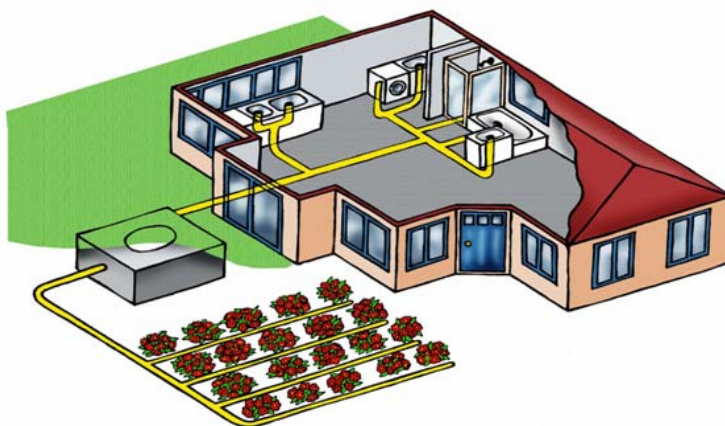


Greywater Reuse and Recycling

Background

Greywater is wastewater that comes from the bath, spa, shower, bathroom wash basins, clothes washing machine, laundry trough, dishwasher and kitchen sink. However, greywater from the kitchen sink is generally not recycled due to the contaminants it contains.

Reusing greywater does not involve any treatment other than coarse filtration (usually to avoid clogging irrigation systems) whereas recycling greywater involves further treatment.



(Source: Department of Health)

Stream	Load contribution	Contents	Key risks	Typical Water Quality Profile and Treatment
Bathroom (bath, shower, basin, spa)	55%	Hair, soaps, shampoos, lint, toothpaste, nutrients, body fats, oils and cleaning products (some faecal contamination including bacterias and viruses)	<ul style="list-style-type: none"> • Faecal contamination risk to public health • Over time, build up of chemicals in soils, potentially impacting on soils, vegetation and groundwater 	Cleanest wastewater: Low pathogens, low organic content – moderate treatment requirements
Laundry	34%	Lint, oils, greases, chemicals, soaps, nutrients (some faecal contamination including bacterias and viruses)	<ul style="list-style-type: none"> • Potentially faecal contamination risk to public health • Over time, build up of detergents in soils, vegetation and groundwater • Bleaches and disinfectants can potentially kill organisms in the soils 	Variable levels of pathogens, high organic content – high treatment requirements
Kitchen	11%	Heavily polluted with food particles, cooking oils, greases, detergents and other cleaning products such as dishwashing powders	<ul style="list-style-type: none"> • Fats which cannot be broken over time will build up in the soil so it repels water • Contaminants build up in soils, vegetation and groundwater 	High pathogens, high organic content – advanced treatment and disinfection

The quality of greywater is very much dependent upon what happens in the house – the detergents and chemicals that are used, what you put through your washing machine (it is recommended that water from soiled nappies is not collected), and what you pour down the sink.

How much greywater does my household produce?

In the 2006/07 financial year the average household in greater Perth consumed 282 kilolitres of water across various uses as shown below.

Use	Volume (kL/yr)
Outdoors	133
Bathroom	51
Toilet	34
Laundry	39
Kitchen	25

About 90 kilolitres per year of reusable and recyclable greywater (bathroom and laundry) was produced by the average household.

What are the costs and benefits of reusing and recycling greywater?

Benefits	<ul style="list-style-type: none"> • Reducing your drinking water consumption and your water bills • Reducing the amount of sewage discharged to the ocean or rivers • Irrigating your garden during a sprinkler ban.
Costs	<ul style="list-style-type: none"> • The environment may be polluted and health problems may arise if the greywater is not recycled correctly • Upfront financial cost of installing a system may be prohibitive to some householders • Ongoing maintenance of a system is important to ensure proper functioning (some people may see it as time-consuming and costly).

How can I reuse and recycle greywater, and is it safe?

