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Throughout Harris County, Large Upscale Subdivisions Are Being Built with OSSFs in Mind

By Ric Jensen Editor, Texas On-Site Insights

Throughout the greater Houston area, and other parts of Texas, numerous new subdivisions are being designed and built with on-site wastewater treatment systems (OSSFs) as an integral part of the infrastructure.

Earlier this spring, I met with Jacob Berry, an inspector with the Harris County Engineer's Office; Richard Carter, a civil engineer who designs water and wastewater treatment systems and heads the firm of Richard Carter and Associates; and D. Ray Young, a civil engineering consultant with WaterEngineers, Inc.

We toured the Powder Mill subdivision near Tomball, the Lakes of Rosehill, the Cypress Creek Ranch near Cypress, and other developments in the northwest part of Harris County. Some of these developments are extensive and include more than 430 lots.

In these areas, upscale subdivisions are being built to meet the needs of Houston's rapid suburban sprawl. In several of these subdivisions, developers prefer onsite wastewater treatment systems over centralized sewers. However, it should also be noted that other types of developments are also being created which are planned from the beginning to incorporate OSSFs. For example, a few new mobile home subdivisions have also been designed and built from the ground with OSSFs as a key component of these entities.

Berry says the Harris County Engineer's Office follows the same permitting process for OSSFs, whether a home is part of a pre-planned subdivision or if it's being considered for an individual, stand-alone lot. The subdivision lots still have to be platted and approved by the County, and the developer must carry out a feasibility study to demonstrate that the lots will accommodate OSSFs for the proposed development type. In addition, studies

of potential flooding and drainage problems have to be resolved through the Harris County Flood Control District.

A thorough site evaluation for each lot in a subdivision also has to be conducted for each individual OSSF permit application. For example, merely creating a lot in a subdivision does not lessen the Texas Natural Resource Conservation Commission (TNRCC) requirements and state regulations to carefully examine all site characteristics.

However, when a subdivision is being laid out, the developer can incorporate the ideal placement of drainfields, disposal areas, and drinking water wells in a more well-planned manner. For example, the technology of choice in most of these situations is an aerobic treatment unit followed by surface application. In some cases, the type of OSSF and specific performance parameters can be incorporated into subdivision ordinances or deed restrictions.

By pre-planning the subdivision as a whole, the developer can also plat the design of the individual lots so they are designed in advance to accommodate the optimal placement of OSSFs and drinking water wells.

Some of these subdivisions, like the Lakes of Rosehill, include a public drinking water supply system in combination with OSSFs for wastewater treatment. For example, lots in the Lakes of Rosehill are typically 0.67 acres in size, which leaves sufficient room for a 3,000 square-foot home and a 3-car garage. However, Carter notes that this is often not enough acreage to accommodate an OSSF that uses surface application and a swimming pool. When homeowners in this subdivision want a large house, a big garage, and a pool, they often choose drip irrigation as the disposal method since it requires less area and the setback requirements are less stringent.

TNRCC rules require that lots with an OSSF and a drinking water well must be least 1 acre. Lots with OSSFs that are on community drinking water systems have to be at least a half-acre.

Also, many of the subdivision developers contract with an individual OSSF installer or maintenance company that potential buyers can meet and talk to when they begin the process of planning their home. It should be noted that individuals still have the opportunity or right to choose which type of system they will install or who the maintenance company will be, depending on site conditions and deed restrictions.

According to Young, a key factor that is influencing this trend towards OSSFs is that it allows these developments to move along much faster. For example, if a developer chooses to utilize a centralized sewer system and not OSSFs, he has to go through the time-consuming process of creating a water or wastewater district and then obtaining a discharge permit from the TNRCC. This can easily take up to three years. On the other hand, if OSSFs are used, you can begin selling lots and building homes within a year.

"One of the most important factors from a developer's point of view is the timing," Carter said. "It's tough on the developer to have to wait through the approval process for a sewer system and not be able to sell lots quickly. There's a considerable cost the developer has to incur when waiting to sell those first lots."

