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TECHNICAL BULLETIN

***** U R G E N T *****

INDIANA TRAINING UPDATE December 2009 PREVENTING EXCESS HYDRAULIC LOADING

Abstract: *The performance and longevity of any onsite wastewater treatment system can be adversely affected by regular, sustained hydraulic loading in excess of daily design flow. Discussed below are certain design and installation techniques which can prevent onsite systems from being flooded by surface and/or ground water flows. Saturated conditions are detrimental to the function of the Enviro-Septic® System, which relies on aerobic conditions to perform optimally.*

Background: During recent inspections of Enviro-Septic® Systems in Indiana, a pattern of common installation errors became apparent. While these errors would be detrimental to **any** onsite system's function, this Technical Bulletin will focus on how these factors impact Enviro-Septic® Systems and how such problems can be corrected and/or avoided in future installations. Onsite systems are sized based on the expected amount of effluent they will treat on a daily basis, which is referred to as "daily design flow." It is important to ensure that each system is adequately sized, taking into consideration the actual number of occupants (if this increases flows beyond the daily design flow) and whether the system will be subjected to additional loading from jetted tubs, water softeners, water purifiers, etc. The volumes of water utilized by such fixtures and appliances should be included in design daily flow calculations in order to size a system properly. Onsite systems are not designed to handle additional water from roof drains, foundation drains, sump pumps, irrigations systems, gutter systems, etc. Since the water from such systems does not require treatment, it can be safely dispersed in a location where it will not impact the onsite system.

Common Causes of Excessive Hydraulic Loading: While an onsite system can easily handle isolated, occasional surges in volume either of effluent or storm water runoff, prolonged dosing in excess of what the system was designed to handle can be problematic. Some of the more common sources of excess hydraulic loading discovered were the result of drain or gutter systems discharging into or near the treatment field, inadequate perimeter drains, ineffective surface diversion/swale installations, and leaking septic tank connections. Recent inspections of Enviro-Septic® systems in Daviess County by the Daviess County Health Department, ISDH, Presby Environmental and Environmental Septic Solutions revealed that these were the most common installation errors contributing to hydraulic overloading of onsite systems.

Also, leaks in the plumbing system can also result in overloading the onsite system and should be repaired immediately. Care should also be taken to ensure that the septic tank and all of its connections, access ports, risers, etc. are properly sealed and watertight to prevent ground water from infiltrating and overburdening the system.

Lowering Ground Water with Perimeter Drains: For Indiana sites where the seasonal high water table ("SHWT") is too close to the surface, a perimeter drain can be used to lower the SHWT. **NOTE: It is preferable in such situations to design an elevated system rather than attempt to lower the SHWT with a drain.** However, there are times when even an elevated system may require a perimeter drain to lower the SHWT. In all cases where a perimeter drain is required, it is crucial that the drain be located and constructed properly. Please see attached Perimeter Drain Notes. A properly constructed perimeter drain surrounds the system on all four

sides and is a minimum of 10 ft. away from the outer edges of the System Sand bed. Ongoing maintenance by the owner to ensure that the outlet remains unobstructed is **essential** to proper functioning; animal guards are required on the drain outlet to prevent animal activity that could result in obstruction. No other drainage systems (such as foundation drains, sump pumps, etc.) should be incorporated into the perimeter drain design or discharge in the area of the onsite system.

Redirecting Surface Water Flows with Diversions and Proper Grading: In selecting the location of the onsite system, it is important to consider the surrounding topography and select a site where surface and subsurface waters do not naturally converge. Adequate soil cover material (loam/topsoil, minimum of 6 in. deep) must be installed above the System Sand; this cover material should be “crowned” to direct surface waters away from the system. Crowning is a very simple procedure: simply make the center of the system area the “high” point and grade the cover material so it gently slopes away from the center; keep in mind there will be some natural settling of cover material. We have found that poor final grading, or using less than the required amount of soil cover above a system, results in “pockets” which hold surface water, allowing it to infiltrate the system and possibly cause saturation. After final grading, the site must be seeded and mulched or sodded immediately to prevent erosion; only shallow-rooted vegetation such as grass or wildflowers should be planted above an onsite system. There should be no trees or gardens planted within ten (10) feet of the system; the State of Indiana does not permit “hardscape” (paving, patios, driveways, parking lots, etc.) to be installed above the system.

Swales are another means of directing surface water away from the system. Swales are installed in undisturbed soil in order to intercept and divert surface water flows away from the system. They should be located a minimum of 10 ft. from the outer edge of the System Sand bed (if a perimeter drain is used, the swale is located above or immediately upslope from the perimeter drain area). Swales must have a positive grade of at least 0.2 feet per 100 feet to prevent standing water. Swales should be sufficiently deep to redirect surface water away from the treatment field effectively. (Please see attached Perimeter Drain Notes.) It is also important to explain the purpose of swales to the system owner so they will not alter them or backfill them. The Monroe County Indiana Health Department recently issued a directive making swales mandatory if a perimeter drain is used. They also stressed the importance of explaining the purpose of swales to the system owner, since in many cases properly installed swales are filled in by homeowners or landscapers who do not understand how critical these surface diversions are to the onsite system’s function.

Conclusion: Proper site selection, accurate sizing, adequate perimeter drains, and well-constructed surface diversions (grading and swales) are effective in preventing excess hydraulic loading to onsite systems. Prolonged saturated conditions compromise the function of all onsite systems and measures should be taken to redirect ground and surface water away from the treatment field. Homeowners should be made aware of the importance of dispersing water other than wastewater away from the onsite system. If you have any questions about the information in this Training Update, please contact Presby Environmental or Environmental Septic Solutions for technical assistance and further guidance.

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