Constructing Wetland Project Is Nature’s Classroom

by Kathy Jesperson
NSFC Staff Writer

Los Padillas Elementary School in Albuquerque, New Mexico, had a problem—a high water table and no central sewers, which ultimately led to groundwater contamination troubles.

To help solve its problem, the school decided to install a constructed wetland system, says John Dufay, supervisor of the Environmental Hazard Response Department with Albuquerque Public Schools, a 135-school district.

Before the school installed the constructed wetland, however, it relied on two elevated leachfields to help purify its wastewater—but it wasn’t enough, says Dufay. “We treat about 3,500–4,000 gallons of effluent a day. To increase the system’s efficiency, when one leachfield was drying out, we’d use the other. But the system was still overloaded and we needed to install a third field.”

Questioning whether or not they wanted to install a third leachfield led to the school trying to find other ways to solve its wastewater treatment problems. Through investigations carried out by Dolores Phillips, a teacher at the school, they decided to do more than just comply with Clean Water Act regulations. They decided to do something to improve the environment as well.

So when the New Mexico elementary school decided on the constructed wetland system, it also decided to take the project a step further. By November 1993, the school had turned its wastewater treatment system into an environmentally friendly project that not only solved its treatment problem, but also enhanced the ecosystem.

**Land use**

“The school district had four acres of idle land next to the school,” says Dufay. “The land was close to the Rio Grande and the Bosque, which is similar to a natural wetland. There was a lot of nature there already—cottonwoods, vegetation native to the southwest. Nothing had been brought in from anywhere else. And the school wanted to use that land to help the environment and help itself.”

After acquiring permission to use the land from the school district, the school built a constructed wetland to treat its wastewater and a wildlife sanctuary to preserve and enhance the nature already present.

New Mexico’s Environment Department issued the discharge permit for the system. “They were pretty easy to work with,” says Dufay. “We went through the normal channels; however, they did require us to have a contingency plan.”

Because the elevated leachfields were still in place and operational, the school decided to use them as the backup system for its contingency plan. These raised beds are also used when the constructed wetlands require maintenance.

Funding, totaling $190,000, for the project came from New Mexico, Bernalillo County, and the school district. The wildlife sanctuary, officially dedicated as Los Padillas Wildlife Sanctuary, ultimately benefits the school’s environmental education program and took $100,000 of the funds, says Dufay. “Although the price tag seems high,” says Dufay, “everything was done first class.”

Dufay insists that it was Phillips who made this “first class” project possible, getting the community involved and securing funds. He says she is also the primary teacher in the school’s environmental education program and took $100,000 of the school’s environmental education program and took $100,000 of the funds.

The school’s desire to be environmentally friendly also helps students understand the nature of things through what Phillips and the school call the “Outdoor Classroom.”

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Three major parts of the program—water conservation, native plants, and groundwater protection—has many, many guest speakers. “They take extra courses so they will be able to teach the children on the chemistry and bio-breakdown of organic matter in the wetland,” Phillips says. “Teachers at the school are very excited about environmental education,” she says. “It’s working.”

Another major part of the program is that the students also participate in lab work, says Dufay. “They do microscope work, and test the pond water using test kits and portable lab equipment to learn about microbiology. And I mentor four or five high school students every year on the environment and constructed wetlands.”

But the students are doing more than just getting their hands dirty, Phillips says. “Besides the hands-on education, the school has many, many guest speakers who come and speak about plant and pond life as well as to instruct the children on the chemistry and biological breakdown of organic matter in the wetland.”

“Teachers at the school are very involved as well,” Phillips continues. “They take extra courses so they will be able to teach the environmental curriculum of the wetlands at all levels.”

Learning about the environment and groundwater protection has been a vital part of the educational program, says Phillips.

“We have nine monitoring wells anywhere from eight and a half to 22 feet deep. These wells serve a two-fold purpose—one is for monitoring required by the state and the other is so the students can see how water flows and how groundwater works. It’s all very exciting,” Dufay says.

The monitoring wells cost about $400 each, says Dufay, and they accounted for about $3,600 of the $90,000 spent on the constructed wetland system.

The wetland is fenced off from the school, says Dufay, and the children can get only within 15 feet of it when it’s in operation. However, the system’s evaporation pond is always accessible. Because one of the main goals of the project was to enhance the environment, extra precautions were taken to ensure that the pond would be safe for the children and the wildlife it supports, Dufay says.

Zero discharges rates

To accomplish this objective, Phillips and the school insisted on a possible zero wastewater contaminant discharge—not because they had to, but because they were concerned with improving the quality of the area’s groundwater.

Zero discharge means that no effluent would be discharged to surface waters. To achieve a zero discharge rate, water from the wetland is discharged to the system’s evaporation pond. Here, the water either evaporates into the air or percolates into the groundwater.

Before effluent is discharged to the pond, it also undergoes ultraviolet (UV) disinfection, which further ensures clean groundwater supplies. “Thirty gallons per minute [gpm] flow through the system,” says Dufay. “Ten gallons go through UV disinfection, with 20 gallons recycled back through the wetland.”

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Additional treatment includes adding organically cultured microbes to the northside of the two-celled system. Initially, 150 gallons of the microbe treatment were added to the system. For the next six months, five gallons were added weekly. To maintain the northside cell, five to 10 gallons are added every two to three weeks. The microbes aid in the breakdown of nitrogen, ammonia, and other nutrients, says Dufay, and have increased nutrient reduction by 50 percent.

“Similar wetlands we’ve looked at see only about a 30 percent reduction,” says Dufay, “but our numbers have been pretty consistent.” (See Figures 1, 2, and 3 on this page.)

“A comparison between the northside cell and the southside shows about a one-third difference,” he explains. “Ammonia is only reduced to about eight milligrams per liter [mg/l] on the southside, but with the added microbes it is reduced to about five to six mg/l on the northside. Because the difference is so substantial, we recycle everything through the northside.”

The wetland, designed by Southwest Wetlands of Santa Fe, New Mexico, consists of five separate components (see schematic on this page). The wetland, designed by Southwest Wetlands of Santa Fe, New Mexico, consists of five separate components (see schematic on this page).

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Simplifying operation

Once the system was complete, its operation was really simple, says Dufay. First, effluent is discharged from the septic tank into a holding tank, where it is retained for approximately two days. It is then pumped to the secondary tanks.

When effluent reaches these secondary tanks, the first tank acts as a regular septic tank. Here, the effluent undergoes additional settling and solids removal. The second of these tanks acts as a buffer, says Dufay.

“We set the system up like this because we use some very powerful pumps to get the effluent through the system,” Dufay continues. “If we just pumped effluent directly into the wetland, the soil would break apart. For this reason, we use a gravity feed system from the second tank, which discharges into the wetland.”

From the secondary tanks the effluent flows to a splitter, where it divides between the north and south cells. It is then discharged through the wetland for treatment and nitrogen removal. Retention time is about two days.

Then, as Dufay explains, the effluent is either disinfected via UV disinfection or recycled back through the wetland. Finally, it is discharged into the evaporation pond.

The septic tanks decrease biochemical oxygen demand (BOD) from 300 mg/l to approximately 100 mg/l. The wetlands further decrease BOD and ammonia levels from approximately 40–80 mg/l down to less than 10 mg/l.

To further increase the system’s efficiency, some low-flow fixtures were installed in the school as part of the system’s pretreatment. “With the amount of effluent flowing through the system,” says Dufay, “it is especially important to cut the amount of water being discharged into the system.

Reducing contamination

“Most importantly, though, is the fact that we’ve experienced a 10-fold reduction in groundwater contamination because effluent is no longer directly being discharged into the groundwater. And the way we know that is through actually sampling the groundwater,” he continues.

Although the school had been part of the area’s source of groundwater contamination, everyone in the area uses septic tanks, and agricultural farmland is prevalent. “That’s the reason we wanted to go with a new method of discharge,” says Dufay.

Once the wetland was installed and under operation, compliance sampling had to begin. “After six to eight months of monitoring, we saw a small contaminant reduction,” Dufay explains. “As of February 1995, though, we’ve seen the absence of fecal coliforms for several consecutive samples. And total nitrogen is now less than three mg/l. Before the wetland, it was well over the limits.”

Dufay adds that factors beyond the school’s control do present some sampling problems. For example, the rainy season, irrigation, farmlands, and other septic systems can cause sampling errors. However, he says, everyone involved with the project is pleased with the system’s performance.

Unique surprises

And it even holds some unique surprises. For instance, the district’s insistence on complex wastewater treatment resulted in a rather pleasant consequence—no smell. “When we tell many of our visitors that the wetland treats wastewater, they think we’re kidding. They think it’s irrigation water,” says Dufay.

Besides being environmentally correct, the system attracts visitors from all over the world, especially Mexico and South America. “I think we’ve had representatives from almost every country in South America,” says Phillips. These visitors come to see the system’s benefits and to learn how to build similar systems for their communities.

While the kind of effort, dedication, and expense of building a system like the one at Los Padillas isn’t typical, Phillips and Dufay would recommend installing this kind of system for other schools.

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Connecticut Adopts Minimum Leaching System Spread

by Frank A. Schaub
with Arthur J. Castellazzo and Robert W. Scally

Editor’s Note: Frank A. Schaub is chief of the On-Site Sewage Disposal Section (OSSDS) in Connecticut’s Department of Public Health Services (DPHS).

He submitted the following article to Small Flows in response to an article appearing in the Winter 1994 issue, “Lateral thinking in groundwater flow: introducing contour disposal fields,” in which David Pask, P. Eng., outlined his design for onsite systems in Nova Scotia based on groundwater flow theory. Schaub outlines a similar contour design that has been recently adopted in Connecticut. (A second article in Pask’s series appeared in the Spring 1995 issue of Small Flows.) The acronym “MLSS” is not to be confused with mixed liquor suspended solids (MLSS), another acronym used in the wastewater treatment field.

The examples used in the article refer to specific products used in the construction of leaching systems, including several new gravelless technology products, concrete chambers surrounded by gravel, and standard gravel trenches. Specific brand names are used by the author for illustrative purposes and do not constitute an endorsement by the National Small Flows Clearinghouse.

