

City of Cape Town
Grey Water Guidelines
 Version - 20 May 2005

1. Introduction

The provision of emergency water supply to informal settlements generates significant volumes of wastewater from the washing of laundry, personal bathing and cooking activities. This water is commonly referred to as “grey water”.

Where grey water is disposed of into the stormwater system, it leads to pollution of the downstream rivers, vleis and coastal waters and significant public and ecosystem health risks. In cases where it is discharged onto the surface of the ground or into open drainage ditches it is also unsightly.

This document aims to provide clear guidelines on how and where to dispose of grey water so as to avoid pollution.

2. Choice of System

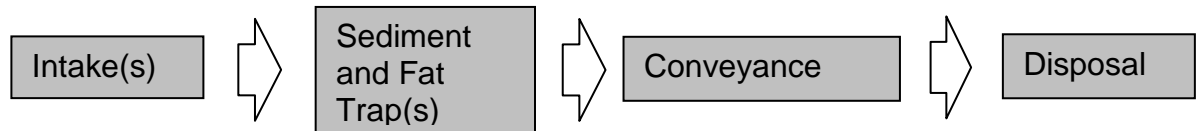
The method of dealing with grey water depends on where and how the effluent will ultimately be disposed of. The various disposal options that exist at each site should therefore be considered before deciding on which is most appropriate. The following basic alternatives are available:

Ultimate disposal point		Consideration
Sewer	by direct connection at grey water intake	Where sewer is available, this option must be used. Rain and surface water ingress into the sewer must be prevented.
	after conveyance by small bore gravity pipeline	Practicality and cost of connecting to sewer (distance, levels, etc) to be considered. Sediment and fat trap required.
	after pumping	Practicality and cost (distance, levels, power supply, pump station, maintenance implications etc) must be considered. Sediment and fat trap required. Small bore rising sewer possible.
Soil (soakaway)		Permeability of soil and water table level, cost and maintenance implications. Sediment and fat trap required.
Stormwater/surface drainage system (Note: this option should not be considered unless previous options are impossible)		Sediment and fat trap required. Public and ecosystem health impacts, practicality and cost of providing and maintaining stormwater treatment facility (eg wetland) to be carefully considered. Licence to discharge wastewater is required in terms of the Water Act.

Other innovative methods of disposal may also be considered, particularly where beneficial use of the grey water as a resource is possible eg Tower Garden concept.

3. Components of System

The typical components of a grey water system are shown schematically and described below.



Intake(s)

Grey water intakes must be located in close proximity to where the water is used. In addition to providing an intake at each water supply point, it is proposed that additional intakes be provided to reduce walking distance from dwellings to disposal points to a maximum of 25m.

Where wash troughs or other communal washing facilities are provided, the drains will stop gross debris from entering the system, but sediment and fat traps are required before disposal, unless going directly into a sewer.

Where 1m high precast ring soakaways already exist but do not provide adequate infiltration, connections can be provided to drain excess water elsewhere. The stones near the surface will trap gross debris and some fat and will therefore need to be replaced regularly.

Where new standpipes are provided, grey water intakes with galvanized gratings should be provided, with sediment and fat traps (see standard detail).

Sediment and Fat Trap

Unless grey water is discharged directly into a waterborne sewer, sediment and fat traps must be provided. Small sediment and fat traps should be located close to grey water intakes (< 3 meters - see standard detail). No more than 5 intakes should be served by one sediment and fat trap. Refer to Annexure A for sizing of traps.

Conveyance

Once sediment and fat has been removed, conveyance to sewer/soakaway/stormwater system can be done using small bore gravity pipeline, where slopes permit. However, in certain extreme situations, it will be necessary to pump. In these situations, very careful consideration must be given to the design, operation and

maintenance and associated costs of the pump station. Refer to Annexure B for indicative pump station design flow rates.

Disposal

Sewer

Gravity connection to sewer is by far the preferred option for disposal and must be used wherever possible.

Soakaway

Soakaways can only be provided in areas where soil is permeable and water table is low (all year round). Soakaways should be designed and sized according to the number of users and soil infiltration rates. Sediment and fat traps should always be provided before grey water is permitted to enter a soakaway. In situations where this has not been done, regular, programmed maintenance of soakaways is essential.

