



**Government of South Australia**  
Department of Health

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*D R A F T   C O D E*

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# Onsite Wastewater Systems Code

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Draft Onsite Wastewater Systems Code

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## **Preface**

This Draft Code has been prepared as the  
“Onsite Wastewater Systems Code” under  
the *Public & Environmental Health Act, 1987*.

## Table of Contents

<b>Foreword</b>	<b>vii</b>
<b>Glossary of Terms</b>	<b>viii</b>
<b>1. Scope and General</b>	<b>1</b>
1.1. Scope	1
1.2. Systems Covered	1
1.3. Legislation	2
1.4. Alternative and/or New Materials or Products	3
1.5. Australian / New Zealand Standards Adopted	3
1.6. Definitions	3
<b>2. Overview of Implementation Process</b>	<b>4</b>
2.1. Scope	4
2.2. Implementation Process and Responsibilities	4
2.3. Application for Installation Approval	4
<b>3. Performance</b>	<b>7</b>
3.1. Scope	7
3.2. Function and Context of Use	7
3.3. Performance Objectives	7
3.4. Performance Requirements	7
3.5. Planning Requirements	7
<b>4. Site and Soil Evaluation</b>	<b>8</b>
4.1. Scope	8
4.2. Performance Objectives	8
4.3. Purpose	8
4.4. Site and Soil Evaluation	8
4.5. Soil Assessors	8
4.6. Site and Soil Evaluation Results and Reporting	8
4.7. Compliance	8
<b>5. Onsite Wastewater System Sizing</b>	<b>9</b>
5.1. Capacity	9
5.2. Non Standard Fixtures	9
5.3. Commercial and other Premises with Onsite Systems	9
<b>6. Design – Land Application Systems</b>	<b>10</b>
6.1. Scope	10
6.2. Function	10
6.3. Performance Requirements	10
6.4. Performance Criteria	10
6.5. Design Considerations	11
6.6. Compliance	12
<b>7. Design - Onsite Wastewater Treatment Systems</b>	<b>13</b>
7.1. Scope	13
7.2. Function	13

7.3.	Performance Requirements	13
7.4.	Performance Criteria	13
7.5.	Conventional Septic Tanks	13
7.6.	Aerated Wastewater Treatment Systems	14
7.7.	Sand Filters	14
7.8.	Reedbeds	14
7.9.	Greywater diverters and treatment systems	15
7.10.	Composting Toilets (wet or dry)	15
7.11.	Access shafts	15
7.12.	Other Wastewater Systems	16
7.13.	Holding Tanks	16
<b>8.</b>	<b>Construction and Installation</b>	<b>18</b>
8.1.	Scope	18
8.2.	Function and Context of Use	18
8.3.	Performance Requirements	18
8.4.	Construction and Installation	18
8.5.	Installation Requirements	18
8.6.	Certification	19
8.7.	Commissioning and Inspection	20
8.8.	Deemed to Satisfy	20
<b>9.</b>	<b>Operation and Maintenance</b>	<b>21</b>
9.1.	General	21
9.2.	Operation and Maintenance Procedures	21
9.3.	Operation and Maintenance Guidelines	21
9.4.	Maintenance & Servicing	21
9.5.	Service Providers	22
9.6.	Service Related Obligations for Onsite Wastewater Treatment Systems	22
<b>10.</b>	<b>Inspection and Monitoring</b>	<b>23</b>
10.1.	Purpose	23
10.2.	Objectives	23
10.3.	Records Management	23
10.4.	Inspection and Monitoring Program	23
10.5.	Annual Performance Monitoring	23
<b>11.</b>	<b>Product Approval for Systems Covered by AS/NZS</b>	<b>25</b>
11.1.	Scope	25
11.2.	Legislation	25
11.3.	Model Approval Procedure	25
11.4.	Application Criteria	25
11.5.	Existing Interstate or Overseas Approval	26
11.6.	Product Certification	26
11.7.	Product Certification Agency	27
11.8.	Design and Manufacture	28
11.9.	Marking	28
11.10.	Guaranteed Compliance and Service Life	28

11.11. Product Literature	30
11.12. Renewal of Product Approval	31
<b>12. Product Approval for Non-Standard Systems</b>	<b>32</b>
12.1. Scope	32
12.2. Legislation	32
12.3. Non-Standard Systems Approval Procedure	32
12.4. Application Criteria	32
12.5. Existing Interstate or Overseas Approvals	33
12.6. Product Quality Assurance	33
12.7. Product Quality Assurance Agency	35
12.8. Design Requirements	35
12.9. Disinfection	37
12.10. Marking	38
12.11. Guaranteed Compliance and Service Life	38
12.12. Product Literature	38
12.13. Renewal of Product Approval	38
<b>APPENDIX A – Onsite Wastewater System Schematic Diagrams</b>	<b>39</b>
<b>APPENDIX B – Setback Distances</b>	<b>43</b>
<b>APPENDIX C – Onsite Domestic Greywater Systems</b>	<b>47</b>
<b>APPENDIX D – Suitable Plants for Surface Irrigation</b>	<b>53</b>
<b>APPENDIX E – BOD<sub>5</sub> Loading and Flow Rates</b>	<b>55</b>