Like many other state, county, and local governments throughout the country, Connecticut has historically had specific regulations prohibiting the issuance of building permits for parcels where the underlying naturally occurring soil cannot absorb and disperse sewage flows without surface breakout or having detrimental effects on groundwater.

However, our experience at the Connecticut Department of Public Health Services (DPHS) shows that even with these and similar regulations requiring analysis of hydraulic function, state and local regulators may be reluctant to request expensive onsite testing and calculations to prove site suitability for relatively small projects. In this manner, they circumvent a crucial aspect of septic system design—how the systems function hydraulically.

**Solution**

To ensure that hydraulic analysis received the attention it deserved, the On-Site Sewage and Disposal Section (OSSDS) set out to develop a simple screening process that could be incorporated into state regulations and would require both new construction and replacement systems to meet a “minimum leaching system spread” (MLSS) design. MLSS is a method for determining the minimum width of a trench required for application parallel to the natural contours of the site.

This process had to include the basic aspects of Darcy’s Law governing groundwater movement through saturated soils, yet be simple enough to be used by land developers, licensed septic system installers, town regulators, and consulting engineers.

The challenge was to develop a process that addressed hydraulic considerations without burdening existing property owners and land developers with expensive onsite testing, lengthy engineering reports, or design reviews.

In 1994, the concept of MLSS was incorporated into the Connecticut Public Health Code. By regulation, each application must be accompanied by MLSS calculations. If the site cannot meet MLSS requirements, the law requires that a more detailed hydraulic analysis must be conducted in order to confirm site suitability.

The MLSS calculation takes less than five minutes to complete and requires only basic information, such as the depth to restrictive soil layer or groundwater, slope of the land or hydraulic gradient, design flow (number of bedrooms or gallons per day), and the percolation rate.

**MLSS method**

The MLSS formula is a straightforward multiplication of a hydraulic factor, a flow factor, and a percolation factor, with the result expressed in feet. The hydraulic factor is a value based upon the relationship between the hydraulic gradient, (expressed in percent slope) and the depth of permeable soil (measured in inches) to a restrictive layer. The flow factor is simply the daily design flow in gallons per day (gpd) divided by 300. For residential structures, 150 gallons per bedroom is used. The percolation factor is a value based upon the percolation rate of the receiving naturally occurring soil layer (expressed in minutes per inch).

**Sample MLSS calculation**

Let’s assume we have 28 inches of permeable soil above a compact glacial or clay soil. The slope of the lot is 3.5 percent. By cross-referencing these two bits of information on the chart (see Figure 1), a hydraulic factor of 34 would be applicable.

If a prospective property owner wanted to build a four-bedroom home on this site, a flow factor of 2.0 would be selected (see Figure 2). If the percolation rate ranges in the 20.1 to 30 minute-per category, a 2.0 percolation factor would apply (see Figure 3, next page). Multiplication of all of these factors produces a MLSS of 136 feet:

MLSS = 34 x 2 x 20 = 136 feet

This means any leaching system constructed for this property would have to be spread out 136 feet parallel to the naturally occurring contours. Depending upon the size of the required leaching system, and the rating of each system, the configuration may consist of one, two, three, or more rows of leaching trenches. (To come up with the most effective leaching method for a specific site, the DPHS has created a formula for rating leaching systems that takes into consideration the size of the leaching system, its dimensions, and its method of application to the soil.)

A four-bedroom home with a percolation rate of 20.1 to 30 minutes per inch would, according to code, require 1,000 square feet of effective leaching area. If we were to attempt to construct the leaching system in a single row, we would have to select a leaching system that provides 1,000/136 = 7.4 square feet per lineal foot of effective rating.

According to the current regulation, use of a four-foot wide leaching chamber, 30 inches high with 12 inches of stone along the sides (total six-foot wide excavation),
Continued from previous page

provides 7.4 square feet per lineal foot. Seventeen eight-foot-long units would meet the minimum spread and provide the required soil interface to satisfy the long-term acceptance rate (LTAR).

Although some designers prefer a single trench installation, multiple trenches can be used, assuming the total width of application is incorporated into the design. If a two-trench system is chosen, several options are available, according to the current code. We calculate the size of these trenches by using the formula 1,000/(2 x 136) = 3.67 square feet per lineal foot. The 16-inch high Infiltrators™ (high capacity), rated at 3.8 square feet per lineal foot, or the 20 inch high Recharger 180™ corrugated leaching chambers covered with filter fabric, rated at 4.1 square feet per lineal foot, could both be used for two-trench designs. A three-trench configuration would also be acceptable provided it was spread uniformly along a contour of at least 136 feet wide. Using the same method, 1,000/(3 x 136) = 2.45 square feet per lineal foot would be needed.

A standard gravel trench, two feet wide with 12 inches of stone beneath the pipe, and two inches of stone on top of the pipe, is credited at 2.4 square feet per lineal foot. A similar gravel trench 30 inches wide is credited at 2.7 square feet per lineal foot. A 12-inch high Contactor 75™ is rated at 2.6 square feet per lineal foot. Finally, three rows (145 feet each) of a 12-inch diameter Geo-Flow™ corrugated filter fabric-wrapped pipe rated at 2.3 square feet would also be acceptable.

**Applications**

There are undoubtedly thousands of lots within Connecticut that were created years ago with little thought for onsite sewage disposal. Nonetheless, all new construction must comply with the MLSS, or use an alternative, more complicated method of hydraulic analysis.

There are a number of ways the MLSS elements can be manipulated in order to arrive at the required spread. For example, because identification of the restrictive layer is so critical in selecting a hydraulic factor, percolation tests may be conducted at various depths to more accurately locate the soil zones with percolation rates slower than 30 minutes per inch. Designers also sometimes locate systems in sloping areas in order to increase the hydraulic factor.

By far the easiest way to reduce the required MLSS is to downsize the project or reduce the number of bedrooms in the structure. If the site cannot meet the requirements of the MLSS, another alternative is to conduct onsite soil testing in order to determine permeability of naturally occurring soils and to calculate the loading rate of the intended leaching area. Such tests would be done by registered professional engineers and could include core sampling to perform static or falling head permeability calculations, monitoring of groundwater levels in test wells to evaluate total site water movement, pit bailing permeability calculations where uniform saturated soils exist, and other similar methods.

In some cases, leaching systems are installed and loaded daily for a month or more during the wettest time of year in order to evaluate the real-life capacity of the soils to disperse clean water. Lot development and approvals are dependent upon the results of the loading tests.

**Educating homeowners**

The MLSS process tends to encourage the widest application for leaching system construction. It also provides an excellent opportunity to notify the property owners that, even though the leaching requirements of LTAR, provided to keep 50 percent of the MLSS. Therefore, an appropriate percentage reduction in water use would be recommended. Before adoption of the MLSS, it was uncommon for most Connecticut regulators to discuss the degree of hydraulic limitations with property owners except in regard to the repair or construction of very small systems.

**Focus and limitations**

MLSS was primarily developed to address sites containing layers of permeable soils above restrictive hardpan or clay. Such lots are typical of those used for residential development in Connecticut. MLSS is not intended to be used where less than 18 inches of naturally occurring soil exists over the broad leaching area, nor is the calculation required where more than 60 inches of permeable soil exists above the restrictive soil layer. The state code prohibits issuance of any permits where less than 18 inches of permeable soil exists above hardpan or where the groundwater level is less than 18 inches for a month or more during the wettest time of the year.

Unless site improvements can be made to drain wet areas, fill cannot be used because of the reliance on naturally occurring underlying soil for absorption and dispersal of projected sewage flows. Systems that would bleed partially treated sewage at the toe of the slope cannot be approved under current regulations for design flows of 5,000 gpd or less. (Five thousand gpd is the cutoff for new and repaired systems requiring permits from DPHS. With flows larger than 5,000 gpd, the state requires a more extensive onsite analysis.)

**First year’s success**

The 1994 code change came as a surprise to few, but overall response from the groups affected by the change has been favorable. The factor charts (see Figures 1, 2, and 3) did change slightly over that two-year period as the process was fine-tuned.

Although the MLSS did not become law until 1994, drafts of the regulation were distributed in May 1992 to allow health departments and design engineers time to familiarize themselves with the calculations.

There was initially a great deal of apprehension from installers, engineers, and land developers concerning the impact of this change on their property and professions. The DPHS responded by conducting extensive training sessions, both during daytime working hours and in the evening, in order to teach individuals the benefits of performing this hydraulic review and alleviate any fears pertaining to condemnation of properties.

It appears the efforts were worthwhile because the first year of compliance has yielded very few problems. Proper design and construction of septic systems that recognizes the important role of soil hydraulics eliminates many problems and system failures that occur because the soil is unable to handle the effluent. In addition, it represents another step toward our long-term goal of constructing onsite sewage disposal systems capable of providing a minimum of 50 years service with only minimal routine pumping of septic tanks.

For further information about Connecticut’s MLSS, you may contact Schaub at (203) 240-9277.

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*This figure is based on a method for rating different types of leaching systems using a mathematical formula established by Connecticut’s regulations.*
Biofilter Offers High Performance with Low Maintenance

by Jeremy Canody
NSFC Staff Writer

Since 1991, Craig Jowett, Ph.D., research associate professor, and a team of researchers at the Waterloo Centre for Groundwater Research in Waterloo, Ontario, have been developing, testing, and evaluating a high performance biofilter to treat domestic wastewater.

A biofilter is any filter in which the primary means of treatment is a result of bacteriological action by organisms growing on the filtration medium. This may take a variety of forms, including a trickling filter; a sand filter; or a rotating biological contactor, a series of rotating disks that maintain a biomass in aerobic and anaerobic conditions. The characteristic they share is the use of a medium to support the growth of wastewater-treating bacteria. Increasing the amount of available space on which the organisms grow increases the removal efficiency of the filter, said Jowett.

The Waterloo Biofilter™ is a passive biofilter that uses a synthetic medium and works independently of the environment so that it will perform well under any soil and drainage conditions. “The biofilter is the equivalent of a single-pass sand filter, but the loading rate is 10 times higher in the biofilter," Jowett said. A typical household’s wastewater can be treated in a six-foot by six-foot size.

