

Greywater trial wrap-up

With the ATA greywater trial now ended, Robin Merrick asks our participants what we need to know before installing a greywater system

ATAs greywater trial has reached its conclusion, revealing the secrets that will help those thinking about installing a greywater system in their home this summer.

In this, our trial wrap-up, we ask our greywater families to reflect upon their experiences of selecting, installing and operating greywater systems in their homes: What were the pros and cons? What barriers did they face? And the critical question, would you do it again?

Greywater diverter systems

Two of our six households installed simple greywater diverter systems (see *ReNew* 92) that capture greywater from the home and direct it into the garden via an agricultural line running under an area of lawn.

The householders' experiences of these 'simple diversion' systems were similar. On the whole the systems performed very well, with both households experiencing similar benefits.

'We are delighted with the results,' declared Marion Evers of Frankston, adding, 'It is embarrassing to look back at our water bills in the year 2000 and see our peak water usage was in excess of 3000 litres per day and 1200 litres just 12 months ago for our two hectare site. Our daily use in summer is now around 600 litres and we hope to reduce this further'.

Ringwood East resident, Evelina North-Coombes, was equally happy with the impact upon her garden. 'The fruit trees are loving it,' she said. 'Our gardener remarked how happy the first stage plants are, evidenced by over 20 buds on the citrus trees, and that the moisture was optimum.



Marion from the Frankston house is delighted with the performance of their simple greywater diversion system.

Whilst both systems are running well, installation of the systems was not without difficulty. In both cases the design of garden trenches involved some guess-work to balance greywater input with the garden's water needs and the systems had to be modified after installation to get them right.

Soil type (readiness to absorb and reticulate the greywater), thirstiness of plants and the garden's slope are particular factors that need to be considered when determining the location, diameter and length of irrigation lines. Design of the irrigation component of these diversion systems requires expert advice to get right, but such advice is expensive and hard to find.

Yet the risks associated with diversion can be managed easily if householders are informed. As Marion

explains, 'I would certainly recommend the use of a greywater diverter [but] with two reservations. Firstly, the use on flat land in a small suburban block would require stringent monitoring to prevent unwanted seepage. Secondly, the use of chemicals may cause damage to plants and the soil.'

Diversion via drip irrigation

Trevor Yodgee's experience with the Greywater Gardener system at his Malvern home was less successful. Still under development, the Greywater Gardener system temporarily stores washing machine water in an above-ground surge tank which is then fed slowly into the garden via surface drip-feeders.

The system keeps the irrigation lines at the gardens surface, and by directing drippers to specific plants, the home-

Trial results at a glance

- Greywater reuse has the potential to significantly reduce mains water use in private homes (by up to 33%!).
- Diversion systems are simple and inexpensive but difficult to get right—expert advice is required to marry greywater output with the water needs of a garden.
- Risks of harm to the environment or humans associated with greywater diversions are largely dependent upon levels of care taken by system owners (particular attention must be given to system inputs).
- All greywater systems require regular, ongoing maintenance.
- Approval processes for treatment systems are onerous and expensive, and consistent and accurate information about greywater reuse is hard to find.
- Treatment systems are complex and consume high levels of embodied and operational energy when compared with the simpler diversion systems. Such consumption is hard to justify at the single-household scale.

owner is better able to monitor the impact of the system and watch out for seepage. This addresses the 'small sites and flat gardens' issue raised by Marion.

However, at the Malvern site, the finely-tuned system failed to deliver the quantity of water required by Trevor's thirsty garden. This was in part because the greywater was only drawn from the washing machine but may also have been

due to evaporation of dripping irrigation water. While this can be addressed by adding a layer of mulch, Trevor said he would prefer to capture the large quantities of shower water sent down the drain by his family of five.

While installation of the Greywater Gardener system was quick and easy, it required repeated maintenance to stop the filter and drippers from blocking.



By diverting greywater into her toilet cistern, Lisa Coffa from North Fitzroy has reduced her mains water consumption by 33%.

Drippers were particularly needy of a monthly flush out. Having said this, the system is low-risk and when fully developed may be ideal for small and/or flat suburban gardens.

From shower to toilet

North Fitzroy resident, Lisa Coffa, opted for the Wattworks system. By diverting greywater into her toilet cistern the system proved highly effective, reducing her mains water consumption by 33%.

The Wattworks system catches greywater in a tank below the bath/shower and pumps it into the toilet cistern on demand. Unused greywater is pumped to the sewer system every 24 hours to prevent it from becoming septic. While Lisa felt it would be great if the system could catch more than just shower water, she was happy with its suitability. 'The system has really met our expectations and we are really satisfied with it. We only use greywater in the toilet so are saving water which is very rewarding. There is a slight odour, however it's not overbearing. The system suits our house and living,' she said.

Installation of the system took one day and maintenance is relatively low, amounting to little more than a monthly cleaning of the filter. All in all the system was quiet, low-risk, cost-effective, and did not require local council approval. However, reliability of parts, particularly the pump and timer, and ease of servicing of these parts are likely to be the big issues for this system.

Sandfilter treatment system

Having a level garden not large enough for a simple diversion system, the Robinson family selected the sand-filter greywater treatment system. The family of five felt that the amount of greywater they expected to generate would justify the system's complex design, approval and installation requirements. The decision was helped by the fact that

the Robinsons were building a completely new home and so were happy to allow the necessary excavation of their garden for installation. This meant they could also separate grey and blackwater pipes at very low cost, thereby capturing all household greywater.

Because greywater was being treated and the system would be permanent, local council approval was required. The approval process was difficult and took over eight months. Council officers were unfamiliar with greywater treatment systems and the regulatory approach for blackwater treatment was applied in the absence of appropriate protocols. Council's conditions included requirements for backflow prevention, public signage and an audio-visual alarm, adding \$2,000 to the cost of the system.

