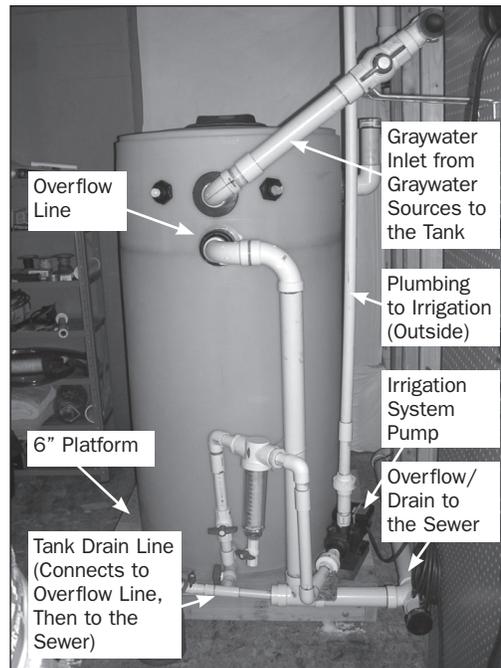


Guidance Manual for Separation of Graywater from Blackwater for Graywater Reuse

Increasing efforts in water conservation have prompted home and business owners to learn more about water reuse. One approach to water reuse that is gaining interest is separating graywater (all wastewater excluding kitchen and toilet water) from other wastewater to supplement non-potable demands. Several states allow graywater reuse and many other states are considering it. Graywater reuse has risks associated with it if not done properly. The purpose of this project was to provide guidance on graywater reuse for homeowners and business owners, utilities, and health departments. The report describes critical system components for safe operation of graywater systems. Included in the guidance manual are the technologies and equipment necessary for graywater reuse systems, maintenance requirements for graywater systems, and best management practices to ensure the safe reuse of graywater.



Graywater Storage Tank Plumbing.

Plumbing for Separate Collection of Graywater

When installing a graywater reuse system, a separate plumbing system must be installed to capture and divert graywater for use, while allowing blackwater to continue to flow to the sanitary sewer. This separation of plumbing is referred to as a dual plumbing system. Designing a graywater reuse system for new construction can be substantially easier than retrofitting an existing building because the system can be designed and completed in conjunction with the original plumbing before the drywall is installed. Retrofitting is more difficult because it may involve cutting and replacing existing lines, and accessing existing pipe behind walls and under floors (Figure 1).

Storage Tanks

Storage tanks allow the system to collect and store graywater until it is ready to be used. The most common locations for a graywater tank are in the basement/crawlspace, garage, or outside (above or below ground).

End Uses for Graywater: Irrigation and Toilet Reuse

Graywater for irrigation should be applied through subsurface or drip methods. Subsurface irrigation requires excavation for installation while drip irrigation applies graywater directly to the base of the plant under a layer of mulch. Most irrigation reuse systems include filtration, pump, supply lines, and an operating system to control how and when a system operates.

BENEFITS

- Contains general guidance on installing graywater reuse systems and includes information on graywater plumbing for irrigation and toilet flushing.
- Provides step-by-step guidance on source separation of graywater from blackwater.
- Illustrates the benefits and concerns associated with graywater reuse.
- Provides safety information on installing a graywater reuse system and reusing graywater for irrigation and toilet flushing.

RELATED PRODUCTS

Long-term Effects of Landscape Irrigation Using Household Graywater (03CTS18CO)

Long-term Study on Landscape Irrigation Using Household Graywater – Experimental Study (06CTS1CO)

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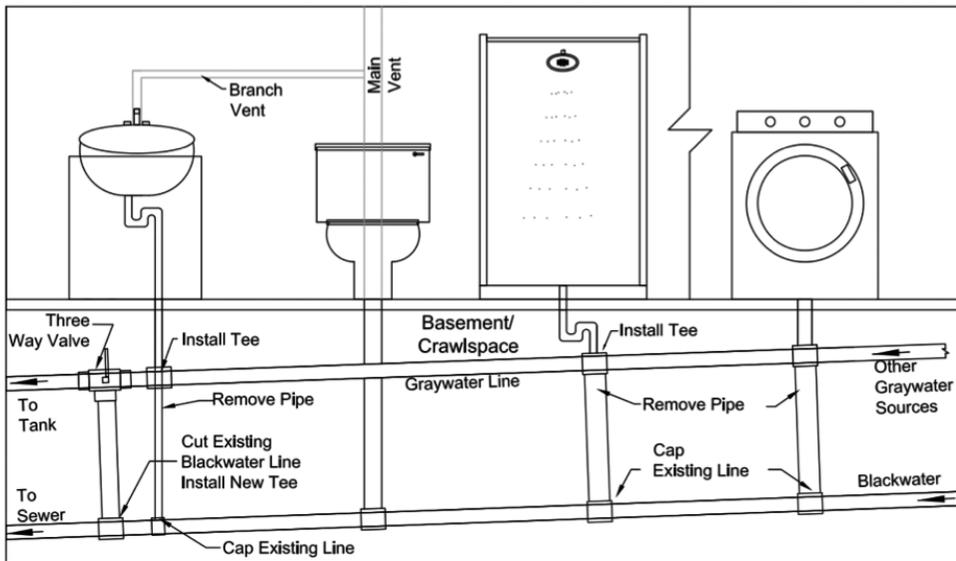


Figure 1. Retrofit Construction for a First Floor Dual Plumbing System.

Due to the complexities of a toilet reuse system, the authors of this report recommend use of commercially available systems. Most manufactured systems include disinfection, filtration, pumps, an operating system, and water dyeing capability. In most cases, a potable source is connected to allow the system to supply potable water if the graywater in the tank becomes too low to supply the toilets. Backflow preventers are required on all potable lines to prevent contamination of the potable water source.

Maintenance and Best Management Practices for a Graywater Reuse System

All graywater reuse systems require maintenance. Proper maintenance ensures that the graywater system will work correctly over time. Best management practices should also be considered to ensure safe graywater reuse including:

- Ensure that the graywater reuse system conforms to state and local graywater reuse guidelines.
- Use a licensed plumber early in the design process.
- Do not use water from the kitchen or dishwasher with the graywater system.
- Label all pipes and outlets to indicate graywater plumbing.
- Protect potable water sources with backflow preventers and graywater identification labels.
- Limit human contact and exposure to graywater.
- Consider that what is used and washed in your sink will end up in your graywater reuse system. A slop sink should be connected directly to the sewer line in order to avoid pouring toxic chemicals down your graywater drains including bleaches, paints, artificial dyes, cleansers, acidic and alkaline substances, or toxic chemicals.

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The research on which this report is based was funded in part by the U.S. Environmental Protection Agency (U.S. EPA) through Cooperative Agreement No. CR-83419201-0 with the Water Environment Research Foundation (WERF). Unless an U.S. EPA logo appears on the cover, this report is a publication of WERF, not U.S. EPA. Funds awarded under the agreement cited above were not used for editorial services, reproduction, printing, or distribution.