

# Pipeline

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Small Community Wastewater Issues Explained to the Public

## ALTERNATIVE TOILETS Options for Conservation and Specific Site Conditions

**H**ow often do we think about toilets? Probably pretty rarely, and why would we? Toilets provide a convenience most Americans take for granted.

But the standard porcelain fixture we're accustomed to has been changing in these times of water quality protection and conservation. Manufacturers are designing alternative toilets that use much less water and some models that use no water at all.

Old-fashioned, water-guzzling toilets of the past consumed up to five gallons of water per flush. (See table 1 on page 2.) Many households still use these dinosaurs. Obsolete toilet designs contribute to the estimated 9,000 gallons of potable water that a person uses to flush away 130 gallons of human waste a year. That's an awful lot of good, clean water swirling down the commode.

Twenty years ago toilet manufacturers began to reduce their tank capacities to a maximum of 3.5 gallons per flush. This reduction in tank size helped lower water consumption somewhat. Today's standard low-flow toilets use a mere 1.6 gallons of water per flush, and the ultra-low-flow or microflush designs use even less. Studies show that this reduction in water usage has not reduced the flushing capability of these toilets in many models.

Owners of boats, recreational vehicles, and campers are already familiar with some alternative toilet systems. Ultra-low-flow, vacuum, and chemical toilets have been used for years in these limited spaces. Today some of

these toilet designs have developed beyond their use in vacation and travel vehicles. They have become part of a strategy to reduce the amount of potable water used for waste disposal.

Water conservation isn't the only reason that toilet alternatives have evolved. Certain site conditions or lack of a water supply may make the traditional septic tank and soil absorption field unsuitable for a home or public restroom facility's wastewater (effluent) disposal. These problems force a landowner to explore other effluent disposal methods.


In addition to alternative effluent treatment processes, a variety of efficient, low-flow or waterless toilet systems are available that can resolve the dilemma of unsuitable site conditions. Toilet options include composting, incinerating, chemical, and oil flush toilets, and privies.

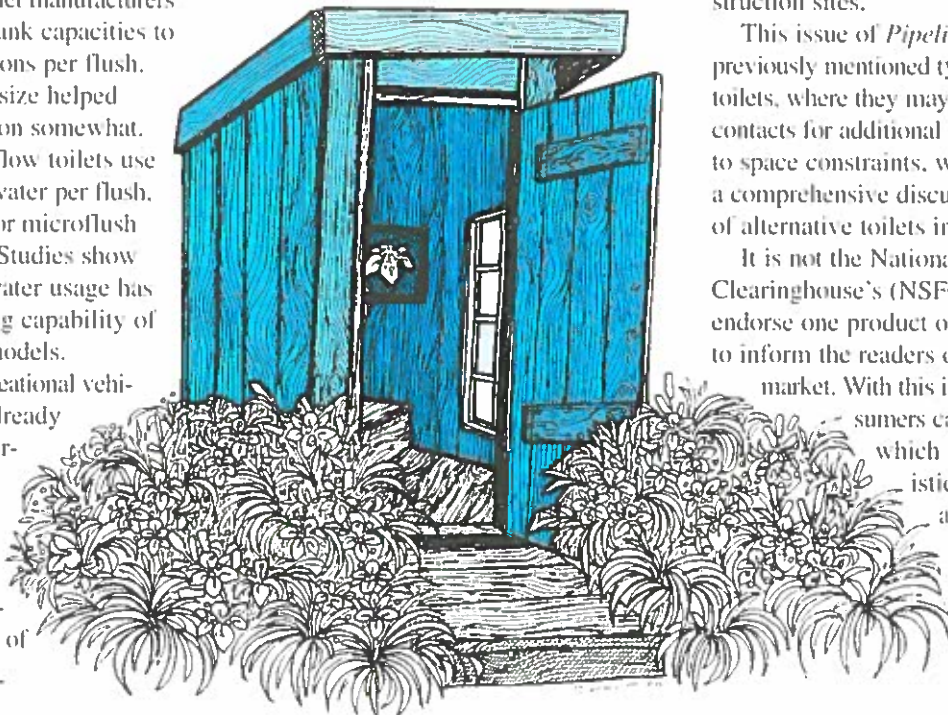
### Readership Survey

We have included a readership survey in this issue of *Pipeline*. Your feedback helps us know if we're satisfying readers' needs and decide on topics for future issues. Please take a few moments to answer these questions so that we may better serve you.

Each toilet has certain features that may make one design more appropriate than another for a family's lifestyle. Some toilets are better suited for infrequent-use situations, such as in vacation cottages or recreational vehicles. And some, like the composting toilet, require a commitment to maintain and remove composted waste material from the storage tank. Privies and portable toilets are most often used in parks, at large outdoor gatherings, or on construction sites.

