On Site Wastewater Systems Code
Information for Plumbers completing application forms for Waste Water Connections

Contains the Fact Sheet for Plumbers on new requirements regarding on site waste water systems and relevant pages from the On-site Wastewater Systems Code 2013
Prepared by Keith Simmonds – Environmental Health Officer

Fact sheet

Information for Plumbers: New Requirements Regarding Onsite Wastewater Systems

On 31 May 2013 the South Australian Public Health (Wastewater) Regulations 2013 (The Regulations) and the On-site Wastewater Systems Code (The Code) will replace the current Regulations and The Standard For Construction, Installation and Operation Of Septic Tank Systems In South Australia and its supplements. This fact sheet is directed at plumbers and highlights some important information relating to these legislative changes.

The new Regulations will require persons who install on-site systems to hold the appropriate licences to undertake the work.

Installation Approvals in areas regulated by local councils and Department for Health and Ageing (DHA).

The present system of approvals for on-site systems will continue although more information will be required particularly with regard to site and soil assessments.

Persons will be required to lodge an application on the required form and provide the necessary supporting information to the relevant authority prior to any work being undertaken.

An Engineers' assessment report will be necessary for all sites (including aerobic wastewater treatment systems installations). The full requirements for the report can be found in the On-site *Wastewater Systems Code* and will include:

- The type of system
- Site and soil details
- The size of disposal / recycled water area required (Note that the 200 m^2 irrigation requirement has been removed with the area to be determined by the engineer)
- Recreation area requirements

For areas where difficulty will be experienced in an engineer accessing the site, a remote assessment strategy has been formulated. For further information contact the local council or DHA, telephone 8226 7100

Certificates of Compliance Required.

Currently, the Office of the Technical Regulator requires Certificates of Compliance (COCs) for all work carried out in SA Water areas. COCs will now be required to be submitted for all work undertaken in areas where the local council or Department for Health and Ageing (DHA) is the relevant authority. The same COC books are used by both regulators with the information provided on the forms relevant for sanitary plumbing and drainage as well as on-site system installations. As per the present system, Certificate books will be available to be purchased through Service SA Customer Service Centres.

Government of South Australia

SA Health

Additional installation Requirements

Due to poor compliance and backflow issues with onsite recycled water irrigation systems, plumbers will also be required to install irrigation systems connected to wastewater treatment systems and provide a certificate of compliance for this work. It is expected that the engineers report will contain information on the irrigation system components.

Wastewater System Servicing Requirements:

Persons servicing wastewater systems (such as aerobic wastewater treatment systems) will be required to complete a training course specified by the DHA. The 3 day course is now being offered by TAFE SA at the Regency Park School of Plumbing. For further information telephone TAFE SA on (08) 8348 4206

For more information

Wastewater Management Section
Public Health Directorate
PO Box 6 Rundle Mall
ADELAIDE SA 5000
Telephone: 8226 7100

Government of South Australia

SA Health

5.2.3 Determination of primary treatment/septic tank capacity

Calculation of the minimum primary treatment/septic tank capacity requires determination of two factors:

1) Volume of daily flow into the tank; and
2) Volume for accumulation of sludge/scum.

The minimum primary treatment/septic tank capacity for a system collecting all wastewater from a residential premises is 3000 L (suitable for 6 EP). The minimum primary treatment/septic tank capacity for a system collecting only greywater or only blackwater is 1620 L (suitable for 6 EP). This is based on a four yearly desludging frequency. For a typical septic tank diagram, see appendix A figure A7.

For all primary treatment/septic tank capacities, including non-residential premises, the minimum effective tank capacity (in litres) is obtained by using Equation 1 as follows:

Minimum Effective Capacity (L) = (P1 x S x Y) + (P2 x DF) **(Equation 1)**

Where:

P1	=	Number of persons using the system (p) [1]
S	=	Rate of sludge/scum accumulation in litres per person per year (L/p/y) [1]
Y	=	Desludging frequency in years (y)
P2	=	Number of persons using the system (p) [1]
DF	=	Daily flow in litres per person per day (L/p/d) [1]

For daily flows and sludge/scum volumes for typical residential dwellings, see tables 5-1 and 5-3 respectively. For non-residential premises, for example restaurants, staff workplaces and schools, see appendix E.