## Tables and Figures

Table 1-1: Determination of Relevant Authority	1
Table 2-1: Implementation Process for Onsite Wastewater System Installations	4
Table 5-1: Design Flows	9
Table 5-2: Sludge and Scum Accumulation	9
Table 5-3: Hydraulic & BOD <sub>5</sub> Design Criteria for Spa Baths & Food Waste Disposal Units	9
Table 7-1: Sludge/scum capacity and desludging frequency	14
Figure 11-1: Product Approval Procedure	29
Table 12-1: Raw Wastewater Characteristics	33
Figure A-1: Typical System Layout –Soakage Trench	39
Figure A-2: Typical Septic Tank Design	40
Figure A-3: Typical Site Layout Plan – Aerobic System with Surface Irrigation	41
Figure A-4: Typical Building Layout - Underfloor Plumbing	42
Table B-1: Horizontal Setbacks for Water Protection Areas	45
Table B-2: Horizontal Setbacks for River Murray Water Protection Area	45
Table B-2: Horizontal Setbacks in Coastal Areas	45
Table B-3: Horizontal Setbacks in Other Areas	46
Table B-4: Horizontal Setbacks from Wells or Dams	46
Table C-1: Frequency of Sampling	50



## Foreword

This Code, *Onsite Wastewater Systems Code*, has been developed pursuant to the provisions of the Public and Environmental Health Act 1987 (P&EH Act). The P&EH Act requires the Department of Health and the Public and Environmental Health Council to keep public health legislation under review for the purpose of accommodating the changing community needs and practices, facilitating the day-to-day administration of the legislation and protecting public health.

Policies and guidelines relating to onsite wastewater systems have been in existence since the late 1980s.

This Code has been compiled to assist the relevant authorities with processing applications for approval of onsite wastewater products and installations.

The Code also provides information to assist manufacturers, designers, consultants, the building and plumbing industry, property owners and occupiers on:

- the technical requirements to be considered in the planning stages of onsite wastewater systems;
- the technical requirements for design of onsite wastewater systems;
- the requirements for approval of onsite wastewater installations;
- the installation and ongoing operation and maintenance of the onsite wastewater system; and
- the requirements for approval of onsite wastewater system products.

This Code needs to be read in conjunction with the Wastewater Systems Regulations, the relevant Australian and New Zealand Standards and other appropriate prescribed codes.

In accordance with the Public and Environmental Health (Wastewater Systems) Regulations 2007, this Department of Health Code is a *prescribed* code; non-compliance with its provisions is deemed to be an offence and the relevant authority may institute legal proceedings.

## Glossary of Terms

All wastewater:	The combined <i>blackwater</i> and <i>greywater</i> from a dwelling or premises.
AS/NZS:	Australian Standards/New Zealand Standards (latest version).
BOD <sub>5</sub> (Biochemical oxygen demand):	Biochemical Oxygen Demand (BOD <sub>5</sub> ) refers to the amount of oxygen that would be consumed over a period of five days by microbiological action in a sample of wastewater at 20 degrees C.
Blackwater:	Wastewater discharged from the human body direct to either a toilet or urinal.
Building:	A building as classified under the provisions of the <i>Development Act (1993)</i> ; or building work requiring <i>Development Act</i> approval; or as defined in the <i>Public and Environmental Health Act (1987)</i> .
Coast:	All land that is: <ul style="list-style-type: none"> <li>(a) within the mean high water mark and the mean low water mark on the seashore at spring tides; or</li> <li>(b) above and within one hundred metres of that mean high water mark; or</li> <li>(c) below and within three nautical miles of that mean low water mark; or</li> <li>(d) within any estuary, inlet, river, creek, bay or lake and subject to the ebb and flow of the tide</li> </ul>
Community Wastewater System (CWWS)	Community Wastewater System for a community, subdivision or town (also referred to as Reticulated Community Wastewater System) consisting of wastewater collection drains, and other components directing wastewater to a common treatment plant and disposal or irrigation area.
Composting toilet:	A device that receives and treats human excreta, domestic organic matter and bulking agents, using natural aerobic stabilisation and disinfection processes to produce a product that is not a public health risk.
Daily inflow:	The volume in litres of <i>sewage</i> and liquid wastes flowing into the <i>wastewater</i> system during a 24 hour period. Also see <i>hydraulic loading</i> .
Department of Health:	Authorised officer for the Department of Health, as delegated by the Minister for Health.
Desludging:	Removal of accumulated <i>sludge</i> and <i>scum</i> from the septic tank or treatment system.
Effluent:	The liquid discharged from a wastewater treatment process / unit.
Equivalent Persons (EP):	150 L wastewater flow per day and 70 grams BOD <sub>5</sub> per day in raw wastewater (or 50 grams BOD <sub>5</sub> per day in wastewater after a septic tank) is considered as one equivalent person load or capacity.
Greywater:	The domestic wastewater from baths, showers, basins, laundries and kitchen sinks / dishwashers specifically excluding water closet and urinal wastes. Also see <i>all wastewater</i> .
Groundwater:	The body of water in the soil, the pores of which are saturated with water. If the body of water is present at all times it represents permanent or true groundwater.
Hydraulic loading:	Liquid flow required to be handled by the wastewater system. Also see <i>daily inflow</i> .
JAS-ANZ:	Joint accreditation system of Australia and New Zealand.
Land application system:	The system used to apply effluent from a wastewater treatment system into or onto the soils for further in-soil treatment and soakage/reuse.
Mean high water springs:	The level that is the average of all twice-daily high tides at spring periods.
NATA (National Association of Testing Authorities):	Government-endorsed provider of accreditation for laboratories and similar testing facilities. Accredited laboratories in Australia will provide reliable and accurate test results of wastewater contaminants.

