

City of Guelph Guelph Residential Greywater Field Test Draft Final Report

Appendix F

Social Feedback Monitoring & Acceptance Data

Final Report

June 29, 2012

Social Feedback Monitoring & Acceptance Data

Please refer to the included PDF file at the end of this document (Metroline Report – Guelph Greywater Reuse Pilot Program).

Home Owners Surveys and Analysis:

Source: 3rd Resident Feedback Survey (After 1 year of owning the system)

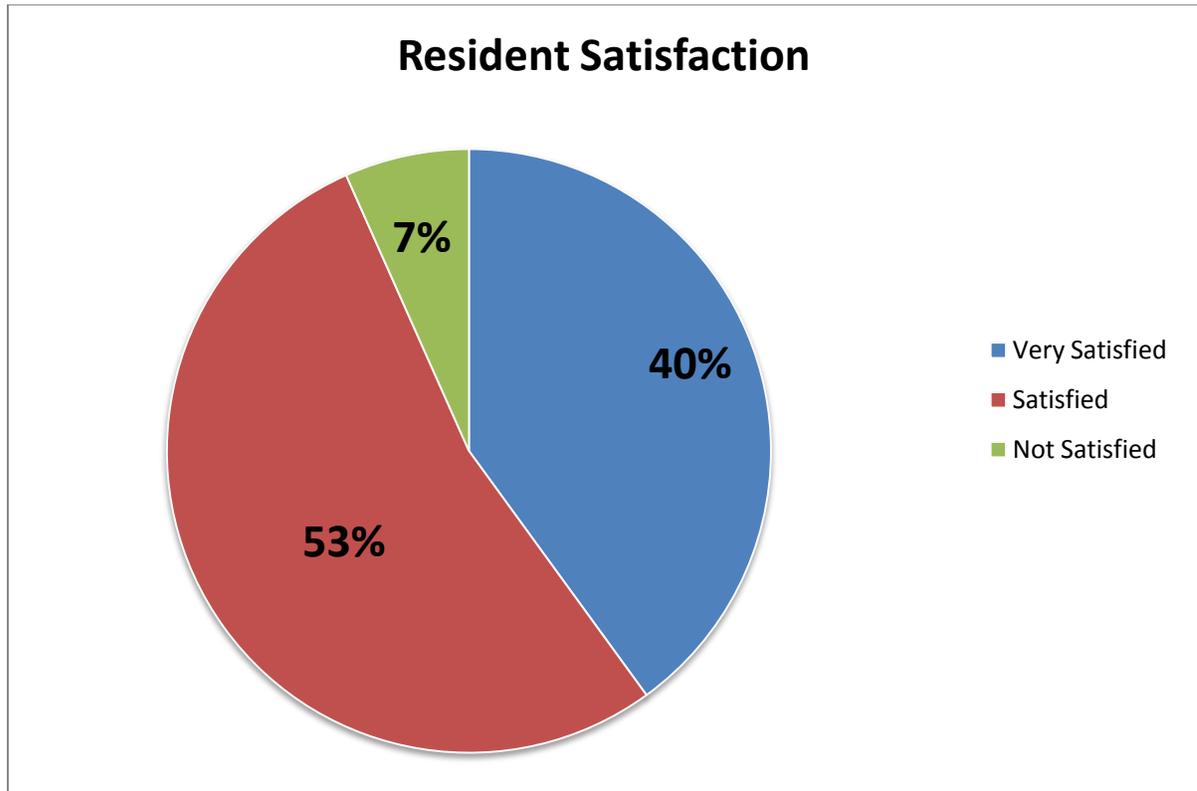


Figure 1: Survey - Resident Satisfaction Pie Chart

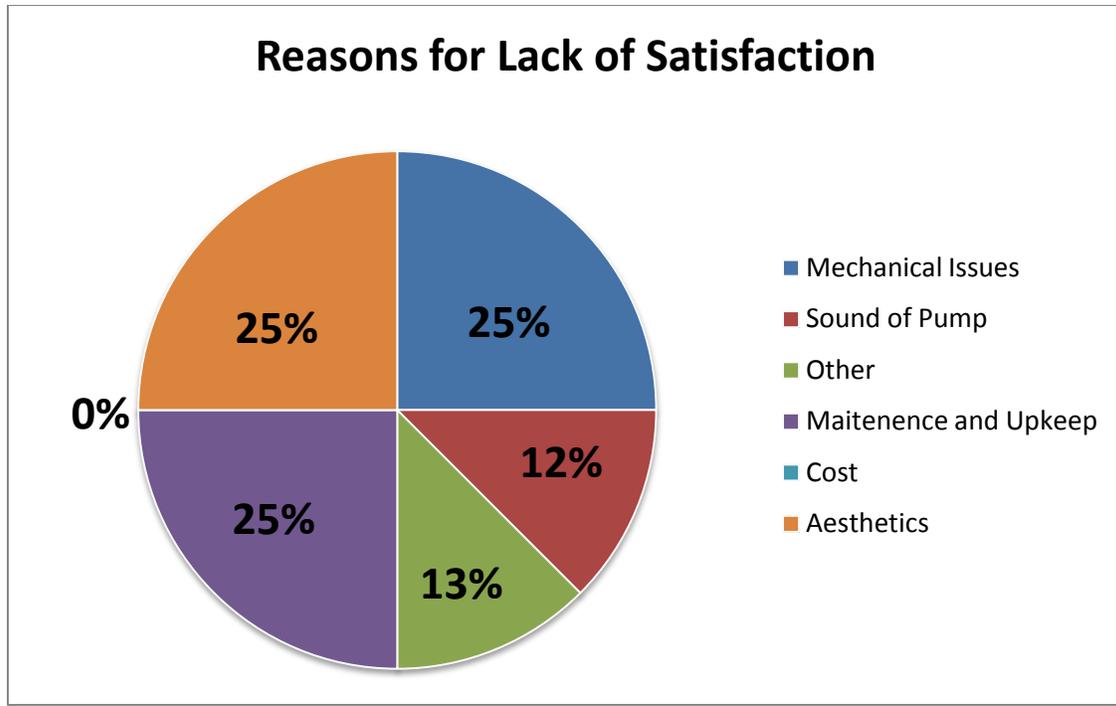


Figure 2: Survey - Reasons for lack of Satisfaction Pie Chart

Source: 3rd Resident Feedback Survey (After 1 year of owning the system)

Pilot Program Participant Feedback Surveys

Survey #1

1. What motivated you to participate in this pilot program? (Rank in order of importance, 1 being the most motivating factor and 4 being the least motivating factor)

Table 18: Response Tally for survey #1 question 1

Rank	Availability of financial incentives for system installation:	Decrease household water use and environmental footprint:	Investment - added to resale value of home	Long-term water utility cost savings	To contribute to future ground water supply
1	7	14	0	2	1
2	5	7	2	9	
3	6	1	4	8	
4	4	0	14	1	

Other motivating factors:

Knowledge of new technology.

Lead by example.

I'm a design builder and I wanted to test the system on my own house to see how it worked and how much maintenance was involved before I recommended it to my clients.

Contributing to the possibility of greywater systems being more readily available in Guelph overall.

Long term water utility cost savings and use.

Knowledge of system function

2. Rate your level of understanding of the operation of your grey water reuse system:
(circle one)

No understanding: **0 votes**

Basic understanding: **4 votes**

Good understanding: **10 votes**

Excellent understanding: **9 votes**

3. How much did you know about greywater systems before you had yours installed?
(circle one)

Beginner (this was my first experience): **10 votes**

Intermediate (Some knowledge): **8 votes**

Advanced (Experienced – previous research and knowledge): **5 votes**

4. Have you read the manufacturer's system manual provided to you? (circle one)

Yes: **17 votes**

No: **7 votes**

Some of it: **1 vote**

If yes, did you find the information helpful? (circle one)

Yes : **15 votes** (What I needed)

No: **2 votes**

If no, please provide details why:

- Not strong in description on programming 1st generation controller, nor factor settings on 2nd generation controller. L
- limited trouble shooting info.
- No time, will read soon.
- Forgot about it.
- There should be more information on troubleshooting problems.
- Didn't get one.
- I would like to know how often to replace the chlorine pucks + filter.
- Don't have one – will call manufacturer and get one.
- Instructions not clear (programming).
- We had a demonstration when we moved in.
- Recommendations did not follow what was allowed in City.

System information

5. Approximately when was your greywater reuse system installed?
Active Oct 09, 2009 before I moved in, in August, June 09, Summer 2009, September 2009, September 2009, August 09, May/ June 2010, Late July 2010, January 2010, 2 years (so November 2008), Commenced Aug 2010 and completed Oct 2010, Oct. 2009, Aug 23, 2010, October 20 2010, July 2010, Dec 1, 2010, February 2011, December 1 2010, July 2010, July 27 & June 2010.
6. What size of system do you have installed in your home?
 - a. 150L: **12 systems**
 - b. 200L: **1 system**
 - c. 60G: **1 system**
 - d. 250L: **3 systems**
 - e. Smaller: **1 system**
 - f. Not sure: **1 system**

System maintenance

- 7 How would you rate your ability to complete the regular maintenance requirements of the system? (circle one)

Poor, I am unable to complete maintenance: **0 votes**

Fair, I am able to complete some maintenance but not all: **9 votes**

Excellent, I am able to complete all maintenance required: **15 votes**

8. What type of filter do you have?

 Sock: **3 systems**

 Cartridge: **10 systems**

9. How often do you clean or change the filter? (circle one)

 Daily: **1 user (New is needed. The paper acordion filters are not good)**

 Weekly: **3 users**

 Biweekly: **6 users**

 Monthly: **7 users**

 Bimonthly: **4 users**

 Never: **1 user (Till Nov 2010, but realized we will probably have to change it monthly).**

10. Total number of times you have cleaned or changed the filter to date:

 Clean Under 10: **11 users**

 Clean 10-15: **3 users**

 Clean Over 15: **3 users**

11. How often do you check or add the chlorine puck? (circle one)

 Daily: **0 users**

 Weekly: **3 users**

 Biweekly: **1 user**

 Monthly: **18 users**

 Never: **0 users**

System performance

12. How would you rate the performance of your system? (circle one)

 Poor: **1 vote**

 Fair: **4 votes**

Good: **9 votes**

Excellent: **8 votes**

13. Have you noticed any water savings on household water bills since installing your greywater reuse system? (circle one)

Yes: **8 users**

No: **5 users**

Not applicable because we live in a new home: **10 users**

The system is too new and we are also using a lot of water maintain filters. Too new.