8.3 Subsurface effluent disposal systems

Subsurface effluent disposal systems rely on the proper assessment of site and soil characteristics (see sections 8.2.1 and 8.2.2) as well as an effective management regime to achieve efficient and safe long term subsurface effluent absorption by soil. The system relies on an effective primary treatment stage usually carried by a septic tank (see chapter 6), followed by a site specific subsurface soakage trench or soakage bed to distribute the effluent evenly and allow sufficient area for absorption into the soil.

8.3.1 System sizing

To determine the minimum requirements for a subsurface effluent disposal system, it is necessary to calculate the required contact area in square metres. The effective contact area of a soakage trench includes the combined areas of the base, side walls and end walls of the system. This does not apply to systems designed in accordance with AS/NZS 1547 (see chapter 9).

The formation of the biomass on the soil contact surfaces within the soakage system is a limiting factor on the effluent percolation. The cumulative effect of the biomass is greater in cohesive soils such as clay, silts and fine sands, the exception being when the soil is the limiting factor, for example heavy clay or rock.

If indirect assessment is used then permeability class and corresponding EPR shall be determined from the soil characteristics and USC classification in accordance with table 8-2.

Table 8-2: Classification of Soils

Soil type	Group symbol	Permeability class	EPR (L/m²/d)
Fine grained soils CLAY or SILT, sandy or gravelly CLAY or SILT	Pt, OH, CH, MH, OL, CL, CI, ML	Practically impermeable	(see below)
Coarse grained soils Fine or medium SANDS, or clayey SANDS Silty or Clayey SANDS	silty SC, SM, SP, SW, GC, GM	Poor soakage	10
Clean coarse SANDS Clean GRAVEL	SP, GP, GW	Good soakage	15

Soils in permeability class 'Practically impermeable' shall be assessed using alternative method(s) if it is proposed to utilise them for land application of effluent/recycled water. Methods as described in AS/NZS 1547 are appropriate.

To calculate the required contact area for a subsurface soakage system, for a domestic dwelling with six persons, use the formula below:

Formula for system sizing

$\frac{P2 \times DF}{EPR}$ = required contact area in m² for the total daily inflow **(Equation 3)**

Where:

P2 = number of persons using the system (p)

DF = daily flow in litres per person per day (L/p/d)

EPR = effluent percolation rate (L/m²/d)

Example 8-1

A residential dwelling serving up to six persons and having a reticulated water supply and soil classified by the wastewater engineer as having an EPR of 10 L/m²/d would require a subsurface disposal system sized as follows:

P2 = 6 p

DF = 150 L/p/d

EPR = 10 L/m²/d

$\frac{P2 \times DF}{EPR} = \frac{6 \times 150}{10}$ = 90 m² contact area

Example 8-2

A warehouse/store with four employees working only one shift (no shower facilities provided), served by a reticulated water supply and having a soil classified by the wastewater engineer to have an EPR of 10 L/m²/d would require a subsurface disposal system sized as follows:

P2 = from appendix E – number of staff per shift x number of shifts = 4 p/shift x 1 shift = 4

DF = 30 L/p/d

EPR = 10 L/m²/d

$\frac{P2 \times DF}{EPR} = \frac{4 \text{ p} \times 30 \text{ L/p/d}}{10 \text{ L/m}^2\text{/d}}$ = 12 m² contact area

8.3.3 Soakage trenches

The common forms of soakage trench used for subsurface effluent disposal are the tunnel system and the perforated pipe system (see appendix A figures A8 and A9).

The soakage trench may be installed in single or multiple runs depending on the length, width and depth of the soakage trench, the length and/or width of the allotment and the direction of landfall. Appendix A figures A10, A11 and A12 show examples of different sizes to achieve the requirements for a standard six person system with a soil EPR of 10 L/m²/d.

Trench dimensions

Width:

> 1200 mm - 2500 mm using a single run of plastic tunnel or perforated pipe.

