

CASE STUDY

An Affordable Wastewater Collection and Treatment Solution for Developments

SOUTH ALABAMA UTILITIES

Problem

In the late 1990's the managers of a traditional water and gas utility realized they needed to start providing wastewater services to new subdivisions or risk losing customer share to other utilities.

Solution

South Alabama Utilities (SAU) worked with developers to install more than 60 miles of Orenco® Effluent Sewer lines, which now serve 47 subdivisions and commercial properties and then send their filtered wastewater to about 150 AdvanTex® textile treatment units at 14 different treatment plants. When the developments are fully built out, SAU's facilities will have the capacity to handle nearly 4,000 new homes — as well as schools, apartments, and business parks.

Rural Water Utility Builds Customer Base with Wastewater



New subdivisions in South Alabama Utilities' (SAU) service area are connected to an affordable effluent-only sewer and community treatment system. SAU handles all system maintenance.

Since the '50s, South Alabama Utilities (SAU), a utility serving the rural areas of Mobile County, has provided water service to 13,000 customers and gas service to 6,000 customers.

SAU was always accustomed to keeping a low profile. However, by the late 1990s new development and potential new customers were heading SAU's way. "To compete for new development, we felt it was essential to make sewers available in areas where we

already had water infrastructure in place," said Donnie Cunningham, SAU's Executive Director. "In the areas we serve, utilities don't have exclusive territories. We were on the verge of losing potential new customers that we felt could have been ours."

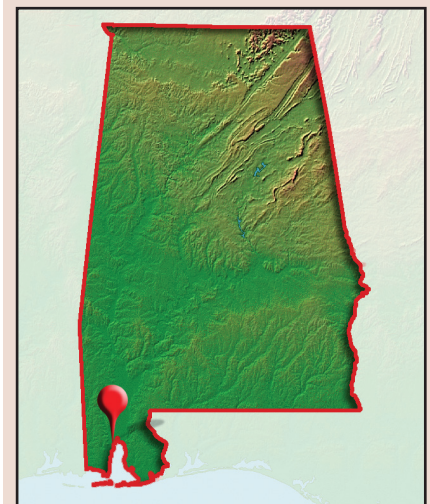
To serve the subdivisions springing up throughout western Mobile County, SAU was encouraged to get into the wastewater business by local developer Steve Brewer, a partner with his son in Brewer Homes. According to Steve, "We were having such a difficult time finding land where we could install conventional septic systems ... I kept asking other builders if there were alternatives. And it turns out there were."

Subsequently, Steve found a technical ally in Dr. Kevin White, professor and chair of civil engineering at the University of South Alabama and

New Development Market

PROJECT OVERVIEW

South Alabama Utilities



Since 2002, South Alabama Utilities Has...

- Installed more than 60 miles of interconnected Orenco Effluent Sewers serving 47 subdivisions
- Installed 3,500 on-lot packages and connected 3,500 homes, with a capacity to serve 4,000
- Built 14 DWT plants incorporating 150 AdvanTex textile treatment units (mostly AX100s)
- Collected a typical monthly service fee of \$35/connection and will ultimately collect more than \$140,000 per month in service charges.
- Sampled treatment plant effluent bi-weekly. Data shows systems are operating within permit limits.

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SOUTH ALABAMA UTILITIES



Champion Hills is one of several subdivisions with decentralized wastewater treatment systems jointly developed by Brewer Homes and John Howard Homes and maintained by South Alabama Utilities. Phase I is sold out, Phase II is 2-3 years old, and Phase III will soon be underway.



Phase I and Phase II of SAU's West Mobile Wastewater Treatment Plant includes 36 AdvanTex®-AX100 textile treatment units. Two additional phases of similar size are planned. Another 18-pod textile treatment system is under construction in a different location.

a vocal proponent of utility-managed decentralized wastewater treatment (DWWT).

