System examples

Town—City of Santa Barbara (part of state greywater study)

The goals for this system were to enable yet more extensive gardening without raising the water bill, to get the greywater out of the ocean (a recent spate of beach closures has raised public awareness about this cost of sewer systems), to gather data for a State of California greywater test, and to demonstrate feasibility of branched drain system design in an officially monitored and permitted installation.

This permitted branched drain network was part of a State of California study.26 Refer to *Appendix/ Getting a permit/ Figs 19-21* to see a copy of the permit and a site plan. The study showed that greywater systems saved water and did not have an adverse affect on soil quality. The system has been receiving only zone switching and slug control since its installation, and reliably distributes greywater to about a dozen fruit trees.

Conserving fall was especially arduous on this site, as the average slope of the land is 2%. This sounds great since you also want your pipes at 2%, until you realize that when you are going at an angle across the slope, the pipes slope less. Maintaining adequate slope was greatly complicated because we threw away perfectly good fall at many points in the system just to comply with the 8" legal burial depth requirement (I don't think the inspector even noticed).

The basin area is way oversized, as per the California greywater law (see *Appendix/ Getting a permit/ Fig 19).* The owners said:

"We never saw water surface. Not even from the lowest outlet, during a deluge of rain when we turned on all the fixtures in the house on for a few hours to test the surge capacity of the system."

The original owners of this site were keen organic gardeners. This house was sold to new owners who are maintaining the beautiful garden nicely. The new owners were very concerned about the greywater system before buying the house and were pleased to have had no problems or have to do hardly anything about the greywater system in the year since they bought the house.

The California study reported favorably on the economics of this system. This despite the fact the system cost was nearly doubled by the legal requirement to plumb twice as much area as you have water to irrigate with, and nearly doubled again by the requirement that the flow be measured. It cost about $1000 in parts and $360 for a plumber to help re-plumb the entire underneath of the house to get 6" more fall to run a dipper box with a counter.

The other two systems in the study handled a similar amount of water but cost $5000 each and had an estimated five year life expectancy. The life expectancy of the branched drain system was estimated at twenty years.

Note on site information for system examples:

The **slope** refers to the slope of the ground in the area where the system was installed. The **number of bedrooms** is given as well as the number of people as this is usually the design basis for permitted systems. **Supplemental irrigation** refers to ways of getting plants watered other than with greywater. **Alternate disposal** are the options for treating / disposing of the greywater other than the greywater system, i.e., the safety net. **Fixtures** are the fixtures connected to the greywater system. The **peak design surge** is the biggest surge of water the system was designed to handle.

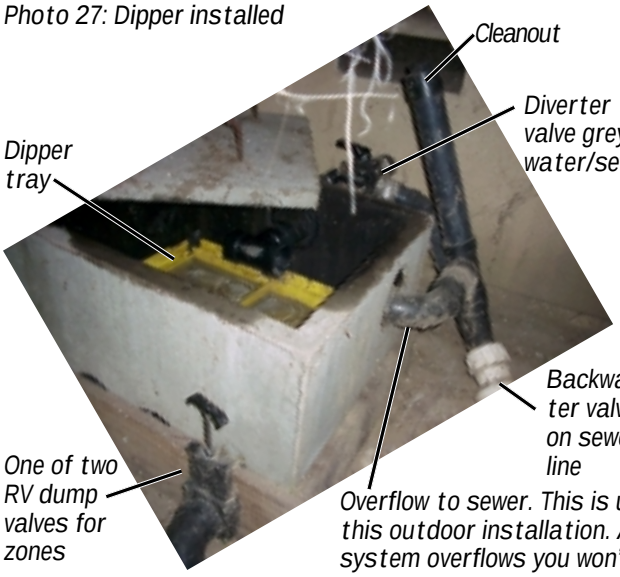
Location: city of Santa Barbara. **Size & nature of property:** 1/4 acre *(1000m²)*, urban. **Soil:** rich, deep, medium high perk. **Low temp:** 32° *(0°c)*. **Rainfall:** 17" *(42cm)* in winter only. **Slope:** 1/4 inch per foot (2%). **Number of bedrooms/people:** two bedrooms, three people. **Fresh water supply:** expensive city water. **Supplemental irrigation:** by hand. **Alternate disposal:** sewer system to ocean.

Fixtures: all but kitchen sink:[25] shower, bathroom sink, washing machine, utility sink. **Peak design surge:** Washing machine + bathtub, 72 gal *(0.27m³)*. **Splitting:** flow combined at dipper box goes to one or both zones. Flow in each zone split to 8ths and 16ths with double ells (so if both zones are being supplied simultaneously, smallest split is 32nd's). 10 outlets in zone one, 7 in zone two. **Irrigated:** Several subtropical and low chill deciduous fruit trees, in mulch basins, through 5 gallon flower pot outlet chambers.

Photo 25: A sturdily made mulch basin. It is deep & wide, with thick walls. The outlet chamber in the middle is a five gallon flowerpot.

Photo 26: Mulched and greywatered landscape. Pipes open inside inverted 5 gallon flower pot outlet chambers in large, deep basins, which are filled with wood chips. To the level of mulch over the surrounding soil. The system is completely invisible in the landscape, yet easily serviced by pulling mulch back.

Photo 27: Dipper installed



Overflow to sewer. This is unnecessary in this outdoor installation. Also, if the system overflows you won't even know it.