Other economic issues also enter the picture of whether a subdivision developer or a homeowner chooses between a subdivision with OSSFs or sewers. Berry and Young suggest that the monthly cost to the developer and the homeowner was fairly similar-about $35 to $40 per month when all factors are considered. Other financial concerns that are debated include the resale costs of the homes when they are resold and the appraised value. While the appraisal values are going to be quite similar for both technologies, Berry and Young suggested that the resale value of homes with OSSFs may be a little lower. That's because some bankers may still believe that on-site wastewater treatment systems eventually need to be replaced and are less permanent than a sewer.

Carter commented that the process of developing subdivisions may, by its very nature, encourage the use of on-site wastewater treatment systems. In order to employ OSSFs, the lot sizes have to be at least 1-acre if individual drinking water wells are used, or at least 0.5 acres if the site is served by a community drinking water system. Therefore, these subdivisions become attractive to individuals wanting to install large homes, pools, tennis courts, and other amenities. At the same time, it's difficult to build subdivisions with lots of 1-acre or more on centralized sewers, because it is impractical and uneconomical to distribute mains and lines through such a large area.

What needs to be done to encourage other regions of the State to encourage subdivisions that are built from the onset with OSSFs as a core design concept? More work needs to be done to work with homebuilder's associations and real estate professionals to better educate them about the opportunities and benefits of incorporating OSSFs into new subdivision development. That's being done in the Houston area where efforts are being made to inform these groups about how OSSFs can play a key role in new subdivision development.

For details, contact Berry at (713) 956-3061 or jberry@eng.hctx.net, Carter at rcahou@aol.com or (281) 373-3838, or Young at dry@waterengineers.com.

Governor's Office Appoints Three New Members to TOWTRC

The Office of the Governor has made the following new appointments to the On-site Wastewater Treatment Research Council:

Sandra A. Cararas is an assistant professor of English at The University of Texas-Pan American, in Edinburg. Ms. Cararas lives in McAllen and will represent the public member on the Council. She replaces Lois Koock.

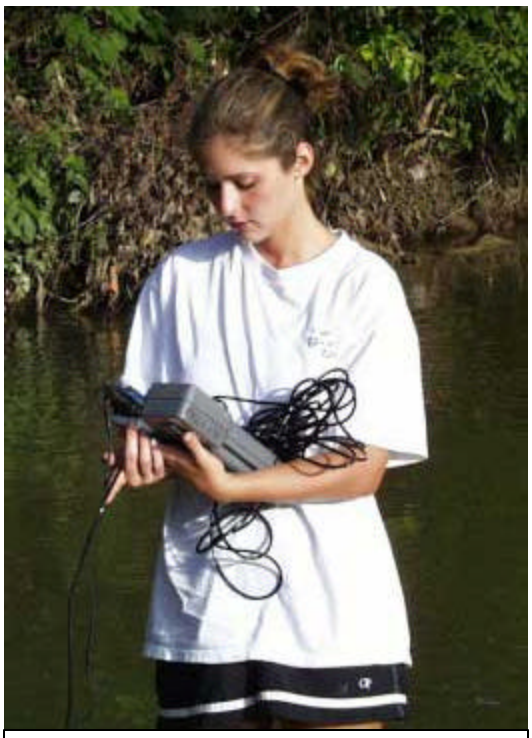
Kosse Maykus is the President of KM Properties, Inc. DBA Maykus Custom Homes, and President of H Creek Development, Inc. in Southlake. Mr. Maykus will represent the home building industry on the Council. He replaces Danny Ray Moss.

James W. Spence is an independent contractor associated with the Ray Wilkerson Companies, Inc. in Austin. Mr. Spence will be the land developer representative on the Council. He replaces Arthur Carpenter.

The following Council members have been re-appointed: Therese M. Baer, P.E., Franz K. Hiebert, Ph.D., and Cynthia D. Williams.

These Council members' terms will expire September 1, 2003.

Blackland Research and Extension Center Publishes Report on Use of Innovative OSSFs in Central Texas



Monica Allen mesuring dissolved oxygen in Nolan Creek

A report describing results of a project to introduce conventional and innovative on-site wastewater treatment systems (OSSFs) in Central Texas was recently published by the Texas A&M University Blackland Research and Extension Center (BREC) at Temple.

