

Summary Sheet

Wastewater Management

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More than half of the mains water used in homes in the Greater Adelaide Region is returned to sewers as wastewater.

There are two main types of domestic wastewater:

- Greywater is wastewater from the hand basin, shower, spa bath, washing machine, laundry tub, kitchen sink and dishwasher.
- Blackwater is wastewater containing, or likely to be contaminated by, human waste matter (e.g. toilet wastewater or waters contaminated by toilet wastewater); and

A typical household discharges an average of approximately 95 litres of greywater and 35 litres of blackwater, per person per day.

About 95,000 megalitres of domestic wastewater is currently generated in the Greater Adelaide Region each year, of which around 75,000 megalitres is discharged into Gulf St Vincent.

This discharge has a detrimental impact on the health of Adelaide's coastal waters.

What is Water Sensitive Urban Design?

Water Sensitive Urban Design (WSUD) is an approach to urban planning and design that integrates the management of the total water cycle into the urban development process. It includes:

- Integrated management of groundwater, surface runoff (including stormwater), drinking water and wastewater to protect water related environmental, recreational and cultural values;
- Storage, treatment and beneficial use of runoff;
- Treatment and reuse of wastewater;
- Using vegetation for treatment purposes, water efficient landscaping and enhancing biodiversity; and
- Utilising water saving measures within and outside domestic, commercial, industrial and institutional premises to minimise requirements for drinking and non-drinking water supplies.

There are many different WSUD measures which together form a 'tool kit' from which individual measures can be selected to form a specific response suiting the characteristics of each development (or redevelopment).

Those measures are described in detail in the WSUD Technical Manual, which can be found online at www.planning.sa.gov.au/go/wsud

Wastewater management is one such measure.

Wastewater Services

In the Greater Adelaide Region, there are two distinct areas of wastewater services – sewered and non-sewered areas.

- Sewered areas. The majority of the Greater Adelaide Region is serviced by a sewer system connected to either one of three major metropolitan coastal wastewater treatment plants (WWTPs) or one of several smaller WWTPs. Wastewater that is not reused is discharged from these plants to receiving waters. SA Water is responsible for the provision of wastewater services in sewered areas; and
- Non-sewered areas. Where a sewer system does not exist, the on-site treatment and reuse options include septic tanks and subsurface disposal systems on individual properties, septic tanks connected to a community wastewater management system (CWMS) and aerobic treatment units with designated irrigation areas. The Department of Health provides information on requirements and approval procedures for new applications. Local councils provide wastewater services to most non-sewered areas.

Purpose

Sustainable water management can assist in achieving targets in South Australia's Strategic Plan and Water For Good.

The reduction of wastewater discharged to reticulated sewerage systems by more efficient water use, greywater and wastewater reuse, and alternative toilet systems can produce significant economic and environmental advantages to the community. However, this needs to be balanced against health risks.

It is possible that in some locations, properly managed and maintained decentralised reuse might be able to cost-effectively augment or replace existing sewerage infrastructure that would otherwise need to be replaced or upgraded.

Scale and Application

Treated wastewater use should be considered in the context of the specific development and management of the entire water cycle.

The potential for treatment and reuse of wastewater will depend on:

- The scale and location of the development;
- The volume and quality and timing (i.e. seasonality) of wastewater generated; and
- The volume and quality and timing of treated wastewater demand.

For urban developments, reused wastewater is suitable for:

- Toilet flushing;
- Public open space irrigation;
- Private garden irrigation/outdoor use;
- Environmental flows; and
- Ornamental water bodies integrated into the development.



