

# Act of Redemption

**An aerobic treatment unit and seldom-used trench bed prevents a widow's home from being condemned in northern Georgia**

By **Scottie Dayton**

**A**n elderly widow in Acworth, Ga., thought her 40-year-old septic tank was leaking. The state-required soil test reported that the back and front yards of the three-bedroom home were unsuitable for a conventional replacement system. Only a small area behind the garage had acceptable soil.

A solution eluded the homeowner for more than a month because the Cherokee County Environmental Health Department and contractors were unfamiliar with advanced treatment technologies. If they couldn't find an answer, the agency would condemn her house.

When the problem finally reached designers John and Judy Fortune of Aerobic Systems LLC in Buchanan, they contacted underground plumbing division manager Scott Law of Superior Plumbing in Kennesaw. Within a week, they had an approved plan to install an extended aeration activated sludge

treatment unit and low-pressure bed — the first in the county — on the woman's half-acre lot.

The system, installed in October 2006, is functioning perfectly, and the home is no longer threatened with condemnation.

#### Site conditions

Soils are Type F, except for 1,500 square feet of shallow sandy clay loam with a load rating of 90 minutes per inch. The water table is 24 inches below grade.

#### System components

The Fortunes sized the system to handle 500 gpd. Its major components are:

- Existing 1,000-gallon, single-compartment concrete septic tank.
- Aqua Safe AS500 package treatment plant from Ecological Tanks Inc., Downsville, La.
- 1,000-gallon polymer holding



**Above, Juan Gonzalas clears soil from around the pipe to check the connection to the Aqua Safe treatment unit. At left, the septic tank riser appears in the foreground; then the riser on the Aqua Safe pretreatment unit and its control, housing the air compressor and electrical components. (Photos courtesy of Superior Plumbing)**

## System Profile

<b>Location:</b>	Acworth, Ga.
<b>Facility served:</b>	Three-bedroom home
<b>Designer:</b>	John and Judy Fortune, Aerobic Systems LLC, Buchanan, Ga.
<b>Installer:</b>	Scott Law, Superior Plumbing, Kennesaw, Ga.
<b>Site conditions:</b>	Type F soils, except for 1,500 square feet of shallow sandy clay loam, load rating 90 minutes per inch. Water table 24 inches below grade.
<b>Type of system:</b>	Low-pressure bed with Aqua Safe aerobic treatment unit from Ecological Tanks Inc., Downsville, La.
<b>Hydraulic capacity:</b>	500 gpd

tank from NORWESCO's Rochester product line, St. Bonifacius, Minn.

- 275 feet of Schedule 40 pressure PVC in various diameters
- 1,500 square feet of prewashed 57 stone
- Blaster 1/2-hp filtered effluent pump from Goulds.

#### System operation

Wastewater gravity feeds into the septic tank, then flows into the

round fiberglass pretreatment tank, which houses an aeration mixing compartment and center, cone-shaped, clarifier. This tank sits inside the holding tank.

Air introduced at 2.5 psi through four perforated drop tubes around the perimeter of the aeration chamber mixes with the influent. Bacteria attach themselves to the bubbles — their oxygen source — and digest 97 percent of the pathogens as they



**“We’d get our depth, set a section of pipe, cover it with 2 inches of gravel, and repeat the process. The work took half a day to complete, and that’s where you start getting into cost because this was a big pit.”**

**Scott Law**

swirl through the wastewater. A pressure switch on the control panel monitors the air pressure and sounds an alarm if it drops below 0.9 psi.

Mixed liquid enters the fiberglass clarifier from the bottom. Solids fall to the bottom in this quiet zone and re-enter the mixing compartment. Clear, odorless effluent continues to flow up to the 4-inch discharge pipe and into the holding tank. “Georgia code requires holding tanks in the event of a power failure,” says Law.

The low-pressure bed is demand dosed. The Blaster pump sends effluent through 150 feet of 2-inch PVC pipe before a valve reduces the pressure to 20 psi just before the liquid reaches the disposal field. Effluent averages 2.37 mg/l CBOD and 2.11 mg/l TSS.

### Installation

When Law first evaluated the site, he determined that the drainfield was at fault. The shallow suitable soil behind the garage was barely acceptable and confined to a long, narrow space. “John and I went over the regulations for a low-pressure bed and found that we had just enough room for the pit and clearance between the soil and water table,” says Law. “That site left us no other options.”

Low-pressure beds are hard to install on slopes greater than 8 to 10 degrees, so they are rare in hilly Georgia. Curtis Barnhardt, chief environmental health inspector in Cherokee County, had never seen one in 30 years of service.

Law and four employees uncovered and pumped out the septic tank and installed new inlet and outlet tees with risers. The laterals to the house had been replaced with PVC pipe three years earlier and were in good condition.

Using a mini-excavator from IHI Compact Excavator Sales with 36-inch bucket and 360-degree swing, they dug the hole for the aerobic tank 4 feet from the septic tank, and gave the 4-inch PVC pipe connecting the two a 4-inch fall.

A control box on the ATU’s tank top housed the air compressor and electrical components. The riser on the tank has a 4.75-inch inspection port. While both tanks were being set, the excavator operator dug the 20- by 75-foot drainfield pit 18 inches deep, excavating from one end to avoid compacting the soils.

“That afternoon, Barnhardt inspected the tanks and pit, which had to be level,” says Law. “When we returned the next morning, the water table in the back yard was so bad that

**Wes Lamb uses a trenching shovel to prepare for burial of the distribution pipes.**

the tanks were floating.”

He removed them and pumped out the holes when his pump truck arrived, then laid down 12-inch gravel beds before reinstalling the tanks. “We filled them half full with water to neutralize their buoyancy and covered those boys up fast,” Law says.

Twelve inches of prewashed 57 stone was deposited into the graded pit and raked level by hand. On top of that went 275 feet of PVC pipes cemented together. The 1.25-inch main trunk line ran down the center of the pit. On either side were 10-foot-long, 1-inch laterals on 5-foot centers. Five 1/4-inch drip emitters were equally spaced along each lateral with the third hole at the junction

After Barnhardt inspected the disposal bed, Lamb laid contractor’s paper over the gravel to keep dust and dirt from contaminating it. That night brought a downpour. Law knew the site would be a mudslide and dreaded going back. “By luck, the gravel bed was as clean as when we installed it,” he says. “I was real thankful that I didn’t have to start all over again.”

They used the excavated soil to cover the contractor’s paper, then incorporated the remainder of the soil into the back yard. “It was such a mess with a lot of low spots,” says Law. “So we graded it, and seeded and strawed it for free.”

### Maintenance

The State of Georgia will not grant an onsite permit unless a service contract accompanies it. Superior Plumbing holds the 3-year service



**Above, Wes Lamb covers the low-pressure bed with contractor’s paper to keep out dust and dirt. At right, a technician cements 10-foot-long, 1-inch laterals to the 1.25-inch main trunk line in the low-pressure bed.**



of the trunk line. Hand-drilled drip emitters faced down.

Barnhardt completely tested and inspected the system before trenching of the lines began. Using a trenching shovel, Wes Lamb dug down 3 inches. “We’d get our depth, set a section of pipe, cover it with 2 inches of gravel, and repeat the process,” says Law. “The work took half a day to complete, and that’s where you start getting into cost because this was a big pit.”

agreement. Twice a year, a technician checks that the aerobic tank is functioning properly, cleans the air filter, checks the solids level, and checks household usage. ■

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Onsite Installer™ / July 2007

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