

PRODUCT EMPHASIS

Clusters: A Viable Alternative

Cluster systems provide sustainable development solutions and quality wastewater treatment for rural communities

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Small cities, townships and counties face many complex wastewater treatment issues. Loss of community identity due to the urban sprawl that often follows centralized sewerage is just one major challenge faced by these communities. Cluster systems have become an invaluable method to provide small communities with high-quality, cost-effective wastewater management, while protecting the character of the community.

Still, many barriers to cluster onsite wastewater treatment systems exist. Heavy federal funding under the U.S. EPA's construction grants program focused the entire wastewater industry on large treatment and sewer networks that discharge to U.S. waters. For years, resources, regulations, permits and design knowledge have all been directed to expand and maintain this infrastructure model.

While this effort has been very effective in reducing point-source pollution, many communities in the U.S. still do not have sewer service. This has forced a paradigm shift in the industry to develop alternative methods of treatment.

One of the biggest reasons for the shift was the end of the construction grants program that was a part of the Clean Water Act. In addition, technological innovation that allows small-scale treatment facilities to consistently meet high treatment standards by using new advanced products has opened the eyes of many regulators nationwide.

All of this has resulted in a change in public policy that is taking place at the state level. In Florida, for example, the Florida Onsite Wastewater Association is proposing legislation that removes the mandatory hookup to sewers even in areas where the sewers will travel by a property. This will give developers and land owners the option to pursue treatment alternatives that return the treated water to the groundwater system rather than discharging to surface water resources. Other states as well as the EPA now recognize the benefits of decentralized wastewater systems.

Preserving open space

Traditional wastewater systems, sometimes called "septic systems," require a lot of land for soil to treat wastewater and have led to the "large lot" zoning that is consuming land across the country at an enormous rate. Recognizing that housing now covers more land than any other human use, looking for wastewater treatment solutions that can be effective on smaller lots and implemented as part of community master plans and cluster developments is a focus for regulators and the onsite industry.

The cluster wastewater system approach is a viable alternative that allows for the preservation of community open space. Cluster wastewater systems can easily be hidden from view because the majority of the treatment works are located underground, and these systems can be landscaped to integrate into open space viewsheds. This creates new opportunities for developers looking for ways to preserve open space and respond to the needs of the community.

New wastewater zoning

As cluster development emerges as the sustainable land use option of choice in many areas, onsite wastewater systems such as constructed wetlands are becoming the wave of the future for efficiently serving small communities.

When residential or commercial wastewater is processed in these efficient treatment systems, it can be recycled back into the groundwater system or reused for beneficial purposes. There are now new options for developing areas that do not force "big pipe" high-density development or the inefficient large lot development required for standard septic tank drain-field systems. Therefore, the next step is to review and revise wastewater codes to accept these alternative treatment options.

Other issues

The most frequently asked question by community leaders is: Who is going to own and operate these cluster wastewater systems?

In the case of regional treatment, the infrastructure model is highly maintained and regulated, and the public owns the systems. These publicly owned systems have many ways to pay for construction operation and maintenance.

On the other hand, the history of onsite septic systems owned by the homeowner has a poor record of maintenance. The homeowner is responsible for the cost of construction, operation and maintenance. While homeowner education is improving, there is a very wide range of homeowner inspection and maintenance.

Maintenance is crucial to the long-term viability of any wastewater treatment system. There is no maintenance-free wastewater alternative.

What would happen if you never did anything for your car but added gas and drove it?

Perhaps it would run a couple of years before a major problem puts it out of commission; however, with proper operation, maintenance and parts replacement, cars can run for hundreds of thousands of miles, and wastewater systems can last 30 to 40 years before replacement is required. This is what we have traditionally expected from publicly owned municipal systems, and with proper maintenance, small community systems have the same capabilities.

Small cluster wastewater system management is just as important for public, homeowner and privately owned systems. The fact that there are numerous ownership options for community cluster systems makes some communities nervous about allowing something different from what they have experienced in the past. To address this concern, wastewater engineering companies, manufacturers and industry leaders are working together to create management models for community-owned systems, homeowner cooperatives and privately owned options. All have advantages and disadvantages.