New land division:	A new land division can be created from existing titles to be more than the original number of titles in the form of Torrens title/Community title or Strata title. A new land division can also refer to a boundary realignment(s) where the number of allotments does not increase.
Onsite wastewater system:	A system that collects, treats and disposes of or reuses domestic wastewater within an individual allotment. This includes land application of treated wastewater which is to be on the same allotment.
Onsite wastewater treatment system:	A system that treats wastewater within an individual allotment.
Performance criteria:	The qualitative or quantitative description of the <i>performance requirement</i> .
Performance objectives:	The outcomes that a system must attain in order to be acceptable.
Performance requirements:	The function that a system has to perform in order to operate as defined.
Primary treatment:	The separation of suspended material from wastewater by settlement and or flotation in septic tanks, primary settling chambers etc., prior to effluent discharge to either a <i>secondary treatment</i> process, or to a <i>land application system</i> .
Reedbed:	Secondary treatment systems consisting of shallow ponds or channels which have been planted with aquatic plants, and which rely upon natural microbial, biochemical, physical and chemical processes to treat wastewater.
Regulatory authority:	An authority that is empowered by statute to be responsible for managing or controlling an aspect of onsite domestic-wastewater systems.
Reserve Area:	An area set aside for future use as a land-application area to replace or extend the original <i>land application system</i> .
River Murray:	As defined under the River Murray Act (2003)
River Murray Protection Areas:	As defined under the River Murray Act 2003, and includes the River Murray Floodplain Area and the River Murray Tributaries Area.
Scum:	The floating mass of <i>wastewater</i> solids buoyed up by entrained gas, grease or other substances which form an accumulating layer on the liquid surface inside the septic or treatment tank / system.
Sanitary drainage system	An assembly of pipes, fittings and apparatus, which is used to collect and convey the discharge from the sanitary plumbing system, together with discharges from fixtures directly connected to the drain to the onsite wastewater system or CWWS. Usually located below ground level.
Sanitary plumbing system	An assembly of pipes, fittings, fixtures and appliances, which is used to collect and convey sewage to the sanitary drainage system.
Secondary treatment:	Biochemical (or other) processing and settling or filtering of effluent received from a <i>primary treatment</i> unit. Effluent quality following secondary treatment is expected to be equal to or better than 20 mg/L 5-day biochemical oxygen demand ( <i>BOD<sub>5</sub></i> ) and 30 mg/L suspended solids (SS).
Septic tank:	A single or multiple chambered tank through which wastewater is allowed to flow slowly to permit suspended matter to settle and be retained, and that organic matter contained therein can be partially decomposed (digested) by anaerobic bacterial action. The term covers the tanks that are used to treat <i>all wastewater, greywater</i> and <i>blackwater</i> .
Setback:	The distance that a <i>wastewater</i> or <i>land application</i> system must be situated from any facility, boundary, watercourse or body of water.
Sewage:	Wastewater generated in a domestic premises, including refuse liquids, wastewater or waste matter (including both greywater and blackwater), which is carried away in sewers or drains.
Sewerage:	A type of Community Wastewater System that receives sewage from multiple locations, and then transports it to a central treatment system (e.g. treatment lagoon or aerobic wastewater treatment plant).

Sludge:	Unstabilised concentrated solids produced during the wastewater treatment process. Also see <i>desludging</i> .
Suspended solids (SS):	Solid particles held in suspension including settleable and non-settleable matter.
Septic tank effluent drainage (STED) or Septic tank effluent drainage scheme (STEDS):	A type of Community Wastewater System that receives septic tank effluent from multiple locations, and then transports it to a central treatment system (e.g. treatment lagoon or aerobic wastewater treatment plant).
Wastewater:	The used water arising from domestic activities in dwellings, institutions or commercial facilities consisting of all wastewater, greywater or blackwater.
Wastewater system:	A system that includes collection, treatment and reuse or disposal of treated wastewater.
Wastewater treatment unit:	One or more components of a wastewater system that provides treatment.
Watercourse:	<ul style="list-style-type: none"> <li>(a) a river, creek or other natural watercourse (whether modified or temporarily dry);</li> <li>(b) a dam or reservoir that collects water flowing in a watercourse;</li> <li>(c) a lake, wetland or other body of water through which water flows;</li> <li>(d) the Coorong;</li> <li>(e) an artificial channel into which the water of a watercourse has been diverted (excluding public stormwater disposal systems); or</li> <li>(f) part of a watercourse.</li> </ul>
Water Protection Area:	A part of the State for the time being declared by proclamation to be a water protection area, under the Environment Protection Act 1993. The River Murray Protection areas defined under the River Murray Act 2003 are also water protection areas.
Well:	<ul style="list-style-type: none"> <li>(a) an opening in the ground excavated for the purpose of obtaining access to underground water;</li> <li>(b) an opening in the ground excavated for some other purpose but that gives access to underground water;</li> <li>(c) a natural opening in the ground that gives access to underground water.</li> </ul>

