5.1 including removal of all vegetation from the disposal field area and fill extensions as specified in Section 801.3; roughening of the ground surface as specified in Section 801.4; establishment of a transitional horizon as specified in Section 801.5; and placement of erosion control devices as specified in Section 801.2 have been completed in full compliance with the Maine Subsurface Wastewater Disposal Rules, 144 CMR 241 for the referenced SSWD permit.

INSTALLER SIGNATURE: \_\_\_\_\_

DATE SUBMITTED: \_\_\_\_\_

By signing and accepting this document from the Certified Installer, I acknowledge that a site preparation inspection was not conducted for the referenced SSWD permit.

LPI SIGNATURE:  
\_\_\_\_\_

ACCEPTANCE DATE:  
\_\_\_\_\_

**DEPARTMENT OF HEALTH & HUMAN SERVICES  
MAINE CENTER FOR DISEASE CONTROL AND PREVENTION  
DIVISION OF ENVIRONMENTAL HEALTH**

**NOTICE OF INTENT TO INSTALL A SUBSURFACE WASTEWATER DISPOSAL SYSTEM  
PERTAINING TO THE REPLACEMENT OF AN EXISTING WASTEWATER DISPOSAL SYSTEM.**

OWNER'S NAME: First \_\_\_\_\_ Last \_\_\_\_\_

PROPERTY LOCATION: \_\_\_\_\_

Town/City \_\_\_\_\_ Street/Road \_\_\_\_\_

Lot # \_\_\_\_\_ Map # \_\_\_\_\_ Book # \_\_\_\_\_ Page # \_\_\_\_\_

The Subsurface Wastewater Disposal System specified on the attached plan has been designed to

[ ] replace an existing system currently in use due to an expansion resulting in an increase in wastewater flow.

[ ] serve a new use on the subject property, specifically: \_\_\_\_\_

The attached design meets the requirements of the Maine Subsurface Wastewater Disposal Rules and will be installed at some future date. This notice is given pursuant to 30A MRSA 4211 § 3B.

\_\_\_\_\_  
LAND OWNER'S NAME PRINTED

\_\_\_\_\_  
LAND OWNER'S SIGNATURE

State of Maine

County of \_\_\_\_\_, ss                      Date \_\_\_\_\_

Then personally appeared the above named \_\_\_\_\_ and

\_\_\_\_\_ and (severally) acknowledged the foregoing

instrument to be his (or their) free act and deed.

Before me, \_\_\_\_\_

Justice of the Peace or Notary Public

**DEPARTMENT OF HEALTH & HUMAN SERVICES  
 MAINE CENTER FOR DISEASE CONTROL AND PREVENTION  
 DIVISION OF ENVIRONMENTAL HEALTH  
 INSPECTION CHECKLIST**

Municipality: _____	LPI Certification #: _____	Permittee Name: _____
Permit Issue Date: _____	Permit Number: _____	Street Address: _____
Installer Name: _____	Installer Certification #: _____	_____
Site Evaluator Name: _____	SE License #: _____	Tax Map #: _____ Tax Lot #: _____

