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Case Study: Arrowhead Village Pressure Sewer & Wastewater Treatment System - Norton, MA

Overview

Arrowhead Village is a 32-lot residential subdivision in Norton, Massachusetts, a community without access to a municipal sewer system. When engineers began planning the development, they faced a two-part problem that would define the entire infrastructure approach.

First and foremost, the site required onsite wastewater treatment. With no municipal connection available and 32 homes generating combined flows far beyond what individual septic systems could reliably handle, a centralized treatment solution was essential to meet regulatory requirements and protect the local environment.

Second, once a centralized treatment facility was identified as the answer, engineers needed a collection system capable of conveying wastewater from every home across the subdivision to that central point without the cost and disruption of installing a traditional deep-cut gravity sewer network.

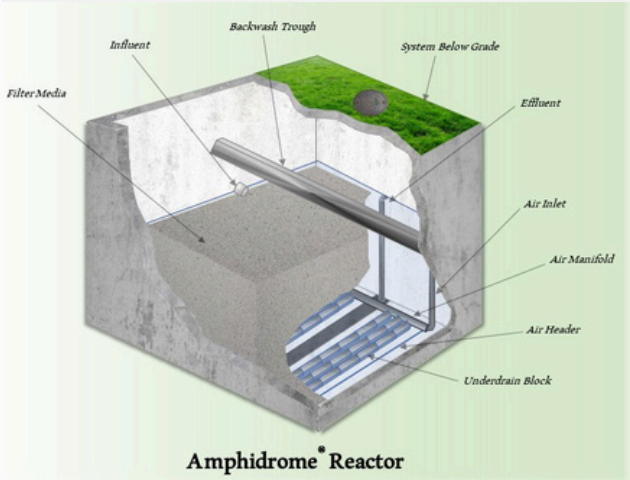
The solution came in two integrated parts: an Amphidrome® advanced biological treatment system to handle the treatment requirement, and an Environment One (E/One) Low Pressure Sewer (LPS) system to solve the collection challenge efficiently and economically.

The Solution

Part 1: Onsite Wastewater Treatment — Amphidrome® System

The treatment requirement drove the project design from the start. With 32 homes and no municipal sewer connection, regulators required a proven, centralized treatment system capable of delivering consistent, high-quality effluent. The Amphidrome® advanced biological treatment system was selected to meet this need. The treatment facility includes:

- A 15,000-gallon anoxic tank for biological nutrient removal
- An 8-foot diameter Amphidrome® reactor providing advanced secondary treatment
- A 19,000-gallon clear well serving as the effluent dosing chamber
- Supporting blowers, controls, and a dedicated control building for monitoring and operations



Amphidrome® Reactor

The system was engineered to handle approximately 9,760 gallons of wastewater per day, sufficient capacity to serve the entire development

while maintaining reliable, consistent treatment performance throughout the life of the project.

Part 2: Collection — E/One Low Pressure Sewer System
With centralized treatment established as the goal, the next challenge was getting wastewater from 32 individual homes to the treatment facility in the most practical, cost-effective way possible.

A traditional gravity sewer system would have required deep excavation, significant grading work, and substantially higher installation costs. Instead, engineers specified an E/One Low Pressure Sewer system, an approach that uses individual grinder pumps at each home and a network of small-diameter force mains to convey wastewater under pressure.

Each home was equipped with an Environment One 2000 Series grinder pump (model 2010-93), designed to handle residential wastewater flows of up to 700 gallons per day. The 32 pumps convey wastewater through approximately 2,495 feet of 1.5-inch SDR-21 PVC force main, transitioning through a short section of 2-inch piping before entering the treatment system.

This approach dramatically reduced excavation requirements, minimized disruption to the subdivision, and allowed the collection infrastructure to be installed at a fraction of the cost of conventional gravity sewer.

Results
Arrowhead Village stands as a practical example of how two complementary technologies, advanced onsite treatment and low pressure sewer collection, can be integrated to solve a complex wastewater challenge in a residential development without municipal sewer access.

By addressing the treatment requirement first with the Amphidrome® system, and then solving collection with E/One LPS technology, F.R. Mahony & Associates delivered a complete, code-compliant wastewater solution that:

- Met regulatory treatment requirements without a municipal sewer connection
- Eliminated the need for costly gravity sewer excavation across 32 lots
- Provided dependable long-term performance with minimal infrastructure
- Reduced installation complexity and overall project cost

The system continues to serve the Arrowhead Village community reliably, demonstrating the effectiveness of this integrated approach for residential subdivisions facing similar constraints.

For more information please contact me today!

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