14. Have you experienced any issues or difficulties with your greywater system? (circle one)

Yes: **18 users**

No: **6 users**

If yes, please check all selections that apply:

Smell of chlorine: **7 users**

Murky water: **7 users**

Mechanical issues (i.e. inability to get water to the toilet): **7 users**

Sound of the pump operation: **3 users**

Unpleasant odour: **5 users**

Location of greywater tank: **0 users**

Film in toilet tank: **7 users**

Other, please provide details: **4 users**

Notes: -Initial problem related to electrical control board, replaced free by rep, no problems since

-Two mechanical problems since start up; 1 yet to be remedied.

-Cap coming off and water getting into electrical part.

-Solenoid and pressure sensor created problems with makeup water. Tank ran dry on several occasions until pressure sensor resolved.

-When the filter blocks up due to soap film the water bypasses to sewer leaving us short greywater for flushes.

-Certain parts are not designed for user to repair on their own – personally I believe all system parts should be simple and easy to maintain or fix.

-Black stuff in water system.

-Original cartridge was cellulose and clogged. Manufacturer replaced it with microfiber cartridge and all is well.

-Filter – after 1 week, even after it was rinsed it had to be switched

-Upon installation, the “chlorine pucks” were not installed. This led to significant bacteria growth within the system.

15. Based on your understanding of how the system operates, how would you rate your ability to troubleshoot system problems if they were to arise: (circle one)

Limited: **3 votes**

Fair: **9 votes**

Good: **6 votes**

Excellent: **5 votes**

Technical support

16. If you required assistance or experienced problems with your greywater system, who would you contact? (Check all that apply)

Manufacturer of the system: **14 votes**

Home builder/System Installer: **11 votes**

City of Guelph: **4 votes**

Plumbing professional: **7 votes**

Other, please provide details: **4 votes**

Self Licensed Plumber. Manufacturer rep – the Install team. To be honest, I didn't have much luck with the manufacturer and ended up calling a local builder when I had questions (Ben Polley). Greywater professional who did the install. Friends who are contractors. Depends upon what seems to be the problem.

General

17. How satisfied are you with your decision to install a home greywater reuse system? (circle one)

Not satisfied: **2 votes**

Satisfied: **9 votes**

Very satisfied: **13 votes**

If you're not satisfied, please share why: (Check all that apply)

Maintenance and upkeep: **3 votes**

Cost: **0 votes**

Aesthetics (i.e. murky water): **1 vote**

Mechanical issues: **2 votes**

Sound of pump: **0 votes**

Other, please provide further details: **1 votes**

I would however like to see a by-pass line capability to system in cases of power failures or mechanical issues.

I am not sure I would recommend this particular system to any clients.

Since focus group session on Oct. 13, 2010, other issues were brought forward – lack of communication & main contact person not identified.

18. How often does your system switch to city water? (Circle one)

Don't Know: **3 votes**

Daily: **1 vote**

Weekly: **5 votes**

Monthly: **2 votes**

Yearly: **0 votes**

Never: **7 votes**

Depends on demand, if hosting entertainment several people, demand is high and make-up water is required.

19. How many people does the system regularly support?

1: **1 votes**

2: **4 votes**

3: **4 votes**

4: **2 votes**

Other: **12, 6, & 5**

20. What are the ages of people living in this residence?

-55-91

-34

-39

-2

-4 month

21. What types of soaps/ shampoos/ etc are used in the shower (ie. Moisturizing, biodegradable, etc)? (optional)

Irish Spring – head and shoulder – Dove Shampoo & moisturizer

Shampoo – Tresemme, Head and Shoulders Live Clean

Soap – Old Spice, Aveeno, Pro-active

Crabtree&Evelyn, Kirkland, Burts Bees, KALAYA glycerine soap

Head & Shoulders, Body Shop, Organic Shampoos

22. Which do you take more often; baths or showers?

Baths:

Showers: **2 votes**

What time of day do you generally shower or bathe?

Evening & Morning

If you take mostly showers, how long are the showers on average?

15-20 min & 10-15 min

23. Do you bathe/shower on a regular basis outside of your home? (ie. At the gym or elsewhere)?

Yes: **0 votes**

No: **2 votes**

24. Does your household have a water softener?

Yes: **1 vote**

No: **1 vote**

If yes, what type?

If yes, do you soften both hot and cold water?

Only hot:

Only cold:

Both hot and cold: **1 vote**

25. What flush volumes do your toilets currently have? (ie. 4.8L, 6L, 13L)

6L & 13L

26. Approximately how many hours of the day are residents at home?

24, Stay at home mom + dad home approx. 12 hrs including sleeping time

27. Additional Comments:

Although I do not like adding chlorine to the system it actually helps keep the toilet bowl cleaner. A quick rinse of the filter at least once a week is the best way to keep the bathwater from bypassing and therefore losing greywater. Once in a while switches to City water. The filter cleaning is a bit of a deterrent. I think a sand filter – self-flushing like ones used in pools would make the system more attractive to the average home owner. The weak point of the system is the filter. Our felt filter does not allow the water through quickly enough once it gets partially clogged with soap film. When this happens the water from showers but especially from bathing bypasses the unit and leaves the system short and then requires city make-up water. Some information about shampoo's and soaps (brand names) that do not clog the filter as badly would be helpful and might require less maintenance.

We use the standard issue chlorine pucks; however our chlorine levels are either very low or just below the accepted value. Difficult to get answers for this. Also the water sometimes has an unpleasant odour. We are able to get rid of it by flushing Javax bleach. Is this okay? Glad to see the city supporting such a great program. Discussion prior to actual installation: of contact people, additional costs RE: filters and chlorine, what to expect RE: water turbidity, possible odours. I would like a bypass put in so when my system decides not to work I can still flush my toilets, which is quite a bit. I am not a happy person, I do not like this system. Turns out we're using city water. That not only surprises me but saddens me. I would like a metre that tells me how much greywater is going into the sewer. Some growing pains but now that we're up and running things are okay. Financial incentive was important. Waiving the annual backflow inspection will be an important ongoing need! I wish this were available for everyone.

Survey #2

Knowledge of system function

1. Rate your level of understanding of the operation of your grey water reuse system: (circle one)
No understanding: **0 votes**

Basic understanding: **4 votes**

Good understanding: **9 votes**

Excellent understanding: **10 votes**

System maintenance

2. How would you rate your ability to complete the regular maintenance requirements of the system? (circle one)
Poor, I am unable to complete maintenance: **0 votes**

Fair, I am able to complete some maintenance but not all: **6 votes**

Excellent, I am able to complete all maintenance required: **17 votes**
3. How often do you clean or change the filter? (circle one)
Daily: **1 vote**

Weekly: **7 votes**

Monthly: **14 votes**

Never: **0 votes**

Other: **Every 4 days, Every 3 months, Bi-monthly,**
4. Total number of times you have cleaned or changed the filter to date:
Less than 10: **7 votes**

10-15: **4 votes**

Greater than 15: **9 votes**
5. How often do you check or add the chlorine puck? (circle one)
Daily: **0 votes**

Weekly: **5 votes**

Monthly: **14 votes**

Never: **3 votes**

System performance

6. How would you rate the performance of your system? (circle one)
- Poor: **1 vote**
- Fair: **3 votes**
- Good: **18 votes**
- Excellent: **1 vote**
7. Have you noticed any water savings on household water bills since installing your greywater reuse system? (circle one)
- Yes: **10 votes**
- No: **6 votes**
- Not applicable because we live in a new home: **7 votes**
8. Have you experienced any issues or difficulties with your greywater system? (circle one)
- Yes: **20 votes**
- No: **3 votes**
- If yes, please check all selections that apply:
- Smell of chlorine: **5 votes**
- Murky water: **11 votes**
- Mechanical issues (i.e. inability to get water to the toilet): **9 votes**
- Sound of the pump operation: **3 votes**
- Unpleasant odour: **6 votes**
- Location of greywater tank: **0 votes**
- Film in toilet tank: **13 votes**
- Other, please provide details:
- Initial problem with system was repaired promptly by BRAC rep. Motor control replaced with new generation control. No issues since.
 - Seems to run too often. Maybe a setting I haven't figured out.
 - Overflow was too low, need adjustment and had flooding issues. Was inspected prior to usage, however backup overflow was too low and had to be adjusted by plumber.

-Chlorine puck gets stuck in sleeve and must be rotated

-Chlorine pucks clogged their cylinder; new cylinder provided by BRAC. Filter clogged repeatedly; old cellulose filter was replaced with a microfiber filter.

-Bacteria growth in toilet tank

-Chlorinator can plug.

-Filter is not performing correctly. too much debris getting through the primary filter and caught in the secondary. BRAC service reps are looking into it

9. Based on your understanding of how the system operates, how would you rate your ability to troubleshoot system problems if they were to arise: (circle one)

Limited: **4 votes**

Fair: **2 votes**

Good: **13 votes**

Excellent: **4 votes**

General

10. How satisfied are you with your decision to install a home greywater reuse system? (circle one)

Not satisfied: **3 votes**

Satisfied: **12 votes**

Very satisfied: **7 votes**

If you're not satisfied, please share why: (Check all that apply)

Maintenance and upkeep: **2 votes**

Cost: **1 vote**

Aesthetics (i.e. murky water): **1 vote**

Mechanical issues: **2 votes**

Sound of pump: **0 votes**

Other, please provide further details: **2 votes**

-Worried about damage to toilet components.

-Not comfortable relying solely on this system . Was not provided a back-up utilizing city H2O if pump failure was to occur – oversight by home builder.

-Our flooding issues could have prevented if inspection noticed/observed the problem – gravitational flow could have prevented if this had been picked up by a plumber etc → not the homeowner who has limited knowledge of piping needs

-Visits to the home to test water

11. How often does your system switch to city water? (Circle one)

Daily: **2 votes**

Weekly: **7 votes**

Monthly: **2 votes**

Yearly: **0 votes**

Never: **6 votes**

12. How many people does the system regularly support?

1: **3 vote**

2: **7 votes**

3: **5 votes**

4: **5 votes**

Other: **5**

What are the ages of the people living in this residence?:

Under 20: **6 votes**

20-40: **8 votes**

40-60: **4 vote**

Over 60: **1 vote**

13. What types of soaps and shampoos are used in the shower? (Please specify the name brand):

Head&Shoulders, TreSemme, Olay bodywash, Old Spice Sport, Live Clean Shampoo, Ivory, Aveeno. Crabtree&Evelyn, Kirkland, Burts Bees, Kalaya Glycerine Soap. Redken, L'Occitane soap and shower gel.

