SHARED Septic Systems

A shared sand filter and drain field was the least expensive solution for a difficult site

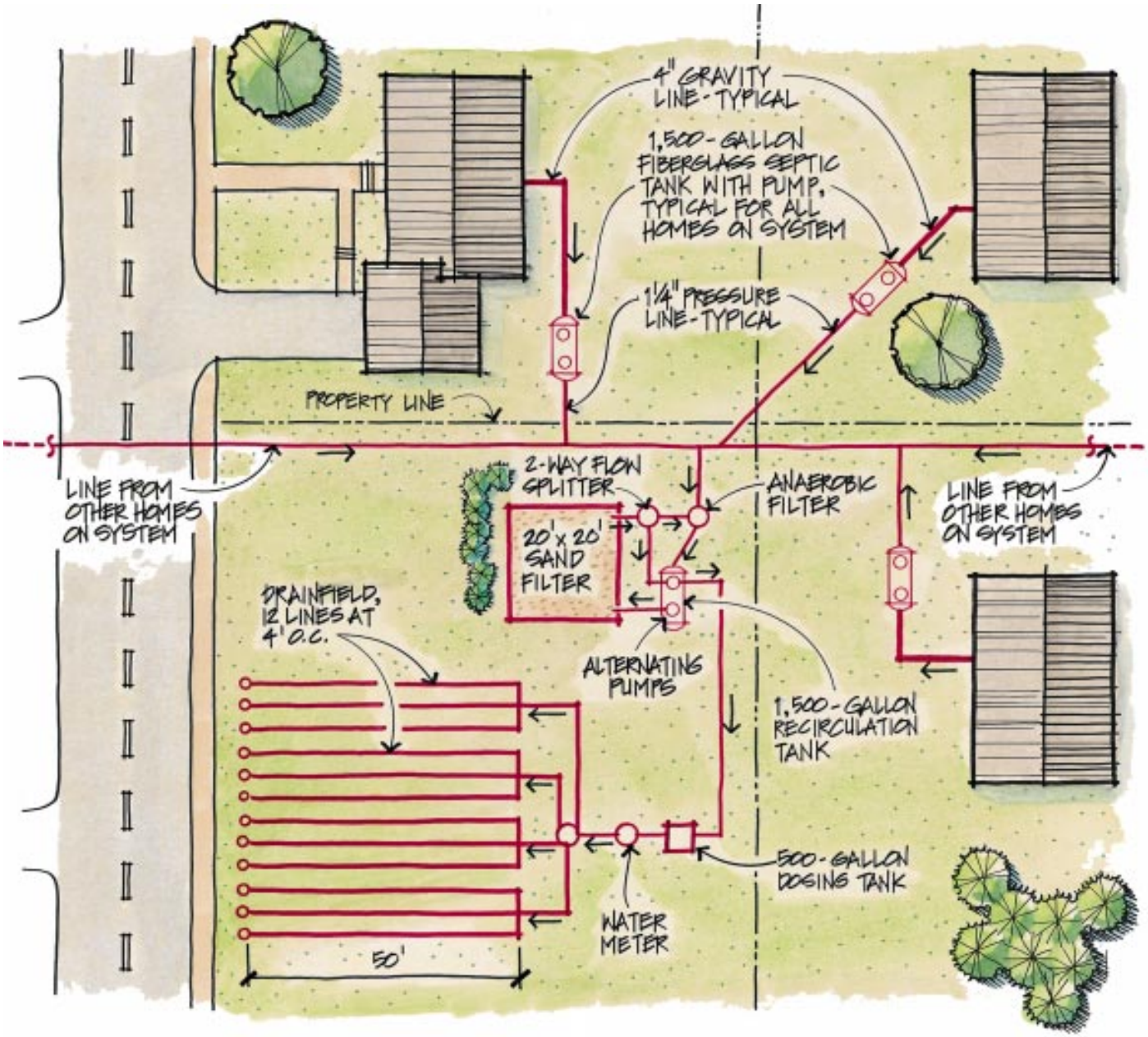
by David Dow & George Loomis

The idea of sharing a septic system with your neighbor doesn't appeal to everyone. Yet, for builders, shared systems make a lot of economic sense. While the treatment system is larger than an individual system, economies of scale create a substantial savings.

In Rhode Island, where we live, the high water table and small lots typically necessitate the use of "alternative" septic systems such as sand filters and biofilters, which treat the effluent before it is pumped to the leach field (see "Alternative Septic Systems," 1/97). The cost of equipping ten homes with individual advanced treatment systems runs between $100,000 and $120,000. But the ten-home shared system described in this article will cost between $75,000 and $85,000. In addition, this was a remedial situ-

A 1,500-gallon fiberglass septic tank is lowered into position. The risers at each end will have tight-fitting covers flush with finished grade to allow for inspection and maintenance.