The project was led by Dennis Hoffman and Loren Witt of BREC and the Texas Agricultural Experiment Station (TAES) and Bruce Lesikar of Texas Cooperative Extension (TCE) and the Texas A&M University (TAMU) Agricultural Engineering Department. Other individuals who played key roles in this effort include Ralph Hicks, Wes Rosenthal, and June Wolfe of BREC; James Alderson and Jeff Heath of the U.S. Department of Agriculture Natural Resource Conservation Service (USDA/ NRCS); Donna Long, Kevin Canfield, and Kenny Zajicek of the Texas State Soil and Water Conservation Board (TSSWCB); Tiffany Morgan of the Brazos River Authority; Michael Jahns of the Bell County Health District; Jeff Holberg of the City of Belton; Vernon Hanson and B. G. Welch of the Central Texas Soil and Water Conservation District; Mac McBryde and Marvin Price of Central Texas College; Darrell Watson of the University of Mary Hardin Baylor; and Russell Persyn of TCE.

This monitoring and demonstration program was funded by the TSSWCB through the U.S. Environmental Protection Agency's Section 319 Program. It began in 1998 and ran

through 2000. The final project report, titled "Comprehensive Rural Water Quality Improvement Project," was published in March 2001.

The overreaching goal of this project was to identify a variety of strategies, or best management practices (BMPs), that individuals and agencies could use to reduce non-point source pollution throughout the Nolan Creek watershed. The watershed stretches through an area that includes Fort Hood, Killeen, Belton, Temple, and Harker Heights.

According to Hoffman, this project was needed because rapid population growth in rural portions of Central Texas was creating increasing demands for onsite wastewater systems. Roughly 600 permits were issued for new OSSFs in the region during each of the past three years. At the same time, problem soils (clays, fractured rock, and limestone) limit the areas where conventional septic tanks and drainfields could properly treat domestic wastewaters.

"A key aspect of this effort is that we were able to educate homebuilders, OSSF installers, and residents about wastewater treatment options that may perform the best in the region, thus helping protect water quality," Hoffman said. "We wanted to show that innovative OSSFs can provide needed solutions in this area in situations where conventional septic tanks and drainfields would not have worked well."

To accomplish these goals, the project emphasized education and training as well as the design, installation, and monitoring of these systems. Achievements of this program are highlighted below.

Educational and Training Programs

To better educate the public about opportunities to utilize innovative OSSFs in this watershed, the project team created fact sheets and other publications and offered training seminars.

Two OSSF workshops were carried out in Killeen, Texas (at Central Texas College) and at the BREC. These short courses presented information on a variety of technologies, including conventional systems, aerobic treatment units, leaching chambers, gravel-less pipe, low pressure dosing, subsurface drip irrigation, and spray irrigation. Roughly 60 people attended the two training sessions and received eight hours of classroom instruction.

In addition, a website created for this project features diagrams of a variety of OSSF technologies that are available, as well as other relevant information.

OSSF Technologies

In this project, three types of OSSF technologies –an intermittent recirculating sand filter, a subsurface flow constructed wetland, and a gray water surface application system–were

installed at two residences. Lesikar played a lead role in designing and installing these OSSF systems.

The OSSF at the first site was designed to treat domestic wastewater from a three-bedroom home in Nolenville near Temple. The system is designed to treat as much as 240 gallons of wastewater each day, though the anticipated flows are only half that much since only two people now live in the house. The OSSF uses a three-compartment, 1,000-gallon concrete septic tank equipped with an effluent filter for primary treatment. From the septic tank, a timer doses effluents to a recirculating intermittent sand filter for secondary treatment. Each dose lasts for roughly 15 minutes and effluents are dosed about six times each day. In this process, the wastewater flows by gravity through the sand filter. Following treatment, effluents were disinfected with chlorine and distributed on the surface during evenings through spray application. The distribution system consists of two spray heads that each cover a radius of roughly 30 square feet.

The second demonstration site for this project was a 4-bedroom home near Belton. The OSSF for this site features technologies that separately treat blackwater and graywater.

The blackwater system is designed to treat 120 gallons of wastewater per day. It utilizes a septic tank to provide primary treatment and a two-cell subsurface flow constructed wetland provides secondary treatment. Each of the wetland cells measures 8 feet wide, 12 feet long, and 14 inches deep. A conventional gravel-filled trench is used to land apply effluents that flow out of the wetlands. The first wetland cell is lined with plastic, while the second wetland is lined with native clay soils.