Dial soap, Johnson's shampoo, Nisim shampoo, Joico, Irish Spring, Garnier-Fructis, Joico, Dove, Pantene ,organic shampoo&conditioner and natural glycerine soap

14. Which do you take more often, baths or showers?:

Baths: **0 votes**

Showers: **5 votes**

Notes: **Baths for kids & showers for adults**

What time of day do you generally shower or bathe?:

Morning: **3 votes**

Evening: **0 votes**

Other: **5am, showers in morning, baths in evening, 2X per day**

If you take mostly showers, how long are the showers on average?:

0-5min: **0 votes**

5-10min: **4 votes**

10-15min: **1 vote**

15. Do you bathe/shower on a regular basis outside of your home? (ie. At the gym or elsewhere)?:

Yes: **0 votes**

No: **5 votes**

16. Does your household have a water softener?:

Yes: **4 votes**

No: **1 vote**

If yes, what type?:

Novo Soft, North Star, Aquamaster, NovoSoft

If yes, do you soften both hot and cold water?:

Only hot: **0 votes**

Only cold: **1 vote**

Both hot and cold: **1 vote**

17. What flush volumes do your toilets currently have? (ie. 4.8L, 6L, 13L):

4.8L: **3 votes**

6L: **3 votes**

13L: **1 vote**

18. Approximately how many hours of the day are residents at home?:

1-6 hours: **0 votes**

6-12 hours: **3 votes**

12 -18 hours: **4 votes**

18- 24 hours: **1 vote**

19. Have you read the manufacturer's system manual provided to you? (circle one)

Yes : **7 votes**

No: **5 votes**

If yes, did you find the information helpful? (circle one)

Yes: **7 votes**

No: **1 vote**

If no, please provide details why:

Did not receive one.

Not entirely helpful for troubleshooting.

No time (I am busy)

Did not receive one

Did not receive one

20. What type of filter do you have?

Sock filter: **7 votes**

Cartridge filter: **5 votes**

Technical support

21. If you required assistance or experienced problems with your greywater system, who would you contact? (Check all that apply)

Manufacturer of the system: **9 votes**

Home builder/System Installer: **2 votes**

City of Guelph: **0 votes**

Plumbing professional: **3 votes**

Other, please provide details: **1 vote**

22. Additional Comments:

I think one rare occasion it malfunctioned briefly and the tank drained, otherwise it has been OK. A better filter system needs to be provided to homeowners -Eg. I'm not sure the average person would be willing to clean out filters.

The maintenance procedure was incorrectly explained. The manufacturer has corrected the previous teachers and owners of the system.

System does require at least weekly filter maintenance but only takes 5 min. Filter maintenance is key to good system performance and longevity. Cost of chlorine pucks.

I would not recommend this system in home owner not mechanically included. I have put quite a bit of time and effort trouble shooting system on own, and not sure if you would see return on investment if having to buy system at \$1800 -2200.

For the manufacturer...As a 5'4 (with my hands in the air) woman, sometimes it's hard to get the filters up because of having to pull straight up at the chin level. (but I've only done it twice so maybe it'll be much easier if its cleaner)

Generally, I am not happy with the overall appliance and its issues from the outset. Many of these problems should/could have been prevented if detailed information had been given to homeowner prior to purchase: to be fully informed. The extra cost and damage to items was frustrating and the extra work in cleanup and trying to problem solve. I feel the inspector should have picked this up – what is an inspector for? Products/supplies not readily available.

Although the system works, it requires a lot of diligence in cleaning the sock to keep it operating adequately. Once you have a routine established, it functions quite well.

Would like a bypass setup installed in case of any issues with grey water system

Replacement of old 13L toilets has been crucial to the operation of the system – we could not keep any water in the tank with just 2 people – we'd empty it with 2 flushes of the old toilets

I wish I had purchased a bigger tank.

Survey #3:

System performance

1. How would you rate the performance of your system? (circle one)
Poor: **0 votes**

Fair: **2 votes**

Good: **9 votes**

Excellent: **2 votes**

2. Have you noticed any water savings on household water bills since installing your greywater reuse system? (circle one)
Yes: **6 votes**

No: **3 votes**

Not applicable because we live in a new home: **6 votes**

3. Have you experienced any issues or difficulties with your greywater system? (circle one)
Yes: **13 votes**

No: **3 votes**

If yes, please check all selections that apply:

Smell of chlorine: **2 votes**

Murky water: **6 votes**

Mechanical issues (i.e. inability to get water to the toilet): **6 votes**

Sound of the pump operation: **1 vote**

Unpleasant odour: **4 votes**

Location of greywater tank: **0 votes**

Film in toilet tank: **6 votes**

Other, please provide details: **5 votes**

- 10 gallons of water/month of potable water wasted via overflow valve
- Chlorine pucks not always dissolving
- Pump failed and was replaced by Brac
- increase in mould/bacteria cultures in toilet tank

- Filter does not fit easily in and out of tube
- 4. Based on your understanding of how the system operates, how would you rate your ability to troubleshoot system problems if they were to arise: (circle one)

Limited: **3 votes**

Fair: **4 votes**

Good: **8 votes**

Excellent: **0 votes**

General

- 5. How satisfied are you with your decision to install a home greywater reuse system? (circle one)

Not satisfied: **1 vote**

Satisfied: **8 votes**

Very satisfied: **6 votes**

- Would not purchase if installing again, do NOT see good return on investment with number of problems encountered
- Not sure if it's suitable for household

If you're not satisfied, please share why: (Check all that apply)

Maintenance and upkeep: **2 votes**

Cost: **0 votes**

Aesthetics (i.e. murky water): **2 votes**

Mechanical issues: **2 votes**

Sound of pump: **1 vote**

Other, please provide further details: **1 vote**

- Required replacing all fill tube systems (x 3), labour/time consuming, fine tuning, adjusting
- Not satisfied with particular filter system – uses too much potable water to clean
- System was installed before we moved in. We need better troubleshooting skills.
- I think the filter cleaning requirement is a bit onerous. If I let it slide, the system ends up using clean water too often.

6. How many people does the system regularly support?

1: **1 vote**

2: **6 votes**

3: **5 votes**

4: **1 vote**

5: **3 votes**

Other:

7. What are the ages of the people living in this residence?:

- **31/35**

- **38/43**

- **41/35/15/12/7**

- **57/91**

- **40/40/12/10**

- **35/40**

- **40/44**

8. What types of soaps and shampoos are used in the shower? (Please specify the name brand).

- Aveeno, Dove, Head&Shoulders and Herbal Essences

- Lush (solid shampoo & conditioner), The Soap Works (natural soaps)

- Salon Selective, Halo shampoo and conditioner

- Sauve Lever 2000, Axe body wash, Bath & Body Works body wash

- Organic, phosphate free

- Head & Shoulders, Tresemme, Axe, L'Oreal, Aveeno

- Dove, Jason Organic Aloe Shampoo, Johnson & Johnson baby Shampoo, Aveeno baby body wash

- Shampoo: Jasön, Nizoral, Lush (solid shampoo)The Soap Works & natural bar soap.

9. Which do you take more often, baths or showers?:

Baths: **1 vote**

Showers: **7 votes**

What time of day do you generally shower or bathe?:

Morning: **6 votes**

Day: **0 votes**

Evening: **3 votes**

If you take mostly showers, how long are the showers on average?:

0-5min: **2 votes**

5-10 min: **2 votes**

10-15 min: **1 vote**

15-20min: **2 votes**

>20min: **0 votes**

10. Do you bathe/shower on a regular basis outside of your home? (ie. At the gym or elsewhere):

Yes: **3 votes**

No: **4 votes**

11. Does your household have a water softener?

Yes: **5 votes**

No: **2 votes**

If yes, what type?

- Mechanical
- beads that are periodically regenerated by saline solution
- Novasoft,

If yes, do you soften both hot and cold water?

Only hot: **0 votes**

Only cold: **0 votes**

Both hot and cold: **4 votes**

12. What flush volumes do your toilets currently have? (ie. 4.8L, 6L, 13L)

4.8L: **0 votes**

6L: **2 votes**

13L: **0 votes**

Dual Flush: **4 votes**

13. Approximately how many hours of the day are residents at home?

0-6: **2 votes**

6-12 hours: **2 votes**

>12 hours: **3 votes**

Knowledge of system function

14. Rate your level of understanding of the operation of your grey water reuse system: (circle one)

No understanding: **0 votes**

Basic understanding: **2 votes**

Good understanding: **7 votes**

Excellent understanding: **2 votes**

15. Have you read the manufacturer's system manual provided to you? (circle one)

Yes: **2 votes**

No: **4 votes**

If yes, did you find the information helpful? (circle one)

Yes: **3 votes**

No: **0 votes**

If no, please provide details why:

- cant find it
- not provided

System maintenance

16. How would you rate your ability to complete the regular maintenance requirements of the system? (circle one)

Poor, I am unable to complete maintenance: **0 votes**

Fair, I am able to complete some maintenance but not all: **2 votes**

Excellent, I am able to complete all maintenance required: **5 votes**

17. What type of filter do you have? (circle one)

Sock: **4 votes**

Cartridge: **4 votes**

18. How often do you clean or change the filter? (circle one)

Daily: **0 votes**

Weekly: **4 votes**

Monthly: **3 votes**

Never: **0 votes**

19. Total number of times you have cleaned or changed the filter to date:

0-10: **1 vote**

10-20: **0 votes**

20-30: **2 votes**

>30: **0 votes**

20. How often do you check or add the chlorine puck? (circle one)

Daily: **0 votes**

Weekly: **5 votes**

Monthly: **5 votes**

Never: **0 votes**

Technical support

21. If you required assistance or experienced problems with your greywater system, who would you contact? (Check all that apply)

Manufacturer of the system: **4 votes**

Home builder/System Installer: **4 votes**

City of Guelph: **2 vote**

Plumbing professional: **1 vote**

Other, please provide details:

22. How often does your system switch to city water? (Circle one)

Daily: **0 votes**

Weekly: **2 votes**

Monthly: **1 vote**

Yearly: **0 votes**

Never: **2 votes**

23. Additional Comments:

- We bought the house one month ago and are still just learning. My answers are not likely helpful yet.
- Thanks for doing this I hope it helps get the glitches out for future users. Note: I clean the filter weekly now and know that it would be have been helpful to have the heads up about soaps, shampoos and conditioners with lotions in them.
- The student who came after Paul worried me – she forgot to put on her gloves and didn't wash her hands before leaving.
- Two of the five residents have their bathroom and shower in the basement and their bath/shower does not put grey water into the system although that toilet uses the system
- Not written down on survey, but when speaking to the homeowner he said he loved the system, and besides a few mechanical issues that BRAC could fix up he was very happy with it
- The second time I switched filters from a plastic cartridge was not because the filter was especially dirty but because the plastic fabric had started to sag and I was having more difficulty getting it in and out of the filter tube [drew picture]; however, the new filter is still not an easy fit.

