February 2009

Guidance for Installers on Designing an Onsite Wastewater Treatment and Disposal System

This fact sheet is intended to provide general direction to onsite sewage treatment and disposal system installer's on the design process to follow when seeking to construct a system. Please note that it may not be possible to always follow the steps sequentially as information from a later step may be necessary. It is intended to provide additional guidance only and the Saskatchewan Onsite Wastewater Disposal Guide and all relevant legislation should be used for further reference and to ensure that all necessary actions are completed. The information contained within the guide is considered a minimum guideline. However, some information within this sheet may result in a design that is greater than the minimums discussed in the guide.

Step 1: Determine Sewage Flows

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The facility to be served should be examined. For residential systems, the maximum sewage volume per day is estimated based on the number of bedrooms in the home. It is the responsibility of the installer to ensure that the estimate of bedrooms is reasonable for the home. For example, homeowners should be questioned regarding plans for unfinished basements in new homes. Other items to be considered are water using devices such as large whirlpool baths and multihead showers, as well as water using activities such as hosting large parties. Selecting the maximum and average day sewage flows should account for typical flows, high usage devices and water using activities. In general, a typical home should be considered to generate a maximum sewage flow of 340 litres (75 igal) per person per day and an average flow of 255 litres (56 igal) per person per day. For homes larger than 2 bedrooms, 1.5 people for each bedroom should be assumed.

The Saskatchewan Onsite Wastewater Treatment System Guide is available online at www.health.gov.sk.ca

Saskatchewan Ministry of Health

Step 2: Determine Soil Characteristics

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Soil logs from test pits or bore holes should be examined in order to evaluate the soil. Limiting layers should be identified and soil characteristics above the limiting layer and at the level of the infiltrative surface should be determined. Soil texture and structure as well as slope of the limiting layer should be determined. A detailed soil investigation forms the basis for the design of an onsite wastewater treatment and disposal system.

Step 3: Select and Design Final Treatment System

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Determine if the soil presents any conditions that would prevent the use of certain technologies or approaches. Evaluate the site (slopes, wells, buildings, disturbed soil, etc) and determine the best location for an onsite system. After selecting the type of onsite system, it should be sized based on the maximum day flows, soil conditions, and technology specific requirements. A number of worksheets are available in the Saskatchewan Onsite Wastewater Disposal Guide.

Step 4: Design Distribution System

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The information from Step 3 will allow the design of the distribution system. A sketch containing all pipe type and lengths; fitting locations and types; distances; and elevation differences should be developed. A number of worksheets are available in the Saskatchewan Onsite Wastewater Disposal Guide for assistance.

Step 5: Size Dose Tank

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The dose tank size is affected by the type of dosing (timed or demand), the volume per dose, and the volume contained within the distribution pipes. As a general rule, the dose tank should have a usable volume of at least twice the average daily flow. Additional assistance is available in the appendices of the Saskatchewan Onsite Wastewater Disposal Guide.

Step 6: Select Dose Frequency and Dose Volume

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After reviewing the assistance provided in the Saskatchewan Onsite Wastewater Disposal Guide, the number of does per day and the volume of each dose should be determined based on the average flow. As a general rule, the volume per dose for a pressurized system should be at least five times the volume in the distribution piping .

Step 7: Set Controls and Pump Run Times

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Float settings for demand or timed dosing are quite different.

Demand Dosing For demand dosing, set the float off switch at least 15 cm (6 inches) above the pump in order to maintain an appropriate level of water over the pump. The on level is set at the level above the off float that will provide the calculated dose amount. If one determines the number of gallons per inch of tank depth, the distance between the two points is equal to the dose volume (in gallons) divided by the gallons per inch of dose tank depth. An alarm float should be set at least 5 cm (2 inches) above the on elevation but at least 15 cm (6 inches) below the invert of the inlet pipe.

Timed Dosing For timed dosing, there can be a few as two floats. The lowest float operates the timer. When this float is down, the timer shuts off. The down position should be sufficiently high to maintain a sufficient depth over the pump. When the float is up, the timer should engage. The up position should be 15cm (6 in) or 1 ¼ dose volumes above the lower position.

The upper float operates a demand dosing system. The up position should be a distance equal to two times the average day flow above the timer off level. When the level in the dose tank reaches the up position, the pump engages and the timer system is stopped. The down position is 15 cm (6 in) or at distance equal to 1 dose below the up position. The down position turns off the timer stop system.

It is recommended that a separate circuit and float be used to indicate alarm conditions.

Continued...Step 8

Step 8: Size the Capacity of the Initial Treatment Component

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The working capacity of the septic tank should be at least one to one and a half times the maximum daily flow. Please refer to the Saskatchewan Onsite Wastewater Disposal Guide for minimum sizes. Larger sizes should be considered where high usage devices and high water using activities are expected. In addition, larger tanks should be considered where additional organics (such as from a garburator) are added to the system. Consideration should also be given to the storage volumes required for sludge and scum.

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http://www.health.gov.sk.ca/health-region-list