The graywater treatment system is designed to accommodate 180 gallons of wastewater daily. Graywater from this site flows into a 500-gallon septic tank with an effluent filter that facilitates anaerobic treatment. Effluents are then chlorinated and flow into a 500-gallon pump tank before they are spray irrigated. The distribution system consists of two spray heads that each cover a radius of roughly 30 square feet.

Monitoring Efforts

Throughout the project, the performance of these OSSFs was monitored by taking monthly samples for standard chemical parameters (total nitrogen, nitrates, and pH) as well as levels of fecal coliform bacteria. Witt led efforts to sample these systems, while Lesikar performed laboratory analyses at TAMU in College Station.

At the same time, streams within the Nolan Creek watershed were monitored at sites downstream of communities or homes that rely on OSSFs for treatment. Samples were taken at stream segments close to Nolenville, Belton, and Fort Hood. These samples were analyzed for the presence of fecal coliform bacteria, which can be associated with poorly functioning OSSFs as well as several other issues, and other standard parameters.

According to Hoffman, these analyses suggest that the demonstration systems installed during this project functioned well, in broad terms. However, the stream sampling

suggested that fecal coliform bacteria are present in several stream reaches that could be the result of the failing septic systems or other issues.

Conclusion

Hoffman notes that the value of projects like this is that it provides a brief period in which intensive efforts can be undertaken to educate industry professionals and the public about the opportunity to utilize non-standard OSSF systems. At the same time, however, he notes that it may be better if these projects could be continued over time to provide more long-term benefits, and not just provide a one-time thrust to address critical water quality concerns.

Notes: More information about this project is available on Hoffman's website, http://waterhome.brc.tamus.edu. To learn more about this project, contact Hoffman at (254) 774-6040 or hoffman@brc.tamus.edu, or Lesikar at (979) 845-7453 or b-lesikar@tamu.edu.

EPA Produces Comprehensive New Manual About OSSF Treatment Methods, Management Strategies

The U.S. Environmental Protection Agency (EPA) recently developed a comprehensive report that discusses a wide range of issues pertaining to onsite wastewater treatment systems (OSSFs).

The report, titled "Onsite Wastewater Treatment Systems Manual," was published in February 2002.

Background Information

Major sections of the report cover the following topics: Background and use of onsite wastewater treatment systems; Management of onsite wastewater treatment systems; Establishing treatment system performance requirements; Treatment processes and systems; and Treatment system selection.

According to the Executive Summary, this report differs from previous EPA efforts in that it emphasizes performance-based requirements for OSSFs, rather than prescriptive codes. The manual is also intended to provide more comprehensive advice on advances in management approaches and treatment technologies.

The manual is not intended to provide detailed design information, nor is it intended to be a substitute for site-specific design criteria. Instead, the report provides an overview on treatment methods, installation practices, and OSSF performance. Finally, the authors note the manual emphasizes the need to improve cooperation and coordination among agencies involved in environmental health, planning, zoning, development, resource protection and other areas.

The State of OSSF Systems in the US and Texas

One of the major contributions of this report is that it presents a detailed current overview on the status of OSSF treatment throughout the nation and in Texas.

According to this study, roughly 23% of the 115 million occupied homes in the United States are served by OSSFs. However, the U.S. Census Bureau estimates that about half of the homes that rely on OSSFs are more than 30 years old. In addition, the report notes EPA data that suggest that the typical failure rate for OSSFs throughout the U.S. range from 10% to 20%. The report also states that OSSFs treat roughly 4 billion gallons of wastewater daily from more than 26 million homes.

The report also cites EPA studies that suggest that on-site wastewater treatment systems now constitute the third most-common source of groundwater contamination, and that these systems are thought to fail largely due to inappropriate sizing or inadequate long-term maintenance.

Insights into the number of OSSFs in Texas are also included in the study. The report cites 1990 census data that estimates that more than 18% of Texans rely on OSSFs, rather than centralized sewers. It also notes that a 1999 study by the National Small Flows Clearinghouse suggested that the failure rate for OSSFs in Texas ranged from 10% to 15%, in large part due to the surfacing of effluents that resulted in the contamination of ground and surface waters.