Legislative Requirements and Approvals

Before developing a wastewater treatment and reuse system it is important to check whether there are any planning regulations, building regulations or local health requirements that apply to wastewater reuse in your area. Legislation or requirements which may apply include:

- The *Development Act 1993* which may require development approval to be given for the installation of a wastewater reuse scheme;
- The *Public and Environmental Health Act 1987* which is implemented by the Department of Health. This agency provides information and assistance in establishing the requirements for installation of an on-site or community scale wastewater treatment system, whether black or greywater;
- The *Environment Protection Act 1993*, which requires a general environmental duty not to cause environmental harm. Specific aspects of the Act which are relevant to installation of wastewater reuse schemes include the Environment Protection (Water Quality) Policy 2003, the Environment Protection (Industrial Noise) Policy 1994, the need to demonstrate that the operation and maintenance of the plant will avoid nuisance by odours and the need for EPA licensing of some systems;
- The *South Australian Sewerage Act 1929* which is administered by SA Water and is applicable to areas where there is a government sewerage system available; and
- The Australian Guidelines for Water Recycling which apply to any wastewater reuse projects and include a risk-based approach to the reuse and recycling of wastewater and greywater from large-scale centralised treatment facilities.

Design Considerations

A key consideration is the intended use of the treated wastewater and the demand profile for that application. Demand management is important to reduce water consumption as the treatment and delivery of recycled water entails significant costs which can be minimised by efficiency of use.

The capacity of the existing infrastructure should be considered to maintain service under expected population increases from new and infill development.

Ensuring human health is protected and the scheme is accepted by the community is important. The following approach may assist in gaining approval and social acceptance of a treated wastewater reuse scheme:

- Adopt a risk-based approach to defining methods of delivery and corresponding water quality requirements as defined in the new Australian Water Recycling Guidelines;
- Define requirements for pre-commissioning monitoring and demonstration of compliance to current health standards for treated wastewater; and
- Identify community receptiveness to different applications of treated wastewater.

The environmental impact of the wastewater scheme should be considered. Possible impacts include greenhouse gas emissions as a result of treatment and transport energy, the impact on the receiving body (i.e. the aquatic environment) and the production of biosolids and other wastes.

Land and asset ownership needs to be identified to ensure that maintenance and management responsibilities are clearly understood. An understanding of and compliance with the relevant legislative requirements also needs to be gained.

Design Process

The design process is likely to require several rounds of reviews as new information arises and negotiations progress with stakeholders that may alter the objectives and available options. The key steps in the design process include:

- Assess the site, catchment and appropriate regulatory requirements. Development characteristics and location can influence viable options for treated wastewater reuse. The factors influencing water reuse viability include the development size and density, development type, areas requiring irrigation and integration with the surrounding environment;
- Identify objectives and targets. It is essential that objectives and targets are established as part of the conceptual design process and discussed with the relevant council prior to commencing the engineering design. The objectives will vary from one location to another and will depend on site characteristics, development form and the requirements of the receiving ecosystems;
- Undertake a water balance. The water balance provides a starting point to assess the viability of reusing water to complement other available water sources. The development of an end use model enables specific water uses to be matched to appropriate water sources on a fit-for-purpose basis and calculates the water demand for each use;
- Identify potential options. There are various treatment technologies that can be selected depending on the scale and application of the scheme. Each option should be evaluated on a case-by-case basis;
- Consult with key stakeholders and relevant authorities. Meeting with stakeholders generally results in greater user confidence and ensures that the objectives are consistent with council directions;
- Evaluate options. The selection of appropriate, sustainable and suitable water treatment technologies is dependent on economic, environmental and social considerations;
- Detailed design of selected option. During the detailed design, a risk management strategy should be developed identifying public health and environmental hazards and appropriate controls to be implemented during the design and operational phases;
- Check the design objectives;
- Develop a maintenance and monitoring plan. Adequate maintenance of wastewater treatment and reuse schemes is important to ensure that the scheme continues to meet its design objectives and does not present public health or environmental risks.

Further Information

While there is a large range of useful resources and further information available on wastewater management, in the first instance it is suggested that people read Chapter 14 of the *Water Sensitive Urban Design in Greater Adelaide Technical Manual*. Further information is available at www.planning.sa.gov.au/go/wsud

Other Summary Sheets

Other Water Sensitive Urban Design Summary Sheets for the Greater Adelaide Region are available in this series. To download the summary sheets, visit www.planning.sa.gov.au/go/wsud

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