Survey #4:

Knowledge of system function

1. Rate your level of understanding of the operation of your grey water reuse system: (circle one)

No understanding: **0 votes**

Basic understanding: **1 vote**

Good understanding: **3 votes**

Excellent understanding: **2 votes**

System maintenance

2. How would you rate your ability to complete the regular maintenance requirements of the system? (circle one)

Poor, I am unable to complete maintenance: **0 votes**

Fair, I am able to complete some maintenance but not all: **4 votes**

Excellent, I am able to complete all maintenance required: **2 votes**

3. How often do you clean or change the filter? (circle one)

Daily: **0 votes**

Weekly: **1 vote**

Monthly: **5 votes**

Never: **0 votes**

4. How often do you check or add the chlorine puck? (circle one)

Daily: **0 votes**

Weekly: **2 votes**

Monthly: **4 votes**

Never: **0 votes**

System performance

5. How would you rate the performance of your system? (circle one)

Poor: **0 votes**

Fair: **1 vote**

Good: **6 votes**

Excellent: **0 votes**

6. Have you noticed any water savings on household water bills since installing your greywater reuse system? (circle one)

Yes: **2 votes**

No: **0 votes**

Not applicable because we live in a new home: **4 votes**

7. Have you experienced any issues or difficulties with your greywater system? (circle one)

Yes: **6 votes**

No: **0 votes**

If yes, please check all selections that apply:

Smell of chlorine: **3 votes**

Murky water: **3 votes**

Mechanical issues (i.e. inability to get water to the toilet): **3 votes**

Sound of the pump operation: **1 vote**

Unpleasant odour: **2 votes**

Location of greywater tank: **0 votes**

Film in toilet tank: **4 votes**

Other, please provide details:

- Approximately six months ago required rebuilding/replacing pump because impeller broke and seized pump operation

8. Based on your understanding of how the system operates, how would you rate your ability to troubleshoot system problems if they were to arise: (circle one)

Limited: **0 votes**

Fair: **1 vote**

Good: **5 votes**

Excellent: **0 votes**

Technical support

9. Have you experienced problems and required assistance with your greywater system, and if so who would did you contact? (Check all that apply)

No, I have no required assistance: **1 votes**

Manufacturer of the system: **2 votes**

Home builder/System Installer: **3 votes**

City of Guelph: **0 votes**

Plumbing professional: **0 votes**

Other, please provide details: **0 votes**

- Contact = Ben Polley

General

10. How satisfied are you with your decision to install a home greywater reuse system? (circle one)

Not satisfied: **0 votes**

Satisfied: **6 votes**

Very satisfied: **0 votes**

If you're not satisfied, please share why: (Check all that apply)

Maintenance and upkeep: **1 vote**

Cost: **1 vote**

Aesthetics (i.e. murky water): **0 votes**

Mechanical issues: **1 vote**

Sound of pump: **0 votes**

Other, please provide further details:

11. How often does your system switch to city water? (Circle one)

Daily: **1 vote**

Weekly: **0 votes**

Monthly: **1 vote**

Yearly: **0 votes**

Never: **1 vote**

12. How many people does the system regularly support?

1: **0 votes**

2: **3 votes**

3: **2 vote**

4: **0 votes**

5: **1 vote**

Other:

13. What types of soaps and shampoos are used in the shower? (Please specify the name brand).

- Pantene (shampoo & conditioner); Dove (soap)
- Aussie Shampoo and Conditioner, liquid bath and body works soap
- Tresemme (Natural), Jason
- Varies
- Herbal Essence, Neutrogena, Dove for Men, Garnier Fructis
- Old Spice, Dove, Pantene

14. Which do you take more often baths or showers? (circle one)

Baths: **0 votes**

Showers: **6 votes**

What time of day do you generally shower or bathe?

Morning: **6 votes**

Day: **0 votes**
Evening: **4 votes**

If you take mostly showers how long are the showers on average?

0-5min: **1 vote**
5-10min: **1 vote**
10-15min: **3 votes**
>15min: **1 vote**

15. Do you bathe/shower on a regular basis outside of your home? (ie. at the gym or elsewhere)? (circle one)
Yes: **0 votes**
No: **6 votes**

16. Does your household have a water softener? (circle one)

Yes: **6 votes**
No: **0 votes**

If yes, what type?

- Kenmore Elite
- General Electric
- The Water Store
- Salt

If yes, do you soften both hot and cold water? (circle one)

Only hot: **1 vote**
Only cold: **0 votes**
Both hot and cold: **5 votes**

17. What flush volumes do your toilets currently have? (ie. 4.8L, 6L, 13L)

4.8L: **2 votes**
6L: **5 votes**
13L: **0 votes**

18. Approximately, how many hours of the day are residents at home?

0-6 hours: **1 vote**
6-12 hours: **1 vote**
>12 hours: **3 votes**

19. Additional Comments:

- need a valve to be able to switch from greywater to city water when the system is not working properly
- Thanks for letting us be a part of the pilot program
- The pressure refill valve installed with the system wastes a large quantity of water and almost negates the installation of the tank. Please advise if other methods are possible.

Thank you for taking the time to complete this survey. Your feedback is greatly valued.

For more information about the Residential Greywater Reuse Pilot Program, contact:

Web Survey Questions and Responses

Table 19: Web Survey Questions and Responses Part 1

Question	Answer	Sample	Percentage
How important is water conservation to your household?	5 - Very important	38	48.72%
	4	30	38.46%
	3	9	11.54%
	2	0	0%
	1 - Not very important	1	1.28%
	Total	78	
How do you conserve water in your home? (Choose all that apply and specify)	Use low flow toilets (6L/flush or less)	53	10.95%
	Use low flow showerheads (9.5 L/min or less)	52	10.74%
	Take shorter showers	51	10.54%
	Turn off water while brushing teeth	68	14.05%
	Use a front loading washing machine	36	7.44%
	Water the lawn less frequently	60	12.40%

	Retrofitted water primed floor drains with a waterless floor drain trap	2	0.41%
	Installed a water efficient humidifier	7	1.45%
	Undertake water efficient gardening practices	52	10.74%
	Use a rain barrel(s)	43	8.88%
	Use low flow faucet aerator(s)	42	8.68%
	Installed a greywater reuse system	1	0.21%
	Installed a rainwater harvesting system	15	3.10%
	Other	2	0.41%
	Total	484	
How familiar are you with greywater reuse systems?	Unfamiliar - this is the first time I've heard of a greywater reuse system	17	21.79%
	Somewhat familiar – I have heard of or seen systems previously	31	39.74%
	Familiar – I understand the basic mechanics of how a greywater reuse system works	27	34.62%
	Very familiar – I or a family/friend own a greywater reuse system	3	3.85%
	Total	78	
Are you aware that the City of Guelph Residential Greywater Reuse Pilot Program offers a financial rebate to homeowners who purchase a greywater reuse system?	Yes	34	43.59%
	No	44	56.41%
	Total	78	
Home greywater reuse systems most commonly capture the	Yes	73	93.59%

used water (greywater) from showers and baths, treat it, and reuse it to flush toilets. Now knowing this, would you consider installing a greywater reuse system in your home?	No	5	6.41%
	Total	78	
What barriers would hold you back from installing a greywater reuse system in your home? Check all that apply.	Initial cost or return on investment	71	46.71%
	Retrofit process	37	24.34%
	Health concerns	8	5.26%
	Complexity of the technology	24	15.79%
	Other	12	7.89%
	Total	152	
What can the City of Guelph do to encourage your participation in the Greywater Reuse Pilot Program?	Offer workshops or educational events	42	21.88%
	Continue to provide financial rebates	71	36.98%
	Provide proof that the system works/saves money	47	24.48%
	Provide proof of health and safety	24	12.50%
	Other	8	4.17%
	Total	192	
Would you like more information about the City's Greywater Reuse Pilot Program and other water conservation initiatives?	Yes	53	43.59%
	No	25	56.41%
	Total	78	

Table 20: Web Survey Question and Responses Part 2

Question: What are your thoughts about the term "greywater"?
Responses
In a community where Waste Resource Innovation Centre seems an acceptable term so does greywater.
I think the term is okay. I think maybe the word "grey" has a negative connotation and might discourage people from considering it.

That the city should think of a new term that will be more 'friendly' to residents. Greywater does not sound too appealing.
I do not know anything about it.
greywater accurately describes what the water that has been previously used is. I don't think "grey" has any particular negative connotations.
it isn't so grey -- consider rewording as a water reuse or second life water r something else positive (sorry if tihere are typos. this survey is slowing down my computer)
I think it is a great concept, but only a few can take advantage of it. You either need a large area for installation and also be able to afford it. What exactly is the payoff period. Like a lot of other green things that cost too much to implement, it will only be for new construction and those who can afford it. The way we cram houses together now a days just doesn't give room for this system. I think we could encourage garboraters and such to reduce waste, which would be more affordable and simpler for the city to give support to many more people.
it's vague. tough to explain what it really means. To me it refers to water that's clean enough to re-use.
sounds like dirty water.
The term greywater would likely have a negative connotation outside conservation and environmentally conscious minds. I know what it is so it's fine. It best describes what the water is - not dirty but grey from skin cells, hair, soap and body care products, perfectly good for flushing toilets and watering one's yard.
Not intuitive... but once you get it... it works.
Term is fine.
used water from household use ie shower, laundry, kitchen sink
I actually think it should have a different name. If I think about grey water it sounds dirty and does not encourage me to consider this option
My parents used to recycle years ago before recycling was a word that I knew about. The clothes washer would drain the water to the laundry tubs, the next load would draw that water to be re-used. The rinse cycle used fresh waterto finish the clothes cleaning cycle. Less soap and less water were needed.Now the grey water idea recycles the water from household sources and flushes the toilet.
I think it is accurate.
why not use gray water if it is safe
Water that has been used for general household purposes and that can be cleaned up enough to make it sufficient for use in landscape maintenance etc. (non-potable but reusable water).
I'm a bit confused by this question - the term greywater refers to reusing water from showers/sinks/etc to run toilets or in some cases water outdoor plants. The term makes sense to me as it diferentiates this water from fresh water just coming into your house.
it sounds dirty - like a dirty pair of sport socks. i prefer the term "recycled" water.