Depth:

> Using plastic tunnel: 400 mm

> Using perforated pipe: 300 mm - 600 mm, being the distance between the bottom of the pipe and trench base.

Note: Unless otherwise stated standard trench configuration is 1200 mm width by 400 mm depth for a tunnel trench and 1200 mm width by 300 mm depth for a perforated pipe trench.

Example 8-3

Trench dimensions for a standard plastic tunnel system are 1.2 m width x 0.4 m depth.

The contact area for one linear metre is: (1.2 m + (0.4 m x 2)) x 1 m = 2 m²

Length of trench for a standard dimension system serving up to six persons and based on an EPR of 10 L/m²/d is:

Tunnel system

$$\frac{90}{2} = 45 \text{ m}$$

8.4 Surface irrigation systems

This section covers surface irrigation methods for recycled water application (refer to appendix A figure A14).

The land application area must be dedicated to the sole use of receiving recycled water. It must be landscaped, preferably with shrubs and trees, and should be designed to discourage pedestrian and vehicle access.

8.4.1 Recycled water quality requirements

Recycled water used for land application must be treated to a minimum secondary standard. The quality of effluent must comply with the following requirements:

> A mean value of BOD_5 less than 20 mg/L

> A mean value of total suspended solids (SS) less than 30 mg/L

> A median value of thermotolerant coliforms *(E. coli)* less than 10 org./100 mL

> Where chlorination is the disinfection process, the apparatus shall be designed to reliably ensure the FAC shall be between 0.5 mg/L and 2.0 mg/L at the maximum effluent flow rate of 10 L/min.

For chlorine requirements for non-domestic premises, contact the DHA.

8.4.2 Sizing of the irrigation area

The land application area for surface irrigation must be designed by a wastewater engineer and be sized to accommodate the total flow from the premises using an appropriate design irrigation rate (DIR).

Historically, a DIR of 4.5 L/m²/d has been found to be suitable for surface irrigation throughout South Australia. However, the wastewater engineer must take into consideration all requirements of this Code when determining the design irrigation rate.

Example 8-4

The irrigation area for a residential dwelling for up to six persons is designed by a wastewater engineer using a nominated irrigation rate of 4.5 L/m²/d.

For a daily flow of 150 L per person and a minimum of six persons, the area of the surface irrigation system is:

$$\frac{6 \times 150}{4.5} = 200 \text{ m}^2$$

All additional plumbing fixtures, for example food waste disposal unit and spa bath, will require an increase in the treatment and reuse capacities (see section 5.4).

To determine the total load for sizing of the irrigation area, it may be necessary to add a range of use conditions, including loadings, where applicable.

If the land gradient is greater than 20% (1:5) the wastewater engineer shall require drip or subsurface irrigation or employ other means to prevent runoff from the site.

8.4.3 Irrigation area requirements

	Requirements
Soil cultivation	The land application area must incorporate at least 150 mm depth of friable soil and/or other suitable material such as pine bark, woodchips, scoria etc. over its entire surface.
Plants	The area should be planted with appropriate flora to ensure transpiration of the recycled water. Plants must be suitable for transpiration of recycled water and be salt and nutrient tolerant (see appendix D). If existing vegetation is not suitable or adequate for evapo-transpiration, extra trees and shrubs must be planted, and additional landscaping may be necessary.
Vegetables and food plants	As a public health precaution, spray irrigation is not to be used on vegetables or food plants. However, if drip irrigation is used, fruit and nut trees may be allowed, provided the produce has no contact with recycled water.
Pedestrian traffic	Pedestrian traffic should be excluded from the land application area. This does not include access for maintenance purposes.
Roof waters	All roof waters must be diverted away from the land application area.
Flooding	The land application area should not be located on land prone to waterlogging or subject to flood or surface water inundation (see section 8.2).
Run off	Landscaping must be designed so that the recycled water does not pool within, or run off from, the land application area. Where the disposal area is constructed over rock, or where there is a danger of recycled water escaping to adjacent areas for example on steep sites, the design engineer must specify the measures to be taken to ensure that recycled water is totally contained within the dedicated area.
Signage	Warning signs must be positioned within the land application area to indicate that recycled water is being used for irrigation. The signs must be on a white background with red lettering of at least 20 mm in height. The signs must be clearly visible from all sides and must contain a warning such as: **RECYCLED WATER – AVOID CONTACT/ CONSUMPTION**
Prevention of contamination	Any spray irrigation system must be installed, operated and maintained to prevent contamination of rain water catchment areas and rain water tanks.