Wastewater is sprayed onto the surface of the filter medium where it is absorbed and treated by colonies of organisms. The wastewater percolates through the medium where it is treated and discharged. Jowett said air is drawn around the saturated foam media by natural convection or by a small fan attached to the roof of the filter. He said at several project sites in Canada, nitrification increased when air was blown through the filter, and that removal of biochemical oxygen demand (BOD) and total suspended solids (TSS) increased by five percent.

Jowett and microbiologist Michaye McMaster developed the system in 1991 to replace the aerobic tile bed of a conventional septic tank system. The biofilter is completely contained in a small transportable box no larger than the septic tank itself.

Jowett explained that the treated water has to be disposed of in one of three ways: gravity fed into an existing tile bed; gravity fed into a leaching pit; or pump-dosed into a pressurized shallow trench. He added that in heavy clay areas, a pressurized shallow trench is an effective method for disposing of treated effluent.

Jowett said he had to consider several things to make a biofilter that could be placed in a large variety of site conditions, free from the environment.

To make the biofilter work, Jowett and McMaster had to allow enough surface area for bacteria to grow, maximize the wastewater detention time, and provide ventilation to allow oxygen transfer to the bacteria. Taking these factors into consideration, they used a foam plastic medium full of tiny pores that allow the microorganisms to utilize the maximum amount of available surface area for synthesis.

Jowett said the foam offers an advantage over other media such as sand, where organisms can grow only on the outside of the grain and eventually form a slime layer that stops the wastewater flow between the grains. He said since the organisms grow inside the pores, it permits more growth space for the organism so aerobic bacteria form more readily, thus minimizing the development of an anaerobic slime layer.

Jowett said a key advantage of the biofilter is that the porous foam medium allows for simultaneous wastewater loading and ventilation. He said he chose this type of medium over a natural source because it has the flow characteristics of gravel but the surface area and absorptive capacity of sand. Jowett said he prefers the artificial foam medium because it has sily properties and allows unrestricted flow, maximized media surface area for bacterial growth, improved wastewater detention time, and the ability to allow improved oxygen transfer to the bacteria.

The biofilter can be placed above ground or in difficult areas where a standard tile bed could not be placed. Conditions such as clay soils, shallow bedrock, or high water tables do not restrict where this biofilter can be placed because it works independently of the environment. Jowett said the biofilter has operated well at temperatures of 40 degrees below zero. He added that warm weather is not a problem because the biofilter is vented and therefore cooled in the free-draining enclosure.

Jowett said that the system does not remove significant nutrients from the wastewater, but added that the biofilter allows for the collection of nitrified effluent and the nutrients can then be removed. He said the system works on anything biodegradable and that anything that is being conducted to determine other practical uses for it. Jowett said the system is ideal for use in polishing lagoon effluent and added that, after experiencing some success with landfills, he is currently setting up projects in Canada for leachate treatment.

He said the biofilter system can be retrofitted to existing systems or difficult sites, but said he prefers to install the filters with new systems.

The biofilter has worked well in communities of various sizes. Current work is being done to design a 10,500 gallon per day (gpd) or 40,000 liter per day (lpd) filter. A 7,900 gpd or 30,000 lpd filter has already been installed on a large communal system. He said the biofilter system is also being used in single family homes throughout Canada.

“Designed the system to be as low maintenance as possible,” Jowett said, adding that he recommends using a pump and a timer on the filter, in addition to a ventilation fan, to help the system operate more efficiently. Jowett said when maintained properly, treatment levels of BOD and TSS range from 95 to 98 percent. Toxic chemicals, which were added on occasion to the septic tanks in field demonstrations, lowered performance in the tank and the biofilter, but both recovered within a week. Continued dosage, however, killed one septic tank and treatment was poor.

The biofilter is currently being monitored at six sites in Ontario and one in Nova Scotia, as well as in the U.S. with one site located in Gloucester, Massachusetts, a National Onsite Demonstration Project site. Jowett said an application to patent the biofilter has been submitted and it should be fully patented soon.
Tennessee Tech Evaluates Septic Tank Filters

by Jeremy Canody
NSFC Staff Writer

Graduate students at Tennessee Technological University in Cookeville, Tennessee, are currently evaluating the performance of two different brands of septic tank filters to see if they are as good as the companies who make them claim they are. The two brands are Zabel and Orenco.

“The filters are a good idea...we just want to see how good of an idea,” says Bill Treanor, a graduate student in the Department of Civil and Environmental Engineering, who is heading the research under the direction of Larry Roberts, Ph.D., at the university. Treanor said they are monitoring the filters made from plastic and PVC pipe to see how effective they are in removing Total Suspended Solids (TSS) and consequently biochemical oxygen demand (BOD) from septic tank effluent.

Each septic tank filter being evaluated performs two functions—to retain solids in the septic tank and lower TSS and associated BOD concentrations. Eliminating solids and BOD (in many cases by 50 percent or more) improves the quality of the effluent, reduces the risk of clogging in lateral drainage pipes, and protects groundwater.

Basic operation
The basic operation of the filters being tested by Treanor is to remove particles before they leave the tank. Both filters work with the same principle in mind, except one uses a series of plastic trays spaced evenly apart as its medium, while the other filters the waste through a series of long tubes and screens that remove the particles as they flow up through the filter. The finely spaced trays or mesh screens catch larger particle matter before it escapes the tank and further clarifies the effluent.

Both are encased in a long cylindrical housing made of plastic and both rely on the spacing of the removal plates or mesh screens to remove the harmful particles. Treanor explained that the secondary purpose of the trays or screens would be to provide a surface area on which microorganisms could grow. As a result, the organisms degrade the harmful particles into basic elements and compounds. He said what makes the filters innovative is that people are beginning to use them more as a preventive measure before their septic effluent lines become clogged.

Preventing costly repairs
Every year, more than 250,000 septic systems fail or require expensive repairs due to effluent pipes becoming clogged or annual maintenance being ignored. Treanor said the problem behind many septic system failures is that people tend to forget the systems once they are installed. He said this type of system is unique because it is designed to trap the solids that would normally clog a drainfield while forcing those larger particles to settle in the septic tank before they can clog the effluent distribution lines.

A properly managed residential septic filter should be cleaned every two to three years when the tank is serviced. In commercial installations, servicing will depend on the flow rate and solids loading characteristics of the wastewater. The septic filters, if used properly, are somewhat self-cleaning. Anaerobic organisms on the filter disks and screened tubes partially digest organic particles lodged in the filter.

The idea of placing a filter onto a septic tank to filter the effluent before it leaves the tank had been in the making for years, but was not developed until five or six years ago. Today, there are only a few manufacturers who produce this type of septic tank filter for both residential and commercial septic tank filtration.

The evaluation is expected to be complete in August. Treanor said they are conducting various tests on the septic filters that include taking BOD and TSS samples before and after each evaluation to compare their findings to those of the manufacturers. So far, the tests have been producing consistent results, he said.

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Don’t forget, it was the sanctuary that used the largest portion of the funds. And we did a lot of extra work. We believe a school could set up a constructed wetland system for about $50,000 or so. However, we would recommend that they consider a gravity feed system rather than pumps,” Dufay says.

Creating a place for everyone
Even though the sanctuary was an expensive undertaking, it was worth it to the school, its staff, and its students. And they made certain that anyone who wanted to enjoy its beauty and nature could. “The sanctuary is accessible by wheelchair and is American’s with Disabilities Act approved,” Dufay says. “Making the sanctuary accessible to everyone was a primary goal.”

Dufay and Phillips say they never imagined just how successful the project would be.

“The number of people who come to see this wetland is overwhelming,” he says. “This was a dream that came true through a lot of hard work from the school and community. And it turned out wonderful.”

For more information about this alternative wastewater treatment system and the Los Padillas Elementary Environmental Education project, call Dufay at (505) 765-5960.

The Los Padillas Wildlife Sanctuary is home to many different species.
Idaho Regulations Program Responsive to Change

by Tricia Angoli
NSFC Technical Assistance Specialist

Idaho has discovered a way to bypass a cumbersome legislative process by separating its onsite wastewater guidelines from its state regulations, making the guidelines more responsive to change.

The state-of-the-art in alternative onsite wastewater treatment had bypassed Idaho until 1985 because of its antiquated regulations process. Prior to that, Idaho’s regulations were based on the U.S. Public Health Service’s Manual of Septic Tank Practices, which was published in 1957.

Idaho changed its system in late 1983 when the state Division of Environmental Quality began to update the onsite regulations. As the regulations were rewritten, an effort to include all the new alternative technologies was made. The end result was a very large, complex document.

When the document was sent throughout the state for review, it was not well received, according to Ken Babin, a supervising environmental health specialist with the Panhandle District Health Department. Babin said it was already extremely long, and with new technologies being created or upgraded continuously, it soon became too cumbersome. In addition, the regulations would never be able to keep pace with the changes in wastewater treatment technology, he explained.

New setup

That’s when Babin came up with the idea of removing the alternative technologies from the regulations and creating a document, called the Technical Guidance Manual for Individual and Subsurface Sewage Disposal Systems.

Idaho’s onsite regulations cover the design and construction of septic tanks, standard soil absorption systems, and large soil absorption systems (greater than 2,500 gallons per day). See Figure 1.

Included in the septic tank and soil absorption system sections of the regulations is information on design specifications, construction, materials, and siting of the system.

The onsite guidelines manual (see Figure 2) contains information on soils, groundwater, and the alternatives allowed. In the “alternative” sections, information is provided on design, construction, and conditions for approval.

Some of the alternative systems listed in the manual are composting toilets, evapotranspiration systems, individual lagoons, intermittent sand filters, sand mounds, and steep slope systems.

Normally, the procedure for changing the regulations to add new technologies or upgrade existing ones takes as long as two years. Babin said having the alternative technologies in a separate document allows Idaho to bypass this lengthy legislative process. Information in the technical guidance manual is then easily updated to reflect changes or updates in the current status of the technology.

Although it is physically separate from them, the technical guidance manual is referenced in the regulations. The alternatives detailed there are used by prospective health department personnel and homeowners when the conventional septic tank/soil absorption system cannot be used.

Legal question

Attorneys were consulted about setting up the regulations separate from the technical guidance manual containing the information on alternative technologies. Babin said at first the in-house attorneys were hesitant, but agreed that legally it could be done.