# 1. Scope and General

## 1.1. Scope

The purpose of this Code is to ensure the safe disposal of domestic/household wastewater to safeguard public health and protect the environment.

This Code sets out the technical requirements for site and soil evaluation, design, installation and operation of onsite wastewater systems in areas not served by a reticulated wastewater collection system (sewerage, STED or vacuum) together with the relevant authority's responsibilities and requirements in this regard. The Code also includes the minimum requirements for standard product approval and non-standard product approval for an onsite wastewater system.

### 1.1.1. Minimum System Capacity

Onsite wastewater systems for a residential purpose must be designed for a minimum capacity of 6 Equivalent Persons (EP).

### 1.1.2. Maximum System Capacity

This Code applies to a maximum onsite wastewater system capacity of 50 EP (provided the number of connected buildings does not exceed 20). The relevant authority for onsite system installation approvals is shown in Table 1-1.

**Table 1-1: Determination of Relevant Authority**

<i>Approval type</i>	<i>Relevant Authority</i>
<b>Installation approvals for Onsite Wastewater Systems less than or equal to 20 EP</b>	Local council
<b>Installation approvals for Onsite Wastewater Systems between 20 and 50 EP</b>	<ul style="list-style-type: none"> <li>• Local council may choose to approve these systems provided the number of connected buildings does not exceed five</li> <li>• Department of Health must agree to this arrangement</li> </ul>
	Department of Health if local council chooses not to approve these systems
<b>Installation approvals for Onsite Wastewater Systems greater than 50 EP</b>	Department of Health
<b>Underfloor plumbing approvals for all developments, including system larger than 50 EP</b>	Local council
<b>Installation approvals for unincorporated areas (including underfloor plumbing approvals)</b>	Department of Health

## 1.2. Systems Covered

This Code applies to any onsite wastewater systems (including underfloor plumbing, treatment system and onsite disposal or irrigation) serving premises where the wastewater is predominantly of domestic origin.

This Code also applies to any part of an onsite wastewater system, installed at each premises as part of a reticulated community wastewater system. The Code does not apply to the sanitary drains, and other components of the main collection system that form part of the reticulated community wastewater system.

Design and operation guidelines for greywater systems are also covered by this Code and Appendix C of this Code.

The Appendices also include additional guidelines for determining design capacities, typical system layouts, setback requirements, and recommended plant species for irrigation with reclaimed water. Appendices B, C and E are normative (the prescribed standard) and must be complied with, while Appendices A and D are informative.

### **1.2.1. Changes to Existing Facilities**

This Clause applies to onsite wastewater facilities installed before the commencement date of this Code. All alterations, additions and repairs made after the commencement date of this Code must conform to this Code. However, the relevant authority may choose to approve all or part of the alterations, additions or repairs under the previous Codes, if the relevant authority is satisfied that:

- no additional flows will be added to the system;
- the protection of public health would not be impaired; and
- the quality of the environment would not be compromised.

### **1.2.2. Greywater**

Under the Public and Environmental Health Act and its Regulations, greywater is a wastewater. The requirements for treatment and disposal/reuse of greywater are the same as for wastewater therefore the requirements of this Code apply to greywater. Where applicable this Code includes Clauses that specifically refer to greywater.

Design, testing and installation guidelines are given in Appendix C of this Code.

## **1.3. Legislation**

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### **1.3.1. Public & Environmental Health Act, 1987**

This Code operates under the authority of the *Public & Environmental Health Act, 1987* or subsequent amendments to this Act or its Regulations. The main legislative requirements concerning onsite wastewater facilities are contained in the *Public & Environmental Health (Wastewater Systems) Regulations 2007*. These Regulations detail the requirements to be satisfied with regard to the manufacture, installation and operation of wastewater systems. This Code should be read in conjunction with these Regulations.

Compliance with this Code is a requirement of the Public & Environmental Health Act, 1987 and its Regulations.

