# PROJECT PROFILE

An Affordable Wastewater Collection and Treatment Solution for Municipalities and Communities

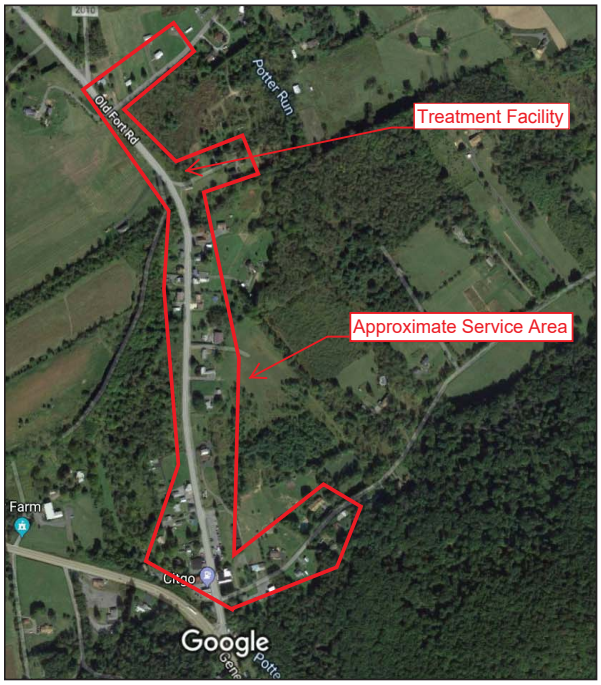
## POTTERS MILLS, PENNSYLVANIA

**Problem** The area around Potters Mills, a village in central Pennsylvania, has a long history of failing septic systems. In an evaluation performed by the local sewage enforcement officer, 72% of the on-lot septic systems in the proposed service area for Potters Mills had confirmed or suspected malfunctions.

**Solution** Located about 3.5 miles (5.6 km) from the closest city sewer system, Potters Mills needed an effective, affordable wastewater collection and treatment system that was easy to install, operate, and maintain with minimal disruption to residents' daily lives. The governing Potter Township chose an Orenco® Prelos® Wastewater Collection System, followed by an Orenco AdvanTex® Wastewater System for advanced treatment.

## In Search of a Solution

Established in the late 1700's, the village of Potters Mills is located in south central Potter Township, Centre County, Pennsylvania. This community of about 140 residents has no public water or wastewater system. All homes and businesses are served by private wells and on-lot septic systems.




*The wastewater service area for Potters Mills includes 46 properties, 72% of which were confirmed or suspected to have a malfunctioning septic system.*

But with septic system failure on the rise, the village had been in need of a sewer solution for many years. When the township's sewage enforcement officer evaluated the 46 properties in a proposed wastewater service area, 72% of the septic systems were confirmed or suspected to be malfunctioning.[1] The evaluation also concluded that most of these systems weren't fixable because of small lot sizes, poor soil conditions, or high seasonal groundwater.

With the nearest municipal sewer system located about 3.5 miles (5.6 km)

## Municipal and Community Market

### Project Overview

**POTTERS MILLS, PA**

**Design Parameters**
- Current number of connections: 42 residential and 4 commercial
- 4-phase design allows for expansion up to 170 EDUs
- Phase 1: 14,000 gpd (53 $m^3$/day) average flow 28,000 gpd (106 $m^3$/day) maximum flow

**Permit Limits (monthly averages)**
- 25 mg/L $cBOD_5$
- 30 mg/L TSS
- < 200 cfu/100 ml E. coli (summer)
- < 2000 cfu/100 ml E. coli (winter)

**Start-Up Date**
- Fall 2019

**Estimated Project Cost**
- $2 million (equipment and installation)

**Funding Sources**
- Pennsylvania Infrastructure Investment Authority (part grant, part loan)
- Community Development Block Grant

