

C A S E S T U D Y

An Affordable Wastewater Solution for Single-Family Homes

CHAPEL HILL, NORTH CAROLINA

Problem

When the drainfield failed on a residential home in North Carolina, there was no additional land for a new one. Sewer service was not available, and the owners were faced with the very real possibility of losing the use of their home.

Solution

Engineer Kevin Davidson suggested the installation of an advanced treatment system (an AX20-RTUV) with the ability to produce effluent that could meet surface discharge standards, eliminating the need for a drainfield. The North Carolina Department of Water Quality (DWQ) approved the repair, the homeowners got to stay in their home, and the system is operating well within permit limits. This was the first North Carolina installation of Orenco's AdvanTex AX20-RTUV for surface discharge.

AdvanTex® with UV Allows Surface Discharge in North Carolina

In a residential area outside Chapel Hill, North Carolina, homeowners had an existing conventional septic system with a drainfield that dispersed into poor soils. When the drainfield failed, the lot was too small to put in a new one, and sewer service wasn't available.

The homeowners were extremely concerned because they would not be able to stay in their home without a functioning drainfield. The North Carolina Department of Water Quality (DWQ) wanted to help the homeowners find a solution. However, to maintain public health, the DWQ had to ensure that any new system could meet local NPDES (National Pollutant Discharge Elimination System) standards.

The homeowners asked engineer Kevin Davidson of Agri-Waste Technology to come up with a solution. Working with Todd Harrell, Orenco's Area Sales Manager, Davidson suggested to the DWQ that the homeowners install an AdvanTex AX20-RT with UV. The AX20-RT with UV provides an extremely high level of wastewater treatment and uses a packed-bed media filter and ultraviolet disinfection to clean wastewater to better than secondary treatment standards.



A typical AX20-RT system installation. Note the system's small footprint. The AX20-RT measures 8.5 x 6 x 5.2 ft (2590 x 1830 x 1575 mm).

Residential Market

Project Overview

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Design Parameter

- 480 gpd (1,817 L/day)

Project Engineer

- Kevin Davidson, P.E.
Agri-Waste Technology

Local Unit of Government

- North Carolina Department of Water Quality (DWQ)

Permit Limits

- < 30 mg/L BOD₅/TSS
- < 200 cfu/100 mL Fecal Coliform

Start-Up Date

- July 2011

Primary Treatment

- 1,000-gallon (3785-L) baffled concrete tank

Secondary and Tertiary Treatment

- AX20-RTUV unit
- UV disinfection

Dispersal

- Direct discharge to drainage ditch

Effluent Quality

- 5.8 mg/L BOD₅
- 4.1 mg/L TSS
- 72 cfu/100 mL Fecal Coliform
- 20.8 mg/L Total Nitrogen

Operation and Maintenance

- Agri-Waste Technology

Continued on next page

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Treated effluent from the system would easily meet NPDES permit limits for surface discharge into a ditch or body of water (< 30 mg/L BOD₅ and TSS; < 200 cfu/mL Fecal Coliform), eliminating the need for a drainfield. The DWQ approved the permit – the first time an AX-RT unit was approved for surface discharge in the state of North Carolina.

According to Harrell, “The AX-RT is great for these repair projects because you can just drop it in behind the existing equipment, even if the equipment is not Orenco’s.” Davidson was able to design the new system using the homeowner’s septic tank, and the AX-RT’s configuration eliminated the need for a discharge tank, separate UV basin, and several risers and lids.

After purchasing equipment from AQWA, Orenco’s local dealer, the entire installation — including all electrical, plumbing, drainage, and landscaping work — was completed in only three days. An Orenco® Biotube® Effluent Filter was placed in front of the septic tank’s outlet, and the AX-RT unit was installed behind the tank. The system discharges directly to a drainage ditch on the property.

AX-RT’s are passively vented and use only \$2-\$3 per month in electricity. The system is maintainable with an annual service call because filters are easily accessible and, as Davidson notes, UV sensors are integrated into the control panel, so the service provider can tell if the bulb is working without having to pull it out. Cleanable media and a high-quality effluent pump that lasts 20+ years contribute to low life cycle costs.

With the success of this project, Davidson is now working on 10 other AdvanTex systems, most of which are using AdvanTex AX-RT units to allow for direct discharge. “I think the AX-RT is the best unit, when you look at aesthetics, installation cost, ability to treat waste, and support from Orenco,” said Davidson. “Compared to other technologies, I would grade Orenco at the top.”



This AX20-RTUV with Ultraviolet Disinfection, engineered by Kevin Davidson, is the first to be approved by the North Carolina Department of Water Quality for a surface discharge permit.

Residential Market

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— Kevin Davidson, P.E.
Agri-Waste Technology

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

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