Fact Sheets Presented in the Manual

Fact sheets included in the manual may be especially useful for OSSF professionals . Fact sheets in the report describe such technologies as continuous flow aerobic systems; fixed-film processes; sequencing batch reactor systems; effluent disinfection processes; vegetated submerged beds; and evapotranspiration systems. Other fact sheets discuss stabilization ponds; systems to provide enhanced removal of phosphorus and nitrogen; intermittent and recirculating sand filters; and land treatment systems. Another fact sheet covers methods to renovate or restore subsurface wastewater infiltration systems. In addition, the report includes fact sheets about septic tank additives; high-strength wastewater; water softeners; and the use of holding tanks.

Notes: To order a free copy of the report, contact Lynnann Paris of the EPA at paris.lynnann@epamail.epa.gov or (800) 490-9198. The report can also be downloaded as an Adobe Acrobat pdf file from the EPA website at this address: http://www.epa.gov/ORD/NRMRL/Pubs/625R00008/625R00008.htm. This is a big file, but you can download individual fact sheets or chapters as smaller documents.

Texas Cooperative Extension Produces New Fact Sheets, Educational Videotape

Bruce Lesikar of Texas Cooperative Extension (TCE) has recently developed additional educational materials about on-site sewage facilities (OSSFs) in English and Spanish.

A new English fact sheet was published about mound systems (publication number L-5414 and TWRI-1002). Spanish fact sheets were published about such topics as evapotranspiration beds (cama de evaptranspiracion), fact sheet L-5228S and TWRI 0502; distribution of effluents with spray irrigation (sistema de distribucion por aspersion con rociadores), fact sheet L-5303S and TWRI 0702; percolating filters (filtro percolador), fact sheet L-5345S and TWRI 0802; artificial wetlands (humedales artificiales), fact sheet L-5230S and TWRI 0602; mound systems (sistema de monticulo), fact sheet L-5414S and TWRI 1102; and alternative systems to recycle wastewater (sistemas de recoleccion alternativos), fact sheet B-6098S and TWRI 0902.

Lesikar also recently published folders that better enable homeowners, maintenance personnel, and regulatory agencies to keep records of work done on individual OSSFs. The folders provide areas to document the permit number of each system as well as what kind of maintenance was performed and when it was done. The packets provide an area to sketch the layout of an OSSF, and include pockets for storing additional information and records. The folders are available in English or Spanish.

In addition, Lesikar recently produced an educational videotape titled "Overview of Septic Systems." One copy has been distributed free to each Authorized Agent and County Extension Office. The goal of this videotape is to inform people of their options when selecting an on-site wastewater treatment system. This video is available as a VHS videotape (product number SP-129) or in DVD format (product number SP-132). Copies of the videotape can be purchased for $25 by contacting the TCE supply center.

Note: The fact sheets and the record keeping folder can be downloaded free of charge by going to the Texas Cooperative Extension website, http://texaserc.tamu.edu. You can also purchase copies of any of these publications, or the video, by contacting the TCE distribution center at (979) 845-6573.

Meetings, Conferences, and Training Opportunities

The Texas Engineering Extension Service (TEEX) has announced its training schedule for on-site sewage facility (OSSF) classes for the March through August 2002. The Installer I, Installer II, Site Evaluator, and Designated Representative classes are required for those seeking Texas OSSF Licenses. The classroom hours for these four courses include the examination period for these licenses. State regulations require those seeking licenses to pre-qualify for the exam. Applicants for licenses should submit TNRCC applications and notarized statements of work experience, as well as their registration forms and payments, three weeks before classes begin. The Aerobic/Surface Irrigation

Operations and Maintenance class and the Water Utility Safety class are for continuing education units (CEUs) only.

The Installer I class provides 13 classroom hours of instruction. Those who complete it will earn 13 hours of CEUs. The class will be taught at the following dates and places: July 16 & 17–Longview; July 30 & 31–Abilene; and August 20 & 21–San Antonio.

The Installer II class provides 21 classroom hours of instruction, and those who successfully finish the class earn 21 CEUs. The class will be offered at the following dates and sites: June 25 through 27–Houston; and August 13 through 15– Mesquite.

The Site Evaluator class provides 17 hours of classroom instruction and 17 CEU credits. This class will be offered at the following dates and places: July 16 through 18–San Antonio; and August 6 through 8–Mesquite.

The Designated Representative class provides 24 classroom hours of instruction and 24 CEUs. The class is scheduled for the following dates and sites: August 6 through 9–San Antonio.

