



Eco-Engineering: Greywater Recycling



Background

Water shortage has been a long running issue in the state of California. Fortunately, most of our indoor water usage is reusable greywater, or used water from sources such as faucets, showers, and washing machines

Goal

Design a residential-scaled filtration system to store and re-use residential greywater and rainwater for irrigation purposes

Objectives

- Research, design and fabricate a working plant-based, outdoor filtration system that is self-sustainable, aesthetically pleasing, and easy to maintain
- Ensure that the final product of the system is safe to use according to state water quality standards
- Treat water well enough so that it can be stored for long periods of time

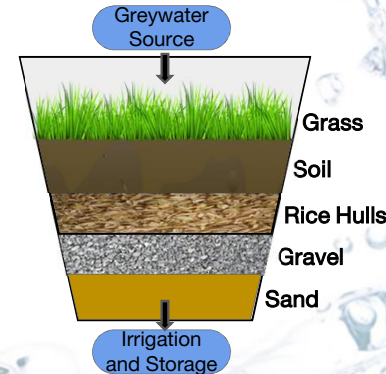
Water Usage Information

Toilet	Shower	Faucet	Clothes washer	Leak	Other*
24%	20%	19%	17%	12%	8%
33.1 gphd	28.1 gphd	26.3 gphd	22.7 gphd	17.0 gphd	10.5 gphd

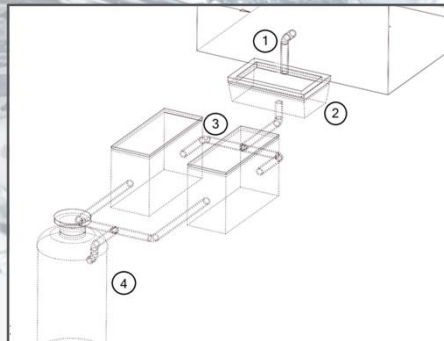
Source: Water Research Foundation Residential End Uses of Water, Version 2 - Executive Report (2016)

- Over half of indoor water usage is greywater

Small-Scale Prototype



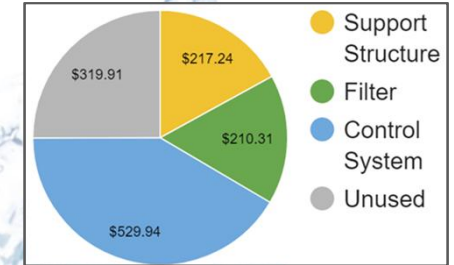
Full-Scale System



Water Flow Journey

- 1) Water comes out of the home
- 2) Falls through initial filter
- 3) Flows through natural underground filter
- 4) Goes to storage tank
- 5) Gets diverted around the yard

Budget



We are currently under our \$1300 budget and we have around \$320 remaining.

Performance

- Neutralizes most odors
- Neutralizes colors
- Tends to make greywater more basic
- Standard household water usage would not overflow the system

Obstacles for Greywater Systems

- Legislation limits greywater usage in many parts of the country
- Current plumbing must be retrofitted, and new homes must have greywater-oriented plumbing
- No large installation/maintenance companies specialize in greywater systems yet

Timeline

Fall & Winter
Developed CAD model, researched filter media and plant, built wooden frame

April
Purchased plants and filter media, completed prototype

May
Purchased materials and finished code for controls system, planned out tests

June
Conducted testing with filters and greywater, finalized 3D model of full-scale system



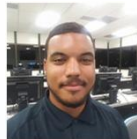
Mark Walter
Advisor



Brandon Marconet



Daniel Santiago



Joshua Houston

Contact: Brandon Marconet
Email: bmarcone@uci.edu