It makes one think of dirty water which I suppose it is, but it is useful dirty water.
previously used water but still usable in areas other than drinking & cooking
I'd like to know more.
sounds like a good term to use to me
Good term. I like it also because it can be used on the pipes too, though I understand that marking with purple is becoming the standard.
I'm not entirely certain where the term originated, though i understand sewage is known as "blackwater." I often wonder if reclaimed greywater is actually grey - clouded with detergents or other things from the tub/shower. this would make sense to me.
it's appalling that we can't use it for something. everyday
I think greywater is a great idea. I am really interested in this technology.
expensive
As new sub-divisions are built this should be part of planning by both builders and municipalities.
Il think it's an excellent idea,wish i could learn more about it and the cost of installing.
Seems to be relatively unknown, maybe another more appropriate word would be more useful. The water isn't usually grey.
great for newer homes but expensive to set uor older homes . city shoud rebate a substancial amt to have more residents interested
Sounds like a useful and great way to conserve water
When I lived in my own house I couldn't afford to set up a greywater system, but what I did was capture water I was running from the tap to get cold or hot water. I stored it in empty plastic containers in the back porch. I used it to water plants indoor and outdoor ones. If I replace a kitchen sink in the future I will go for a 3 basin setup with the third drain for reuseable water. I also beleive using shower water to flush toilets sounds good but would there not be a problem with soaps ? What about their reactions to toilet bowl cleaners and soap scum collecting in pipes ?
useable, but un-used resource
I think it is a great way to reuse water and reduce fresh water consumption.
I understand that it is water used in activities such as showering and dishwashing to be collected and then reused for flushing the toilet and even water plants.
I think it is a great idea - instead of "clean" used water being sent directly to a sewer system, to use it again. In North America, and our obsession with cleanliness, it maybe isn't the friendliest term, but I don't have another term that would work.I think that a massive education and marketing campaign may be necessary in order to make this work.

full of bacterias
water recycling
I'm not sure what you mean by "what are your thoughts...". Grey water is grey water. It often gets sent down the drain, when there could be another use for it. When I was a child, my parents' washing machine had a feature on it that the water from one load could be sucked back from the laundry tub for the next load. I used that washing machine until just a few years ago when I couldn't get parts anymore. Features like that should be standard, but since I haven't been appliance shopping lately, I don't know if today's models have them or not.
They are awesome.
none
n/a
an interesting concept
Perfect description. Grey meaning inbetween. Clean water is not a black or white issue.
wasted resource
Makes sense and implies exactly what it is
I think it is a term that can easily put people off the concept.
It's water to be reused that is non-potable
good idea but costly to retrofit in older homes; should be a priority in new home construction
Reusing water
I'm not sure if this question is worded appropriately. However I think a greywater system is a good use of recycled water.
The term greywater does not really explain what it is to be used for. Grey water to me sounds like old stale water.
Potentially a good idea
A bit questionable but conceptually accurate.
Sounds like a good idea.
I'm glad the City is initiating this effort, which we are known for by the way all the way to California. My niece told me that Guelph is mentioned when they tackle environment measures. Our city seems to be the model. I'm very interested in the greywater system & would like to get more information on the cost & City's reimbursement program.
another term (euphemism) would be more appealing

I like it and think it is an interesting and descriptive word that got my attention!
It's fitting
Think it is a good idea, but largely misunderstood. very little general familiarity of it. would be good if builders in guelph had to do several things to get a building permit:- make all houses grey water adaptable- make all houses "solar thermal ready" by having conduit installed- make all south facing roofs free of unnecessary architectural detail so that solar PV or solar thermal could be installed on a larger % of the roof- avoid air vents for attics on south facing roofs, instead the builder has to install ridgevent
Don't really have any thoughts about the term greywater.
never heard of it
the term has a negative connotation, sounds dirty or unclean
I think of the water that is not really "dirty" and could be reused for purposes that do not require purified or treated water. It allows for the water to be used more than once before travelling to the wastewater treatment plant.
I was confused by it. I didn't know what it meant at all. I think it would be better termed something more obvious such as waste water or used water..
It seems a great way to use water twice before it goes to waste. But it might be difficult to retrofit into an existing home.
It sounds a bit "clinical" and gross. Maybe it could be played up and made more fun-sounding?
I feel that the term greywater is very appropriate given the various states of water within a building. Appropriate in the sense that it lies in a middle ground as to the degree of contamination.
I think it's pretty straight forward.
I think this is a fantastic idea. I'm familiar with the term, having owned an RV previously and I think it accurately describes the water condition. It is still reusable for certain functions - like water for the toilet tank- but is not pristine water for drinking, cooking, washing, etc. I think it is an accurate term.
The term is appropriate.
One of the biggest water wastage beyond sewage and outdoor watering.
It sounds very interesting to conserve water - if more people are aware of it - it would save us money and all would benefit
It is great. I would like to participate in the program.
May not be completely appropriate since in cottage disposal it could include everything but sewage, so might be offputting to the general public. Greywater reuse focuses on less contaminated washwater - there might be a better descriptor for this sourcewater.

Table 31: Survey Question and Responses Part 3

What would influence your decision to install a greywater reuse system in your home?	Please Rank the answers from 1 to 6 (1 being highest priority and 6 lowest priority)	Water and financial savings	Initial costs	Maintenance requirements	System complexity	Resale value of your home	Environmental ethic
	Rank: 1	10	38	3	6	1	15
	Rank: 2	21	16	15	10	3	8
	Rank: 3	16	9	22	9	4	13
	Rank: 4	9	6	22	16	8	12
	Rank: 5	15		9	17	16	16
	Rank: 6	2	4	2	15	41	9

Table 42: Survey Question and Response Part 4

Are there any general thoughts/comments you would like to offer regarding the City's Greywater Reuse Pilot Program?
The City isn't effectively enough spreading word of this program.
n/a
Nope
I think that Greywater reuse is amazing and I am very glad that the City is attempting this. While I think that having approved grey water reuse is great, that restricts citizens from taking the action, which is really what you want.
The name's a bit cumbersome - why's it gotta be a pilot program? "greywater rebate program" might be more compelling
This is an excellent step on the conservation strategy path. Keep up the good work!
Still don't know anything about the program.
I think that reusing grey water is a great idea.I believe that retrofitting is quite expensive, and not sure about space required. More education would be helpful.Installing in new builds would make sense.
what impact is there for people with pets ... ie is it safe for pets if they happen to drink water out of the toilet bowl.
I'm not aware of the costs.How much time does it take to construct and install the system?Retro fit may be difficult, maybe better for NEW constuction.
good program, please continue
This is a good idea that will improve the greening of Guelph if participation is high enough. It

would be great to make a list of the most water-wise cities in Canada!
Thanks for setting it up! If people adopt greywater systems it could make a difference in water usage.
i think this is a great initiative. currently i live in a multi-res unit, but look forward to owning a home which i can install a greywater system in the future.also, i think becky is super cool!
Not at this point.
I'd like to know more about it.
great idea
How do I find out more?
glad you have one!
I'm not sure of the cost of installation so i'm not sure of the financial value at this point. But I'm intertest in being more environmentally friendly
no
Nor really as i did not know about it,maybe more public information.
A focus on rebates for rental units and explaining the system and benefits to renters would be useful.
the program requires a higher level of public awareness.Sell the program!
I don't think it's well known. I think it's a good idea. More information should be availble.
Provide educational information, especially about initial costs, retrofitting, and resale value of home
nope
no
No. I don't know enough about it to offer any thoughts or comments.
None.
nope
n/a
I am wondering if there is a system to go from sink (handwashing) to toilet, rather than from shower.
Good luck - my impression is that it would cost way too much to repairs to make it feasible as a retrofit.Should be in ALL new builds approved in Guelph - no building permit unless its a part of the house plan. We are on a limited supply groundwater system.
Is there any way to make the cistern (collection barrel) accessible to the outside of the home for gardening and car washing? For years I used to drain our washing machine into 20L pails, then shut off the washer, go outside and dump the pail on the grass or garden, then go back and let the washer continue to drain into the pail again. This helped our lawn and gardens during drought years, and I didn't have to use a sprinkler.
As I own a heritage house in Guelph I'm never sure how easy these initiatives are for my type of property. Perhaps a FAQ that includes a discussion of a retrofit on a (very) old house.
Can it b be done on an already built house.
A good direction to explore and support.
no
i would like someone to contact me or let me know of any workshops. Thank you very much.
please consider increased communication about this and how homeowners can find out about the programme
No
put a short article and diagram in the Trib.
am interested to know what the initial costs are.

Letter with info like the recent info about water primed drain.
It is a great way the City helps in sustainability.
Keep up the great work - Guelph is proud to be a water conservation leader!
I believe that the program is a great idea and that the reuse of greywater within homes is an amazing idea that can greatly reduce water usage.
Make details more easily available.
I think it is a fantastic idea - very forward thinking. Glad to live in a city where something like this is being offered/promoted!! Promote more though because I just happened upon this information while looking for recreational activities on the city web site.
A chart indicating average installation costs (parts and labour cost) would be useful. I also think that some homeowners have the capability of doing the work themselves. Especially if they participate in obtaining permits and inspections. I'm every bit as capable as a plumber, the labour cost are prohibitive in most cases.
Excellent idea

Social Acceptance Research on Qualitative Builder/Homeowner Interviews

Conducted by Dr. Benjamin Kelly – Nipissing University

Approach

Building capacity and developing a user-led design process is an inherently social and reflective enterprise. A test pilot project of this magnitude committed itself to understanding how individuals acquire perspectives and orient their interactions toward the social objects that have meaning for them (Blumer 1969; Prus 1996; 1997). The methodological approach that best lends itself to capturing the perspectives and lived experience of social actors is participant observation and interviews. In order to understand the perspectives of social actors, it becomes necessary for researchers to situate themselves within the social networks of those they seek to study.