The Aerobic/Surface Irrigation System Operations and Maintenance class provides 8 hours of classroom instruction and 8 CEUs. The class is scheduled for the following dates and places: July 25–Austin; August 29–Victoria; and July 23–Mesquite.

It needs to be noted that people only receive the CEUs if they already have a license and are taking the class to earn CEUs. People taking these classes to become licensed do not obtain CEUs.

To learn more about any of these classes, to obtain TNRCC applications and experience forms, or to register, call TEEX at (800) 824-7303.

The 2002 Summer Conference of the Texas On-Site Wastewater Association (TOWA) will meet July 11-13 in San Antonio. The conference will cover such topics as septic system inspection and certification for real estate sales; troubleshooting problems associated with aerobic treatment units; system design and maintenance, treating high-strength wastes, and spray irrigation as a wastewater disposal method. TOWA will also conduct summer schools that provide continuing education credits.

The TOWA Summer School will meet July 11–13 in San Antonio. The summer school provides instruction in troubleshooting aerobic treatment units, drip irrigation, the design of basic and advanced systems, maintenance, and dealing with high-strength wastes. Up to 16 hours of continuing education units are available for those who complete the course.

For details, visit the TOWA website at http://www.txowa.org, or call them at (512) 494-1125.

The 11th National Conference of the National Onsite Wastewater Recycling Association (NOWRA) is set for September 18-21 in Kansas City, MO. The conference will include technical education sessions, workshops about the functions of onsite wastewater treatment systems (OSSFs), seminars, and a tour of OSSFs. Specific subjects that will be covered at the Conference include drip distribution systems for wastewater treatment recycling; dealing with high-strength wastes; the use of cluster systems; developing model performance codes; and the basics of on-site wastewater treatment. To learn more, visit the NOWRA website at http://www.nowra.org.

The Annual Conference of the National Environmental Health Association (NEHA) will meet July 1-3 in Minneapolis, MN. The conference features sessions dealing with the use of onsite wastewater treatment systems (OSSFs). The workshop will examine issues associated with cluster systems, development of a national code, and the implementation of performance-based standards. Other themes of the conference include new materials designed to educate the public about how to operate and maintain OSSFs, a discussion of the new U.S. Environmental Protection Agency OSSF design manual, and ways to verify the performance of decentralized OSSF technologies. To learn more, visit the NEHA website at http://www.neha.org.

The Texas Natural Resource Conservation Commission (TNRCC) offers a list of approved providers of continuing education units (CEU) on its website. The list includes classes in Texas and elsewhere that provide training for which applicants can earn CEU hours. To learn more, go to the web at http://www.tnrcc.state.tx.us/enforcement/csd/ics/ossf_ceu.html.

The National Environmental Training Center for Small Communities (NETCSC) will offer the 3rd annual National Environmental Training Institute for Small Communities in August 2002. Some of the sessions that may be of interest to OSSF professionals include the following: Assessing Wastewater Options for Small Communities (August 5); Alternative Onsite Wastewater Systems (August 7); Alternative Onsite Wastewater Treatment Technologies (August 8); and Emerging Perspectives on Decentralized Wastewater Management (August 9). For more information, call NSFC at (800) 624-8301 or visit their website at http://www.nsfc.wvu.edu.

The Soil and Site Evaluation Course offered by the Texas A&M University System is now online, and is the only online course approved for continuing education units (CEU) by the TNRCC OSSF Program. You can take this course from the comfort of your own home and at your own pace and there is no need to travel! The class is approved for 8 hours of CEU credit. More information is at http://www.urban-nature.org/soil_and_site.htm.

City of Austin Monitors Innovative OSSFs that Use Sand Filters at Environmentally Challenging Sites

The City of Austin is monitoring two innovative on-site wastewater treatment systems to determine if they can serve as models that can be used in other challenging parts of the region. Susan Parten, an engineer who owns and operates Community Environmental Services, Inc., is carrying out the monitoring under contract for the City's Water and Wastewater Utility. According to Crespin Guzman, who heads up the on-site and decentralized wastewater treatment program for the City, this type of monitoring is needed.

"These systems may offer industry professionals and homeowners viable options in instances where it appears as though no other technology would work as well and as cost effectively," he said. "We realize the capital costs of these systems are a little high now, but we feel the costs will come down as more homebuilders and installers become familiar with these technologies and how to design and install them. This project will highlight this option to people who really need solutions to challenging circumstances."