Ten-House Septic Design



This retrofit system provides septic disposal for ten existing homes at a savings of around $3,000 per home compared with the cost of individual systems. It also required less disruption of the sites, since only one leach field and sand filter had to be installed.

ation, working around older homes on quarter-acre lots; new construction costs could be substantially lower.

There are other advantages besides lower cost. Shared systems allow the clustering of homes in new subdivisions, providing more contiguous open or common space. Cookie cutter lots can be avoided, and homes can be built on marginal sites with the treatment system located in an area best suited for the purpose. Systems are easily expandable and can be modular. Small-diameter PVC pipe is used for septic transport, which can be managed with smaller size pumps instead of large, expensive pumping stations. There is an additional benefit for existing homes: A shared septic system design reduces disruption to individual yards, because only the septic tank and transport line need to be installed.

In some states — Oregon is one example — the legislature has passed laws to control urban sprawl by promoting alternative septic system designs, which can be used on marginal land rather than arable land. In areas with a high water table or problem soils, a shared system may be the only solution. For instance, many summer cottages on the East Coast have been converted to year-round homes. These homes are typically located in sensitive areas and cannot meet today's standards for septic disposal unless an innovative approach like a shared system is used.

A Working Example

The shared system shown in this article uses a recirculating sand filter, with components like the filter kit, pumps, pump vaults, risers, and controls supplied by Orenco Systems of Sutherlin, Ore. The system was designed to handle up to ten homes in a community of converted summer cottages that had previously relied on cesspools for septic treatment. No public sewers were available, and the small lots couldn't accommodate a traditional septic tank and leach field design because of the high water table.

Each home has a 1,500-gallon fiberglass septic tank, manufactured by Fiber Enterprises of Red Bluffs, Calif. Pump vaults are placed in the tank's outlet end, from which effluent is pumped through 1 1/4-inch PVC pipe to a recirculation tank. There, the effluent mixes with a portion of already filtered effluent, then cycles through a sand filter. The sand filter consists of a watertight PVC liner filled with 2 feet of sand. The sand has been processed to meet strict size and uniformity specs and must be very clean to prevent clogging. The sand physically screens the effluent and provides a place for bacteria to reside and feed on organic matter.

Three-quarter-inch PVC laterals spaced 24 inches apart distribute the effluent through holes drilled face-up every 24 inches. Protective "domes" of 12-inch-diameter PVC pipe ripped in half lengthwise cover the laterals. When effluent is pumped into the lines, it sprays up and is deflected by the half pipe, which disperses it over the surface of the sand. These domes also provide air to the sand filter to assist the bacterial activity. We placed pea stone and filter fabric over the domes, and buried them below 2 inches of topsoil.

After circulating through the sand filter approximately five times, the effluent flows by gravity to a pump tank from which it is pumped to a partitioned shallow drain field. The drain field trenches are spaced 4 feet apart, and have 1-1/4-inch PVC distribution laterals running down them. We used domes made from 12-inch PVC over the drain field lines. The drain field is also buried a few inches below the existing grade.

The sand filter is a 20x20 membrane-lined container filled with 2 feet of clean sand. Large-diameter PVC pipes ripped in half cover the lateral discharge lines to help disperse the effluent and to allow air to the filter medium. The entire area was covered with 3/8-inch pea gravel and 2 inches of soil, then seeded.

Since the wastewater is now highly treated, the drain field can be reduced in size and depth, making installation less costly. In addition, the effluent is placed in the most biologically active layer of soil and within easy reach of plant roots.

Maintenance Agreement

All septic systems need to be maintained, but shared systems require more frequent monitoring. Since several homes are linked in a shared septic system design, there's more effluent, so the drain field and recirculation tank need to be checked every six months. Either a community wastewater management program or an existing sewer district could provide proper oversight and maintenance. At the very least, the participants in a shared system need to be held legally responsible for the continued costs and performance of the system, if only to protect the other system users. An association arrangement, which is written into the deed, can specify each homeowner's responsibilities.

Annual costs for a shared septic system like the design shown here should match those of any conventional septic system with a pump: $100 to $150 for service and maintenance and $40 for electricity per user.

Since this design is meant to establish a biochemical equilibrium between the amount of waste added and the breakdown of the effluent, it's possible that the system could last indefinitely if maintained properly. If either the sand filter or drain field become saturated, however, it's easy and inexpensive to renew the system. To replace the sand in the filter should cost $2,000 to $3,000, while the drain field could be replaced using the space between the existing laterals for another $2,000 to $3,000.

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