### **1.3.2. Other Acts & Regulations**

Persons installing a wastewater system must ensure compliance with the requirements of other regulatory authorities. Where applicable the following legislation must be complied with in its current form:

- *Development Act (1993) & Regulations including the Building Code of Australia*
- *Environment Protection Act (1993) and Regulations including the Environment Protection (Water Quality) Policy (2003)*
- *Natural Resources Management Act (2004) & Regulations*
- *Sewerage Act (1929) & Regulations*
- *River Murray Act (2003) and Regulations*
- *Occupational Health, Safety & Welfare Act (1986) & Regulations*
- *Local Government Act (1934 and 1999) & Regulations*
- *Council By-laws*
- *Plumbers Gasfitters & Electricians Act (1995)*
- *Native Vegetation Act (1991) & Regulations*

### 1.3.3. Plumbing Code of Australia and Plumbing & Drainage Standards AS/NZS 3500

The essentials of good plumbing and drainage are simple design, sound materials and good workmanship. All materials, fittings and fixtures used must be according to a standard approved for sanitary plumbing and drainage.

All sanitary plumbing and drainage work including the installation of fixtures and connection to the onsite system via traps, waste pipes and drains shall be carried out in accordance with the Plumbing Code of Australia (Section A “General Provisions,” Part B3 “Non Drinking Water Services,” Section C “Sanitary Plumbing and Drainage Services,” Section F “Onsite Wastewater Management Systems” and Section G “Materials and Products Certification) and the Plumbing and Drainage Standards AS/NZS 3500.

## 1.4. Alternative and/or New Materials or Products

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This Code should not be interpreted to prevent the use of materials or products not specifically referred herein. If it is desired to use alternative and/or new materials and products not covered by this Code, they shall be submitted to the Department of Health and where necessary other authorities such as SA Water and the Joint Accreditation System of Australia and New Zealand (JAS-ANZ) for certification or approval.

## 1.5. Australian / New Zealand Standards Adopted

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The following Australian/New Zealand Standards (AS/NZS) are adopted in this Code:

- AS/NZS 1546.1 On-site domestic wastewater treatment units Part 1: Septic tanks;
- AS/NZS 1546.2 On-site domestic wastewater treatment units Part 2: Waterless composting toilets;
- AS/NZS 1546.3 On-site domestic wastewater treatment units Part 3: Aerated wastewater treatment systems;
- AS/NZS 1547 On-site domestic wastewater management;
- AS/NZS 3000 Electrical installations (known as the Australian/New Zealand Wiring Rules);
- AS/NZS 3500.2 Plumbing and drainage Part 2: Sanitary plumbing and drainage; and
- AS/NZS 3500.1 Plumbing and drainage Part 1: Water services.

Australian/New Zealand Standards (1546 series and 1547 referred to above) are taken to apply to all onsite wastewater systems and land application facilities up to 20 EP, or 50 EP if the local council chooses (refer to Section 1.1.2 of this Code).

Any additional information or requirement provided in this Code overrides corresponding or differing AS/NZS requirements. References to AS/NZS in this Code must be considered as the corresponding clauses of the subsequent versions of the AS/NZS will apply. If revisions of the AS/NZS differ considerably, the relevant authority will determine which approach best meets the required performance outcomes.

## 1.6. Definitions

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Unless noted otherwise in the glossary of terms, all definitions have the same meaning as given in the relevant Australian/New Zealand Standard or Australian Standard.

## 2. Overview of Implementation Process

### 2.1. Scope

This Section of the Code identifies and provides guidance on the responsibility levels and process stages for site-and-soil evaluation, onsite wastewater system design, installation, construction, operation and maintenance and Relevant authority approval for an onsite wastewater system.

### 2.2. Implementation Process and Responsibilities

Table 2-1 summarises the essential stages in the implementation process alongside suggested levels of responsibility.

**Table 2-1: Implementation Process for Onsite Wastewater System Installations**

<i>Implementation Stage</i>	<i>Process</i>	<i>Implemented by</i>
1. Feasibility (See Section 5)	Review whether site has suitable area for onsite wastewater system	Owner Builder Relevant Authority*
2. Site investigation (See Section 5)	Site and soil check Site and soil evaluation Design reporting	Site evaluator Site evaluator/soil assessor Designer
3. System design (See Sections 5 & 6, and Appendix B)	Land application system selection and sizing (where applicable) Onsite wastewater treatment selection and sizing Off-site wastewater system or other reuse applications (where applicable)	Designer Owner Designer Owner Relevant Authority*
4. Approval needed (See Section 4.3)	Submit application including site and soil evaluation report and design report to Relevant Authority	Owner/Designer Relevant Authority*
5. System installation (See Section 7)	Construction and/or installation of treatment plant and land application system	Installer/ Designer Owner Relevant Authority*
6. System use (See Sections 8 & 9)	Operation and maintenance  Monitoring	Owner/occupier Relevant Authority* Service technician Pump-out contractor  Owner Manufacturer Relevant Authority*

\* Refer to Table 1.1

**Note:** Prior to commencement of construction of a dwelling and the onsite wastewater system, the owner or owner's representative shall obtain all relevant authority approvals.

### 2.3. Application for Installation Approval

Application for approval to install an onsite wastewater system must be made on the required application form and provide the necessary information as detailed on the form. Installation of a system shall not commence without approval from the relevant authority.