Since 2002, SAU has become a national model for utility-managed effluent-only sewers and DWWT. Its 60 mile-network of effluent sewers and its 14 treatment plants are all interconnected, so flows can be sent “down the line” for treatment whenever needed. This has the effect of expanding system capacity at low cost and providing redundancy in emergencies.

At full build-out, the system will have the capacity to serve nearly 4,000 new homes, schools, apartments, and businesses. To SAU, this means nearly 4,000 new customers and an additional \$140,000 per month in service charges.

Before getting into the DWWT business, SAU did its homework and sent a Board member and two consulting engineers from Speaks and Associates to visit Orenco Systems®, a manufacturer of effluent sewer equipment. They toured effluent sewer communities in the vicinity and, says Mikell Speaks, “I was impressed with the longevity of the systems and by how little maintenance they needed. I talked with one guy and he was like the Maytag repairman ... he got maybe two calls a year.”

How It Works ...

Effluent sewer systems include equipment on each lot (a tank to retain solids, a pump package, and a control panel) followed by small diameter effluent collection lines that transport filtered effluent to a decentralized wastewater treatment system (typically, low-maintenance textile treatment units), and then to a subsurface dispersal system. (See “How It Works”)

To ensure product consistency, SAU purchases all collection and treatment equipment from Orenco’s Distributor and AdvanTex Dealer, William (Billy) McLean of Dauphin Environmental Equipment, LLC, in Mobile.

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SAU’s “Build-As-You-Go” Business Model

	DEVELOPER	UTILITY	PROPERTY OWNER
Effluent Sewer Infrastructure	Installs effluent sewer main-lines within subdivision.		
Wastewater Treatment Facility (WWTF)	Deeds land for WWTF to utility. Pays utility \$2,000-\$3,000 per lot up-front.	Builds WWTF.	
On-Lot Equipment (STEP/STEG pkgs)	Pays tap fee as each house is sold.	Buys/installs STEP/STEG pkgs.	Pays monthly bill averaging \$35-\$40.
Overall DWWT System		Operates/maintains DWWT system.	Follows Homeowner’s Manual. Calls utility in case of alarm.

Under SAU's program, all parties share the cost of extending wastewater infrastructure — developers, property owners, and the utility — on a “build-as-you-go” basis. (See chart on p. 2 for details). Dr. White estimates the total cost for systems such as SAU's at about \$11,000 per lot, including both collection and treatment.¹

“The whole system is modular, so most costs are only incurred as needed,” says SAU's Cunningham. “The treatment and dispersal systems can be built in phases. Monthly service charges from phase-one homeowners help build a reserve for development of the next phase.”

How It's Working Out ...

“We get nothing but positive reactions from our home buyers,” says developer Steve Brewer. “As far as they're concerned, they have a centralized sewer system. If they have a problem, they pick up the phone and call SAU.”