Installation was also a lengthy process, thirteen months in all, and involved seven different trades, numerous separate suppliers and frequent coordination meetings on site, costing a total of \$14,500.

The sand-filter system required monthly monitoring of effluent, removal of tank bio-solids every three years and annual water testing as well as a monthly clean-out of the pump filter. But since becoming operational in early March, there have been no adverse environmental or human-health impacts and the treated water is relatively clear and odour-free. More treated greywater will be produced by the system than used on the Robinson's garden and the family would like to use this treated water for toilet flushing. However, such use is currently not permitted in Victoria without a tertiary level of treatment.

Carolyn Robinson was philosophical about the family's experience. 'Whether people should put in such a complicated and expensive scheme as this one is questionable, given the expense, level of complexity, and difficulty

in obtaining statutory approvals. Should people re-use greywater? Absolutely! Use of greywater gives householders the opportunity to irrigate their gardens at times when rainwater collection is not available. We suggest that simpler, less complex and less expensive systems are more appropriate for domestic situations'.

Peat treatment system

New Water's peat-based greywater treatment system was selected for the Edwards' home in Highett because the family uses large volumes of water to maintain a very productive vegetable garden and fruit trees. Untreated greywater diversion would have been too risky because many of their vegetables are eaten raw and they have two young children. The Edwards also expressed a reluctance to use environmentally-friendly products exclusively, so treatment of the greywater added an additional layer of protection.

Because the New Water system treats the greywater, local council approval was required. Maribyrnong City Council officers liaised regularly with the Edwards and the suppliers of the system, and visited the site repeatedly during its installation. Their fluid, cooperative approach and recognition that they too were learning about greywater reuse allowed the trial to proceed without long approval delays.

The New Water system is performing well and is producing class A effluent. However it is still in the development stage and is regularly 'tweaked' so it is difficult to determine the level of householder maintenance required, or to ascertain the reliability of the system. When asked what he would do if he could start from scratch, Andrew Edwards identified two specific areas relating to the design of the system: 'Specifically, we'd connect the laundry tub direct to sewer, providing

an alternative route for the more harmful chemicals,' and because there is currently no winter use for the treated water '...I'll be connecting the system to the toilet cistern after the formal trial period has finished.'

Greywater trial outcomes

Greywater reuse has the potential to significantly reduce water consumption in the home (up to 33%), it's just how this is done that remains the question. Each home will have its own needs and idiosyncrasies but there are a few definite conclusions we can draw from the trial.

Treatment systems are well suited to large volumes of water but are complex, require council approval, consume far greater quantities of energy than diversion systems and can be very expensive. It can also be difficult to find reliable and consistent information about grey-

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ATA's rough guide to selecting your greywater system

1. Answer each question in column 1 by selecting your preferred Column 2 response
2. Circle all ticks and M's located on that line
3. Select your preferred system based upon the maximum number of ticks, taking into account the level of management required, indicated by the frequency of M's

Criterion		Diversion to toilet	Diversion to garden	Treatment system
Column 1	Column 2			
Quantity of greywater generated	low	✓	✓	
	medium	✓	✓	
	high	✓	M	✓
Household composition	young children present	M	M	✓
	young children absent	✓	✓	✓
Household visitation	frequent visitors	M	M	✓
	occasional visitors	✓	✓	
Willingness to minimize chemical inputs	high	✓	✓	
	low	✓	M	✓
Use of effluent	native garden		M	✓
	nutrient-hungry garden		✓	
	edibles eaten raw		M	✓
	Orchard/edibles eaten cooked		✓	
	toilet flushing	✓		✓
	clothes washing			✓
Garden size	large	✓	✓	✓
	medium	✓	✓	
	small	✓	M	
Soil type	clay	✓	✓	
	sand	✓	M	✓
Proximity to water body	close	✓	M	✓
	far	✓	✓	
Willingness to maintain system	high	✓	✓	✓
	low	✓	✓	M
Cost	< \$1,000		✓	
	<\$6,000	✓	✓	M
	>\$6,000			✓
Total No. of ticks (✓) indicating suitability of the system				
Total No. of issues requiring careful management (M)				

M: this is a risk requiring careful management

Blank cell: the system is not suitable for the selected task (or the selected use does not justify the financial and environmental costs associated with this system)

water reuse, particularly when using a treatment system. On these grounds alone it is difficult to justify their application to individual homes.

This leaves us with diversion systems. These systems are simple and inexpensive but can require expert advice to make sure your greywater output matches your requirements. It is important to assess your needs before deciding on a particular diversion system. For example, if you live in an apartment or gardenless home with a few window boxes or a small patch of green, you may opt for the shower to toilet diversion system rather than a standard diverter or drip irrigation system. Likewise, a drip irrigation system may not suit your needs if you have a large garden or plot

of land.

Ultimately, while there are a number of households willing to take the time to research possibilities for greywater reuse and install systems in their homes, a broad dissemination of practical and consistent information is required before reuse is practiced widely.

As a result, the ATA is using the results of the trial to advocate for policy changes and more reliable information about how best to reuse greywater in individual homes. The greywater reuse trial has played an important part in assessing the potentials of greywater use and the ATA would like to thank the many supporters of the ATA Smartwater Greywater Trial:

First and foremost, we thank the

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And of course, we thank our six marvellous greywater households—Jeff and Carolyn Robinson, Oliver and Evelina North-Coombes, Andrew and Karen Edwards, Norman and Marian Eyres, Trevor and Sue Yodgee, and Lisa Coffa, without whom the trial would not have been such a success. ★