**Fees**
- Estimated monthly residential rate: $81/EDU (standard fee in Potter Township rate district)

**Collection System and Primary Treatment**
- Thirty-nine 1000-gal (3.8-$m^3$) Prelos Processors
- Five 1500-gal (5.7-$m^3$) FRP STEP tanks
- One of each type of tank at two additional locations (parallel operation)

**Secondary Treatment**
- 1 AX-Max 300-42
- 1 AX-Max 275-42

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## POTTERS MILLS, PENNSYLVANIA


*A Prelos Wastewater Collection System allows sewer lines to be installed using horizontal directional drilling, minimizing disruption to the community.*

from Potters Mills, township leaders realized they needed a closer, more accessible solution to their sewage problems. Dick Decker, a retired Professional Engineer and Chairman of the Potter Township Board of Supervisors, was at a training session for engineers when he was first introduced to Orenco's liquid-only (effluent) sewer systems. That was in the summer of 2010.

Following Decker's introduction to the liquid-only sewer solution, the Township began preliminary engineering and testing in preparation for upgrading its Act 537 Plan. The Pennsylvania Sewage Facilities Act (Act 537) requires that all commonwealth municipalities develop and implement comprehensive official plans that provide for the resolution of existing sewage problems and the future sewage disposal needs of the municipality and of new land development.

At this time, the Township began consulting with Kerry Tyson, P.E., of Nittany Engineering (a division of Century Engineering). Tyson would help with project development and with documentation and formal preparation of an Act 537 sewage management plan.

From the beginning, keeping operation and maintenance costs down for both collection and treatment was a high priority. Another goal was to find an effective treatment system that was easier to maintain and operate than the extended-aeration, activated-sludge treatment plant that the Township already owned and operated at another location within its boundaries.

### Collection and Treatment Systems Evaluated

In consultation with Tyson, the Township considered these four wastewater collection options:

- Gravity sewer: The area's high groundwater would make installation difficult and had the potential for infiltration problems. Also, the Township wanted to minimize disruption for residents, but installing a gravity sewer requires open trenches and heavy machinery.
- Grinder sewer: The Township was hesitant to take on the expense of grinder pump operation and maintenance. Also, due to the age of many of the homes in the service area, it was uncertain whether they had sufficient electrical capacity to operate the 230-volt pumps.
- Vacuum sewer: This was eliminated early on due to the high groundwater and small size of the service area.
- Orenco's Prelos Wastewater Collection System: The Township favored the simplex pumps and small-diameter HDPE pipe that are key components of a Prelos system. This type of sewer can typically be installed using horizontal directional drilling, which minimizes the disturbance (as well as the related restoration and repair) usually associated with sewer installation.

For wastewater treatment, the Township also considered four options:

- Existing treatment plant: Wastewater from Potters Mills would be transported to a central pump station and then pumped to the nearest existing treatment plant. This was estimated to be almost twice as expensive as the lowest-cost option.
- Activated sludge: The Township already owned and maintained one of these treatment systems in a different location and wanted a system for Potters Mills that would be less demanding to operate and maintain.
- Membrane bioreactor: This type of treatment couldn't fulfill the Township's requirement of being simple to operate. It also came with a high capital cost and couldn't be easily expanded.
- Orenco's AdvanTex Treatment System: This was found to be the most cost-effective system for the Potters Mills service area. Another advantage was that it could be installed in phases to accommodate future treatment needs.

## Prelos Collection and AdvanTex Treatment

Potter Township chose to install a Prelos Wastewater Collection System followed by AdvanTex treatment. With all system components (tanks, pumps, treatment units, controls, etc.) being furnished and backed by Orenco, the Township was confident in the system's performance. In addition, the simple operational requirements of the Orenco system would allow township workers to operate and maintain it without needing extensive or complicated training.