Susan Parten, an environmental engineer, is monitoring innovative OSSF's for the city of Austin

The two systems that are being monitored are located on the west end of the City near Town Lake. Both sites present environmental and physical challenges that would prohibit the use of conventional septic tanks and drainfields, including shallow rocky soils, limited disposal areas, and nearby cliffs.

One of the homes with these unique onsite wastewater treatment systems (OSSFs) has been operating since last fall. The home is owned by Tom and Carolyn Curtis and was designed by Steve Ellison. The OSSF at this site uses a standard septic tank followed by an intermittent sand filter. The sand filter covers a surface area of roughly 300 square feet (15 feet wide, 30 feet long, and 4 feet deep), which allows it to treat roughly 1 gallon of effluent per square foot per day. Wastewater flows from the septic tank to a screened effluent filter where it enters a pump vault. Effluent is distributed onto the sand filter from the pump vault through the use of a timer, which sends out pulses of treated wastewater to the sand filter about six to eight times a day. One pump distributes effluent to the sand filter, while another pump directs treated effluent to the disposal field. Within the sand filter, orifices with a shield are employed to evenly spread out and distribute the wastewater.

Because this site has several limitations, the designer of the system had to develop two disposal areas. One of these consists of a flower bed near the home, while the other covers a median between the house and the street.

The other system is located in the Rob Roy development and is similar in several regards. This system was designed by Steve Wenzel. Again, an intermittent sand filter was the method of choice for on-site wastewater treatment. For both these systems, the proper type of sand had to be brought in from Brady, Texas, since local suppliers were not able to produce the right gradation at the time the systems were built.

Parten explained that she carries out the monitoring about once every two weeks, and will continue monitoring both sites for a period of two years. Samples are collected and analyzed for several parameters, including biochemical oxygen demand, nitrates, total Kjeldahl nitrogen, fecal coliform bacteria, and other parameters. She explained the benefits of using this type of technology.

"Even though there are very few systems like this in Texas that use intermittent sand filters for on-site wastewater treatment, hopefully they'll be used increasingly because of their excellent performance for adverse conditions. Intermittent sand filers are not proprietary, and have been operating successfully for decades in other areas of the United States.

"Intermittent sand filters can have long reliable service lives, if installed and managed properly, and low operations and maintenance costs. Ongoing maintenance costs tend to be substantially less than for other commonly used secondary treatment systems, and sand filters tend to consistently produce an excellent overall quality of effluent. Properly designed and installed sand filters should require at most only one service call per year, just to inspect things such as pressure ("squirt height") in distribution lines, and flushing lines that show any build-up."

Parten also noted that nitrification (conversion of ammonia to the nitrate form of nitrogen) tends to be very efficient in intermittent sand filters, which results in a relatively odor-free effluent as compared with several other types of secondary treatment processes. Sand filters also provide very good pathogen reduction.

"The high quality of effluent produced by intermittent sand filters makes them ideal for difficult sites with either shallow rock or groundwater, or where surface irrigation is to be used. If required for irrigation or other special site conditions, disinfection through chlorination is carried out much more effectively when very low levels of BOD and ammonia have been achieved, as occurs reliably with this type of system," she said.

Parten said that there are numerous very credible studies that have been done on sand filters during the past few decades. Articles on sand filters and their performance can be found in most ASAE proceedings for their symposiums on individual and small community sewage systems over the past 10 to 20 years. Two such articles include "Onsite Intermittent Sand Filter Systems: A Regulatory/Scientific Approach to Their

Study in Placer County, California", and “Pressurized Intermittent Sand Filter with Shallow Disposal Field for a Single Residence in Boone County, Missouri.” Several states including Oregon and Missouri give disposal field sizing reductions for systems utilizing intermittent sand filters, with the reduction based on soil type, based on their experience with these systems. Parten has monitored other systems in the past on behalf of the City of Austin, including a septic tank to wetland treatment system with low pressure dosed subsurface disposal at a residence, and a wetland/trickling filter system constructed at one of the City's municipal treatment plants. This latter system designed for larger flows was constructed purely for research and demonstration purposes and is best suited for clustered development or commercial facilities located in sensitive environmental conditions. This system has shown very good results for total nitrogen reduction, as well as excellent secondary treatment.