The attorneys were concerned that guidelines governing the alternative systems would not be enforceable if they were not included in the actual onsite regulations. Although the manual has never been challenged in court, it still could be, according to Babin.

“The worst thing that could happen would be to throw out the alternatives section in the manual,” he said. “Then the regulations would have to be rewritten to include the alternative technologies, and that could be even worse.”

How the system works

A committee was created to review new technologies and products available in the onsite wastewater treatment market. The committee, consisting of three district health department environmental health specialists, the state onsite sewage coordinator, a licensed professional engineer, and a septic tank system installer, meets twice a year—one each spring and fall. A soil scientist also is available for consultation.

At the first meeting, additions, changes, or deletions to the manual are suggested. These changes are reviewed for a six-month period by all of the people who have a copy of the technical guidance manual, including installers, engineers, health district personnel, and soil scientists.

After their comments have been returned, the committee reviews...
A Prescription for Performance-Based Codes

by Anthony B. Smithson, M.S., R.S.

Editor’s Note: With this column, Small Flows initiates a new series in which readers provide their own opinions about issues and trends in the small flows field. The series debuts with an article by Anthony B. Smithson, M.S., R.S., individual sewage disposal program coordinator for the Lake County Health Department in Waukegan, Illinois, a northern suburb of Chicago bordering Wisconsin.

Smithson’s staff reviews more than 1,000 proposals per year for onsite systems. What follows is his personal insight into the controversy surrounding the use of performance- versus prescriptive-based codes to guide the design of onsite wastewater systems.

Prescribed codes are laws that specify soil, site, and design requirements for the installation and operation of onsite systems. Performance codes require the installation of systems that meet specific treatment performance criteria.

I confess to being passionate about onsite wastewater issues, although I am careful about where I make that statement. For 20 years, on both public and private fronts, I have maintained enthusiasm for the technical, practical, political, and economic aspects of onsite wastewater treatment disposal. I have assimilated the “literature” over the years, and have tried to implement innovative and alternative technologies and philosophies consistently throughout my career.

I am troubled, however, by the philosophy that promotes “performance” instead of “prescriptive” regulatory instruments for onsite wastewater systems. Ayres and Associates, in its 1993 report, Evaluation of Current Onsite Sewage Disposal System Practices in Florida, describes this approach with great specificity. Wisconsin is promulgating a performance-based code, and the idea is, in general terms, becoming the “golden boy” of the onsite wastewater intellectual community.

My concerns are not with the concept. I think, in fact, that it is a marvelous step forward. Onsite systems are engineered toward particular, measurable performance objectives in a cooperative effort between the regulator, the designer, the installer, and the homeowner. The educated homeowner or a licensed service provider then manages the system within those performance parameters, reporting to the regulatory agency with certain monitoring or servicing data as required.

Advantages


Each site, the difficult site being most challenging, is addressed according to its individual characteristics to achieve the established performance objective for treatment and disposal. The specific proposal may be “engineered” by the designer, and approval is granted when the regulator is satisfied that performance objectives are met. No particular system design is prescribed by the regulatory code.

A performance-based code allows the application of any number of innovative and alternative approaches to difficult or unusual sites provided only that performance standards can be met.

To those of us passionate about onsite wastewater, this opportunity for creative problem solving is nothing less than thrilling. Once in place, performance-based codes establish a framework for the continuing integration of new technologies and new ideas; new problems and new solutions. I intend to maintain my push for the implementation of performance-based codes.

Concerns

My concerns, therefore, are not with the idea; it seems to me a natural advance in the manner with which we approach onsite wastewater problems. My concerns are, rather, that the philosophy not lose credibility by failing to be user friendly.

Performance-based scenarios cast interested, motivated, confident, well-informed, well-equipped, and open-minded regulators, designers, installers, service providers, and homeowners into a cooperative march toward a shared objective. The “performance code” assures accurate soil and site information, allows the designer to “engineer” a system (rather than having a design prescribed), assures proper construction practices (low compression equipment on dry sites), and ongoing maintenance to the system once in use. It is acknowledged, as is evident, that the approach increases the responsibility upon all involved parties.

I submit, however, that the real responsibility will continue to fall on the regulator. Moreover, that individual could be left standing alone without the protection and support of the prescriptive provisions most codes afford. My experience suggests that most regulators are not prepared to move from where they now stand to this position of greater responsibility and independent decision making. In the “real world,” a reluctance to embrace performance codes is defensible.

My empathy for the regulator is quite qualified. I have no patience for those cemented to the past, nor for those hiding behind overly restrictive regulations, unwilling to experience an independent thought. This group, a shrinking minority, impedes any constructive change.

My concern is for the well-intentioned but ill-equipped, the lone sanitarian with responsibility for 10 other program areas, the engineer with no biology or chemistry in his or her educational background, the environmental health graduate defending his or her soil descriptions. They are overwhelmed and under supported, pressured by tradition, and operating in a political and economic environment that cannot be ignored. Prescriptive codes, with their specified standards, provide a needed “shelter” for those operating “where the rubber meets the road.”

If performance-based philosophies become too much separated from prescriptive codes, onsite leaders may become loners. That which is thrilling to one, the flexibility for creative design, for instance, can be frightening to an inexperienced, undertrained regulator facing hostile developers in a politically shaded environment. A prescriptive code is necessary, I believe, to deal with the practical realities of this business.

Advocates of performance-based codes must not, therefore, simply cross this bridge of progress and press ahead; it will not support those who carry most of the weight. The bridge leading to the eventual acceptance of performance codes is the improvement and standardization of prescriptive codes. Prescriptive codes “guarantee” implicit performance standards by prescribing certain prerequisites for the installation and use of an onsite wastewater system.

Typically, prescriptive codes are overly conservative in granting approval, and completely absent in addressing the ongoing use of the system. The conservative nature of prescriptive codes presumably builds in compensation for design error, for variations in application over large geographic areas, and for the lack of ongoing system regulation.

Continued on page 10
The National Drinking Water Clearinghouse (NDWC), sister organization to the National Small Flows Clearinghouse, recently produced “Groundwater Protection Begins at Home,” a poster that illustrates household hazardous wastes and groundwater protection.

The poster was published in the Spring issue of On Tap, a newsletter that provides information on drinking water for small communities. This entire issue of On Tap focuses on groundwater.

The free poster includes articles on household hazardous waste, how to set up a hazardous waste disposal program, and a sheet of resources.

To order a copy of “Groundwater Protection Begins at Home,” call the NDWC at (800) 624-8301, and order Item #DWBPLPE40. A $2 shipping and handling charge will apply.

EPA Offers Booklets on Recycling and Surface Disposal of Sewage Sludge

Sewage sludge, also known as “biosolids,” can be disposed of or recycled. For help with either, the U.S. Environmental Protection Agency is offering two separate booklets, available from the National Small Flows Clearinghouse (NSFC).

Biosolids Recycling: Beneficial Technology for a Better Environment provides information about biosolids and how recycling them can benefit communities in several ways.

This 32-page booklet outlines many of the agricultural uses and benefits of biosolids, including organic fertilizer for farmers, landscapers, and the general public. Biosolids are used to increase forest productivity, to reclaim lands damaged by mining, and as a substitute for soil landfill covering.

Included in the booklet is the list of standards for the use or disposal of biosolids from the 40 CFR Part 503 Rule. A brief explanation of the risk assessment process and the experts who cooperated with the assessment is also included.

Biosolids Recycling, complete with graphs that demonstrate the benefits of fertilizing with biosolids, also provides lists of specialists and coordinators to contact regarding the possibilities for the local use of biosolids.

The second booklet available from the NSFC is Surface Disposal of Sewage Sludge. This guide outlines the 40 CFR Part 503 Rules requirements for owners and operators of surface disposal units for sewage sludge.

Regulations are divided into two sections, one section pertaining to active sewage sludge units with liners and leachate collection systems and the other pertaining to active sewage sludge units without liners and leachate collection systems.

For units with liners and leachate collection systems, guidelines are specified for the recording of management practices, vector attraction reduction, pathogen reduction, and reporting.

Sewage sludge units without liners and leachate collection systems are subject to different guidelines. Outlined in the booklet are separate guidelines for the monitoring and recording of pollutant concentrations, management practices, vector attraction reductions, pathogen reduction, and reporting.

Included at the end of the 30-page booklet are two appendices. Appendix A is a list of sources for maps and information. Appendix B is an outline of sample closure and post-closure plans.

To order a copy of Biosolids Recycling: Beneficial Technology for a Better Environment, contact the NSFC at (800) 624-8301, and order Item #WWBLGNS9. The booklet is free. Please include $2 for shipping and handling.

Surface Disposal of Sewage Sludge is available for $6.65. To order your copy, call (800) 624-8301, and request Item #WWBKRG45. Please include $2 for shipping and handling.

A Prescription for Performance-Based Codes

Continued from page 8

management. In their typical form, many prescriptive codes are shameful in the antiquated methods and irrational restrictiveness they incorporate.

Proposing a merger

However, prescriptive codes and performance philosophies can be—and I believe must be—integrated into more effective and flexible prescriptive codes. The body of regulators cannot move toward performance philosophies and the comprehensive view of onsite wastewater systems that approach entails without the support afforded them by some form of prescriptive code. In my view, each approach is in need of the other.

I would propose, therefore, that the education, research, and policy making community be cautious not to leave regulators too far behind. Demonstrate how performance-related methodologies can be incorporated into prescriptive codes. Push for credible site evaluation procedures and the incorporation of alternative system designs into onsite wastewater codes. Support the necessity of proper construction procedures, ongoing operational responsibility, and regulatory monitoring activities. Identify the worst codes, and lobby for their change.

Most importantly, recognize that the regulator who will carry these new ideas forward also bears the weight of tradition and folklore, must maneuver around political and socioeconomic constraints, is frustrated by budgetary and time limitations, and struggles with experience and training deficits. It is important for that regulator to have a sound, practical direction toward improving onsite wastewater practices. Throw us a rope and pull.

Small Flows will print other perspectives on this topic in future issues.

