

# CASE STUDY

## A Sustainable Wastewater Collection and Treatment Solution for New 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 facilities. 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.



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

### Rural Water Utility Builds Customer Base with Wastewater

Since the 1950's, 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

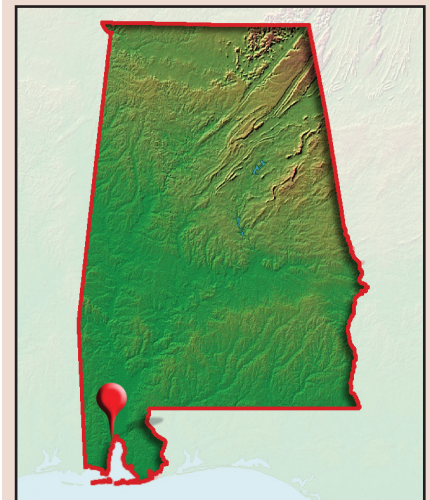
new development and potential new customers were heading SAU's way. "To compete for new development, we felt it was essential to make sewers available in areas where we already had water infrastructure in place," said Donnie Cunningham, SAU's Executive Director. "In the areas we serve, utilities don't 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."

### New Development Market

#### Project Overview

#### MOBILE COUNTY, ALABAMA



#### Since 2002, South Alabama Utilities has...

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

\* Source: South Alabama Utilities.

## SOUTH ALABAMA UTILITIES

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



Phase I and Phase II of SAU's West Mobile wastewater treatment facility 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.



Champion Hills is one of several subdivisions with decentralized wastewater treatment systems that are maintained by South Alabama Utilities.

### 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” insert.)

To ensure product consistency, SAU purchases all collection and treatment equipment from Orenco's distributor and AdvanTex dealer network.

Under SAU's program, all parties share the cost of extending wastewater infrastructure – developers, property owners, and the

## SAU's “Build-As-You-Go” Business Model

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



## SOUTH ALABAMA UTILITIES

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.<sup>1</sup>

“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.”

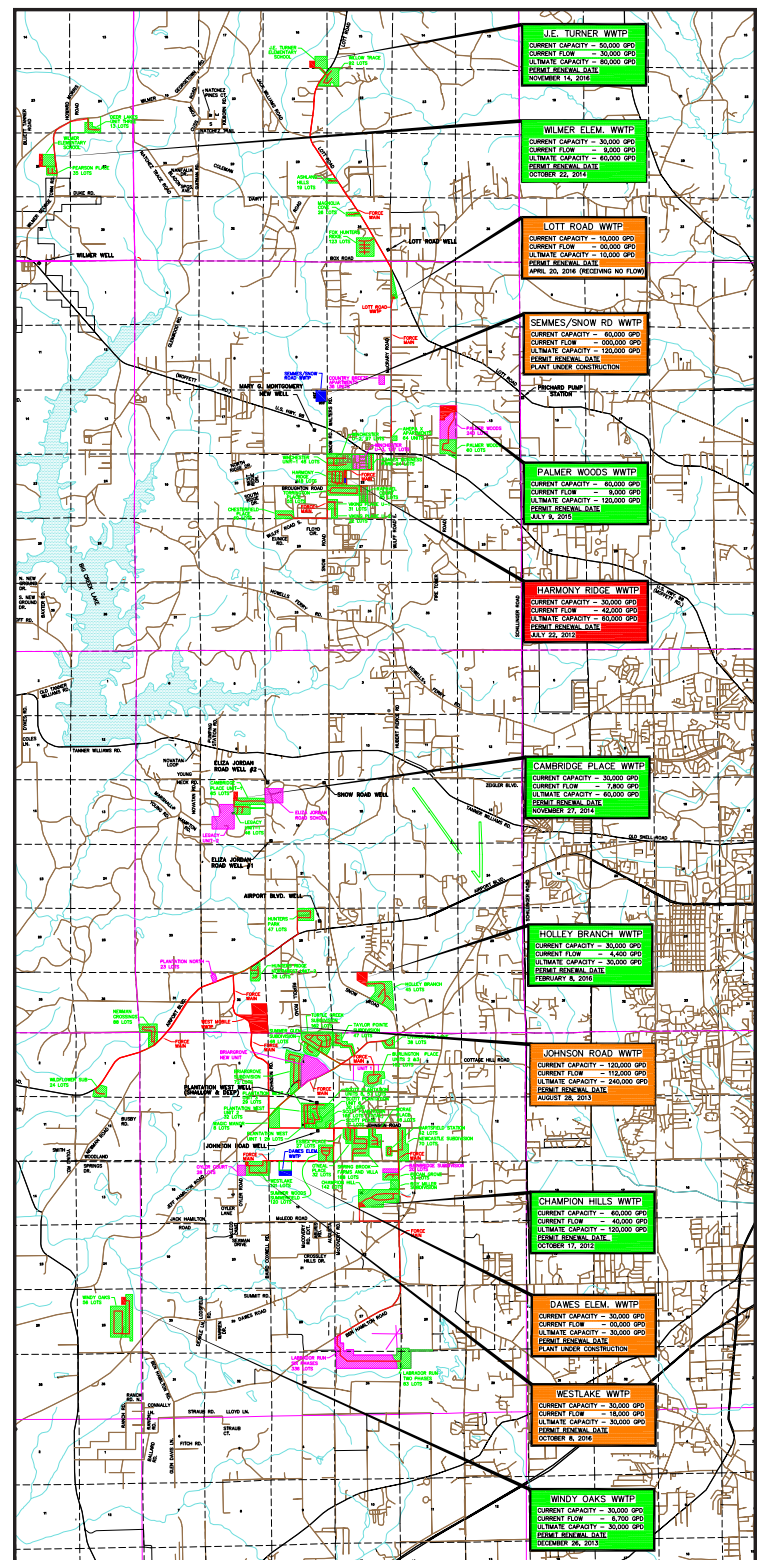
On the commercial side, SAU is now providing wastewater treatment for a 172-apartment complex, a 31-lot business park across the highway from the new \$5 billion ThyssenKrupp steel mill, and numerous other commercial properties.