Stormwater

In addition to sediment and fat traps, further treatment is required before discharge into the stormwater system. This may be achieved through provision of an artificial wetland. Aspects that will require consideration are:

- Availability of land
- Design and sizing of wetland, plant species etc
- Maintenance of wetland (and access)
- The need to restrict public access to wetland
- Approval of the Department of Water Affairs and Forestry

Catchment, Stormwater and River Management must be consulted and in agreement with any proposal which involves wetlands or discharge into the stormwater system.

4. Operation and maintenance

All drainage aspects of grey water disposal systems should be provided, operated and maintained by Water Services. Waste Management should be responsible for the removal of the solid waste collected at intakes.

It is highly recommended that communities provided with grey water disposal systems be educated in terms of their purpose and correct use. It must be made clear to communities that the grey water system may not be used for disposal of “black water” or “night soil”. Alternatives for disposal of black water must be available.

The maintenance of sediment and fat traps should be programmed to take place on a regularly cycle, depending on capacity and usage of the system.

5. Implementation

These guidelines will be implemented with immediate effect, but subject to review, as and when required. Initial implementation projects should be treated as pilot schemes. Their effectiveness and maintenance requirements should be carefully monitored, so as to gain experience and provide input for ongoing improvement of these guidelines.

Provision for disposal of grey water in terms of these guidelines should in future be made in all projects involving the provision of services to informal settlements. Where water and sanitation services have already been provided, retrofitting of grey water disposal systems is now required.

Annexure A: Sizing of sediment and fat traps:

Assumptions:

- Approximately 30 informal dwelling units per greywater disposal point. (Most ideal - should give a maximum walking distance of about 25 metres.)
- Most solids have been removed through a screen – grid with 20mm openings.
- Effluent should have a retention period of at least 3-4 minutes to allow solids to settle.

Sizing:

- Need a tank/container that can hold a volume of at least 150 litres of greywater to allow sediment and fat to deposit. A two-compartment tank with total capacity of about 300 litres should be ideal. (See standard detail.)
- If it is necessary to accommodate more than 30 informal d.u. per collection point, the total greywater capacity of a two-compartment tank should increase as follows:

Number of informal dwelling units per collection point	Total greywater capacity of tank (in litres)	Notes
30	300	Recommended.
60	370	It is assumed that not all greywater will be disposed at collection points due to longer walking distances. Not recommended.
90	430	
≥120	460	

Annexure B: Greywater pump requirements

Assumptions:

- Approximately 30 informal dwelling units per greywater disposal point. If it is necessary to accommodate more than 30 d.u. per collection point, the pumping requirements will need to be increased proportionately, in line with Annexure A.
- At least every water standpipe will have a greywater collection point. If there are more standpipes than greywater collection points, the peak flows will differ and should be designed separately.
- Average flow/standpipe = 1,58 litre/min
- Average flow/greywater collection point = 1,0 litre/min

Sizing:

For approximately 30 dwelling units per greywater collection point and a greywater collection point at each standpipe, the following peak flows are recommended to be used for pump designs:

No of water s/pipes	No. of greywater collection points	No. of d.u. or households	Peak flow at pump (litre/min.)	No of water s/pipes	No. of greywater collection points	No. of d.u. or households	Peak flow at pump (litre/min.)
1	1	30	22	5	5	150	67
	2	60	29		6	180	71
	3	90	35		7	210	76
	4	120	41		8	240	81
	5	150	47		9	270	86
2	2	60	36	6	10	300	90
	3	90	40		11	330	95
	4	120	46		12	360	100
	5	150	52		6	180	76
	6	180	57		7	210	81
3	7	210	63	7	8	240	85
	8	240	68		9	270	90
	3	90	46		10	300	94
	4	120	52		11	330	99
	5	150	57		12	360	104
	6	180	62		13	390	108
	7	210	67		14	420	113
	8	240	72		7	210	85
4	9	270	77	7	8	240	90
	10	300	82		9	270	94
	4	120	57		10	300	98
	5	150	62		11	330	103
	6	180	67		12	360	108
	7	210	72		13	390	112
	8	240	77		14	420	116
	9	270	82				
10	300	86					
11	330	91					
12	360	96					