8.4.4 Irrigation system requirements

Requirements	
Distribution	The recycled water must be distributed evenly over the entire land application area without spray drift, pooling and/or run off from the area.
Recreational area requirement	Sufficient space must be provided on the site for social and recreational use in addition to that required for the surface recycled water irrigation area. See section 8.4.5 below. It should be noted that this requirement does not apply to shallow subsurface recycled water irrigation areas or as otherwise specified by the relevant authority.
Spray irrigation	The spray heads must be suitable for use with recycled water. The spray plume must not exceed 600 mm above the finished level of the land application area.
Placement of irrigation	Care must be taken in the selection of the type and placement of the spray heads to ensure the plume is contained totally within the surface disposal area. This may require the installation of 90° and/or 180° sprays around the perimeter of the surface irrigation disposal area.
Spray drift	Spray drift into adjacent areas is not permitted and some sites may require drip irrigation due to adverse conditions (for example exposed sites subject to strong prevailing winds, no fencing provided, excessive land slope). The relevant authority reserves the right to impose further measures to minimise spray drift.
Dripper irrigation	A dripper system can be used as an alternative to spray irrigation, provided there is no pooling or run off of the recycled water within or from the land application area. The number of outlets required is dependent on the type and capacity of the drippers, the wastewater treatment system, pump and landscaping. A detailed plan is to be submitted with the application showing the discharge quantity and the area to be served by each dripper, including details of trees, shrubs and other plants to confirm uptake of the applied recycled water. Approval will be granted on an individual basis.
Capacity of irrigation system	The irrigation system (including the pump, pressure lines and distribution points) must be of sufficient capacity to ensure that the rate of discharge is at least 50% greater than the maximum volume delivered at any one time into the wastewater treatment system to satisfy imposed pressures such as friction or static head.
Pipework	Pipes and fittings complying with AS/NZS 4130 and AS/NZS 4129, or with AS/NZS 1477 are suitable for header and main pump pipework. Pressure compensating drip emitter lines should be of purple colour to indicate the conveyance of wastewater effluent.
Backflow prevention	Backflow prevention devices to protect all water supplies must be installed in accordance with AS/NZS 3500. Compliance is also required with any further potable water supply authorities' requirements.
Fixed system	For residential premises, the land application area must be a fixed system.
Moveable system	For commercial and/or industrial premises, a moveable system may be allowed, subject to individual approval. Any moveable system must be installed so as to confine the discharge of recycled water solely within the land application area and comply with all requirements of this Code.
Timer switches	Timer switches are not permitted for the operation of the surface irrigation disposal system unless they are electrically operated in conjunction with the irrigation pump.

8.4.5 Recreational area requirements

For single residential premises, the area provided for domestic, social and recreational use must be at least 50% of the surface irrigation area.

For multiple occupancy residential premises, this must be at least 25% of the area required for surface irrigation.

The relevant authority reserves the right to exempt commercial premises form this requirement. This requirement excludes land used for:

- Building and perimeter paving
- Pedestrian and vehicle access
- Vehicle parking, carports, garages and sheds
- Septic tank and wastewater treatment unit
- Surface recycled water irrigation area including setback distances of 1.5 m or less.

8.5 Shallow subsurface irrigation

Refer to chapter 9 of this Code and AS/NZS 1547.

