



# Extension FactSheet

Food, Agricultural and Biological Engineering, 590 Woody Hayes Dr., Columbus, OH 43210

## Managing Septic Tank-Mound Systems

**Karen Mancl**

Professor and Water Quality Specialist  
The Ohio State University

A septic tank-mound system is made up of three parts. Wastewater first flows from the home into a 1000 to 2000 gallon septic tank buried in the yard. The tank is watertight and equipped with baffles to create a place for wastewater to stand for at least a day. During that time the solid materials settle to the bottom of the tank and the greases and other light materials float to the top. While the wastewater, with the solid material mostly removed, flows out of the tank past an outlet baffle for additional treatment, the solid material accumulates until the tank capacity is reduced and the tank requires pumping.

Wastewater from the septic tank accumulates in a second, smaller tank which is equipped with a pump and float switches. When sufficient wastewater flows into the tank, the float switches activate the pump and the wastewater is pumped as one dose to the mound.

The wastewater that flows from the tank is still sewage, requiring additional treatment to prevent contaminating water resources or threatening the health of people in the area. Deep, well-drained soils are ideally suited to provide the necessary treatment. Unfortunately, rural homes are planned for areas which have shallow soils or in areas with high seasonal water tables. Special sand, “mounded” on top of the ground, can augment the existing soil providing the necessary depth for wastewater treatment. The wastewater is distributed through small pipes with small holes buried in the top of the mound. Any remaining solid

particles are filtered out, and the organic matter and ammonia are reduced in the layer of sand by the microorganisms that colonize the sand particles. Disease-causing organisms are filtered out in the soil underlying the mound. To learn more about mound systems ask for AEX-744, *Septic Tank-Mound Systems*; Bulletin 813, *Mound Systems for On-Site Wastewater Treatment*; and Bulletin 829, *Mound Systems: Pressure Distribution of Wastewater* available from Ohio county Extension offices.

The process of infiltration and treatment occurs for years in properly sited, designed, and managed mound systems. If neglected, a number of things can go wrong. Fortunately, if identified early, problems can be easily corrected at no or minimal cost.

The goal of a management program is to ensure long-term performance of septic tank-mound systems to protect the public health and the environment. This is accomplished through a five-step process.

### Step 1

**Proper siting and design is always critical in the consideration of septic tank-mound systems.** Ensuring that these systems are properly sited and designed takes on extra importance to the entity providing long-term management. Systems that have serious design problems are sometimes referred to as “lemons.” A management program, no matter how conscientious, will be unable to overcome the deficiencies present in



The Georgetown Divide Public Utility District has operated a management program for Auburn Lake Trails in El Dorado County, California, since 1970. The utility district has a detailed set of rules on site evaluation and system design for the 3538-acre rural development. Every one of the 965 lots has undergone a detailed site evaluation with 4000 test holes examined by a soil scientist. Every lot had a designated home site for a three-bedroom home, a disposal site, a replacement area and a system type.

systems that are constructed in soils unsuited for mound systems or are inadequate for the amount of wastewater being generated.

Management entities have detailed rules on site evaluation and design criteria for the systems they plan to manage. Inspections of the site as the system is being planned and sited are done to ensure that the systems are in the right place from the start. Designs are also reviewed and approved by the management entity to avoid oversights.

## Step 2

**New septic tank-mound systems that will be managed must be constructed with management in mind.** Fortunately, it is not difficult or expensive to construct a system to facilitate long-term management. The special features include:

- a detailed drawing of the system as built.
- risers to the ground surface with access covers are needed on all tanks. This provides for quick and easy access for inspection and maintenance. All electrical

connections and alarms must be placed in a weather-proof box outside of the dosing tank.

- *small inspection ports* are needed down to the gravel/sand surface and the sand/soil surface. This enables an inspector to quickly check for ponding that is an indication of an impending malfunction.
- *valves and risers at the end of all lateral lines* to facilitate flushing debris from each line. Mound systems are constructed with small diameter pipes with small holes. If not flushed out, the holes in the pipes can clog over time.
- *groundwater monitoring wells* downslope of the mound, if the system is constructed in an area with high, seasonal groundwater.

Tank risers, lateral valves and risers, inspection ports and monitoring wells can be added as a retrofit to existing septic tank-mound systems.

## Step 3

**Because mound systems have mechanical dosing systems, each mound system should be inspected every 6 months.** Inspections take from 30 to 60 minutes to complete and include:



All mound systems at Auburn Lake Trails have tank risers, lateral valves and risers, inspection ports and groundwater monitoring wells. The management entity replaces trench monitoring risers and caps, flushes disposal bed lines, helps homeowners with advice on problem solving (odors, pump alarms, pumping) and performs legally required environmental monitoring.