Most important is that there are options to choose from and that ownership results in responsible management of the systems installed under their guidance.

The EPA has identified the performance of onsite and clustered (decentralized) wastewater treatment systems as a national issue of great concern. Five management models are recommended. For cluster systems, operating permits, maintenance contracts and operation by a specified management entity (public or private) are needed.

Leading the sustainable development movement

To preserve open space and protect the rural character of the community, Lake Elmo, Minn., refused to connect to the regional sewer. This conflicted with growth plans created by the regional planning agency, the Metropolitan Council, and a legal battle ensued that went to the Minnesota Supreme Court. As a result, Lake Elmo was forced to accept regional sewer along the Interstate 94 corridor and limited use elsewhere. The remaining areas of the community, however, retained their original wastewater systems and land use plans.

In 1995, a local developer, Robert Engstrom, proposed a development near the "Old Village," the central area of Lake Elmo. His plan, called "The Fields of St. Croix," was to mirror the Old Village with large tracts of open space surrounding a cluster of homes to be served by a central water and sewer system.

No ordinances were in existence to accommodate such a request, and wastewater treatment was a concern. After months of work with the city and state, the development was able to proceed with the first state-permitted subsurface flow wetland in Minnesota.

This was the beginning of open space developments using decentralized wastewater technology within the community of Lake Elmo and the state of Minnesota.

There are now eight cluster treatment systems in Lake Elmo, treating a combined flow in excess of 118,000 gpd. Minnesota has more than 100 decentralized wastewater systems. Some of these systems employ both subsurface flow and vertical flow systems. Subsurface infiltration chambers are used for effluent disposal in this glacial till environment. The chambers are engineered to allow more open soil contact for better infiltration and increased gas exchange. This provides more oxygen to the system. Their light-weight and compact design makes them easy to install even on challenging sites.

Continuing the trend

Pratt Homes recently proposed a sustainable housing design project in an ecologically minded community in Afton, Minn. Current large lot development in Afton is dotting the landscape with just a few homes and consuming land at enormous rates. The neighboring Woodbury represents maximum development on a big pipe sewer system discharging to the Mississippi River.

The vision of Len Pratt, founder of Pratt Homes, is for a cluster development of smaller lots on former pastureland. Pratt would preserve the forested areas, wetlands and drainage ways and use a wastewater system that purifies the water before returning it to the soil and back into the groundwater system. According to Pratt, the area is sustainable infrastructure. Even more desirable is Pratt's plan for using constructed wetlands for wastewater treatment using natural biodegradation processes that are friendly to the environment.

Cluster concept in cowboy country

Dorsey Creek Ranch is an innovative project on every level and a new concept for Big Horn County, Wyo. The development design, based on a painting by Cezanne, will take groundwater to serve the 138-home development and use constructed wetlands to purify the wastewater. Dip irrigation technology common to ranchers in the West will efficiently return this water back into the system to grow crops on an organic farm. The relatively high-density housing project proposed in Big Horn County is a new approach for this sparsely populated area that currently has about four people per square mile. The 137-home subdivision on approximately 150 acres will provide

modest, affordable homes while still maintaining the rural nature of the area.

Although clustered developments such as Dorsey Creek have been happening in the U.S. for years, it's a relatively new concept in the West, but one that is beginning to gain momentum there. Recently, Larimer County, Colo., began offering incentives to property owners to use clustered development in an effort to keep most of the land open for agricultural uses.

Cluster development and community wastewater systems preserve open space for recreation, agriculture and wildlife habitat, and allow communities to retain their character. They also present communities with options where centralized sewerage is no longer economically feasible or aesthetically desirable. Products and design technology in the wastewater industry have advanced to the point that environmentally safe treatment can be provided on sites without the need for central sewer systems.

As a shift in thinking at the regulatory level continues to take place, opening the way for ecologically based cluster treatment, the beauty, functionality and economic sustainability of communities nationwide will be better protected for the future. **WWD**

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