Would you like to comment about this or other onsite topics? We’d like to hear from you. Please send draft articles to Editor, Small Flows, The National Small Flows Clearinghouse, West Virginia University, P.O. Box 6064, Morgantown, WV, 26506-6064. Or fax your idea or article to (304) 293-3161.

A comprehensive story on household hazardous waste is on the back of this poster. If you purchase products containing hazardous substances, buy only as much as you need. If dumped down the drain, flushed down the toilet, or poured on the ground, these substances can contaminate the water we draw our drinking water.

When rain and snow fall, some water flows into streams, lakes, and oceans, and becomes surface water. Most precipitation, however, either evaporates or seeps deep into the soil, eventually becoming groundwater.

Some contamination can be traced to hazardous substances we use around our homes. We buy products containing these substances, and they end up in water that we use. If we use the wrong chemicals, we can cause long-term problems. If we use the right chemicals, we can cause short-term problems.

Be careful! Many of the agricultural uses of household hazardous waste are illegal and can result in both immediate and long-term health effects. Whenever disposing of pesticides, fertilizers, and household hazardous waste, follow local regulations in your community. Please contact your local health department for more information.

On Tap - Summer 1995 - Vol. 9, No. 3
LETTERS TO THE EDITOR

The National Small Flows Clearinghouse, established by the U.S. Environmental Protection Agency under the federal Clean Water Act (CWA) in 1977 and located at West Virginia University, gathers and distributes information about small community wastewater systems. Small Flows is published quarterly.

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Contour systems make sense to West Virginia sanitary

Dear Editor:
I found the contour articles very interesting because they make scientific sense out of what I’ve been thinking about Morgan County soils and drainfields since I became the sanitarian.

The installers here are all very good at putting in shallow lines on contour (lots of practice). We put in all the square feet the book calls for and we stack the lines (although according to contour theory, only the top one is doing any work). We only work with soils as shallow as those in the articles if we’re fixing an existing failure.

Such a case has recently come up. I’m suggesting installing the longest possible top line (about 150 feet in the available space) with the rest below. This satisfies my “contour” sense and the design standards.

I’d like to see a follow-up article. The Morgan County Board of Health is considering allowing some alternative systems for new construction. I’ll see if I can get contour disposal fields on the list.

Robert J. Campbell, R.S.
Berkeley Springs, West Virginia

Soil scientist objects to use of term “loam”

Dear Editor:
I found a portion of David Pask’s article, “Design Process for Contour Disposal Fields” in the Spring 1995 issue very abrasive and disrespectful to the profession of soil science. In it he wrote, “I have also adopted the engineering classification of soils for its simplicity, and for avoidance of the term ‘loam,’ since almost everyone can claim to have ‘good loamy soil!’”

To a soil scientist, the term “loam” means the soil has equal proportions of sand, silt, and clay. Loam is defined as having not more than 52 percent sand, between eight and 27 percent clay, and less than 50 percent silt. A good soil scientist can hand-texture those percentages within five percent very consistently.

Around 1870, soil science was revolutionized by a Russian scientist named Dokuchaiev. He recognized that soils were independent natural bodies with their own unique properties that depend on climate, biota, parent material, topography, and time. Soil scientists can use their knowledge of the previous factors, along with field observations, to interpret a great deal about permeability, perched seasonal water tables, and groundwater contamination potential.

If Pask had ever worked with a good soil scientist, he would see that they have a lot to offer since they are “experts” in the field of soils.

Phillip Ray Owens
Soil Scientist
Fayetteville, Arkansas

The use of “french drain” is so ill-defined, I believe we should not use it at all. Not only does the type of drain need to be defined, but specific details as to depth, construction, slope, and outlet requirement need to be provided. We have enough problems defining things like “bedrock”; please do not add to the confusion.

The intent of this letter is the hope the editorial staff will move toward a higher technical level in the review of articles and have authors upgrade the image of the profession.

Edward O. Church, P.E.
Denver, Colorado

Idaho Regulations
Program Responsive to Change

Continued from page 8

the material and makes recommendations based upon those remarks.

Babin said state health districts are pleased with the regulations and technical guidance manual for two reasons. “First, it gives the health districts a bag of alternatives to use and outlines conditions under which they can be used. And second, the manual gives them flexibility when permitting onsite systems and the ability to change it [in the meetings],” he said.

For more information, contact Babin at (208) 667-9513. If you have a similar process or would like to share your state’s procedure for onsite wastewater regulations with the National Small Flows Clearinghouse, contact Tricia Angoli at (800) 624-8301.
**Program Helps Homeowners Repair Onsite Systems**

**by Natalie Eddy**  
NSFC Staff Writer

Pennsylvania has developed a low-interest loan program for homeowners to help make the state’s waterways and groundwater pollution-free by preventing onsite wastewater system failures.

An offshoot of its successful Pennsylvania Infrastructure Investment Authority (Pennvest) program that has been providing low-interest loans to municipalities since 1988, the On-Lot Funding program now gives homeowners the same option.

The $10 million program, jointly run by Pennvest, the state Department of Environmental Protection (DEP), and the Pennsylvania Housing Finance Agency (PHFA), was designed to provide alternatives to homeowners previously incapable of financing repairs or replacement of onsite wastewater treatment systems.

Eligible residents may secure one percent per annum loans of up to $15,000.

Bill Shadow, press secretary for Pennvest, said the individual homeowner financing program, initiated in July 1994, came about through need. With a significant number of Pennsylvania homes relying on onsite systems, Shadow says a small percentage of failing systems could have a severe impact on Pennsylvania’s environmental welfare.

“Because much of the state is rural, the DEP field people were talking about having to require people to upgrade septic systems and having people who couldn’t possibly afford it. There was no way to help them,” Shadow commented.

“So the PHFA, DEP, and Pennvest got together and worked up a program that uses commercial banks to fill in the gap between communities and individuals.”

**Program’s necessity**  
Since the On-Lot Program’s inception one year ago, 49 loans have been financed, securing more than $500,000 for individual homeowner improvements. The program is growing steadily. “It’s not growing by leaps and bounds, but it takes a little more time for news to get out to the people who need the program most, those who live in rural areas,” Shadow said.

Although most of the projects completed under the program have been for conventional septic system repairs or replacement, Shadow said there has been a handful of project repairs on other types of onsite systems, such as sand mound systems and individual lagoons.

John McHale, sanitary program specialist with the DEP’s Division of Municipal Planning and Finance office, said individual homeowner financing for wastewater treatment is imperative for the state. “Pennsylvania is basically a rural state in much of its area. On-lot disposal is not going to go away as a technology for the sanitary disposal of household sewage. Individualized small flow systems will still have to be there.”

McHale said approximately 2.2 million or 18.4 percent of the state’s population, are served with either on-lot sewage disposal systems or have no wastewater treatment at all. While a few of these residents have no wastewater treatment, statistics do not track those who lack sewage disposal for their individual households.

McHale said 31.8 percent of the area identified in the biannual U.S. Environmental Protection Agency Needs Survey is served by onsite disposal systems only. Another 41.3 percent have both on-lot disposal and collection and treatment. Only 26.6 percent of the needs areas report treatment and collection systems only.

Although there are no specific figures on failure rates for onsite systems, McHale said he knows failures are occurring. “There are areas regulated by each of our regional offices that are trying to correct failing systems,” he said, adding that it’s an ongoing problem.

**Poor site conditions**  
To complicate matters, McHale said the state has a great deal of inappropriate soil for the traditional wastewater septic tank system. “As our municipalities are becoming more educated, we’re identifying areas where systems have been put in that were inappropriate and have failed.”

High water tables or seasonally high water tables and shallow soils associated with the state’s mountainous terrain are responsible for some of these problems. “We also have problems with the effects of karst geology. Those are areas that are affected by a type of limestone geology where you encounter problems in terms of sink hole development and underground water channels,” he said.

In the south central portion of the state, a high groundwater nitrate problem (attributed to agricultural uses) already exists, which makes septic tank systems a poor choice even where appropriate soils exist. “You don’t want to put in a system which could have a further effect on groundwater. Then, it becomes a hazard itself,” he said.

McHale added that there are some frustrations with alternatives to the conventional inground on-lot sewage disposal system because of local perceptions, but noted that in some rural areas where there is no public sewage system and soil conditions are not proper for conventional septic tank systems, alternative technologies have to be used.

“That’s why we have approved individual, residential elevated sand mound on-lot systems as standard systems and are beginning to use spray irrigation systems for individual residential use,” McHale said.

Loans are available to homeowners whose incomes do not exceed $49,944. The maximum term of the loan, which is secured through a mortgage on the borrower’s home, is 15 years.

Only residences located in areas where there is not a community wastewater collection and treatment system in place, or to be constructed in the next five years, are eligible.

“An important stipulation is that there has to be an existing system. You can’t put in an entirely new system,” Shadow said.

In addition, there is a $450 program participation fee that can be financed through the loan with $150 being payable as a loan application fee.

**Application process**  
The first step in applying for funding is to contact a participating lending institution for credit approval. A list of participating lenders can be acquired from the PHFA.

Once credit approval is given, homeowners then contact their municipal officials and have them sign a standard form certifying that their project is not in an area currently served by public sewers and is not slated for infrastructure development within the next five years.

Next, the homeowner must contact the sewage enforcement officer.
Delaware Offers Homeowner Onsite Funding Plan

Delaware offers a low-interest loan program to help low- to moderate-income homeowners fund onsite wastewater treatment system repairs.

There are slight differences between Delaware’s Septic Rehabilitation Loan Program and Pennsylvania’s On-Lot Program (see related story on page 12). Despite the differences, one factor remains the same: need.

“This is really a necessary program,” said Charles Kashner, housing mortgage loan officer with the Delaware Department of Natural Resources and Environmental Control (DNREC).

He explained that Delaware is a rural area. “Smaller towns are served by central sewage, but the majority of people have onsite septic systems. Our motto is ‘Working for you to provide clean water for today and tomorrow.’ Ideally, we want to keep our natural resources clean for everybody,” he added.

Delaware’s program offers a three-percent interest loan to individual homeowners or investors to make improvements to their onsite systems, ranging from $1,000 to $10,000. Borrowers may have up to 20 years to repay the loan.

For investor loans, the tenant’s or occupant’s income must fall within the guidelines of the program’s eligibility. There are separate income level scales for owner/occupants and investors with tenant/occupants.