One of our key goals was to find out what is important to operators and how they define and manage situations that are both constraining and enabling through the course of their interactions with technology and the pilot project team. It is the management and negotiation of these social perspectives and the consequences that follow the clash of multiple definitions among and between groups that are most important in understanding the social dynamics that underlay capacity building and knowledge translation.

There has been very little research on public acceptance of auxiliary water technology. Research that does acknowledge water conservation typically emphasizes concerns around safety, with economic and political issues taking center stage at the expense of detailed social analysis. The majority of these studies is based on survey data and therefore makes little effort in acquiring the everyday learned perspectives and meaning making processes of the people interacting with water conservation technologies.

Studies of public perception are more common within the context of modified primary systems (Haddad, Rozin, Nemeroff, and Slovic 2009) These modified primary systems focus on recycled and desalinated drinking water (see Dolnicar and Schafer 2008) One study is of particular interest as it is very similar to the Guelph pilot project findings. In 2010, Domènech, L. and Saurí, D. wrote a paper entitled *“Socio-technical transitions in water scarcity contexts: Public acceptance of greywater reuse technologies in the Metropolitan Area of Barcelona.”* Domènech and Saurí’s research focused on water re-use for flushing toilets in an area of Barcelona, where greywater systems have been in use for more than six years. A survey was conducted in the Sant Cugat del Vallès area; 120 households using the re- use systems responded. Most users had initially felt positive about greywater use, but acceptance decreased slightly after experience with the system and more than a third of respondents were dissatisfied with it. Some of the main drawbacks, according to users, were the unpleasant odour and appearance of the water,

system breakdowns and maintenance costs. However, most users did appreciate the benefit of saving drinking water.

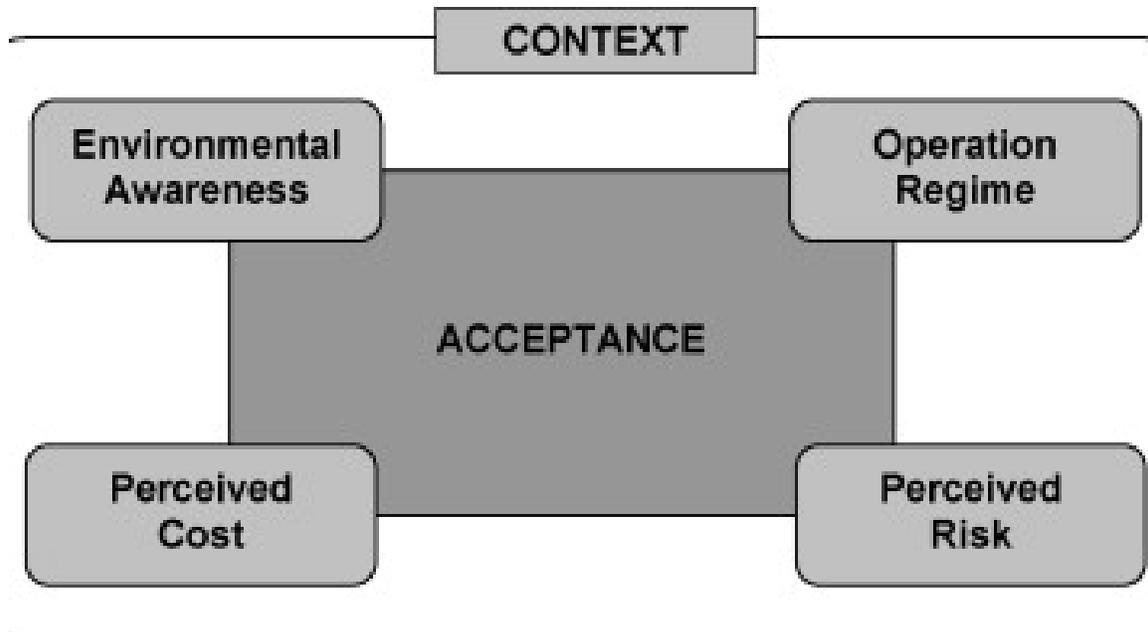


Figure 3: Domènech and Saurí (2010)

Guelph findings were similar to the Barcelona project and followed a similar context (see **Error! eference source not found.**). Cost, risks, technical difficulties, and environmental consciousness played a prominent role in both the Barcelona and Guelph projects. Our study has a significantly smaller sample size (N= 30+) but has the added advantage of analysis based on more in-depth discussions with participants than merely survey reports. Qualitative analysis has yielded a typology of users termed “gifted” and “retrofit.” The gifted term refers to the group of participants who received their greywater system with the purchase of their new home; the retrofit participant group consisted of people who were renovating their homes and chose to include a greywater reuse system as part of their renovations.

“Retrofit” and “Gifted” Participants:

The two groups that emerged during our pilot study organize themselves around a maintenance discourse. The retrofit participants identified themselves with a proclivity toward managing the technology while the gifted group generally was extremely frustrated with the technology’s demands on their time.

Those whose homes were gifted with greywater technology were usually young couples who were purchasing new homes and viewed the system as a “mortgage add on.” They did not

expect to spend a great deal of time with the system and some felt that they were not fully made aware of the responsibilities of the system by the builder. Those participants who retrofitted their homes had a better understanding of the technology's needs and were willing to invest their time into maintaining the system.

In addition to our findings, studies show that different segments of a population need to be targeted differently as interest and education of water conservation varies across the population. "Segment membership is strongly associated with socio-demographic status as well as stated willingness to use recycled water for a range of household uses" (Dolnicar and Hurlimann 2010:57).

Acceptance of Practice vs. Technology by Audience, Willingness/Technical Aptitude of Audience, and Desired Level of Performance/Interaction

Guelph pilot project findings suggest that there is a great deal of ambivalence surrounding the value of greywater technology. More specifically, all members agree that the "concept" of environmental responsibility is important and many invoke a number of strategies to conserve water, but their experiences in translating the idea into reality via greywater technology were wrought with frustration. All participants expressed a great deal of environmental engagement. Many had developed a number of personal environmental strategies. The following quotes indicate some level of authentic awareness and engagement in the reduction of their ecological footprint:

"I have not turned my hose in 3 years, those plants that don't survive too bad. We refuse to water the lawn."

"We use our water barrels on our veggie patch and we don't waste water on the lawn."

"There was a time when I would wash the cars with the hose and the whole bit but now I use one bucket."

"I use dish water to feed the plants... I feel good that I am not wasting water."

Many drew on the narrative of scarcity to justify their environmental concerns:

"We try to be conscious of the amount of water we use because most of the people in Africa would kill for the water we waste and it really shouldn't be like that so we try to real hard to watch the amount of water we use."

Another member echoes similar concerns:

"We really didn't watch it [water consumption] carefully until we were without water for some time and then it became vital for us to pay attention to it and see it as the gift it is...this is what changed for us, we are not accustomed to thinking about it as much as we should."

More specifically, a few members acknowledged the city regulations on water use as an aide in modifying their own and others behavior:

“Warning signs in the city during the summer about water levels have helped us, remind us that everyone is pulling together and doing the same thing.”

“It is helpful that Guelph has water bans because it makes you aware of it. All this is very helpful in moving us forward. If it is mandated and it public we can make a difference but if it’s in the house it’s harder for anyone to see compliance. The fact we get charged for use of water and then disposal of water, double billed, it drives home the fact that there are costs associated and this is helpful to see on my bill, use and disposal.”

“The city’s water ban creates this change, especially in the outdoor context.”

With this initial willingness to entertain the possibility of advancing water conservation through the use of auxiliary water systems, member participation in the pilot project revolved around the following two emerging themes:

- 1) Green Impression Management
- 2) Green Ambivalence

1) Green Impression Management

Many participants drew on the narrative of scarcity to justify their environmental concerns. More specifically, a few members acknowledged the city regulations on water use as an aide in modifying their own and others behavior.

- “Warning signs in the city during the summer about water levels have helped us, remind us that everyone is pulling together and doing the same thing.”
- “It is helpful that Guelph has water bans because it makes you aware of it. All this is very helpful in moving us forward. If it is mandated and it public we can make a difference but if it’s in the house it’s harder for anyone to see compliance.”

Participants valued displaying positive conservation images. They accomplished this by comparing their behavior and attitude to neighbors; friends and family members who they feel neglect these principles.

- “I think it [greywater system] makes me cool. We throw it out in conversation. Whether it’s a cool factor or a pride factor I don’t know how you want to label it... For us it’s something we are proud of in a good way and for us it’s cool in our circle of friends even for our parents who water their lawn like crazy and use pesticides it’s important for them to see us making these changes and it gets them to ask why we are making these choices. It’s for

people who like it, that great, and even for people who don't get it, it makes them think about it."

- "It just feels right to use what you have available, most of my friends and neighbors are on board, very conscious about water use, but there is the odd person who sneaks out and waters their lawn and you can just feel the guilt. They don't want to but they just can't help themselves"

2) Green Ambivalence

During interviews, participants expressed a great deal of environmental engagement. However, this was tempered by four key issues:

In order of influence, these are:

- 1) Technological Maintenance
- 2) Incurred Costs
- 3) Aesthetic Appeal
- 4) Health Concerns.

Member's attempts to balance these push/pull factors generated a great deal of ambivalence toward their participation in the project and auxiliary water systems in general.

Technological Maintenance: [We take this theme up in greater detail under subsection 7.4]

Cost:

Despite the shared discourse around environmental ideals, differences in environmental attitude emerged among participants when costs were considered.

Some felt that being environmentally responsible outweighs savings while others expressed the need to at least receive a return on their investment.

Aesthetics:

The "Yuck Factor" (Haddad, B., P. Rozin, C. Nemeroff, and P. Slovic 2009)

"Aesthetic Appeal" constituted the bio-film around the toilet, color of water and smell.

These issues were at the forefront of discussions especially when friends and family were visiting.

Health:

“Health Concerns” are not a major deterrent to environmental engagement, but when invoked, they revolved around some of the more vulnerable members of the family (i.e. well being of children and pets).

