



Syracuse, New York

The Demonstration of New Advanced Wastewater Treatment Technologies at the Skaneateles Lake Watershed

GRANTEE: CITY OF SYRACUSE
 GRANT AMOUNT: \$665,095
 POPULATION: 4,900
 SOIL CONDITIONS: PERCOLATING/STEEP

Project Purpose: The Skaneateles lake watershed has topographically challenging conditions which has made it difficult for conventional septic systems to meet regulatory rules that protect a critical drinking water source. The City of Syracuse sought to demonstrate the use of commercially available advanced onsite wastewater treatment systems at lakefront properties.

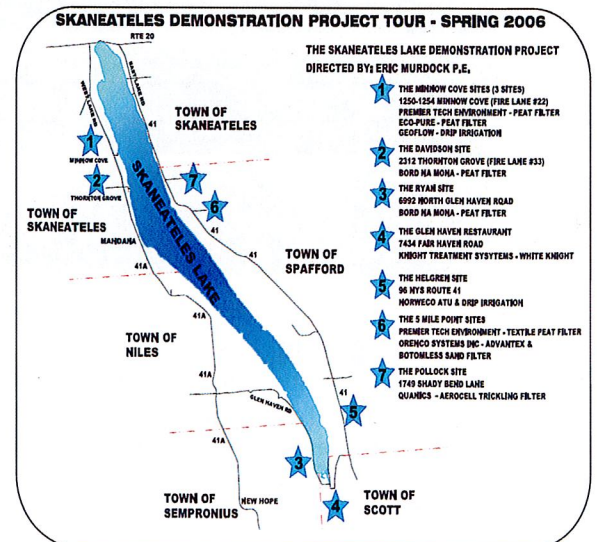
Proposed Solution: Replace failing conventional septic systems with cost efficient pre-engineered Enhanced Treatment Units (ETUs) that meet drinking water standards. Create an oversight management plan supported by regulatory enforcement to ensure the long-term success of the installed septic systems.

Project Overview

The Skaneateles Lake is a critical drinking water source for the City of Syracuse as it is providing an unfiltered water supply for over 250,000 residents. Many lakefront properties in the Skaneateles Lake watershed were failing and polluting the lake due to their improper instillation, age, and/or lack of maintenance. Installing conventional onsite wastewater treatment systems and having them function properly has been challenging for properties in the watershed as much of the lakes shoreline is steeply sloped, have poorly drained soils, and slow permeability. To demonstrate the efficiency of advanced Onsite Wastewater Treatment Systems (OWTS), properties with challenging site conditions were selected for the instillation of units that meet new construction standards. The demonstration project had four main objectives:

- Identify and replace failing and/or inadequate OWTSs along the lakefront sites with a variety of alternative treatment systems and evaluate their performance.

- Develop a uniform regulatory framework for all jurisdictions within the watershed.
- Promote awareness, education, and training for professionals, as well as homeowners and the community.
- Meet effluent concentrations for BOD₅ and Total Suspended Solids of 10 mg/l and a 2-log reduction of total and Fecal Coliform at the down gradient hydraulic boundary of each property.



Technology

Nineteen sites that represent a variety of topography, usages, soil characteristics, and challenges the lake faces were selected based on technology criteria and nine commercially available advanced OTWS were installed on the sites. The advanced OTWS were selected based on an assessment of select criteria such as their cost efficiency, ability to treat effluent in-tank, proven record of performance, and ease of maintenance. The nine advanced onsite wastewater treatment systems used were:

Premier Tech Env. Ecopure/Peat Filter and drip dispersal - uses fungi and peat moss to time dose effluent into a mound

Premier Tech Env. Ecoflo/Peat Filter and Drip Dispersal - effluent has a 36-48hour residence time on the peat then disperses into a 15' x 20' sand pad

White Knight Treatment System - a Microbial Inoculator Generator oxygenates tank and breeds microorganisms which results in the complete consumption of organic materials

NORWECO-ATU Unit and Drip Dispersal - contains a clarification chamber where wastewater gets chlorinated and dechlorinated and discharged into a 500 gallon pump tank to a dispersal field

Oreco Systems Inc./Advantex with Bottomless Sand Filter and Drip Dispersal - septage is recirculated five times and the remaining effluent is pumped to dispersal fields

Eljen Trench - uses in-drains creating vertical infiltration surfaces which reduce land requirements by 50%

Premier Tech Textile/Peat Filter and Conventional Trench - uses aerobic treatment process where effluent flows to a peat filter and is then discharged to a 500-gallon concrete dry well.

Quanics/Aero Cell Trickling Filter - fixed film media installed on top of the OWTS that pretreats before effluent discharges into subsurface trenches

Effluent Dispersal Systems - drip lines made of polyethylene tubing are coated in antibacterial lining installed 6 to 10 inches below the surface.

Monitoring Data

Performance evaluations were based on sampling and analysis for BOD₅, Total Coliform, Total Kjendahl Nitrogen (TKN), Fecal Coliform, and Phosphorus. Effluent samples from the advanced OWTS were collected before and after each unit process on a

monthly basis for at least one year using sampling wells, lysimeter or other sampling mechanism.

Technology	BOD	Total Coliform	Total Nitrogen	Phosphorus	Cost
Premier Tech Env-Peat Filter	90	98	0	<10	\$18,546
Premier Tech Env. Ecopure - Peat Filter and Drip dispersal	74	78	37	<10	\$30,000
Premier Tech Env. - Ecoflo Peat Filter and Conventional Trench	96	100	67	<10	\$28,029
Premier Tech Env. Ecopure - Peat Filter and Drip dispersal	85	92	34	<10	\$30,000
Bord na Mona Bottom Draining Peat Filter	97	100	66	<10	\$28,028.
Bord na Mona Bottom Draining Peat Filter	97	97	38	<10	\$25,546
White Knight Treatment System	81	98	29	<10	No Cost Provided
NORWECO-ATU Unit and Drip Irrigation	-	-	-	-	\$8,000
Oreco Systems Inc. - Advantex with Bottomless Sand Filter	91	99	84	<10	\$32,842.
Oreco Systems Inc. - Advantex with Bottomless Sand Filter	92	99	52	<10	\$32,842
Eljen Trench	97	100	83	<10	\$24,553.
Premier Tech Textile/Peat Filter and Conventional trench	77	84	62	<10	\$36,724
Oreco Textile Filter and Bottomless Sand Filter	70	95	10	<10	\$14,844
Quanics - Aero cell Trickling Filter	47	77	53.1	<10	\$20,902

Project Successes

The demonstration site continues to serve as a source of value as it is being used to inform updated policies and regulations among local jurisdictions. Skaneateles Lake watershed regulatory authorities now require that replacement systems that cannot meet new construction standards have an Enhanced Treatment Unit. The advanced OWTS installed are the first of their kind in New York State and serves as an excellent outreach and training tool through field tours and onsite training events. The training opportunities target