**Note:** *Planning officers and Environmental Health officers should have a good understanding of approval requirements for wastewater systems and developments, and communicate closely.*

### 2.3.1. Application

The application for installation of an onsite wastewater system shall be on the required application form and include:

- Design Report in accordance with Section 6 of this Code. This should include a Site and Soil Evaluation Report in accordance with Section 4 of this Code. The Design Report should include the following information:
  - ❖ Conclusions and recommendation of selected onsite wastewater system (including land application system);
  - ❖ Calculations for land application area sizing, based on Design Loading Rate (DLR) selected from the site and soil evaluation;
  - ❖ Consideration of reserve land application area;
  - ❖ Measures to achieve even distribution;
  - ❖ Installation and construction details; and
  - ❖ Surface water diversion measures.
- A detailed site layout plan (in duplicate) drawn to a scale of 1 in 500 showing, where relevant:
  - ❖ Block dimensions,
  - ❖ Contours indicating natural ground fall,
  - ❖ Proposed location of buildings and all other structures,
  - ❖ Position of the proposed wastewater system, including distances from boundaries, buildings etc,
  - ❖ Details of any site modifications, e.g. benching, cutting and filling,
  - ❖ Details and location of any diversion trenches to collect surface or migrating subsurface water,
  - ❖ Details and location of storm, surface and roof water disposal,
  - ❖ Details of any well or dam used or likely to be used for human and/or domestic use,
    - ◆ Details of any water source used for agricultural, aquacultural or stock purposes,
    - ◆ Details of any watercourse, used or likely to be used for human and/or domestic use,
    - ◆ Type and capacities of the proposed wastewater treatment system and/or pump sump,
    - ◆ Details and drawings of all components of the land application method including length, width and depth, materials, layout, flushing equipment, surface water diversion, pumps, alarms,
    - ◆ Where connection to a septic tank effluent disposal scheme is available, show the line of drain and the connection point.
- A detailed building layout plan must be provided (in duplicate) drawn to a scale of 1 in 100 showing:
  - ❖ The position and description of all sanitary fixtures to be connected to the onsite wastewater system,
  - ❖ Method of connecting the fixtures to the drainage system – including location of the sewer drain, inspection openings, and inspection shafts, junctions and bends, size and grade of sewer drain, position and size of traps, vents and waste pipes,
  - ❖ The intended use of the building and the intended use of rooms within the building,
  - ❖ The maximum number of persons using the system.

- The required fee as determined by the Regulations and the relevant authority;
- Any other information as required by the relevant authority.

### **2.3.2. Approval**

The relevant authority must ensure that the following are considered in the approval for installation of an onsite wastewater system:

- The proposed onsite wastewater system / product is a Department of Health approved product / system;
- The installation requirements take into account the requirements of the Department of Health product approval;
- The installation requirements take into account the requirements of this Code;
- Any other installation requirements as required by the relevant authority are included.

## 3. Performance

### 3.1. Scope

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This section of the Code provides the performance objectives and performance requirements for the sustainable management of onsite wastewater facilities.

### 3.2. Function and Context of Use

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The function and context of use of an onsite wastewater system shall be as per the function and context of use given in AS/NZS 1547 (Clause 2.1.2 of 2000 version).

### 3.3. Performance Objectives

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Onsite wastewater systems shall meet the key performance objectives outlined in AS/NZS 1547 (Clause 2.2.1 of 2000 version).

### 3.4. Performance Requirements

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Onsite wastewater systems shall meet the performance requirements outlined in AS/NZS 1547 (Clause 2.2.2 of 2000 version).

### 3.5. Planning Requirements

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At the early development stages of a Plan Amendment Report (PAR), and for land divisions, the option of a reticulated community wastewater system must be compared with onsite servicing.

The chosen option must be demonstrated to best meet the performance requirements. This assessment must include public health, environmental, legal and economic factors which are likely to impinge on the siting and design of an onsite wastewater system, including the land application system and reserve land application area.

When the assessment has been undertaken and onsite wastewater systems have been chosen as the best option, then only the types of onsite wastewater system selected, including disposal / land application types and any reserve area requirements, can be installed on each allotment.

Councils may choose to develop policies on development densities which consider the cumulative effects of onsite wastewater systems.

For systems that are on Aboriginal land, consultation must occur with the landholding authority (ie Aboriginal lands Trust, Maralinga Tjarutja and Anangu Pitjantjatjara Yankunytjatjara Lands) as part of the development proposal prior to submitting the application to Planning SA.

## 4. Site and Soil Evaluation

### 4.1. Scope

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This section of the Code sets out the site and soil evaluation procedures for individual lots to determine the nature of a site and its soil. It also provides methodologies and techniques for determining soil categories that are used for the design of land application systems.

### 4.2. Performance Objectives

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The site and soil evaluation shall meet the performance objectives outlined in AS/NZS 1547 (Clause 2.3 in 2000 version).

### 4.3. Purpose

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A site-and-soil evaluation<sup>1</sup> is carried out in order to obtain detailed site-specific information relating to the allotment. This enables the onsite wastewater system design to meet the performance objectives required by this Code.