Effluent sewer systems like SAU’s require very little maintenance. (See “Orenco Effluent Sewer Systems: Operational Costs – 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 facilities, construction superintendent Braxton Platt says, “A two-person crew can perform routine maintenance on three 30,000-gpd systems 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 unit maintenance,” adds Tim Lee, Lead Field Operator. “We test the effluent bi-weekly at all facilities 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. South Alabama Utilities maintains 14 of them, and this map shows all but one.

## SOUTH ALABAMA UTILITIES

## A National Model

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.<sup>2</sup>

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."

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.



<sup>1</sup> 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.

<sup>2</sup> 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.

Data used by Orenco to derive the representations and conclusions contained within this Case Study were current as of April 2012.

## New Development Market

## PROJECT TEAM

## Utility

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Semmes, Alabama  
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Donnie Cunningham, Executive Director  
Braxton Platt, Construction Superintendent  
Tim Lee, Lead Field Operator

## Project Engineer

- Speaks & Associates  
Mobile, Alabama  
251-666-4646  
Mikell Speaks, P.E.  
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## Consulting Engineer

- Dr. Kevin White, Ph.D., P.E.  
Professor and Chair, Civil Engineering  
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Mobile, Alabama  
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## Developers

- Steve Brewer, GBI  
Eric Brewer, GBI  
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Mobile, Alabama  
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- John Howard, President, CEO  
John Howard Companies  
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For information about Prelos™ Sewer, AdvanTex® Wastewater Treatment, or Orenco Controls™, contact Orenco Systems®, Inc.



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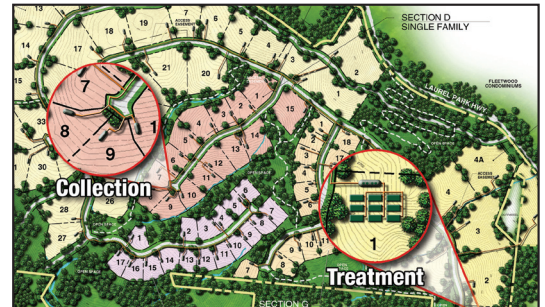
## HOW IT WORKS

### Prelos™ or Orenco® Liquid-Only Sewer to AdvanTex® Treatment System

In a Prelos or Orenco liquid-only sewer, every property in a community or subdivision uses a Prelos Processor or on-lot tank for collecting household wastewater. Solids remain in the tank for passive, natural treatment.

After filtering, the 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 reverse).



- 1 Prelos Processors™ or on-lot tanks provide primary treatment, so only liquids are conveyed to the treatment facility.
- 2 Our patented Biotube® Pump Vault filters out solids, and our pumps can last more than 25 years,<sup>1</sup> requiring minimal or no maintenance.
- 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 on excavation costs. No expensive manholes or lift stations are required.
- 5 The primary wastewater treatment provided by the liquid-only sewer can decrease the capital cost and operating cost of the wastewater treatment plant.<sup>2</sup>

<sup>1</sup> As seen in the Elkton, Oregon, sewer system.