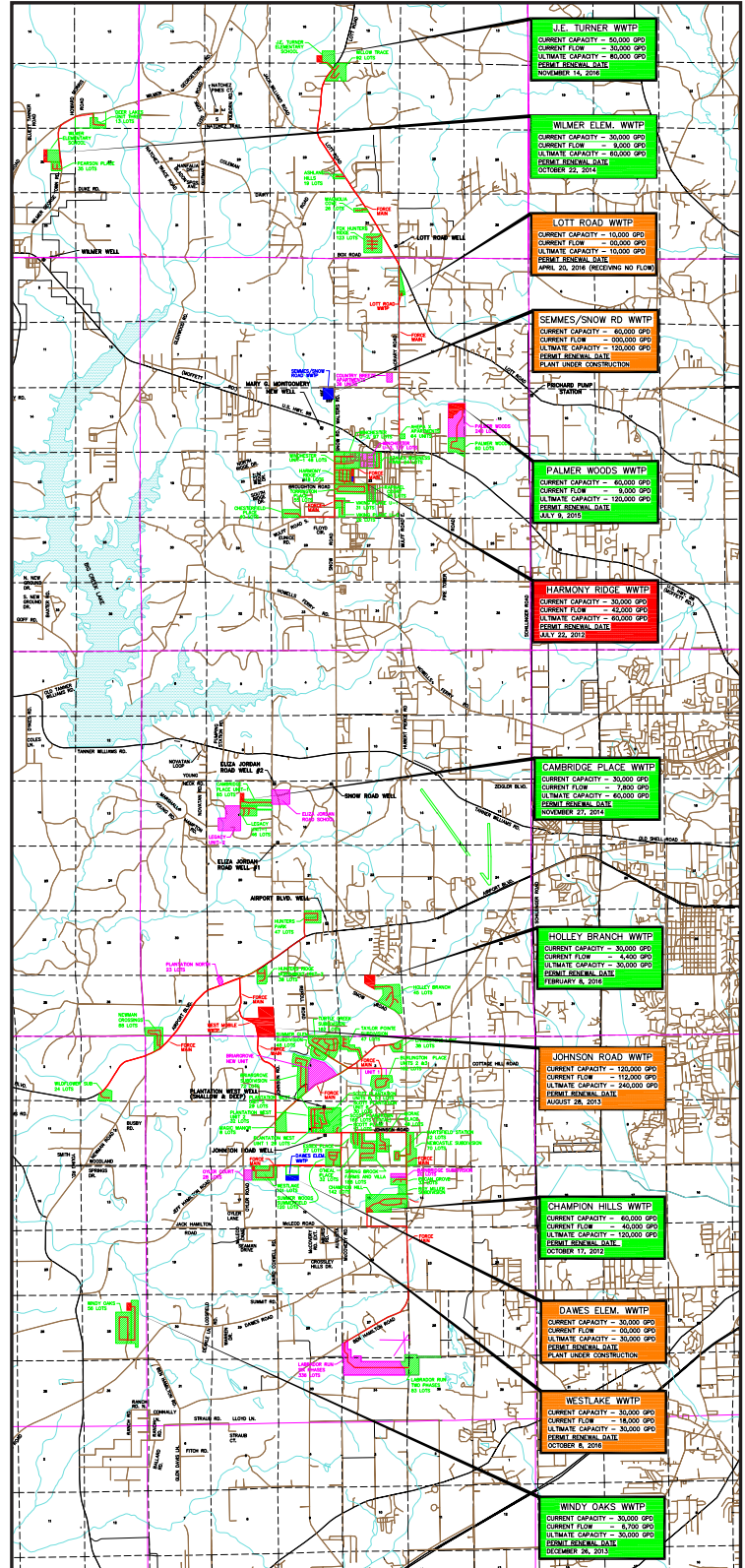
On the commercial side, SAU is now providing wastewater treatment for a 172-apartment complex, a 31-lot business park across the highway from the new \$5 billion ThyssenKrupp steel mill, and numerous other commercial properties.

Effluent sewer systems like SAU's require very little maintenance. (See: “Orenco Effluent Sewer Systems: Operational Cost — On-Lot Components,” NFS-EFS-OM-1.)

SAU, for example, estimates that a two-person crew can install the on-lot equipment at a home in half a day and a single person can perform maintenance of this equipment in an hour.

For the treatment plants, construction superintendent Braxton Platt says, “A two-person crew can perform routine maintenance on three 30,000 gpd plants in a single day and spend as little as an hour at each, checking pumps and cleaning filters.”

“We've become more proactive with treatment plant maintenance,” adds Tim Lee, Lead Field Operator. “We test the effluent bi-weekly at all plants and then spreadsheet the results. If we see any samples that are outside of normal, we perform maintenance.” Sampling data shows SAU's treatment systems produce effluent that is within permit limits.



Currently there are 18 utility-maintained decentralized wastewater treatment systems in the Mobile, Alabama, area, and South Alabama Utilities maintains 14 of them. This map locates all but one. The 14th is to the north and serves a business park in Calvert.