Expectations around Water Quality and End Uses

If we are to emphasize one major stumbling block in the continued advancement of water conservation and water reuse technologies it would be misplaced expectations. A majority of end- users appeared to be under three false expectations. The first being a solid return on their investment, the second a belief that they would not have to spend much time managing the system and third, the water in their toilet bowl would look and smell no different than prior to their enlisting in the pilot project. The following quotes demonstrate how participants felt about cost, maintenance and aesthetics.

Misplaced Expectation 1:

“...the economic margins with the grant it is ok but without the grant and with inspections it blows out any savings and that impossible, then your just doing it out of the kindness of your heart, and that’s an ok reason to do it but...”

“I just assumed that my water bill would be reduced”

“We hoped that it would increase the resale value of our home”

Misplaced Expectation 2:

“I thought I had to replace the sock once a year...seems like I am playing with it every week, this is crazy.”

“I have no idea how this thing works.”

“There is always something wrong with it, I just ignore it now.”

Misplaced Expectation 3:

“I will not tolerate a dirty toilet. I still want that bowl clean.”

“...we just have to move beyond the psychological disgust of it all.’

“ Everything has been fine but the ring in the toilets.”

“There is film and stain in my toilets... I have to use an industrial toilet bowl cleaner. “

“At first we got cloudy water and then slimy water and then stench of chlorine.”

“I cleaned my toilets yesterday and this morning there is a ring.”

Key Audiences and Synergies

It appears that at this time there is one key demographic that is satisfied with using the current water reuse technology. These “green individuals” have both a strong desire to reduce their ecological footprint and possess a predisposition towards mechanical know-how. It is not enough for a participant to possess an environmental consciousness. They must also have realistic

expectations of the amount of time and effort reuse technology demands if it is to operate soundly.

While a majority of gifted participants buying new homes were initially excited to receive the technology as an “add on”, they later came to understand the onerous maintenance schedule and other perceived downfalls of the system and some participants’ satisfaction level decreased as a result.

Gifted participants were much more dependent on the greywater technology than retrofitted users because technological failure disrupted their daily routine to a greater extent as installment of the technology did not have their needs in mind.

It was evident that the tension between environmental engagement and green ambivalence subsided for participants who were already in the process of renovating their homes.

Retrofit: Taking Advantage of Renovations

Cost, health and aesthetic concerns could be justified and environmental values expressed within the context of renovations. Renovations and taking advantage of government rebates and audits proved to be timely for those who retrofitted their homes with a greywater system.

- “We had a plumbing disaster and while we were fixing that, tearing down walls putting in new pipes we decided to take advantage of the city’s rebate program and who knows over a long span it may actually pay for itself.”
- “We always talk about reusing water and wonder why we just can’t do it. Then we went to a home show a couple of years ago and found out it was possible but did not really connect with everything until we found the incentive program and got things going. So far so good.”
- “We re-plumbed the shower and this made it easy. We also did an energy audit so the timing was perfect. The bylaws were not even in place in the past so we couldn’t do it.”
- “We were renovating at the time. The system does not save enough money to warrant major renovations on its own but we were already in the process so we did it. “
- “We were doing some plumbing at the time, and small repairs and so we thought we would do it at the same time. We were in the process of doing environmental upgrades to the house and it just seemed to fit in nicely with the timing and what we were doing.”
- “I was doing renovations in the bathroom.”

Gifted Frustrations: Where is My Bypass?

Gifted participants were much more dependent on the greywater technology than retrofitted users because technological failure disrupted their daily routine to a greater extent as installment of the technology did not have their needs in mind. For example, all retrofitted participants had the ability to shut down the system and return to city water whereas the gifted users did not have this bypass option.

- “I wish there was a bypass and you could just shut the whole system off.”
- “I find its all mechanical issues. I want to bypass the system but I don’t want to touch it because of warranty issues. That is why I was hoping to come here and talk about installing a bypass system to shut it off when it is having problems. I wish when you realize that the system is having problems you can just shut it off and use city water.”
- “Twice my system has gone down on a long weekend. Good luck getting service then.”
- “All our toilets are fed by the greywater system not city water so if we have a problem with the system we have a problem with the toilets.”

A retrofit participant demonstrated how less dependent he was on the successful daily operation of the greywater technology:

- “In my house we installed a new pipe for the system and have the city pipe come out right beside it. We have a shut off on the pipe so at anytime we can bypass.”

The Reality of the Situation

The participants that were extremely frustrated with technology expressed deep appreciation for the greywater “concept” but admitted that the idea of water conservation was difficult to translate into everyday reality.

- “It’s not worth the hassle... The concept it great. I would love a greywater system that worked.
- “I want to be convinced that it is worthwhile. I don’t want to put forth effort that does not make a difference.”

These gifted systems seemed as though they did not fully engage the end-users. Furthermore, most participants expressed feeling like “guinea pigs” and believe that designers and companies are using customers as test subjects in the development of their technology and therefore would not recommend it to others.

“I can honestly say that with the system I have in my house I would not recommend it to anyone. There are some serious flaws in the system that needs to be sorted out long before they can say. From what I understand you could up keep the system you would still have problems. From what I understand you have problems with the 1st generation sox, then 2nd generation and now they are tying cartridges. To me that says we are having problems and we are trying to sort it out.”

Unless of course they are truly committed to intensive maintenance as one participants point out:

- “Initially I was disappointed with the system. It took a long time to sort out how to make it work. Now that I am comfortable with it I like it but I would not recommend it to anybody. I would not say this is for everyone. You really have to be someone who cares about this and is willing to work at it; otherwise it is nothing but trouble. Especially in new houses [gifted] where you don’t really think about what it would be like to have a system like this... It was offered, sounds like a good deal and you took it whereas all of us [retro] had to really think about it and put money up to do it. The gifted homes really need a failsafe system, need to plumb it in two ways so you can disconnect it. Example, when you have a party you go straight to city water because there is no way it will ever keep up.”

Education and Technical Support Requirements Summary, Challenges and Opportunities

It is key that gifted participants become aware of the time and effort the current technology demands of them. Moreover, it is important they become informed of the limited return on investment water reuse technology offers at this time. We must avoid these unintended consequences. If participants’ initially believe that the technology requires little effort and profit, and then experience the opposite, their disappointment will only stall future efforts. These early adopters should nevertheless be encouraged to view themselves as early pioneers that are making a difference because in the end it is their social networking that makes up the majority of water conservation promotion. The pilot project has made efforts to understand the users’ perspective and therefore future innovation can take their insights and experiences as a means to develop more efficient user- friendly technology.

Unintended Consequences: Avoid reuse systems as mortgage “add-ons”

- Majority of users see themselves first and foremost as consumers
- Reliability of greywater re-use technologies need to be improved.
- Users require a “crash course” before installation
- Gifted members expressed the fact they are more dependent on specific inflexible design pathways than participants whose homes are retrofitted with technology that is designed with end-user input.
- Must begin constructing the profile of an “auxiliary acceptor”
- Market toward “do-it-yourselfers” (at least until the private sector transcends the “troubling shooting” phase)

Conclusion

Promoting a positive “green” image, reducing one’s ecological footprint and saving money were factors that pulled people toward water conservation. Losing money, health and aesthetic concerns and spending too much time on technological maintenance pushed people away from investing in water conservation. These push/pull factors constitute the high levels of green ambivalence experienced in the pilot project.

With a program of this complexity, there is innovation and participation required on a variety of levels. The triple-helix of innovation for this project includes the University, Government, and the Private Sector (Etzkowitz 2008). The private sector's participation was the missing link in this project. Despite the municipal government's efforts to market and trouble shoot the auxiliary system, the company chose not to get heavily involved in the project.

This was problematic as participants often turned to the city for technological assistance. Missing one link in the triple helix chain can result in stunted innovation. Continued efforts by the city of Guelph to bring a more amicable business to the table should yield substantial dividends.

Henry Etzkowitz (2008) suggests that a regional innovation organizer (RIO) may facilitate and accelerate successful public technological up –take. RIO's are neutral regional leaders that can bring various stakeholders together. These "innovation organizers" take the "lead in recruiting partners and managing the interaction among a group of firms in a region." (Etzkowitz 2008: 82). The city of Guelph appears to be a developing RIO in water reuse technology and water conservation. The city should note that they are well on their way to becoming a successful RIO but full maturation for the most efficient RIOs can take decades. The Guelph pilot project is just one step toward the "incubation of innovation" within water reuse technologies.



Greywater Reuse Pilot Program

Qualitative Research with Guelph residents and those participating in the program

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Background & Objectives

- The City of Guelph has embarked on a pilot program with about two dozen households, to test a Greywater Reuse system in residential applications
- Research is indicated :
 - with program participants to gather feedback on their experience and perceptions of the system and the pilot program
 - with other Guelph residents to understand perceptions of Greywater Reuse Systems, the image of households who have them, and to understand perception and barriers to use



Research Methodology

- Metroline Research Group conducted a series of three focus groups in Guelph on Wednesday October 13th, 2010
- Each group lasted approximately 90 minutes, and was held in a professional focus group facility, where members of the project team were able to observe the sessions as they happened
- The groups were segmented as follows:
 - program participants who have been involved since 2009
 - program participants who have been involved since the beginning of the year
 - other residents of Guelph not part of the program
- Respondents were homeowners living in the City of Guelph



Notes On Reading This Report

- A study such as this, based on three focus groups generates a wealth of qualitative information
- In effect, this approach provides research and management groups with an opportunity to learn about the range and nature of the factors which are linked to a given realm of interest. It also fosters understanding of the reasons for their occurrence.
- However, because of the type of study conducted, the observations which emerge from this research must be viewed as tentative and directional, as the precise extent to which phenomena occur in the total target group universe can only be accurately determined via statistically representative quantitative research



Key Insights

What Have We Learned?

Summary/Recommendations



Key Insights

What have we learned?

- **KEY INSIGHT #1: Program participants find the system to be not very self-sufficient**
 - it takes fairly serious effort to develop their own routine
 - can be difficult to 'balance' the system so water that appears in the toilet bowl is clean looking and doesn't leave too much bio-film
 - more education and written instructions should be provided to homeowners when they first start using the system
 - clues can include the appropriate methods for cleaning the filter sock, how frequently to clean it, where to place the chlorine puck, what types of soap/shampoo are better for use in the system, etc.



Key Insights

What have we learned?

- **KEY INSIGHT #2: Program participants who actively signed up for the program are clearly more engaged**
 - these are participants who own a home, found out about the program and signed up to have the system retrofitted into their home
 - they seem more satisfied with the system, claim better success, and are more driven to maintain it
 - participants who obtained the system through a new home purchase are less satisfied, were less driven to obtain the system, and seem to be having difficulty with maintenance



Key Insights

What have we learned?