*About 107 mound systems are inspected each year at Auburn Lake Trails. By catching problems early, they can be corrected by the management entity and reduce the environmental and public health impact. If a problem, such as ponding in the gravel bed, is identified the system is checked every three months to ensure that raw sewage does not come to the surface.*

- walking around the lot looking for landscape changes that can interfere with or damage the mound system. Also look for problems caused by cross connection with a well or community water system.
- walking downslope of the mound to check for signs of surfacing sewage.
- locating and opening up each inspection port to check for ponding.
- activating the pump or siphon and checking alarms.
- opening risers at the end of each lateral to open and flush lines to remove debris that may clog holes in the small diameter pipes.
- collecting a groundwater sample if any is present in monitoring wells.

Every three to five years the septic tank should be opened and inspected to:

- check for deterioration of the tank lid and riser.
- check for deterioration of tank baffles.
- measure the level of sludge and scum in the tank.

An additional 15 to 20 minutes per system must be set aside for record keeping that includes:

- recording observations of ponding, deterioration and, if measured, sludge level.
- leaving a hang-tag for residents to let them know their system was inspected.
- sending a follow-up with a form letter on the condition of their system.
- updating databases and generating reports.

Finally, time to travel to the systems for inspections in rural areas must be included. By scheduling inspections by neighborhood, travel time can be kept to a minimum.

## Step 4

### **Early maintenance and repairs are possible and encouraged through a regular inspection program.**

Routine maintenance, like septic tank pumping, can be accurately prescribed. Problems, such as ponding in a mound, can be identified and corrected before wastewater begins to surface on a lot.

Management entities aggressively monitor routine maintenance and repairs to make sure they are done



*Overall management system performance at the Auburn Lake Trails Onsite Wastewater Disposal Zone is very high. Fewer than 1% of onsite systems have malfunctioned since management began. The few malfunctions, while creating an inconvenience for homeowners, have not resulted in public health problems or environmental contamination. No wastewater has been discharged from Auburn Lake Trails to the highly valued American River.*

as needed. Most management entities have penalty provisions in place if homeowners refuse to maintain or repair their systems. The management entity may also have the authority to go onto private property and perform the necessary work. Fortunately, this is seldom a problem. Once properly sited, designed, and guarded from damage, mound systems need only regular maintenance and repair or replacement of worn pumps and controls.

It is important to note that the expected life of any wastewater treatment system, including mound systems, is 20 to 30 years. Pumps can wear out in 10 years or less. While older systems may still function, they will likely require upgrading or component replacement. A management entity can monitor the systems' age and forewarn property owners of anticipated upgrades.

## Step 5

**Supporting the management entity ensures long-term performance of mound systems.** While it is not cost-free, managing mound systems is about one-fifth the cost of a typical sewer bill. The most important element of a management program is a knowledgeable and dedicated inspector. Depending on labor costs in the area and travel distances, semi-annual mound system inspections cost from \$100 to \$150 per year per home.

Maintenance and repair costs vary. Some management entities set fees so they can provide the necessary maintenance for everyone. In others, the property owner contracts and pays for necessary maintenance and



*The inspector at Auburn Lake Trails has been checking the more than 850 mound and other onsite systems since 1993 as a full-time job. Because he knows so much about every system, inspections are completed quickly. When asked what he likes best about his work, he said he likes dealing with the public and working for a close-knit utility company.*

repairs on an individual basis. What works best depends on the wishes of the community.

Providing long-term management of mound systems is simple, quick, and inexpensive. With semi-annual inspections, the need for maintenance and repair is identified early, and it can be taken care of at no or minimal cost. Most importantly, with regular flushing, clogging of the small holes in the small diameter pipes can be avoided. Through management of properly sited and designed septic tank-mound systems, rural communities can provide for low-cost wastewater treatment and protect the public health and the environment in areas with thin soils and high, seasonal groundwater.

*Funded in part through a grant from the National Onsite Demonstration Project, West Virginia University.*

Visit Ohio State University Extension's WWW site "Ohioline" at: <http://ohioline.ag.ohio-state.edu>

All educational programs conducted by Ohio State University Extension are available to clientele on a nondiscriminatory basis without regard to race, color, creed, religion, sexual orientation, national origin, gender, age, disability or Vietnam-era veteran status.

Keith L. Smith, Associate Vice President for Ag. Adm. and Director, OSU Extension

TDD No. 800-589-8292 (Ohio only) or 614-292-1868

4/01-klw