Borrowers are expected to pay one-and-a-half percent of their monthly family income or $10 a month, whichever is greater.

For example, a family making $20,000 a year would pay about $25 a month, or about $300 a year.

“Our program has income limits that vary from county to county, depending on the number of people in the household,” Kashner added.

Homeowners who live in areas where no sewer district is planned within the next three years are eligible for the funds. “If you live in a house with a failing onsite system, you’ve got a problem today,” he said. “If we see no sewer district planned in the very near future...we will consider [you] for a loan.”

Funding for the program is provided through a portion of the state revolving fund.

In the program’s two-and-a-half years in existence, 50 loans have been secured providing more than $415,000 in improvements.

With the exposure the program has gotten, everything has been very positive. It has been a nice feather in the DNREC’s cap. We’ve received a lot of good remarks on it,” said Kashner. “But we could still be contacting more people, and we’re working on that with press releases to the media. Once we reach everyone with the news about our program, we will be so busy we won’t be able to get a day off.”

For more information on the Delaware program, contact Kashner at (302) 739-5081.

Other states may offer similar funding programs. If you would like to share information about your state’s program or want to share information about your program for possible publication in Small Flows, contact the National Small Flows Clearinghouse at (800) 624-8301.

Program Helps Homeowners Repair Onsite Systems

Continued from previous page

(SEO) who serves their municipality to determine if a repair or replacement of their on-lot system is permissible under all applicable state regulations.

Next, the system designer must certify that the proposed system is the most cost-effective system for the property. The SEO then issues a permit.

Three written bids are required. The final step is to take the permit application, permit, bids, and certifications from both the designer and municipal officials to the participating lending institution contacted in the first step. The loan will either be approved or denied.

Shadow said to ensure that the systems remain operating, a pumping frequency schedule for septic tank systems and reporting requirements are included in the loan agreement.

Shadow said the savings to homeowners using the On-Lot program is significant compared to traditional loan interest rates.

For example, the interest cost savings on a 15-year, $10,000 loan under this program, compared with a conventional loan, could range from $3,000 to $6,000.

For more information about the On-Lot Funding program or Pennvest, contact Shadow at (717) 783-4887. You may also contact the following agencies at the corresponding numbers: Pennvest, (717) 787-8137; PHFA, (800) 822-1174; and DEP, (717) 787-3481.

Booklet Offers Advice for Improving a Community’s Creditworthiness

Wastewater and community officials are often faced with the challenge of applying for government loans or grants, state revolving funds, or municipal loans or bonds. One of the determining factors that can make or break a community’s ability to obtain a loan or issue a bond is its creditworthiness.

The U.S. Environmental Protection Agency (EPA) has designed a booklet to help wastewater utility managers and community officials assess and improve their community’s creditworthiness.

The Road to Financing, Assessing, and Improving Your Community’s Creditworthiness was designed with a financially burdened community in mind. It lists several easily understood steps a community can take to evaluate its creditworthiness.

To order a copy of this 14-page booklet, contact the National Small Flows Clearinghouse (NSFC) toll-free at (800) 624-8301, and order Item 9FM0717. The booklet is free. Please add $2 for shipping and handling.

It also explains several determining factors a bank will look at before deciding to lend a community money for a wastewater project. For example, the booklet says a bank will consider the amount of debt a community has, what type of debt it is, and where a community will get the money to repay its debt.

In addition to suggesting many vital questions, the booklet explains how to evaluate a community’s debt situation by providing several helpful solutions for calculating a community’s determining indicators.

Other topics covered include tips for presenting a community in the best way to a bank when seeking a loan, how to make a community’s credit stronger, and where to get help for solving a community’s financial problems.

To order a copy of this 14-page booklet, contact the National Small Flows Clearinghouse (NSFC) toll-free at (800) 624-8301, and order Item 9FM0717. The booklet is free. Please add $2 for shipping and handling.
Small Flows Activity Heats Up During Summer Months

by Eleanor Palko
NSFC Contributing Writer

This summer, the National Small Flows Clearinghouse (NSFC) outreach and technical services staff are busy spreading the message of clearinghouse services and meeting both new and familiar faces.

One important NSFC aim is to forge links with the academic community that help us keep pace with research. To that end, Patricia Miller, National Onsite Demonstration Project (NODP) technical coordinator and NSFC outreach coordinator, Peter Casey, NSFC program coordinator, and NODP technical coordinator David Pask, attended the Waterloo Centre for Groundwater Research Septic Systems conference. “Alternative Systems: Nutrient Removal and Pathogenic Microbes,” in Waterloo, Ontario, May 15. They exhibited NSFC publications and outreach materials and attended seminars. Miller also attended a Consortium of Institutes for Decentralized Wastewater Treatment meeting and joined Casey and Pask for an associated field trip to view Waterloo’s alternative onsite wastewater projects.

From Waterloo, Casey went to Kansas City, Missouri, to join other education, rural development, environmental health, national, and regional U. S. Environmental Protection Agency (EPA) professionals for the EPA’s Fourth National Wastewater conference. Casey displayed NSFC publications and educational materials, and answered inquiries from other conference participants while getting to know many people in the field. Recently, Casey also traveled to Cincinnati, Ohio, to meet with EPA Center for Environmental Research staff members.

Casey visited the NODP in Anne Arundel County, Maryland, meeting with Richard Piluk, chief of sanitary engineering with the county, and observing the installation of a recirculating sand filter and a peat filter system, as well as visiting other demonstration project sites.

Closer to home, Miller, Pask, Casey, and technical assistance staff provided technical assistance for the Monongalia County NODP, which began construction in June. This demonstration project is drawing many visitors interested in the recirculating sand filter, constructed wetland, contour disposal field, low-pressure dosed system, gravelless trench system, and drip absorption system being installed at this site.

Miller donned her “Dr. Doo-Doo” costume and packed up her “Bottle o’ Sludge” to entertain and educate middle school students and their teachers at the California University Children’s Groundwater Festival held in California, Pennsylvania, May 10. Miller’s inexpensive hands-on science experiments illustrating septic system function and malfunction are a hit with young audiences, who gain an awareness of wastewater and its role in water quality.

Wrapping up May, Miller attended the National Watershed Coalition’s Fourth National Watershed Conference held in Charleston, West Virginia, where she exhibited NSFC and NODP publications and materials. There she had the opportunity to meet Robert Perciasepe, assistant administrator for EPA’s Office of Water, and debut the NSFC’s new watershed package and other watershed related activities.

The first week of June found Miller in Virginia for back-to-back conferences. First she traveled to Harrisonburg, Virginia, for the National Water Quality Assessment’s (NAWQA) Potomac Basin Meeting where she represented both the NSFC and the West Virginia Water Research Institute. From there she traveled to Arlington, Virginia, for the Nonpoint Source Federation’s 1995 Nonpoint Source conference where she exhibited and distributed NSFC materials and answered many inquiries from conference participants. NSFC has provided the Federation with extensive information about the role of onsite systems in nonpoint programs.

The technical assistance team of Tricia Angoli, Clement Solomon, and Murty Susarla attended a National Environmental Training Center for Small Communities’ training session in Philadelphia, May 3–4. The topic was “The Pieces of the Small Community Puzzle: Working Effectively in Small Communities on Environmental Projects.” Angoli says the information they gained at the conference will be of great value in helping the staff respond to hotline requests from small towns and the consultants who work with them.

The NSFC also welcomed Chris Berry, a summer intern from West Virginia University’s School of Journalism. Berry is gaining valuable experience while contributing articles and photographs to the Summer and Fall issues of Small Flows. Chris is also busy tabulating responses to the Small Flows readership survey.

The NSFC’s technical assistance staff is making progress on several fronts. The Manufacturers and Consultants database is being updated (see related article on page 16) and development of an updated facilities database is moving forward. Staff members contacted states for current information on facilities to include in the database.

Staff changes include the promotion of long-time NSFC staff member Crystal Stevens to administrative assistant in the technical assistance group. She is updating the Outreach Resource Guide, which contains contact information for more than 50 national-level organizations. (Small Flows will announce its availability.) Solomon and Susarla recently earned full-time status as technical assistance specialists. Both Solomon and Susarla have represented the NSFC at conferences and are familiar voices on the technical assistance line.
NSFC Initiates Effort To Extend Assistance

by Natalie Eddy
NSFC
Staff Writer

The National Small Flows Clearinghouse (NSFC) has been reaching out over the past year to 15 states that may not previously have taken full advantage of its services devoted to small community wastewater treatment planning.

“Some states have historically accessed our services less than others. It is important for the NSFC to reach out to these states to ensure that they know about our services, the information we have, and how wastewater treatment alternatives may be helpful in their small communities,” said John Mori, manager of the Environmental Services and Training Division.

He added that the NSFC can provide access to high-quality, up-to-date information about small community wastewater treatment issues. “In particular, the clearinghouse has a superior store of information about low-cost alternative treatment methods that may be more appropriate for small communities than traditional large flow, urban systems,” he said.

The list of states was compiled by reviewing past records of technical assistance outreach-related activities and determining which states the clearinghouse had made the least contact with. The states identified in the review include Colorado, Connecticut, Delaware, Georgia, Idaho, Indiana, Kansas, Kentucky, Nevada, New Hampshire, New Jersey, Oklahoma, Rhode Island, Utah, and Wyoming.

Jennifer Hause, NSFC senior technical assistance specialist, said that to determine the states’ current status and need for technical assistance, the NSFC staff started by contacting five agencies from each state. Those agencies included extension services, state training centers, state regulatory agencies, the Rural Water Association (RWA), and the Rural Community Assistance Program.

Hause said the NSFC hoped to ensure that local officials, especially those that deal or work with small communities, were aware of NSFC services and information repositories.

She added that although many of those contacted within the states knew about the NSFC and its newsletter, Small Flows, most were not familiar with the NSFC’s other services, such as the Wastewater Treatment Information Exchange Bulletin Board System, technical assistance, and outreach activities.

As evidence, the NSFC has received numerous requests to participate in conferences. It also has received several requests to provide customized information packets. Topics discussed in the packets include inflow and infiltration, training certification, safety issues, and a variety of technology issues, such as constructed wetlands and alternative technologies used under specific site constraints.