<u>Item</u>	<u>Checked By</u>	<u>Date Completed</u>	<u>Initials</u>	<u>Comment</u>
<b>TREATMENT TANK(S)</b>				
Inlet & Outlet Elevations	<input type="checkbox"/> LPI <input type="checkbox"/> Installer <input type="checkbox"/> SE	_____	_____	_____
Inlet & Outlet Baffles	<input type="checkbox"/> LPI <input type="checkbox"/> Installer <input type="checkbox"/> SE	_____	_____	_____
Access Openings	<input type="checkbox"/> LPI <input type="checkbox"/> Installer <input type="checkbox"/> SE	_____	_____	_____
Tank Integrity	<input type="checkbox"/> LPI <input type="checkbox"/> Installer <input type="checkbox"/> SE	_____	_____	_____
<b>PUMP SYSTEMS</b>				
Level Switches	<input type="checkbox"/> LPI <input type="checkbox"/> Installer <input type="checkbox"/> SE	_____	_____	_____
High Water Alarm Circuit	<input type="checkbox"/> LPI <input type="checkbox"/> Installer <input type="checkbox"/> SE	_____	_____	_____
Access Openings	<input type="checkbox"/> LPI <input type="checkbox"/> Installer <input type="checkbox"/> SE	_____	_____	_____
Tank Integrity	<input type="checkbox"/> LPI <input type="checkbox"/> Installer <input type="checkbox"/> SE	_____	_____	_____
<b>DISPOSAL AREA</b>				
Site Preparation	<input type="checkbox"/> LPI <input type="checkbox"/> Installer <input type="checkbox"/> SE	_____	_____	_____
System Footprint	<input type="checkbox"/> LPI <input type="checkbox"/> Installer <input type="checkbox"/> SE	_____	_____	_____
Horizontal Setbacks	<input type="checkbox"/> LPI <input type="checkbox"/> Installer <input type="checkbox"/> SE	_____	_____	_____
Backfill Material	<input type="checkbox"/> LPI <input type="checkbox"/> Installer <input type="checkbox"/> SE	_____	_____	_____
Shoulder & Fill Extensions	<input type="checkbox"/> LPI <input type="checkbox"/> Installer <input type="checkbox"/> SE	_____	_____	_____
Elevations	<input type="checkbox"/> LPI <input type="checkbox"/> Installer <input type="checkbox"/> SE	_____	_____	_____
Stone Quality	<input type="checkbox"/> LPI <input type="checkbox"/> Installer <input type="checkbox"/> SE	_____	_____	_____
Proprietary Devices	<input type="checkbox"/> LPI <input type="checkbox"/> Installer <input type="checkbox"/> SE	_____	_____	_____
Filter Fabric/Hay	<input type="checkbox"/> LPI <input type="checkbox"/> Installer <input type="checkbox"/> SE	_____	_____	_____
Distribution Piping	<input type="checkbox"/> LPI <input type="checkbox"/> Installer <input type="checkbox"/> SE	_____	_____	_____
Surface Water Diversion	<input type="checkbox"/> LPI <input type="checkbox"/> Installer <input type="checkbox"/> SE	_____	_____	_____
Site Stabilization	<input type="checkbox"/> LPI <input type="checkbox"/> Installer <input type="checkbox"/> SE	_____	_____	_____

By signing this document I certify that all construction activities, materials, and components noted above have been completed or installed in full compliance with the Maine Subsurface Wastewater Disposal Rules, **144 CMR 241** for the referenced SSWD permit.

Title: _____	Date _____	HHE-238C
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**DEPARTMENT OF HEALTH & HUMAN SERVICES  
MAINE CENTER FOR DISEASE CONTROL AND PREVENTION  
DIVISION OF ENVIRONMENTAL HEALTH**

**HOLDING TANK DEED COVENANT FORM**

**Property Owner:** Complete and record this form with your County Registry of Deeds. Then forward a copy of the recorded deed covenant to the your municipality's Local Plumbing Inspector.

**County Registrar:** Please cross-reference this document with book and page no.

**Property Owner Statement:** I(we), \_\_\_\_\_ are the owner(s) of the property located at \_\_\_\_\_ (street) \_\_\_\_\_ (town).

The property's deed is recorded in book no. \_\_\_\_\_, page no. \_\_\_\_\_ .

We state that the holding tank installation for the aforementioned property received approval by the town of \_\_\_\_\_ and its officials.

**Stipulations of Covenant:**

**Municipal Approval Conditions:** This approval has been granted subject to the implementation of the above conditions and said approval will become null and void if the required and stated conditions of approval are violated.