SOUTH ALABAMA UTILITIES



Dr. Kevin White, Ph.D., P.E., Professor and Chair of the Engineering Department at the University of South Alabama, won the 2004 Green Award from a Mobile-area conservation group for his efforts to bring decentralized wastewater treatment technologies to the community.

A National Model

According to Orenco Dealer Billy McLean, seven different utilities and small towns in four different counties are now using Orenco’s Effluent Sewers; and seven of them also use AdvanTex Treatment Systems. They are toured by out-of-area groups, and they have become the subject of classes, workshops, seminars, and articles.

In a feature story in the March 2009 issue of Water Environment & Technology magazine, for example, the EPA’s Joyce Hudson and Robert J. Freeman conclude that “These ... systems in the Mobile area represent a significant performance improvement over traditional septic tank and drainfield developments of the past, and have provided savings of 25% to 50% over centralized collection and treatment.”

In 2010, the Water Environment Research Federation (WERF) published a series of Fact Sheets showing costs for several sewer technologies.² Based on costs for a 200-home system, these Fact Sheets show that effluent sewers are one-third less costly than conventional sewers.

And the cost of treatment is significantly lower too. Says Dr. White, “Effluent sewers and attached growth treatment systems minimize solids handling, thus allowing for smaller infrastructure and lower costs. If we had it to do over again, knowing what we know now about the huge costs and environmental issues with centralized city sewers, we might not sewer in that way. Certainly, in many outlying areas, decentralized wastewater concepts would dominate.”

New Development Market

Project Team

Utility

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For more information about AdvanTex® Treatment Systems, contact Orenco Systems®, Inc., at 800-348-9843.

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¹ White, Kevin, Ph.D., P.E., Course Lecture and PowerPoint Slides, “Centralized Management of Decentralized Infrastructure,” University of South Alabama Department of Civil Engineering, 2010.

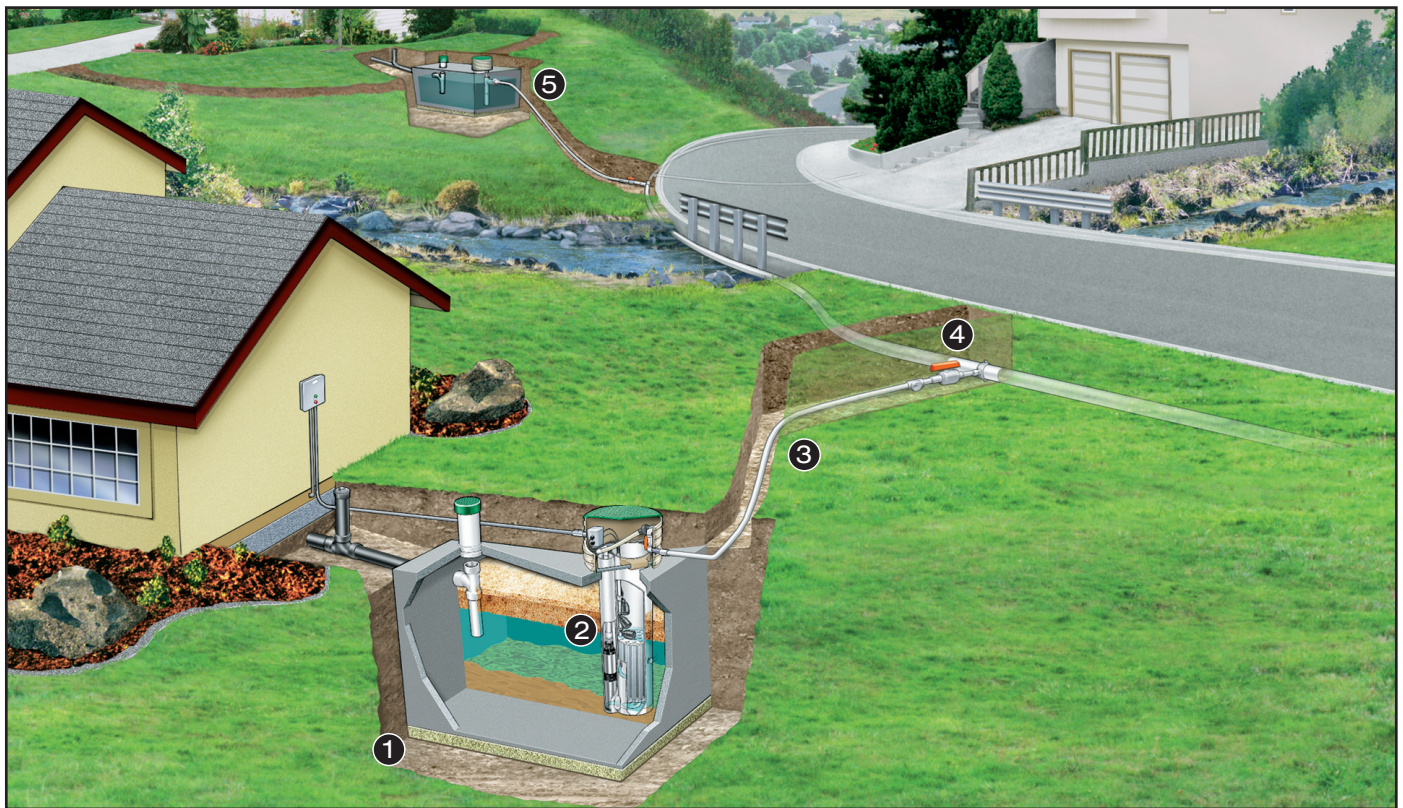
² Water Environment Research Federation, WERF Fact Sheet C1: “Performance & Cost of Decentralized Unit Processes: Gravity Sewer Systems,” and WERF Fact Sheet C3: “Performance & Cost of Decentralized Unit Processes: Effluent Sewer Systems,” April 2010.