Hause added that the RWA surveyed rural community wastewater treatment operators in Rhode Island and Connecticut concerning the topics they would be most interested in learning more about. In response, information packets on such issues as land application and sludge treatment disposal options are being sent out as requests are received.

Most requests were addressed by the end of June. However, outreach activities targeted in these states will continue over the next several months.

NSFC Updates Product Prices, Issues New Catalog

The National Small Flows Clearinghouse (NSFC) recently reevaluated its pricing structure for the more than 250 products it offers.

According to Vernon Deal, the NSFC’s resources center supervisor, this is the first time a uniform pricing structure has been established for the NSFC’s products.

The goal of the new pricing structure is to allow the NSFC’s products distribution unit to recover all of its operating costs, says Deal. He pointed out that the NSFC’s products department is entirely self-supporting and must recover its costs in order to maintain service.

“This new structure will enable us to better serve our customers by streamlining the day-to-day operations of our product distribution unit and allowing us to offer items at a fair market value,” he says.

“We hope the price increases will not be too burdensome for our customers. Not all of our products will increase in price; some will actually decrease due to the uniform pricing structure.”

Deal also points out that all of the NSFC’s free products will still be free. In addition, he says, “We will strive to have the lowest prices possible.”

The products insert found in the middle of this issue of Small Flows reflects the new prices, which went into effect August 1.

In addition, the NSFC is currently updating its Guide to Products and Services. The new guide is expected to be available by fall and will include the new pricing structure and the addition of more than 50 new products.

The new guide will be mailed to all NSFC customers who have placed orders in the past year. It will also be available upon request.

CALL FOR PAPERS

The Small Flows Journal

Papers are now being accepted for upcoming issues of The Small Flows Journal, the only juried technical journal devoted specifically to small community wastewater issues (i.e., communities with populations less than 10,000 or communities handling less than one million gallons of wastewater flows per day).

For additional information about the journal, manuscript submission guidelines, and publication deadlines, contact Cathleen Fulvey, editor, at (800) 624-8301, ext. 526, or mail to Editor, The Small Flows Journal, National Small Flows Clearinghouse, West Virginia University, P.O. Box 6064, Morgantown, WV 26506-6064.
EPA Offers Environmental Problem-Solving Guide

A new, free U.S. Environmental Protection Agency (EPA) guide offers small communities information about environmental issues along with suggestions for dealing with problems.

Environmental Planning for Small Communities—A Guide for Local Decision-Makers presents a process for creating and implementing a comprehensive environmental plan, which may help local officials create an integrated approach to protecting the environment and meeting their community’s needs.

The guide contains information about finding solutions to domestic wastewater problems and offers helpful suggestions for onsite and cluster systems.

It also contains information about industrial wastewater and pretreatment requirements and regulations that may apply before wastewater is discharged into a public sewer system.

The 154-page book provides officials the opportunity to plan ahead for problems that might otherwise severely impact a community without the financial resources to meet all of the regulatory requirements.

Appendices are provided that include information on regulations, assessing risks, and where to turn for additional help.

The guide was produced by EPA’s Office of Research and Development (ORD) and the Office of Regional Operations and State/Local Relations.

To order a copy of Environmental Planning for Small Communities—A Guide for Local Decision-Makers, call the Center for Environmental Research Information, ORD Publications at (513) 569-7562, or fax your request to (513) 569-7566. Please request publication number EPA/625/R-94/009.

WTIE–BBS Enhancements Are Now Online

The next time users of the Wastewater Treatment Information Exchange Bulletin Board Service (WTIE–BBS) log on, they will be greeted by a pleasant new screen of boxes on a striped background. In addition to the new look, new users will be able to log on and use the system simultaneously.

“In an effort to improve reliability that will afford better customer service we have upgraded our system software,” said Brad Maust, system operator. “This allows us to expand services while maintaining maximum accessibility and reliability.”

The WTIE–BBS will be more seamless, reliable, and cleaner, thanks to the enhancements.

Users will see a new menu template on the screen. In addition, the background will remain constant throughout the session, making the graphics easier on the users’ eyes.

These enhancements are the first step in a larger plan for BBS improvements, according to Maust. For example, it will be easier to install online databases with the new software, he said.

Users of the WTIE–BBS can exchange information on a variety of wastewater-related topics by participating in any of the discussion groups that are available on the system. Users are also able to download files and other pertinent information.

Users can log on to WTIE–BBS using a computer equipped with modem and communications software by dialing (800) 544-1936 or (304) 293-5969. Any questions or comments may be directed to Maust at (800) 624-8301 or (304) 293-4191, ext. 531.

NSFC Updates Manufacturers/Consultants Database

Is your company’s current product or service listed in the National Small Flows Clearinghouse’s (NSFC) Manufacturers and Consultants Database? If not, you’re missing a great opportunity to connect with customers who may need you.

The Manufacturers and Consultants Database houses information on small flows manufacturing and consulting firms. The NSFC provides information from this database to customers who are looking for a particular product or service. For instance, a town in Colorado may be looking for manufacturers of gritter pumps and engineering firms with experience designing and installing such systems.

This summer the NSFC is updating the database and is attempting to locate other firms that are not listed. The database is continuously updated, and every two years, the NSFC makes an aggressive effort to contact and update all the companies listed.

“Our goal is for the Manufacturers and Consultants Database to be as comprehensive as possible,” says Todd Olson, the NSFC’s engineering research assistant who is coordinating the update. “There is no fee to be listed in this database, and it is certainly in a company’s best interest to be included.”

Olson mailed data collection forms to the 1,600 firms that are currently listed in the database in early June. He collected information through July 31 for the update. According to Olson, the updated database listing will be available by the fall.

If your firm did not receive data collection forms and you would like to receive a free listing in the Manufacturers and Consultants Database, call the NSFC at (800) 624-8301, and request the Manufacturers/Consultants Data Collection package.

To order a search of the database, call the NSFC at the toll-free number above. There is no charge for the search, but printouts cost $10 per page.

Have you returned your Small Flows Readership Survey?

In the Spring 1995 issue of Small Flows, we included a short readership survey to help us better serve you, our readers. Thus far, we have had a tremendous return rate—we have received more than 1,500 responses. However, we know that there are many surveys that have not yet been returned.

We would be very appreciative if you would take some of your time to fill out the survey and return it to us. It will take only a few minutes, and the survey’s self-mailer is prepaid.

We hope that the results will tell us how you view our publication—what you like, what you dislike, what you want to see more or less of. Any input that you give us will help make Small Flows more of what you want. The next issue of Small Flows will summarize the results of the survey, so don’t be left out. Mail yours to us today!
Politics, Other Pressures, Can Cause Legal Dilemmas for Onsite Consultants

by Kent Seitzinger  
NSFC Legal Advice Columnist

This column is devoted to an overview of a situation that seems to arise frequently among consultants engaged in the practice of site evaluations, system designs, and/or inspections of subsurface disposal systems. These problems arise from a discrepancy between politics and governmental regulation, on one hand, and scientific knowledge, on the other.

Governmental regulation of subsurface disposal, whether at the state level (e.g., regulation under the Pennsylvania Sewage Facilities Act) or at a local level (e.g., California’s county-by-county approach) usually has been developed from a variety of sources. Some jurisdictions rely on the Uniform Plumbing Code. Some continue to rely on the Manual of Septic Tank Practices, originally published by the U.S. Public Health Service in 1957. Some rely on the U.S. Environmental Protection Agency’s Onsite Wastewater Treatment and Disposal Systems Design Manual, first published in 1977. Many have no basis other than that jurisdiction’s earlier version of its own regulations.

Regardless of what the regulations are based on, it is certain that the adoption and/or enforcement of these regulatory programs is usually significantly affected by outside factors including political pressures, local prejudices, misunderstandings and misinformation, and bureaucratic apathy.

In my former career as a registered sanitarian who performed wastewater consulting services, several instances arose that caused me great concern. An example will best illustrate the situation. After performing a site inspection, including soil mantle profile and percolation test, I determined that the site had mottled soil approximately 35 inches into the profile. Other indications pointed to the fact that the mottled soil was caused by a seasonal perched water table.

Based upon other site considerations, it was clear that the best system for this site was an elevated mound system. I wrote to the property owner explaining the results of my site evaluation and my recommendation for the mound system. With the owner’s authorization, I designed the mound system, sent the plans to the owner and he submitted them to the county. The county disapproved the mound system with the explanation that such systems were experimental. I met with the county director of environmental health and ultimately prevailed upon him to visit the site and examine the soil profile himself.

After inspecting the site himself, the environmental health director told the property owner that he would approve the mound but that it was experimental. Incredibly, he indicated that he would also approve a conventional septic system.

My client then came to me, somewhat upset, asking why I had designed a system that was so expensive when the county would approve a conventional septic tank–leachfield system. I then was in the unenviable position of having to explain to (if not convince) him that the environmental health director’s position was technically incorrect. He insisted that I design a conventional system for him at no additional cost. I provided the design as requested but gave it to him with a disclaimer letter that I had him read and sign.

The point of this “war story” is simple. There will be a variety of occasions when a consultant may be required to approve a site or design a system not based upon good scientific or engineering principles, but rather upon regulatory schemes that may be considerably more influenced by politics than by sound engineering principles. When this happens, it is important for the consultant to take steps to minimize his or her exposure to a subsequent action should the system malfunction.

Here are a few steps:
1. Always use a written contract with an appropriate disclaimer indicating that you do not guarantee that a system you have designed will work properly;

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WATS Q & A

Editor’s Note: The following question was received over the National Small Flows Clearinghouse’s WATS line. If you have a question, please call (800) 624-8301.

Can the installation of low-flow fixtures cause any problems with existing septic systems?

For the most part, there are no major problems associated with using low-flow fixtures (water-conserving devices) in conjunction with existing septic systems. While the wastewater will be more concentrated, the increase in pollutant concentrations will likely have an insignificant impact on existing septic systems.

Under optimal conditions, wastewater should remain in a septic tank one to two days. This allows the solids to settle, the scum (including fats and grease) to rise, and pollutants to gradually decompose, allowing a partially clarified effluent to flow to the soil absorption system.