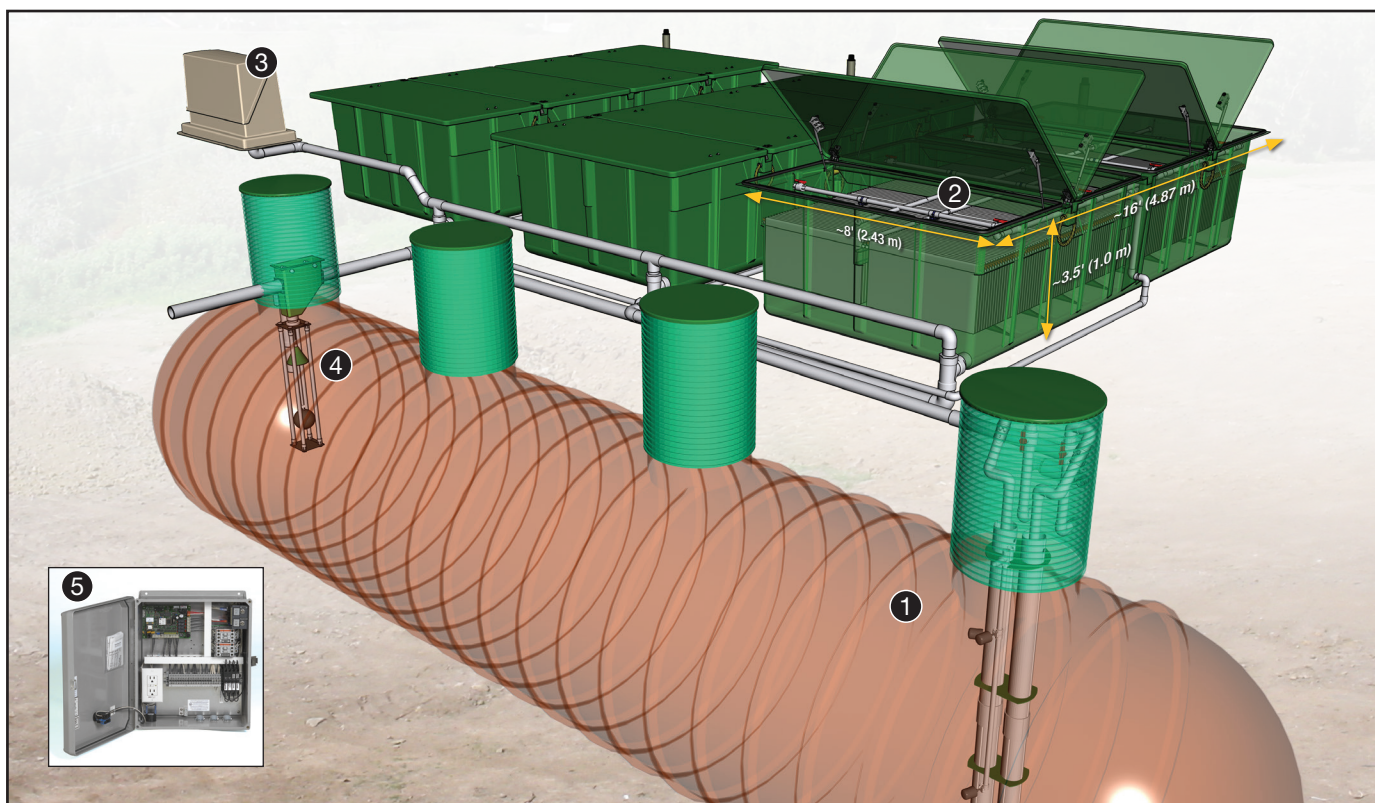
<sup>2</sup> As seen in the Montesano, Washington, sewer system.



## HOW IT WORKS

### Prelos or Orenco Liquid-Only Sewer to AdvanTex Treatment System

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

<sup>1</sup> See [www.orenco.com/training/videos](http://www.orenco.com/training/videos)

<sup>2</sup> Maryland's "Bay Restoration Fund Ranking Documentation," <http://mde.maryland.gov/programs/Water/BayRestorationFund/OnsiteDisposalSystems/Documents/BAT%20Ranking%20Document.pdf>