Appendix A

Figure A1: Typical site layout plan

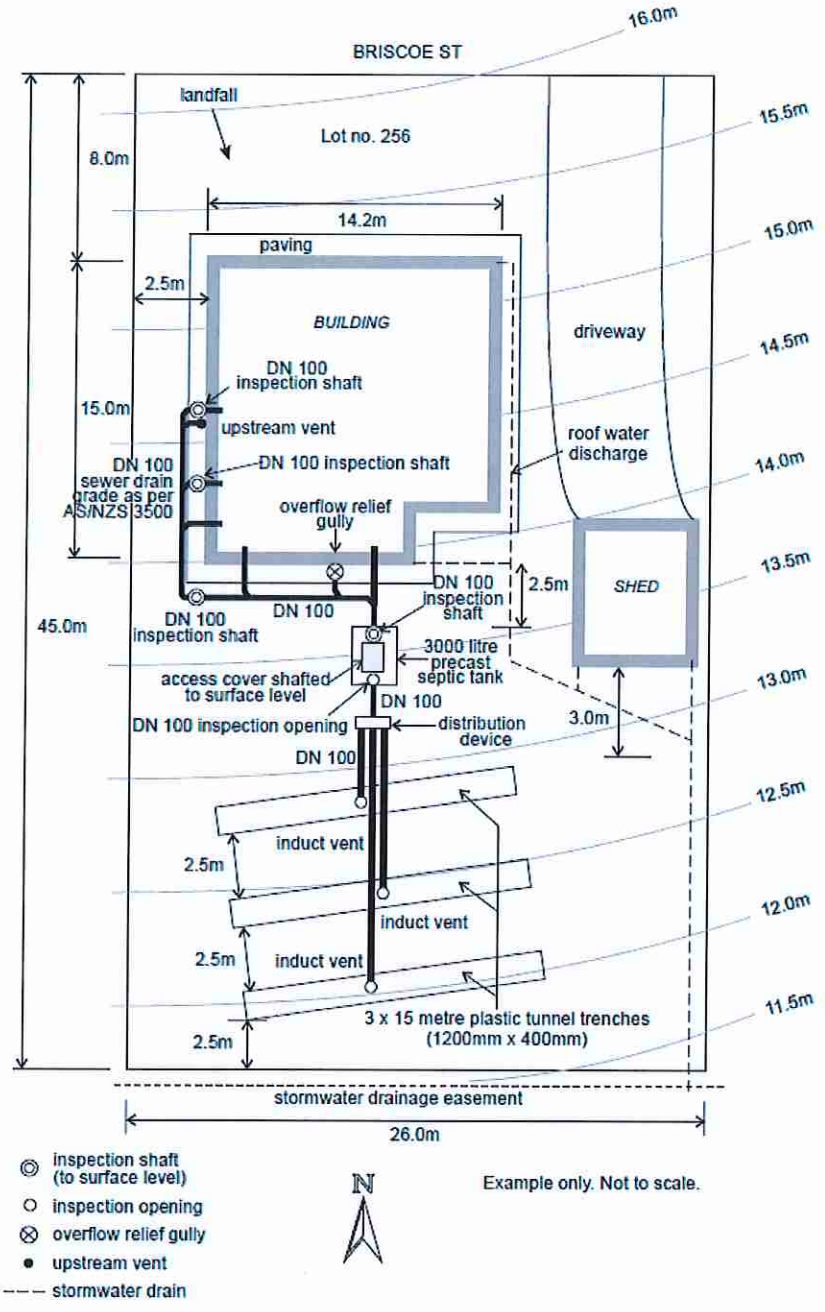
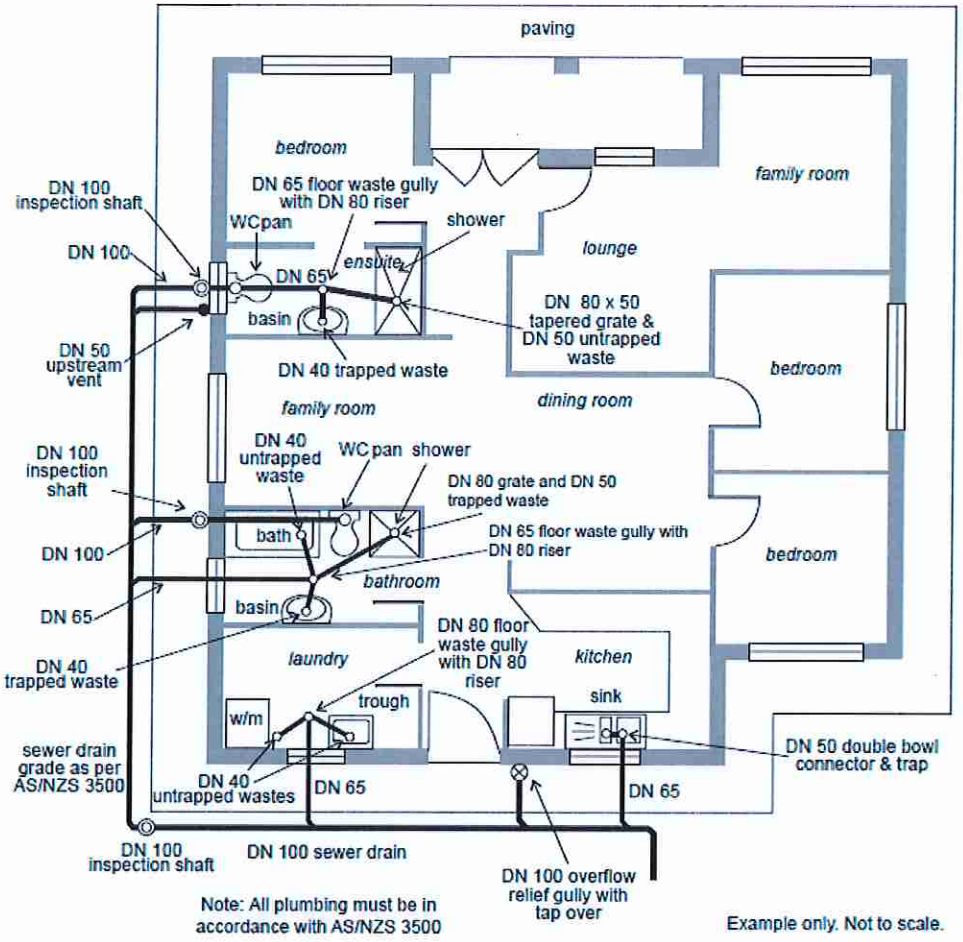