### 4.4. Site and Soil Evaluation

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The site and soil evaluation shall be undertaken in accordance with AS/NZS 1547 (Clause 4.1.3 in 2000 version). The site and soil evaluation shall also take into account setback distance requirements, which are described in Appendix B of this Code.

The site and soil evaluation shall also take into account specific provisions of *Development Plans* (under the *Development Act 1993*).

### 4.5. Soil Assessors

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Soil assessments must be undertaken by an appropriately trained professional engineer (i.e. geotechnical engineer or civil and environmental engineer) or soil scientist.

### 4.6. Site and Soil Evaluation Results and Reporting

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The results from the site and soil evaluation shall be in accordance with AS/NZS 1547:2000 (Clause 4.1.4 in 2000 version), and a site evaluation and soil assessment report shall be prepared (Refer to AS/NZS 1547, Clause 4.1.5 in 2000 version). The report should form part of the design report, and be appropriate to the scale and extent of the onsite wastewater system under design.

### 4.7. Compliance

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Compliance with the acceptable solutions in AS/NZS 1547, (Appendices 4.1A, 4.1B, 4.1C, 4.1D, 4.1E and 4.1F in 2000 version), subject to the satisfaction of the relevant authority, shall be deemed to satisfy the requirements of this Code.

The relevant authority reserves the right to require the applicant / owner to have percolation tests performed and to provide the results of such testing for assessment prior to granting approval. The relevant authority can also choose to ask for other scientific and/or engineering evidence to justify the proposal.

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<sup>1</sup> Refer to note accompanying AS/NZS 1547, Clause 4.1.1 in 2000 version.

## 5. Onsite Wastewater System Sizing

### 5.1. Capacity

Onsite treatment and land application system capacities shall be determined in accordance with Table 5-1 and Table 5-2.

**Table 5-1: Design Flows**

	<i>Water Supply</i>	<i>Flow L/p/d</i>
All wastewater	Mains water	150
	Roof catchment and storage	125
Greywater	Mains water	100
	Roof catchment and storage	75
Blackwater	Not applicable	50

**Table 5-2: Sludge and Scum Accumulation**

	<i>L/p/yr</i>
All wastewater	80
Greywater	40
Blackwater	50

Residential wastewater systems with standard sanitary fixtures shall be designed with a daily organic load of 70 grams BOD<sub>5</sub> per person per day (raw sewage), and a daily organic load of 50 grams BOD<sub>5</sub> per person per day ex the primary treatment compartments (septic tank).

### 5.2. Non Standard Fixtures

Non standard fixtures are permitted, provided the increased hydraulic and organic capacity requirements of the whole onsite wastewater system are considered. Systems which are connected to spa baths and food waste disposal units require an increased hydraulic and organic loading allowance, in accordance with Table 5-3.

**Table 5-3: Hydraulic & BOD<sub>5</sub> Design Criteria for Spa Baths & Food Waste Disposal Units**

		<i>Hydraulic Load</i>	<i>BOD<sub>5</sub> Load</i>
Additional Loading from premises with Spa Baths	Spa capacity < 120 L	No Increase	No Increase
	Spa capacity 121 L – 370 L	250 L	No Increase
	Spa capacity 371 L – 680 L	500 L	No Increase
Additional Loading from premises with Food Waste Disposal Units	Domestic Residential	No Increase	Increase by 33%
	Non-Domestic Residential	Increase by 10%	Increase by 33%
	Restaurants / dining / meals	Increase by 10%	Increase by 50% on meal only

### 5.3. Commercial and other Premises with Onsite Systems

For premises which require an onsite wastewater system but are not a standard residential premises, the design flows and organic loadings are provided in Appendix E of this Code. These criteria must be considered when designing such systems.

## 6. Design – Land Application Systems

### 6.1. Scope

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This section of the Code sets out the performance requirements, performance criteria and the requirements for design, siting and sizing of a land application system.

### 6.2. Function

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The function of the land application system is to further treat and absorb the effluent from the wastewater treatment unit and to distribute the effluent to the natural environment in a manner that achieves the performance requirements set out in this Code.

The majority of onsite wastewater facilities make use of an appropriate land application system. Following the site and soil assessment (Section 4) an appropriate land application system is chosen. Land application systems may be installed in the ground, near the surface or above surface in the open air. In these situations, systems are exposed to the effects of the weather, internal loads/pressures, external loads/pressures and any ground movement. In addition corrosion of materials and pipe work is possible internally from the treatment unit effluent and externally from the surrounding environment.

Improvements in the performance of the treatment unit and the subsequent disposal techniques (including land application) have resulted in the onsite system designer now having a wide range of techniques or combination of techniques available to match a particular soil type and category.

In addition the knowledge base for the long term use and sustainability of conventional systems has grown and has resulted in differing, often more conservative requirements for the installation of land application systems.

### 6.3. Performance Requirements

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Design of land applications systems shall be in accordance with the performance requirements outlined in AS/NZS 1547 (Clause 2.4.1 in 2000 version).

### 6.4. Performance Criteria

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The land application system must be designed based on the hydraulic loadings outlined in Section 5 of this Code.