For more information, contact Parten at SueParten@aol.com.

UT LBJ School Paper Describes Key Elements of Programs to Convert Colonia Residents from OSSFs to Sewers

A paper published by the Lyndon B. Johnson School of Public Affairs (LBJ School) at the University of Texas at Austin seeks to analyze reasons it is difficult to convert Rio Grande Valley residents from septic tanks and drainfields to centralized wastewater systems.

The paper, “Mandatory Hook-Up Policies for Colonia Wastewater Projects,” was written by Jeremiah Carew (a graduate student at the LBJ School) and Karen Poff (a graduate student at Humbolt State University). It was published in The LBJ Journal of Public Affairs in the Spring 2000 issue. To develop this article, the authors reviewed literature about this topic, interviewed key personnel of relevant state agencies, and met with managers of water and wastewater systems that provide assistance to economically distressed areas, including colonias.

Background Information

The paper presents an overview of the Texas Water Development Board (TWDB) Economically Distressed Areas Program (EDAP), which provides funding for water and wastewater services in colonias along the Texas–Mexico border and other areas lacking water and wastewater service. Colonias are unincorporated communities along the border that do not have adequate infrastructure, including water or wastewater services.

The authors clarified the various levels of regulatory authority that different entities use to encourage, or even force, individuals within colonias to convert from septic systems to join a sewered system. They described the powers of rural water supply corporations, river authorities, municipalities, water districts, and other political subdivisions. A differentiation was made between an entity’s authority to require people to connect to community sewers in colonias, once they become available, and the tools that are available to enforce those requirements.

The authors note that there are only three scenarios in which an entity can require colonia residents to convert from septic systems to centralized systems: 1) when wastewater is provided in certain areas of a river authority's jurisdiction; 2) when wastewater service is provided inside a city's limits; and 3) when wastewater is provided in counties or other political subdivisions based on certain types of financial assistance given through the TWDB.

The authors described other concerns that may limit the willingness of colonia residents to become hooked up to wastewater service. Some colonia residents suffer from economic hardships that make them believe it is too expensive to be connected. Others, the authors note, delay becoming connected with the expectation that the government may eventually provide the services at no cost.

Case Studies

In developing this article, the authors developed case studies, or examples, of instances where the conversion from septic tanks to community systems was very successful.

They note that, on several occasions, water managers described that households initially connect to a community wastewater system, if this is provided free of charge. However, they revert to their on-site wastewater treatment system once they begin receiving monthly sewer bills. The Texas Natural Resource Conservation Commission OSSF staff notes that there should not be two systems connected to the house–the OSSF should be abandoned when the home is hooked up to a centralized sewer. A solution that seems to be especially effective is to fill the septic tanks with dirt at the same time yard lines associated with the community wastewater system are installed.

Here are a few other highlights of success stories the authors mentioned:

- The Lower Water Valley District serves the lower valley in El Paso County. This district ensures that community members connect to centralized sewers through the threat of penalties for not connecting. They also work with the El Paso Interreligious Sponsoring Organization (EPISO) which directs people who cannot afford to connect to agencies and organizations that may be able to help.
- The North Alamo Water Supply Corporation (NAWSC) serves parts of Hidalgo, Cameron, and Willacy counties and currently provides service to more than 800 customers. NAWSC notifies its water customers that a wastewater system is under construction and that all customers will be required to connect. The Corporation requires individuals to sign an agreement that they agree to pay for wastewater services, but also explains loan and grant programs that may be of aid if these people cannot afford to be connected.
- The El Paso Water Utilities Public Service Board manages and operates the water and wastewater system for the City of El Paso. The utility conducts public meetings to update residents on the creation of new sewers. If people choose not to switch from septic tanks to community systems, the utility can suspend water services.

Summary

Successful programs, the authors note, are those in which entities have the authority and tools to force individuals to convert from septic systems to community sewers, and that use incentives such as penalties and fines to encourage colonia residents to convert. The use of educational and outreach programs that provide information about funding opportunities and describe the benefits of converting to sewers are also key components of successful efforts.

Notes: This full article is available by contacting Ric Jensen at (979) 845-8571 or rjensen@tamu.edu. You can learn more about this project by contacting UT LBJ School researcher David Eaton at (512) 471-8972 or eaton@mail.utexas.edu.