This issue of *Pipeline* discusses the previously mentioned types of alternative toilets, where they may best be used, and contacts for additional information. Due to space constraints, we cannot present a comprehensive discussion of all types of alternative toilets in this newsletter.

It is not the National Small Flows Clearinghouse's (NSFC) intention to endorse one product over another, but to inform the readers of options on the market. With this information, consumers can better decide which toilet characteristics may be most appropriate in their individual circumstances. 



## Toilet Options: Ultra-low-flow

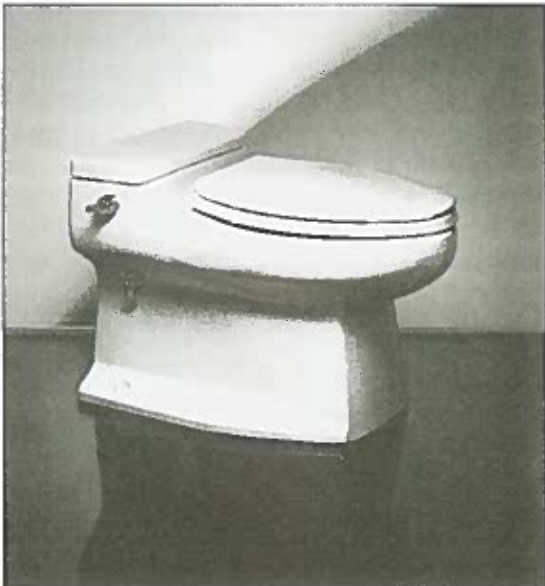


Figure 1. This ultra-low-flow toilet from Microphor in Willits, California, uses 0.5 gallons of water per flush.

### Ultra-low-flow toilets

Water conservation awareness prompted manufacturers to begin making more efficient toilets in the early 1980s. The federal government established a national manufacturing standard in 1994 mandating that new toilets sold in the U.S. use a maximum of 1.6 gallons of water for flushing.

Studies across the country show that these low-flow toilets reduce water use by 23 to 46 percent, saving an average 10.5 gallons of water per person daily. According to the U.S. Environmental Protection Agency's Office of Water, through the use of water-efficient toilets

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in new construction and normal replacement, the U.S. is expected to save 7.6 billion gallons of water per day by 2020.

Some toilet manufacturers have taken water reduction further with ultra-low-flow models. (See figure 1.) These toilets can use as little as 0.25 gallons per flush. Products vary in that they may have narrower bowls with a smaller water surface, manually controlled water flow (via a foot pedal) into the bowl, or water pumps to assist in bowl emptying and cleaning.

One model eliminates the "S" trap of a conventional toilet design, enabling waste to be washed down using less water.

Another product flushes by opening a hinged flap to let wastes and a small amount of water fall into a lower chamber. After several seconds the flap reseals, and a blast of compressed air forces the wastewater over the trap and out a discharge line from the toilet.

Public parks, restaurants, hotels, and other public facilities, such as roadside rest areas, are installing these ultra-low-flow toilets to help reduce water consumption and subsequent wastewater disposal. Ultra-low-flow toilets also enable business construction in areas where restrictions may limit sewage disposal capacity.

For example, many resort areas and municipalities place restrictions on

## Important!

Toilet systems in buildings without access to public sewage that discharge human waste must have some treatment system in place, whether a holding tank for subsequent pumping and disposal or an onsite sewage treatment system. Homes and facilities using toilets that do not discharge wastewater, still need to have a treatment system in place to treat and dispose of all other household wastewater.

sewage capacity flowing into publicly maintained systems. Ultra-low-flow toilets may make building in these areas possible. Similarly, facilities (like resort hotels) facing expansion difficulties due to the size of their existing onsite systems may install ultra-low-flow toilets, thus enabling their present onsite systems to adequately treat the reduced wastewater flow. (Note: This reduction in wastewater quantity does not reduce the organic loading rate to the system.)

### Advantages:

- Ultra-low-flow toilets reduce water consumption and costs to the consumer.
- They contribute to preserving the environment by protecting ground water from depletion and possible contamination.

### Disadvantages:

- Some ultra-low-flow models may require flushing more than once to adequately clean the toilet bowl. ●

TABLE 1 Annual Total Water Usage by Toilets\*

Water Consumption by Toilets gal/flush	Water Consumption by Number of People in Household gal/year				
	1	2	3	4	5
1.5	2,190	4,380	6,570	8,760	10,950
3.5	5,110	10,220	15,330	20,440	25,550
5.0	9,125	18,250	27,375	36,500	45,625
7.0	10,220	20,440	30,660	40,880	51,100

\* Assumes four flushes per day per person for 365 days.