Any new septic system should be properly sized to handle whatever wastewater loading is expected. At the very least, most states require the septic tank to be sized to hold a certain number of gallons per bedroom, often about 250 gallons per bedroom, with a minimum septic tank size ranging from 500 to 1,000 gallons. Similarly, the soil absorption system must be sized according to soil conditions based on the results of a site evaluation that includes either a soil survey or a percolation test and the estimated hydraulic loading.

Reduced flow rates allow for an increase in retention time in the septic tank, providing more time for solids to settle and reducing the amount of water the soil absorption field must accept. Monitoring of septic tanks in Indiana and Pennsylvania over several years reinforced the fact that the increase in pollutant concentrations in effluent is proportional to the decrease in flow. The pollutant mass loading can then be readily treated by the soil absorption system.

The use of low-flow fixtures is a benefit to a septic system because it reduces hydraulic overloading—one of the most common reasons for septic system failure. When more wastewater is produced than the septic system can handle, the wastewater is not retained long enough in the septic tank to effectively remove solids and oxygen-demanding pollutants. These pollutants are “washed out” into the soil absorption system, clogging the field and forcing the undertreated wastewater to surface to the ground or back up into the house.

Hydraulic overloading usually results from excessive water use, leaky plumbing fixtures, addition of water-using appliances, or an increase in the number of occupants. Use of low-flow fixtures can reduce these heavy amounts of wastewater so the system operates properly. However, low-flow fixtures are not a “cure-all.” The homeowner should repair leaks and should make sure that house gutters and downspouts are not connected to the septic system or routed toward the area of the drainfield.

Water conservation can prolong the life of any soil absorption system. Water efficient plumbing fixtures are very cost-effective in either new construction or replacement of existing fixtures. If designed properly, low-flow fixtures are compatible with normal pipe sizes and slopes.

Hydraulic load reduction with water conservation devices seems to be a viable method as well as a low-cost alternative for alleviating a failed septic tank soil absorption system where the cause of failure is slowly permeable soils or organic clogging of soils with otherwise acceptable porosity.

For additional information on the effects of water conservation devices on septic systems, call the National Small Flows Clearinghouse at (800) 624-8301, and request the Conserve package. It contains articles about water savings associated with use of low-flow fixtures, the impact these devices have on septic systems, and the studies mentioned above. The package is free. Please allow $2 for shipping and handling. (There will be a charge for the Conserve package after October 1, 1995.)
Calendar of Events

If your organization is sponsoring an event that you would like to have promoted in this calendar, please send information to the Small Flows Editor.

August

Date: August 13–16
Place: Cincinnati, OH
Phone: (703) 684-2400

Event: Small Community Nutrient Removal Workshop
Date: August 16
Place: Kansas City, MO
Phone: (913) 551-7217
Betty Peterson

Event: U.S. EPA Region 10’s NPDES Permit Writer’s Course
Date: August 21–24
Place: Bellevue, WA
Phone: (701) 917-8240
Kelly Beard–Tittone

Event: National Environmental Training Center for Small Communities: “Basics of Environmental Systems Management for Local Officials”
Date: September 27–28
Place: Chelmsford, MA
Phone: (800) 624-8301
Sandy Miller, ext. 536

Event: Infrastructure Assistance Coordinating Council’s 7th Annual Local Government Conference
Date: September 12–13
Place: Wenatchee, WA
Phone: (360) 586-7656
Cris Glenn

Event: Water Environment Federation’s Short Courses: “Pretreatment Regulatory Compliance for Municipal and Industrial Wastewater Professionals,” “Negotiating Your NPDES Permit: What You Need to Know,” and “Pollution Prevention and Waste Minimization: Tools and Strategies to Execute a Multi–Media Program”
Date: August 30–31
Place: Chicago, IL
Phone: (703) 684-2400

September

Event: National Environmental Training Center for Small Communities: “Reducing Commercial and Industrial Solid Waste”
Date: September 6–7
Place: Asheville, NC
Phone: (800) 624-8301
Sandy Miller, ext. 536

Event: Water Environment Federation’s Specialty Conference: “Sewers of the Future”
Date: September 10–13
Place: Houston, TX
Phone: (703) 684-2400

October

Event: National Environmental Training Center for Small Communities: “Basics of Environmental Systems Management for Local Officials”
Date: September 17–20
Place: Denver, CO
Phone: (202) 962–3623
Jean Buchanan

Event: National Rural Water Association’s Management and Technical Conference
Date: September 17–20
Place: Atlanta, GA
Phone: (405) 252-0629

Event: Water Environment Federation’s Short Courses: “Pretreatment Regulatory Compliance for Municipal and Industrial Wastewater Professionals”; “Negotiating Your NPDES Permit: What You Need to Know”; and “Pollution Prevention and Waste Minimization: Tools and Strategies to Execute a Multi–Media Program”
Date: September 25–26
Place: Philadelphia, PA
Phone: (703) 684-2400

Event: American Society of Civil Engineers’ Seminar: “Waste Water Treatment with Advanced Integrated Wastewater Pond Systems (AIWPS) and Constructed Wetlands”
Date: September 27–29
Place: Honolulu, HI
Phone: (800) 548-2723
Michelle Kaplan

November

Event: American Society of Civil Engineers’ Seminar: “Waste Water Treatment with Advanced Integrated Wastewater Pond Systems (AIWPS) and Constructed Wetlands”
Date: November 1–3
Place: Kansas City, MO
Phone: (800) 548–2723

Event: U.S. Environmental Protection Agency and U.S. Department of Agriculture’s "U.S. Small Community Wastewater Collection, Treatment, and Reuse Technologies Exhibition and Seminar for North Africa and the Middle East"
Date: November 27–December 2
Place: Tunis, Tunisia
Fax: (202) 260–4878
Water Festival Workshop Slated for September

by Chris Berry
NSFC Staff Writer

Water festivals are held all year long around the country. But when spring comes bursting forth in all her glory, so do the water festivals.

To help festival organizers prepare for successful activities, The Groundwater Foundation is sponsoring “Priming the Pump: A Water Festival Workshop,” which will be held in Nebraska City, Nebraska, September 22–23.

The conference will focus on organizing water festivals and other programs aimed at grade school children. A water day consists of explaining and demonstrating how to conserve, as well as protect water quality. Children are given the opportunity to do hands-on activities. “It’s fun entertainment for the kids. They are very receptive to it,” said Amy Killham, program director for The Groundwater Foundation.

Eight to 10 guest speakers are anticipated for the Nebraska event. Patricia Miller, Ph.D., National Small Flows Clearinghouse (NSFC) outreach coordinator, will present workshops that explain how to educate students about septic systems. Several speakers will discuss how they organized their own water festivals. Outdoor water festivals will be explained by a speaker from Omaha, Nebraska. Fundraising and promoting water festivals will also be discussed.

Nancy Galloway from Moscow, Russia, is slated to speak at the conference. Galloway is developing a water festival in New Delhi, India. She is presently involved in water education in Moscow.

Killham explained, “Presentations by water festival organizers and water educators will discuss what works best to keep the kids’ attention and how to develop a water day at grade schools.” In addition, evaluation techniques to determine the success of water festival programs will be discussed.

“Priming the Pump” is an annual event that last year attracted approximately 120 participants from around the country. States that will be represented at this year’s conference are Michigan, Maine, Nebraska, and possibly California.

For more information on “Priming the Pump,” contact The Groundwater Foundation at (402) 434-2740, and request a brochure.

NETCSC Will Host Onsite, Maintenance, Other Programs

The National Environmental Training Center for Small Communities (NETCSC) will host a train-the-trainer program directed at onsite operation and maintenance, September 13–15, in Tacoma, Washington.

The Onsite System Operation and Maintenance program will be co-sponsored by the National Onsite Wastewater Recycling Association (NOWRA).

This training program’s focus is to enable environmental trainers and technical assistance providers to use a newly developed onsite system operation and maintenance curriculum. Participants will also learn how to train onsite system operators, as well as guide them toward the effective maintenance of decentralized wastewater systems.

After completing the program, participants will be able to train operators to understand basic wastewater terminology, subsurface technologies and how they operate, and the basics of groundwater and hydrology dynamics.

In addition, participants will be able to train operators to perform maintenance on septic tanks, pump tanks, lift stations, and grease traps, as well as how to calculate loading rates, dosing volumes, and pump delivery rates.

The cost of this training program is $275, which includes a field trip to demonstration sites, course materials, lunches, breaks, and transportation to and from the demonstration sites.

NETCSC is also hosting two other environmental train-the-trainer workshops: one for commercial and industrial solid waste training and the other for environmental systems management.

The “Reducing Commercial and Industrial Solid Waste” training program is being co-sponsored by the Land-of-Sky Regional Planning Council. It will be held in Asheville, South Carolina, September 6–7. The cost is $90 and includes course materials, breaks, and lunches.

Environmental trainers and technical assistance providers will learn to assist businesses in reducing commercial and industrial solid waste flows. Participants will also be able to conduct solid waste assessments for business and industry and perform several other pertinent steps in reducing solid waste.

NETCSC will hold a “Basics of Environmental Systems Management (BESM)” program, September 27–28, in Chelmsford, Massachusetts. Environmental trainers and technical assistance providers who participate will become familiar with the BESM curriculum. They will also learn techniques for delivering BESM training to local officials, as well as how to use camera-ready training materials.

For more information on these training programs, contact Sandy Miller at (800) 624-8301, ext. 536.

Politics, Other Pressures, Can Cause Legal Dilemmas for Onsite Consultants

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2. Keep abreast of state-of-the-art developments in your professional discipline;
3. Always make sure you document the work you do for your client;
4. Always keep your client fully informed as to his or her options and the potential consequences of any particular decision;
5. If a client chooses to go against your recommendation or you are forced by a regulatory agency into using a design you disagree with, always fully describe to your client what has occurred, document it fully, and have your client sign and date related documentation; and
6. Obtain errors and omissions insurance coverage if available.

There is nothing a consultant can do to prevent being sued by a disgruntled former client. However, these steps can minimize a consultant’s chance of being sued and, if such a suit is brought, will provide a much better defense than the consultant would otherwise have. And, always consult local legal counsel for advice before taking any action that might have legal consequences.