- **KEY INSIGHT #3: There are some concerns about the system itself**
 - as mentioned in Insight #1, can be hard to get the right balance so water in the toilet bowl is 'acceptable' looking
 - the filter is problematic, and program participants have the perception the manufacturer is still proving the system using this test
 - longer-term participants have tried a couple of different filter options and cleaning frequencies to get to a point where they are making it work
 - supplies, such as chlorine pucks, are not readily available and price can be an issue moving forward



Key Insights

What have we learned?

- **KEY INSIGHT #4: The program has some areas to improve within the Communications and setting expectations for the homeowner**
 - program participants wished they had a better sense of their role and responsibility during the installation process
 - a need for better training or education when the system is first installed, including some written examples and instructions
 - direction on brands or types of soap/shampoo that will work best in the system
 - clearly indicate who to call when there are questions or problems with the system
 - some guidance on whether results from the testing process are acceptable, and how to improve them



Key Insights

What have we learned?

- **KEY INSIGHT #5: While there is an interest in the program and system by Guelph residents, there are a number of concerns/barriers to installing a system**
 - the biggest barrier being cost of the system and return on investment
 - demonstrating a need for such a system
 - addressing potential health concerns, which those in the program no longer find to be a big concern



Water Efficiency

Attitudes and Behaviour

Water Efficiency

How has your water use behaviour changed in the past few years?

- As seen in recent research for the City of Guelph and other municipalities/regions, water efficient behaviour is becoming more the norm in Ontario households:
 - Outdoor
 - watering the lawn less often or not at all
 - washing the car infrequently or not at all
 - not washing the driveway
 - using rainbarrels
 - adhering to the Outdoor Water Use restrictions
 - Indoor
 - retrofitting fixtures (toilets, front load washers, showerheads, appliances)
 - turning off the tap while brushing teeth, flushing less often, etc.



Water Efficiency

How do you conserve water?

- Now that fixtures have been replaced, and outdoor behaviour has changed, many residents are finding more creative ways to conserve water than 5 years ago
 - *“When I change my fish tank, I use the water on my plants...”*
 - *“We used to pour the water from our humidifier down the drain, now we keep it to water the plants or the garden...”*
- One of two residents in this research are not quite as avid at conserving as the rest:
 - *“I have replaced my showerheads and toilets, but other than that I don't do much...”*

Water Efficiency

What stops you from conserving more water?

- Generally speaking, it appeared that participants in the Greywater Reuse Program were very conscious about conserving water
- Barriers to conserving more water can be divided into two categories:
 - those whose household has younger children and who do not want to fight the battle
 - *“I have four teenage girls. It’s pretty hard to control their water use and showers...”*
 - those who seem willing to save more water, but lack the knowledge or expertise



Programs

Programs

What programs for Water Efficiency does the City of Guelph offer?

- Awareness of Guelph water efficiency programs varied
 - most know about Royal Flush
 - *"It seems to be successful. I haven't been looking to replace my toilets, but I know it's there when I do..."*
 - about half or a little more know about Smart Wash
 - only a few know about Healthy Landscapes
 - Outdoor Water Use By-Law
 - many mention the road signs and that they check them for water levels and for other information



Greywater Reuse Program

Reactions from General Population



General Population

Awareness of Greywater Systems

- No respondent was aware of a pilot program underway
 - most had heard of a greywater system after it was explained to them, but had very little knowledge or experience with how the system works
 - the term greywater is not “sexy” but is appropriate
 - respondents feel that the term means:
 - “*impure*”
 - “*not drinkable*”

General Population

Reactions to the concept

- Reactions to the concept were mixed. Everyone seemed intrigued by the idea of doing something 'new' or 'extra' to help the environment:
 - most liked the concept but weren't always sure about implementation in their home
 - *"I would feel like my toilet isn't clean anymore...I like it to be Tidy-Bowl clean..."*
 - a couple were concerned that it was just a test for the sake of 'doing something', rather than a long-term benefit to the environment
 - *"Sometimes I feel like this programs are just gimmicks, done for political reasons..."*
 - the expectation is that this would be an expensive thing for their home
 - *"I would totally do it if the cost wasn't crazy..."*
 - *"If it was affordable I would be one of the first to do it..."*

General Population

Questions/Barriers to Use

- The idea was new to most and raised many questions:
 - cost – can it be done affordably?
 - space – how much room will this take up in my house?
 - retrofit – how easy would it be to install in an older home?
 - maintenance – how much of my time would be required to maintain the system?
 - ROI – What am I going to save in the long-term
 - payback – What is the payback term?
 - They want no more than 10 years, but most want less than that, particularly those who are younger and may move out before they get the value
 - examples – Has this been used elsewhere and was it successful?
 - endorsement – Does the City of Guelph or Home Depot endorse a product?



General Population

How to get people interested?

- If a full Greywater Reuse program is to be launched, there are several ways, over and above the expected advertising, to generate interest:
 - develop an open house program – providing walkthroughs of houses that have this system involved
 - host public information sessions/workshops
 - prepare a display and put it in public places, like Stone Road Mall
 - install systems in city public facilities and post that it is in use
 - install a system at the University of Guelph to inform students
 - testimonials – reviews from pilot program participants
 - offer a purchase payment plan



Pilot Program Participants



Pilot Program

Overview

- Participants could clearly be segmented into two groups:
 - those who chose to participate in the program:
 - Found out about the program
 - Did their research
 - Applied to participate
 - Had an older home that was retro-fitted
 - those who were offered the program
 - When buying a new home, it was a feature that was offered to them at no additional cost
 - May or may not have done some research



Pilot Program

New Home Buyers

- Participants who hadn't considered this type of system before and may be less interested in conservation
 - two were single and living alone
 - presented with this as an opportunity by the home builder, and took it without much knowledge or understanding as it was offered to them as a "free upgrade"
 - took delivery of the system when they got the keys to their home
 - shown what it was, where to put chlorine pucks and that it had to be cleaned out as one of a long list of items when taking delivery of the house
 - none received a manual



Pilot Program

New Home Buyers (continued)

- Of the three:
 - one has it working relatively well
 - one has difficulties with his system and has been in touch with manufacturer but is frustrated
 - one has had many difficulties and is ready to stop using it

Pilot Program

Retrofit

- The pilot program participants who made the effort to sign up for the program and have the system installed seem more committed to water conservation:
 - interestingly, all of these participants were either in the middle of a renovation, or had planned to do some upgrades to their home
 - have read about or are concerned about projected cost increases and changes to their water, and are being proactive
 - are more willing to actively participate in maintaining the system
 - had educated themselves about the product more fully before committing
 - typically, have had better results than those in new homes
 - Potentially because of:
 - greater interest
 - age/maturity
 - better training/knowledge



Pilot Program

Why did you get involved?

- Getting involved in the program is a serious commitment to the environment for most of these participants
 - decreased water usage
 - being a good steward of the environment
 - *“We’re starting to understand the value of good water, why should I be flushing it down the toilet?”*
 - it’s a logical step
 - *“It seems like a no brainer...”*
 - *“It makes so much sense, I wonder why it has taken so long...”*
 - being ahead of the curve for increased water costs
 - *“We read about and hear about changes that will be coming to the cost of water, so getting this in place now will save us in 10 years...”*



Pilot Program

System Function/Use

- There are some concerns about the system
 - there is no way to bypass the system
 - *“When I have people over and the toilet is being used a lot, you hear the pump running all the time to backfill from city water...”*
 - *“I wish when I am having trouble I could just turn it off until it’s fixed. I had a valve get stuck and the water was running constantly...”*
 - the payback margin (ROI) is slim, and there is some concern about ongoing costs
 - *“Why should we have to pay the \$100 a year for inspection after 5 years? ”*
 - the filter has to be cleaned regularly, frequency varies depending on size of household
 - those who started with the paper, honeycomb style filters had difficulties
 - the newer, microfibre cone-type filters are better, but still could use some improvement



Pilot Program

System Function/Use

- the system is complicated and can be hard to maintain
 - *“I cleaned my toilet yesterday, then this morning there was already a bio film...”*
 - *“If you use the wrong soap, the wrong shampoo, the wrong anything, it will clog up the filter very quickly, and things stop working right...”*
 - *“It’s not a system that is self-sufficient, you need to be keeping up with it or else it will die on you...”*
- supplies, such as the chlorine pucks are not readily available

Pilot Program

Image

- Most respondents, with the possible exception of those who have the system through new home purchase, are pleased they are participating and consider the image to be a positive:
 - they show pride in ownership
 - having the system makes you look good to others
 - *"I think it makes me cool!!!"*
 - the system is a good conversation point
 - *"When we have friends over, they ask about it, and wish they had gotten involved..."*
 - the new home buyers who have had some difficulty like the image that having the system in their house represents, however they are not likely to recommend it:
 - *"At this point, after everything I've been through, I wouldn't recommend it to anybody..."*
 - *"I like it, but I still don't think I would recommend it to my friends. It takes work...."*



Pilot Program

Health Concerns

- After having the system in their house, respondents have few concerns about impact on human health generally
 - they do express some concerns about levels of bacteria present in the testing report
 - households with small children have to be careful that their child isn't playing in the toilet
 - *"We learned early on to keep the door to the powder room closed during the day, so that my son doesn't go splashing in the toilet bowl..."*
 - there was greater concern about pet health – respondents can see potential for problems if the household has a dog that drinks from the toilet when owners aren't looking



Pilot Program

Rebates/Incentives

- The \$1,500 rebate offered by the City of Guelph to program participants was a key driver for participation
 - retrofit participants say they likely would not have incurred the full expense
 - in particular, all of these pilot program participants were in the midst of a home renovation that allowed the plumbing to be installed easier



Pilot Program

Improving the program/process

- Participants provided several points of feedback to help improve the program
 - develop a clearer, written set of instructions or steps to take to get everything set up, and the role/responsibility of the homeowner in that process
 - participants expressed some discontent about how much work was involved at their end – not that the work was required, but that it was not expected going in
 - clearly identify who to call in case of problems, questions or troubleshooting
 - improve the assistance and support provided by the manufacturer
 - provide some direction or reassurance with testing reports, so homeowners feel comfortable that everything is in an acceptable range, and provide suggestions for improvement on the testing results