Reusing greywater may involve bucketing or installing a greywater diversion system which diverts greywater directly to a subsurface irrigation system without any treatment (usually filtration). Greywater recycling involves installing a system which treats greywater to a quality for other uses such as toilet flushing or sprinkler irrigation.

There are simple strategies to manage the health and environmental risks associated with greywater:

- only harvest the lowest risk greywater do not harvest kitchen greywater;
- ensure that the treatment system is 'fail-safe', that is greywater will automatically be diverted to the sewer if the greywater system blocks or malfunctions;
- if using on gardens, do not over irrigate, do not use on food crops that are eaten raw and wash your hands after gardening;
- never store greywater for more than 24 hours;
- never drink or allow pets or animals to drink it or have access to it; and
- use low phosphorus detergents.

Both diversion and treatment systems need to be approved by the Department of Health. It has published a Code of Practice on the reuse and recycling of greywater which includes details on how to safely bucket greywater and how to go about safely installing and maintaining an approved greywater system. The department also publishes a list of all greywater systems approved for use in Western Australia.

Advice on choosing the most appropriate system for your household can be obtained from your Local Government office or the Wastewater Management Branch of the Department of Health.

When is greywater reuse or recycling not permitted?

- The greywater system (or system design) is not approved
- The property is connected to a sewage system and the Water Corporation does not approve the diversion of greywater due to operating constraints
- The property is in an environmentally sensitive area (refer Code of Practice)
- Inappropriate site conditions exist such as unsuitable soils or elevated ground water levels
- Insufficient property area is available to achieve the necessary setbacks and area required for irrigation.

Who needs to approve the installation of greywater systems?

Local Government approves systems that harvest greywater from dwellings for up to 10 people. They may consult with the Water Corporation, the Department of Health or the Department of Environment and Conservation to ensure that there are no risks to public health, no adverse impacts on the existing sewer infrastructure and no adverse impacts on the local environment.

For systems that are designed to harvest greywater from dwellings with more than 10 people, approval is required from the Department of Health. In addition to examining the design, the department will want to ensure that the appropriate operating and maintenance regimes and expertise are in place to manage the system.

There are two types of approvals required – approval to construct and an approval to use. Approval to use will be granted once the greywater system has been inspected to ensure that it has been properly installed. In all cases, connection into the system or modifications to domestic plumbing must be carried out by a licensed plumber.

Current Situation

Greywater system rebates

Waterwise Rebates for greywater systems were introduced in February 2003 as part of the Waterwise Rebate Program. They currently attract a Government rebate of up to \$500. By January 2008 only 144 households had applied for a rebate compared with over 21,000 rebates for garden bores and over 13,000 for rainwater tanks.

Greywater systems as part of new developments

Bridgewater is a residential village development near Mandurah on 14 hectares with a planned total of 389 houses. Each house is equipped with an on site greywater recycling system for private groundwater irrigation through a subsurface drip system. Groundwater is used as a backup supply to maintain irrigation flows whenever a house is vacant. Residents pay a weekly rent including a management fee, part of which is used to fund monitoring and maintenance of the greywater systems. Each resident owns and operates their own system and is expected to meet repair costs.

Australian Guidelines for Water Recycling

In November 2006 the Commonwealth Government released the *Australian Guidelines for Water Recycling: Managing Health and Environmental Risks* (Phase 1). These guidelines focus on large scale recycling of treated sewage and greywater for household use, irrigating public open space and crops, fire fighting and industrial uses. In particular the recycling of greywater on site (including in office and apartment blocks) for various uses is also addressed.

The Department of Health is currently developing State-based guidelines to support these national guidelines.

'How to' guide for alternative water supplies

The Water Corporation is committed to working with the development industry, key regulatory agencies and the community to further examine the potential of alternative supplies as an effective and reliable means to meet residential demand. A 'how to' guide (H₂Options) has been produced to provide an overview of what kinds of alternative water supplies (including greywater) are available to meet residential non drinking water demand and key steps that are required to deliver this water (including the required regulatory approvals).