**Property Owner** signature(s) \_\_\_\_\_  
\_\_\_\_\_

State of Maine

County \_\_\_\_\_, ss Date \_\_\_\_\_

Then personally appeared the above named \_\_\_\_\_ (and)

\_\_\_\_\_ and (severally) acknowledged the foregoing instrument to be his (or their) free act and deed.

Before me \_\_\_\_\_  
Justice of the Peace or Notary Public

**DEPARTMENT OF HEALTH & HUMAN SERVICES  
MAINE CENTER FOR DISEASE CONTROL AND PREVENTION  
DIVISION OF ENVIRONMENTAL HEALTH**

**WELL SETBACK RELEASE FORM**

**We, the undersigned, are the owner(s) of the well and/or property herein described. We have read and understand the following information concerning the proposed separation distance between our well and the subsurface waste water disposal system for which a variance is being requested. We are prepared to accept any risk that the subsurface waste water disposal system may pose to our well.**

All wells should be located a safe distance from all possible sources of contamination; in this case a subsurface waste water disposal system. The Maine Subsurface Waste Water Disposal Rules require a minimum of 100 feet between a <1000 gpd disposal system and a well; 200 feet between a 1000-2000 gpd disposal system and a well; and 300 feet between a >2000 gpd disposal system and a well with water usage of 2000 or more gpd or public water supply well. **(Please circle the appropriate category.)**

Since the safety of a well primarily depends on considerations of good well construction, geology and adequate maintenance of the subsurface waste water disposal system, the best means of protecting the well water quality is to maintain the maximum distance between a well and a disposal system. The Department of Health and Human Services suggests that a maximum setback distance should be maintained.

The separation distance between our well and the subsurface wastewater disposal system for which this well release approval is requested is: component \_\_\_\_\_ / \_\_\_\_\_ feet.

component \_\_\_\_\_ / \_\_\_\_\_ feet

**Address of Property with Disposal System:** \_\_\_\_\_  
(Include Municipal Book & Page No. or Map & Lot No.) \_\_\_\_\_

**Owner(s) of Property with Disposal System:** \_\_\_\_\_

**Address of Property with Well:** \_\_\_\_\_  
(Include Municipal Book & Page No. or Map & Lot No.) \_\_\_\_\_

**Owner(s) of Property with Well:** \_\_\_\_\_

**We, the undersigned, release the site evaluator, well driller, the municipality and the State of Maine from liability should our well become contaminated.** (Note: If the subject well has more than one owner, all well owner signatures must appear on this document.)

Well Owner(s) Signature \_\_\_\_\_ Date \_\_\_\_\_

\_\_\_\_\_ Date \_\_\_\_\_

\*\*\*\*\*  
\*\*\*

State of Maine

County of \_\_\_\_\_, ss \_\_\_\_\_ Date \_\_\_\_\_

Then personally appeared the above named \_\_\_\_\_ (and \_\_\_\_\_  
\_\_\_\_\_) and (severally) acknowledged the foregoing instrument to be his

(or their) free act and deed.

Before me, \_\_\_\_\_  
Justice of the Peace or Notary Public

HHE-306 Rev 10/01/02

**DEPARTMENT OF HEALTH & HUMAN SERVICES  
MAINE CENTER FOR DISEASE CONTROL AND PREVENTION  
DIVISION OF ENVIRONMENTAL HEALTH**

**NOTICE OF PERMIT**

Permit # \_\_\_\_\_ to install a subsurface wastewater sewage disposal system was issued to:

\_\_\_\_\_  
Applicant's name and mailing address

for property located at \_\_\_\_\_  
Property's street and municipality.

on \_\_\_\_\_ mm/dd/yyyy. A copy of the permit is on file at the \_\_\_\_\_  
Town/City

municipal office or \_\_\_\_\_  
Other, Specify

and may be viewed during normal working hours.

\_\_\_\_\_  
LPI Name, Printed

\_\_\_\_\_  
mm/dd/yyyy

\_\_\_\_\_  
LPI Signature