

A Wastewater Management Model for Small Communities

In 2004 the Town of Warren, Vermont constructed and implemented decentralized wastewater systems and a management program in its historic Village. The program is a model for other small communities in evaluating need, determining options, and creating a municipal management plan. Stone Environmental, Inc. of Montpelier, Vermont was the primary consultant to the Town during the planning phases. Forcier Aldrich & Associates, Inc. of Essex Junction, Vermont was the engineering consultant during design, construction, and start-up.

Ensuring Reliable Wastewater Systems

The program combines traditional and alternative sewage systems with a comprehensive management plan to ensure that most of the Village's 95 properties are served by a reliable wastewater system that protects the environment

and preserves the Town's rural character. For the first time in Vermont, joining such a program was not mandatory, and more than 90% of Village residents joined voluntarily. Owners of properties in the Village who did not participate in the original project will be able to join in the future.

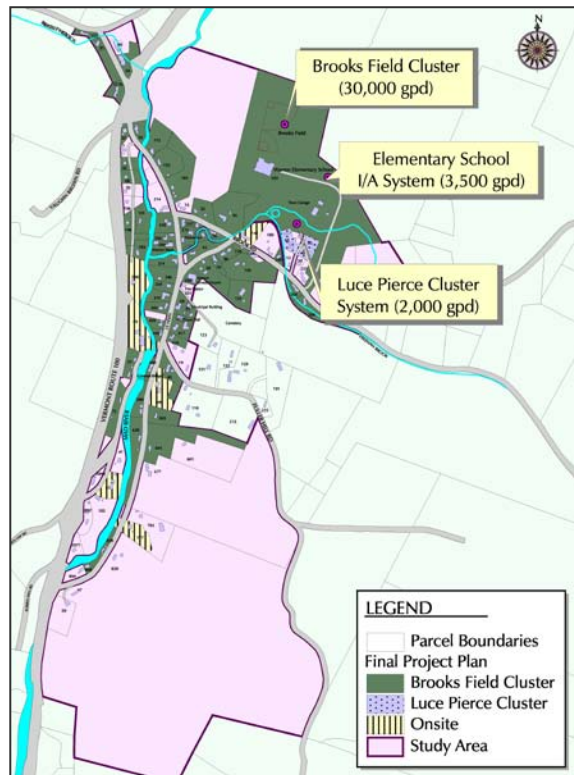
Each participating Village property is connected to one of four wastewater systems: a managed pre-existing onsite system, a new individual onsite system, a 30,000 gallon per day (gpd) cluster system at Brooks Field, or a 2,000 gpd cluster system on Luce Pierce Road. The combination of existing onsite systems with new onsite and cluster systems was the first municipal project of its kind in Vermont. The Town manages the systems with assistance from an operation and maintenance service provider, and annual engineering reviews.

Timely Response to Problems

The Town can remotely monitor the system's four pump stations through the use of radio telemetry. If a problem occurs, the remote unit automatically alerts the service provider. Individual properties use Web-based telemetry: telephone connections on 31 Septic Tank Effluent Pump systems enable service providers to view them remotely and change variables such as pump run times. Each property's water meter has a remote touch pad that records water usage, which is part of the monthly wastewater bill. With a view to reducing water use and assisting lower-income residents, user fees are based both on the number of bedrooms on the property and on a water use rate that encourages water conservation.

Award-Winning Achievements

Warren's decentralized wastewater management project achieved many firsts, including being the first decentralized project in Vermont to conduct a detailed needs assessment, the first alternative system permitted in Vermont, the first project to use remote monitoring for management, and the first with a comprehensive decentralized wastewater management plan.



Final project plan for the historic village

The system at the Warren Elementary School was the first municipal alternative treatment system permitted in Vermont (see box). Its design helped convince regulators to include alternative technologies in Vermont's onsite wastewater rules. The Elementary School system and the Village Decentralized Wastewater Improvements project both received ACEC/Vermont Grand Awards for Engineering Excellence from the American Consulting Engineers Council.

Steps to Success

Warren is a typical 19th century New England mill town of small lots with individual wells and septic systems close to the Mad River and Freeman Brook. Before the project, the Town had no municipal wastewater infrastructure, other than a small cluster system serving seven properties.

Amid growing concern about the possible impact of septic systems on the rivers, the Town conducted a traditional sewer feasibility study in the early 1990s. Residents, believing the study did not prove a need, rejected its recommendation for a centralized system with mandatory connections. Then in 1998, the Mad River Valley Planning District helped the Town win a US EPA National Onsite Demonstration Grant, and the decentralized management project was launched. The project covered five key areas:

- **Public Education and Outreach:** A local Wastewater Advisory Committee, appointed by the Selectboard, helped residents understand the project and gained their support. Extensive, ongoing education and communication efforts took place between the consultants, the Town, residents, and regulators.
- **Needs Assessment:** A lot-by-lot needs assessment found that most properties would benefit from connection to an offsite system. Systems at three properties could be managed with minor upgrades; and five were recommended for onsite replacement.
- **Recommended Options:** The team considered options for replacing and managing existing systems. After testing seven potential sites for cluster systems, they identified four that could serve 76 properties. They also developed preliminary cost estimates for construction.
- **Town Bond Vote:** The Town needed to approve a bond vote to secure financing for the project. After several public meetings, residents approved their portion of the financing in March 2002.

Warren Elementary School—A National Success Story

A failing wastewater system at the elementary school threatened the quality of the school's water supply. The Town decided to replace the old system with a pilot alternative system to demonstrate the use and benefits of innovative and alternative technologies.

A recirculating Advantex™ textile filter and shallow gravel-less, time-dosed dispersal system were installed in January 2001. An immediate benefit was apparent in the size of the new system's dispersal field: due to the use of pretreatment technologies, it was only half the size of a traditional dispersal field.

The new system is monitored through the use of telemetry and regular sampling of treated effluent. It also undergoes regular inspections and maintenance. To date, it has performed well within its permitted standards.

- **Construction:** Phase 1, completed in 2004, enlarged the existing Brooks Field cluster system from 5,000 to 30,000 gpd. Phase 2, completed in 2005, includes two managed onsite systems, five onsite replacement systems, three connections to the 2,000 gpd Luce Pierce cluster system, and water meter installations. The Brooks Field system includes 31 individual Septic Tank Effluent Pump system connections and 28 individual gravity system connections.

The Next Phase

The Brooks Field cluster system's original State permit was limited to existing flows, so even after users connected to the new system, residents couldn't add apartments or otherwise increase their wastewater flows. To address this issue, Stone conducted additional hydrogeologic investigations and will continue to conduct water quality sampling downgradient from the new system to support the Town's State permit amendment application to allow new flows into the Brooks Field system.



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