

The Use of Dry Sanitation in an Urban Environment

Introduction

Dry sanitation and the recycling of greywater in Bellevue East, Johannesburg have been incorporated into an urban home to demonstrate that it is possible to maintain a high standard of living whilst keeping monthly municipal service costs to a minimum. The secret of this lies within the use of appropriate technology and the household participating in the maintenance of the systems.

Conventional wisdom maintains that in the urban environment waterborne sewage is the only solution, even when full pressure house connections are provided. Experience shows that communities and municipalities cannot always afford the operating and maintenance costs. This results in large-scale pollution from overflowing sewer systems and huge arrears by consumers.

The work of The Mvula Trust in rural and peri-urban areas had demonstrated that waterborne sewage does not have to be the only option. An issue was that work had been carried out in poor communities and, understandably, politicians viewed the technology as somewhat second rate.

Inspired by the involvement of Premier Manne Dipico in the Northern Cape Water Services Programme, and the initiative of the communities of Namaqualand and Weiler's Farm in Johannesburg, the technical Manager of The Mvula Trust decided to convert his house, to prove that within a city it is possible to have a high standard of living without the need for municipal sewers and high monthly municipal service costs.

Thus in January 2001 a greywater recycling system was installed, followed by the removal of the en-suite flush toilet. It was replaced with a dry sanitation system in February 2001.



Urine Diversion in a suburban bathroom

Re-use of Greywater

In an urban area the disposal of greywater presents the biggest problem, and this has been one of the main reasons for the installation of sewers. Also, when mixed with blackwater from the toilet, it carries pathogenic material, which is harmful.

To demonstrate that a municipal sewer connection is not required, the first stage was to separate the blackwater from the greywater. The outlet pipes from the kitchen and the main bathroom, collecting approximately two thirds of the household consumption, were led to a sump. A simple submersible pump with float control pumps was attached to a normal garden sprayer to irrigate the garden. Spraying the water aerates it as well as distributing it enough to prevent damage to the vegetation from the soaps and fats. Spraying also ensures that the combination of evaporation, transpiration and permeation prevents saturation of the ground.

The result is a green garden without the use of municipal water. The only effort required is the cleaning of the filter every second week, and moving the sprayer around the garden. The water could also be re-cycled through flush toilets for additional water savings.

The cost of the installation was approximately R1, 000. This could have been lower, and the whole house could have been put on the recycling system, if the installation was planned when the house was built. Unfortunately the house was built in 1910, precluding this technology. The cost saving depends on the block tariff that a consumer is paying, but payback should be between one and two years.

Dry Sanitation

A waterborne sewage reticulation is often seen as the ultimate solution for sewage disposal. If one does not want to handle faeces, and has the money to pay for the system, then perhaps it is. However, any waterborne system carries the risk of blockages and overflow, and is just a way of passing the problem onto someone else.

If one is prepared to handle desiccated faeces, then a dry sanitation system offers enormous advantages over waterborne sewage in terms of capital investment, service costs and risk of pollution. To anyone who is prepared to participate in faecal waste management, a dry sanitation system is a viable and attractive alternative. The use of dry sanitation, together with recycling of greywater, removes the need for a municipal sewer connection.

The house now incorporates a system called urine diversion, which separates the urine from the faeces. This type of toilet is used in the same manner as normal toilets, except that a

man must sit down to urinate. The urine is led into a container, and the faeces fall into the pit below. A mixture of soil and ash is then thrown down the pit to help kill off the pathogens and dehydrate the faeces. This system was chosen as it can be built inside the house, and is easy to maintain.

The pedestal is made using a fibreglass mould into which a sand cement mixture is cast. After finishing and painting, the toilet looks no different from a ceramic pedestal. The cost, if made by oneself, is R30. Even if it is made commercially, the production is so simple it can be made within a community, promoting local economic development.

On this particular toilet the urine, which is a fertiliser, is removed once a week and poured into the compost heap and around the garden.

Every six months the dried faeces are removed from the rear of the toilet—a simple 15-minute job. The faeces are then disposed of within the compost heap to ensure pathogen destruction. Since the faeces are partly desiccated, and mixed with soil and ash, they can be handled with a rake and spade, and are totally inoffensive.



Pipes for greywater recycling are led to a sump, the water being used to spray the garden

Composting is an essential part of the process as the heat generated within the compost heap ensures destruction of the more hardy pathogens such as worm eggs.

The house garden is purely ornamental. However, as has been shown by various international organisations, if the greywater, urine and faeces are used for crop production, the results are hugely beneficial. For poor people, improved food production can lead to better health, with the surplus crops being sold for cash.

If dry sanitation and recycling of grey water are incorporated in the planning of residential development, the savings are significant. Since there is no need for reticulation, bulk sewers or treatment works, it is conservatively estimated that there is a capital saving of R5, 000, with a reduction in monthly service costs of R100 per month. Although some of the capital cost is offset by the need for the pump, the cost saving is still in the order of R4, 000.

level of service and convenience as a wet system, so long as the household accepts the first condition.

In up-market housing this is not that significant, but in RDP housing this could result in a significant improvement of the quality of a house and standard of living, without a household incurring unaffordable, monthly municipal service costs.

Conclusion

The decision by a household on whether to install wet or dry sanitation depends on a number of factors. These are:

- 1) Whether the household is prepared to be involved in the maintenance of the system;
- 2) If the system involves outside maintenance, whether they can and are prepared to pay for this;
- 3) Whether there is the institutional capacity to support the chosen system; and
- 4) If water is required, whether or not there is a sufficient supply.

In many areas the conditions imposed by 2), 3) and 4) are not met, and a wet system cannot be installed. This does not mean that dry systems are limited to these areas. As has been shown in Bellevue East, even when the above three conditions can be satisfied, a dry system is still a viable option. It provides exactly the same

The Mvula Trust Case Study Series includes case studies and stories of The Mvula Trust projects and experiences in the field of community-managed water supply and sanitation.



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