Figure A2: Typical building layout plan



Appendix B
Setback Distances

Setback distances for wastewater systems are required to ensure that public and environmental health considerations are addressed. The topography of the site and distance of a wastewater system from buildings, boundaries, water bodies and other physical and environmental features will have implications for the stability and desired performance of the system.

The information provided below does not abrogate responsibilities under other Acts or regulations.

Where possible, setback distances greater than the above are recommended.

Table B1: Setbacks for devices/treatment system components

Device/system component	Minimum setback	Additional information
Septic tanks, pre-treatment apparatus and pump sumps (including pump sumps/ pits associated with greywater systems)	2.5 metres from any building, boundary and land application area unless otherwise specified by a wastewater engineer 10 metres from any watercourse, well, bore or dam used or likely to be used for human or domestic purposes On land above the 1 in 10 year return period flood event	In situations where the placement of a septic tank, pre-treatment apparatus or pump sump intersects the angle of repose for the building/boundary footings or foundations, or its position may affect the stability of building/boundary footings and/or foundations, the relevant authority may require advice from a wastewater engineer for their installation
Distribution sumps	1 metre from the septic tank and land application area 2.5 metres from buildings and boundaries	These setbacks apply unless otherwise specified by a wastewater engineer
Aerated or other manufactured wastewater treatment systems Greywater systems, aerobic sand filters, reed beds and other built in-situ designs	3 metres from any buildings and boundaries unless otherwise specified by a wastewater engineer Tanks must be 2 metres apart where multiple tanks are used unless as otherwise stated by the product approval 10 metres from any watercourse, well, bore or dam used or likely to be used for human or domestic purposes 1.5 metres from the surface or shallow subsurface irrigation area On land above the 1 in 10 year return period flood event	Where separate primary and secondary treatment tanks or separate septic tank/ treatment tank and pump sumps are used: > Tanks/sumps must be installed on a level compacted/solid base > Tanks/sumps must be spaced so that ground movement will not result in structural damage or loss of integrity of the base support of the shallower tank (angle of repose factor) Note: The relevant authority may require certification by a wastewater engineer for the setback distance between the above systems and/or buildings/boundaries The distance between the above systems and the septic tank and/or the pump sump may vary in accordance with the requirements of relevant authority, engineer and manufacturer Systems should be down slope (where practical) from any building located on the site

Table B2: Setbacks for land application systems from boundaries, buildings, wastewater devices, pools etc.