The Future

Five Star Plus Stage 2

In May 2007 the WA Government announced new building standards for all new homes to have water and energy saving devices. The first stage introduced in September 2007 included the need for water efficient taps, showerheads and toilets for new buildings (residential and commercial).

Stage 2, due to be introduced in mid 2008, is expected to require greywater to be connected to an alternative drain. This means that the cost for a homeowner to connect, at a later date, to a greywater reuse or recycling system will reduce significantly. This has the potential to significantly increase the number of greywater systems installed in Western Australia.

Sustainability considerations – addressed in planning

Economic	Socio-economic/cultural/health	Environmental
Costs per kilolitre for an individual unit are higher than for other climate independent sources	Recycling greywater may help to maintain gardens during restrictions	Inappropriate <ul style="list-style-type: none"> siting of greywater systems and recycling of greywater may pollute waterways through leaching of nutrients (like phosphorous) and other chemicals
Home owners bear costs of up front installation and maintenance	Inappropriate systems or inadequate maintenance risks public health	Use of washing powders that contain sodium salts may cause salty greywater which will negatively affect plants and reduce drainage in soils
Supported by Government rebate	Cannot irrigate gardens if home is not occupied – link to back up water supply	Greywater recycling (where the greywater is treated) has benefits for areas with septic tanks

The sustainability considerations can be addressed by:

- educating users as to appropriate chemical inputs
- (i.e. washing powders etc) and the importance of regular maintenance;
- ensuring only approved systems are installed and installed correctly; and
- providing plumbing for a greywater recycling system when a house is built (such as proposed through Five Star Plus Stage 2).

Potential source yield



If building codes change as proposed, greywater recycling systems will become more common in new homes due to the lower cost of connection. If 10,000 greywater reuse or recycling systems were installed and used 60 kilolitres of water on average, 0.6 gigalitres of water (enough to supply 2,500 homes) could be saved.

Potential cost



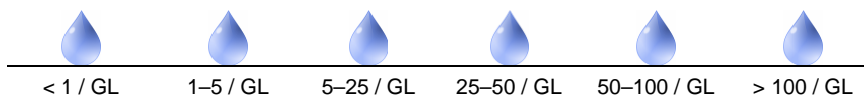
Greywater systems are estimated to cost between \$4 - \$5 a kilolitre.



More Information

- *Code of Practice for the reuse of greywater in Western Australia* (January 2005), available at: http://www.health.wa.gov.au/envirohealth/water/docs/Code_of_Practice_for_the_Reuse_of_Greywater_in_WA.pdf
- Australian Guidelines for Water Recycling: Managing Health and Environmental Risks (Phase 1), available at: http://www.ephc.gov.au/ephc/water_recycling.html
- Waterwise Rebate program – details available at: <http://portal.water.wa.gov.au/portal/page/portal/WiseWaterUse/WaterwiseRebates>
- Inkerman D'Lux development, details available at: www.clearwater.asn.au/resources/566_1.Inkerman.pdf
- H2Options, available at: http://www.watercorporation.com.au/P/publications_alternative_water_supply.cfm
- Five Star plus building standards available at <http://www.5starplus.wa.gov.au/premier/>
- EPA Victoria, Domestic Wastewater Management Series: Reuse Options for Household Wastewater, available at: [http://epanote2.epa.vic.gov.au/EPA/Publications.nsf/2f1c2625731746aa4a256ce90001cbb5/f406263fd484e6f1ca2571ea0009bd3f/\\$FILE/812.2.pdf](http://epanote2.epa.vic.gov.au/EPA/Publications.nsf/2f1c2625731746aa4a256ce90001cbb5/f406263fd484e6f1ca2571ea0009bd3f/$FILE/812.2.pdf)
- Department of Health, Western Australia, Greywater Fact Sheet: http://www.health.wa.gov.au/envirohealth/water/docs/factsheet_greywater.pdf

Key



Potential source yield (in 50 year planning horizon)



Potential Cost (2007 \$)