*When complete, the Potters Mills AdvanTex facility can be expanded in four phases to handle the wastewater from up to 170 equivalent dwelling units.*

Since 1981, Orenco Systems has researched, designed, and manufactured leading-edge onsite and pressurized wastewater collection and treatment technologies. Its Prelos Wastewater Collection System is an innovative technology based on almost 40 years of proven sewer solutions.

*The Prelos Processor includes a patented "meander" design for superior solids settling, along with a patent-pending, passively self-cleaning pump vault, and a lightweight, low-horsepower effluent pump.*

The Prelos Processor is the core of the system. Its watertight tank has a unique, patented "meander" design for superior solids settling, removal, and primary treatment. Solids are screened by its passively self-cleaning pump vault and filter, so only liquids are transported to the treatment facility. The processor is easy to maintain, with long-lifespan components that include a lightweight effluent pump that can last more than 25 years.[2] An optional 10-year, extended limited pump warranty is available. Small diameter service lines that follow the contour of the land carry the primary-treated effluent from the Prelos Processor to the AdvanTex treatment facility.

AdvanTex treatment systems use a fixed-film, attached-growth treatment process and are an excellent solution for small communities and small-flow applications. In an AdvanTex system, wastewater is uniformly distributed onto unsaturated textile media. The system uses fractional-horsepower fans to draw air through the media and provide sufficient oxygen for aerobic digestion. Low-horsepower, high-head turbine pumps operate intermittently with sophisticated controls that automatically adjust pump run-times based on daily flows to meet pre-set recirculation ratios. The energy required for aerating and distributing the wastewater onto the media is considerably less than for an activated-sludge system.

## Installation and Start-Up

Sippel Development began construction of the system in January 2019, with various challenges to overcome. Due to the age of the community, many property owners didn't know exactly where their septic tank and/or drainfield were located. Other lots were so small that the property's new Prelos

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Processor had to be buried in the same spot as the existing septic tank. This meant that several homeowners had to be provided with temporary sewage service after their old septic tank was replaced and until the new collection and treatment system was operational.

*Treated effluent is pure enough to be discharged into a nearby creek.*

Installation plans also had to account for the high groundwater around Potters Mills by using anti-buoyancy measures for installing all tanks. And because of underground rock, there were some areas where horizontal directional drilling was not an option for installing the collection and effluent discharge lines. Despite these complications, installation proceeded mostly on schedule.

Potter Township owns, operates, and maintains the collection system, from the Prelos Processor inlets to the treated effluent discharge outfall to Sinking Creek. They also own and operate the AdvanTex treatment facility, which is located near the northern end of the service area, next to a community park and about 200 feet (61 m) from the nearest home.

The AdvanTex facility can be expanded in four phases to eventually handle up to 170 equivalent dwelling units (EDUs). Phase 1 includes one AX-Max 300-42 and one AX-Max 275-42 and can treat up to 70 EDUs.

Dick Decker, P.E., Chairman of the Potter Township Board of Supervisors, says, "Orenco was extremely cooperative in working with Nittany Engineering to develop a treatment plant design that would meet the NPDES effluent discharge criteria. Especially helpful was Orenco's Garry-Lee Espinosa in their Systems Engineering Department, who prepared numerous proposals for the engineer's revised designs and was essential in reviewing the finalized overall system design to ensure it was consistent with Orenco's published design criteria."

*1. Sewage Enforcement Officer Status Report, Potters Mills, March 3, 2015.*

*2. As seen in the Glide and Elkton, Oregon, and Diamond Lake, Washington, sewer systems.*

## Municipal and Community Market

**Disinfection**
- Ultraviolet light

**Discharge**
- Surface discharge to Sinking Creek

**Monitoring and Control**
- Orenco Controls™ TCOM™ panel

**Ownership, Operation, and Maintenance**
- Potter Township

**Engineer**
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For information about Prelos® Sewer, AdvanTex® Wastewater Treatment, or Orenco Controls™, contact Orenco Systems®, Inc.

Orenco® WATER

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