Land application system	Minimum setback	Additional information
Subsurface effluent disposal systems (e.g. soakage trenches and soakage beds)	2.5 metres from septic tanks, wastewater treatment systems, pump sumps, pre-treatment apparatus, allotment boundaries, diversion trenches, soakage trenches, ETA/ETS beds, or any other land application system 3 metres down slope from a building or a swimming pool, or where the site is flat, 3 metres from any point of the building or swimming pool 6 metres upslope from a building or swimming pool	These setbacks apply unless otherwise specified by a wastewater engineer
Shallow subsurface recycled water irrigation systems	On a flat or gently sloping site (i.e. gradient less than 1:100): > 0.5 metres from allotment boundaries > 1.5 metres from aerated or other wastewater treatment products, septic tanks or pump sumps > 1.5 metres from buildings, including those erected on adjoining allotments > 3 metres from swimming pools including surrounding paved areas On a sloping site (i.e. gradient greater than 1:100): > 0.5 metres down slope from allotment boundaries > 1.5 metres up slope from allotment boundaries > 1.5 metres down slope and 3 metres up slope from buildings, including those erected on adjoining allotments > 3 metres up slope from a lower cut face/bench > 3 metres down slope and 6 metres up slope from swimming pools including surrounding paved areas	These setbacks apply unless otherwise specified by a wastewater engineer Note: Where it is intended to locate the shallow subsurface irrigation area up slope of a building, the wastewater engineer should be consulted to determine the likely impact on the building's structure and the need for any additional requirements such as diversion trenches. Confirmation of the wastewater engineer's requirements should be provided with the application

Land application system	Minimum setback	Additional information
Surface spray and drip recycled water irrigation systems	On a flat or gently sloping site (i.e. gradient less than 1:100): > 0.5 metres from allotment boundaries > 1.5 metres from aerated or other wastewater treatment products, septic tanks or pump sumps > 1.5 metres from buildings, including those erected on adjoining allotments > 3 metres from swimming pools including surrounding paved areas On a sloping site (i.e. gradient greater than 1:100): > 0.5 metres down slope from allotment boundaries > 1.5 metres up slope from allotment boundaries > 1.5 metres down slope and 3 metres up slope from buildings, including those erected on adjoining allotments > 3 metres up slope from a lower cut face/bench > 3 metres down slope and 6 metres up slope from swimming pools including surrounding paved areas	These setbacks apply unless otherwise specified by a wastewater engineer For larger systems utilising spray irrigation, the relevant authority may increase setback distance requirements or request other measures to reduce the risk of public exposure to aerosols Note: Where it is intended to locate the surface irrigation area up slope of a building, the wastewater engineer should be consulted to determine the likely impact on the building's structure and the need for any additional requirements such as diversion trenches. Confirmation of the wastewater engineer's requirements should be provided with the application

Table B3: Setbacks for all land application systems from inland or coastal waters

Physical characteristics/ site aspects	Minimum setback	Additional information
Well, bore or dam used or likely to be used for human or domestic purposes	50 metres	
Watercourse used or likely to be used for human or domestic purposes	50 metres	Watercourse (see glossary for definition) identified on a current series 1:50,000 topographic map published by the Department of Environment, Water and Natural Resources A watercourse is delineated as a blue line on a 1:50,000 topographic map. However, there are situations where a watercourse exists but is poorly delineated on the 1:50,000 topographic map or is obscured by other detail. Therefore it is important to ensure that the 50 metre setback is maintained
Water source used for agricultural, aquacultural or stock purposes	50 metres	
Pool level for the River Murray and its lakes	100 metres and above the 1956 flood level	Disposal of effluent is not permitted within the 1956 River Murray and lakes flood zone
Mean high water spring along coastal foreshore areas	100 metres	The setback distance of the land application system should be at least 100 metres from mean high water spring along coastal foreshore areas