HOW IT WORKS:

Orenco® Effluent-Only Sewer to AdvanTex® Treatment System

With an Orenco® Effluent Sewer, every lot in a community or subdivision includes an on-lot tank for collecting household wastewater. (See illustration, below.)

Solids remain in the tank, for passive, natural treatment. Then the filtered effluent is discharged (by either pump or gravity) through shallowly-buried, small-diameter collection lines that follow the contour of the land. The filtered effluent then flows to a nearby AdvanTex® Treatment System (See illustration, Side B.)



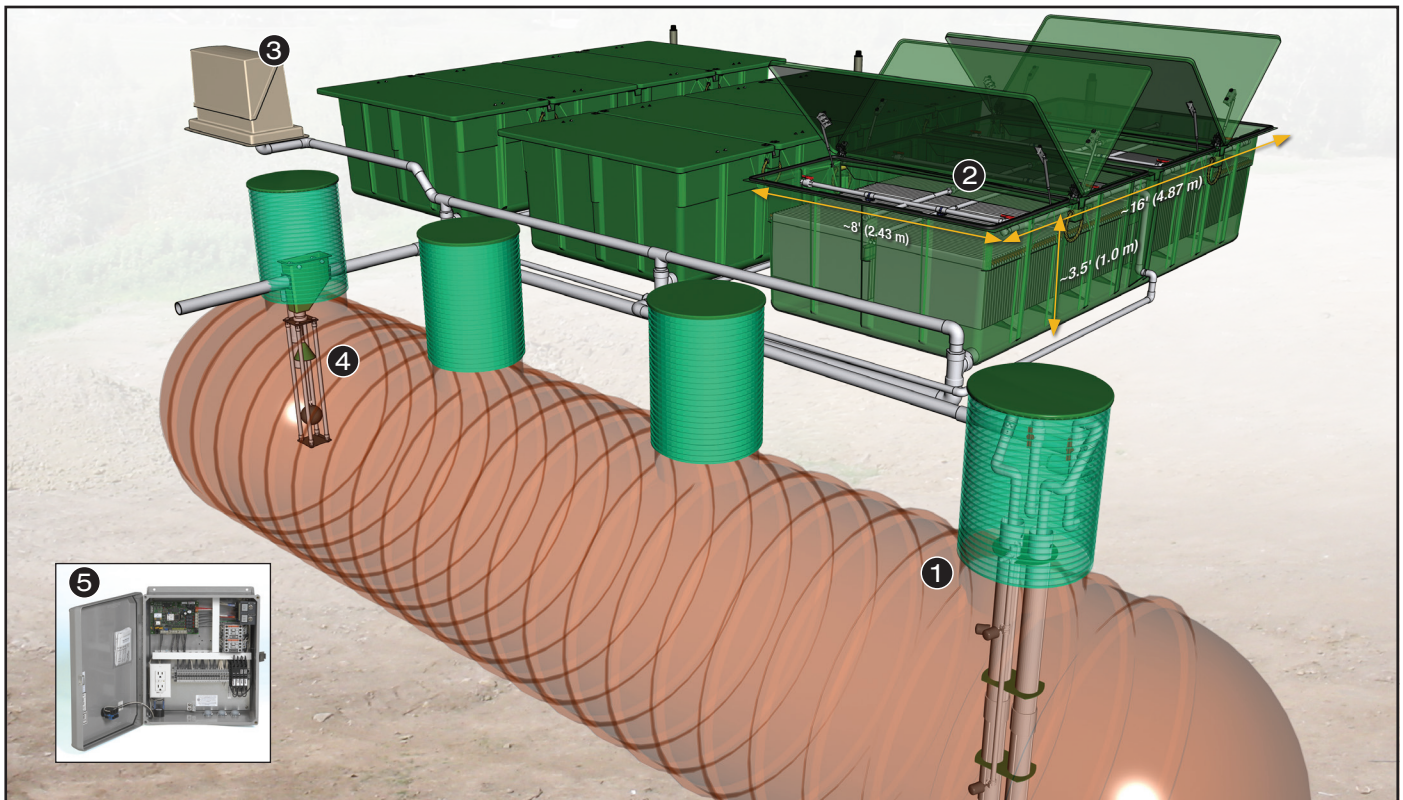
- 1 Watertight tanks provide primary treatment, so only liquids are conveyed to the treatment plant. With proper use, tanks can go 8-12 years between pump-outs.
- 2 Our patented Biotube® Pump Vault filters out solids, and our lightweight, non-corroding pumps last more than 25 years.
- 3 One-inch (25-mm) diameter service lines can be easily installed with a trencher.
- 4 Small-diameter main lines follow the contour of the ground, saving excavation costs. No expensive manholes or lift stations are required.
- 5 Filtered effluent is conveyed by gravity from homes at higher elevations, so no pump is typically required.

HOW IT WORKS:

Orenco® Effluent-Only Sewer to AdvanTex® Treatment System

AdvanTex Treatment Systems are an award-winning¹, low-cost, and low-maintenance technology. They can be installed in-ground or partially bermed, for a very low profile. Larger units can be purchased with a catwalk (for operator ease of servicing) and set above-ground. Filtered effluent from each property's on-lot tank is conveyed through shallowly-buried, small diameter collection lines to a recirc tank at the AdvanTex treatment facility.

¹ To see awards video, go to: <http://www.orenco.com/videos/orenco/AwardsPlayer.html>



- 1** The recirc tank includes a flow inducer with high-head effluent pumps (which are controlled by a panel). Then the liquid is pumped to the AdvanTex pod in small, even doses.
- 2** AdvanTex pods include hanging sheets of textile media on which microorganisms grow and digest waste, naturally.
- 3** The vent fan assembly pulls air through the AdvanTex pod to maintain an aerobic environment, while using very little energy.
- 4** The recirculating splitter valve sends the liquid back through the treatment process again when tank levels are low and discharges it when tank levels are high.
- 5** AdvanTex systems use a remote telemetry control panel, which allows operators to check on the system from office or home, without traveling to the site. The panel's dedicated phone line allows real-time remote adjustments and control.