#### 6.4.1. Effluent Quality Requirements

Effluent quality requirements for shallow subsurface and surface land application systems shall be in accordance with AS/NZS 1547 (Appendix 4.2A10 of 2000 version).

The required effluent quality for other types of reuse shall be determined by the Department of Health.

#### 6.4.2. Aerosol Exposure Minimisation

- Where possible, measures should be taken to reduce the risk of exposure to aerosols when designing land application systems. Measures to consider include surface drip or shallow subsurface irrigation (subject to soil assessment recommendations);
- Spray drift control (part circle, inward facing, low throw, large droplet sprinklers, microsprinklers, anemometer systems);
- Vegetative buffers using screens of trees or shrubs.

For larger systems (for example systems greater than 20 EP) utilising spray irrigation, the relevant authority may request certain measures to reduce the risk of public exposure to aerosols, such as those described in the SA Reclaimed Water Guidelines.

## 6.5. Design Considerations

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Design of the land application systems shall be in accordance with AS/NZS 1547 (Clause 4.2, and Appendices 4.2A, 4.2B and 4.2C in 2000 version). Design shall also take into account the construction and installation requirements of this Code and AS/NZS 1547 (Clause 4.5 in 2000 version).

Other design requirements are as follows:

- All onsite wastewater system access points and land application systems must be located above the 1 in 10 year return flood event;
- Land slope at the onsite wastewater system site should not be greater than 20% (1 in 5);
- All pipework used for land application systems must be suitable for use with reclaimed water. Potable water pipes are not permitted for use;
- An induct vent is required to be provided on the inlet pipe to each run of a multiple soakage trench (or gravity distribution) system;
- Design (including siting) of the land application system must take into account the impact on native vegetation;
- All land application designs must also comply with the relevant section of the local council's development plan.

Appendix A shows typical system layouts for septic tank and aerobic treatment systems with surface irrigation, and a typical underfloor plumbing layout.

### 6.5.1. Environmentally Sensitive Areas

Specific site and design requirements exist for land holdings in Water Protection Areas (as proclaimed by the EPA) and Coastal Areas. Land holdings in Water Protection Areas shall have a minimum level of secondary treatment for all installations or upgrades.

See Section 6.5.2 Setback Distances for specific setback distances in these areas.

### 6.5.2. Setback Distances

The design of a land application system shall meet all required setbacks, as detailed in Appendix B of this Code. Note that specific criteria apply for Water Protection Areas, and Coastal Areas.

For the situations not covered in Appendix B of this Code, AS/NZS 1547, (Clause 4.2.3.3 in 2000 version) provides requirements for locating a land application area on an allotment.

### 6.5.3. Reserve Area

During the early development stages of a PAR and for land divisions, a reserve irrigation area shall be made available for future site expansion, for resting or duplication of the land application system if unforeseen circumstances require this at some time. The reserve area must be equal in area to the design land application site and is subject to the same setback requirements. No development shall be allowed on the reserve site. The requirement for a reserve area is in addition to recreation/open space requirements as specified by the relevant local council's development plan.

The location and area of the reserve land application area must be indicated on all site plans, and access to the site must be considered.

A reserve area should also be allowed for, where achievable, in existing allotments with wastewater systems requiring upgrade (eg upgrades due to system failures, or significant additional loadings such as the addition of bedrooms which result in increased occupancy and hydraulic flow).

A reduction in the reserve area can only be achieved the developer or designer demonstrates, to the satisfaction of the relevant authority, that the proposed system will be sustainable with a reduced reserve area for the life of the system. This may include provisions such as:

- Council is committed to provision of a reticulated community wastewater system to be installed within 5 years;
- The land application system incorporates specific design aspects such as dose loading or alternate loading of the design area, or a water balance has been undertaken for the site and is favourable for a reduced reserve land application area.

## **6.6. Compliance**

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Compliance with the acceptable solutions in AS/NZS 1547 (Section 4.2 and Appendices 4.2A, 4.2B, and 4.2C in 2000 version), subject to the satisfaction of the relevant authority, shall be deemed to satisfy the requirements of this Code.

The relevant authority reserves the right to require the applicant / owner to have percolation tests performed and to provide the results of such testing for assessment prior to granting approval. The relevant authority can also choose to ask for other scientific and/or engineering evidence to justify the proposal.

## 7. Design - Onsite Wastewater Treatment Systems

### 7.1. Scope

This section of the Code sets out the function, context of use and performance requirements for onsite wastewater treatment systems and ancillary components. This section focuses on the selection and sizing of an onsite wastewater treatment system.

### 7.2. Function

The function of an onsite wastewater treatment system is to receive and treat domestic wastewater so as to produce an effluent appropriate to the land application system to be installed within the boundaries of the property. In doing so the onsite wastewater treatment system must:

- protect public and environmental health by minimising the risks associated with the treatment of wastewater and its ultimate discharge to the environment;
- provide treatment capacity to meet expected hydraulic and organic loadings from a premises discharging domestic wastewater;
- provide a reliable treatment process that will achieve the nominated effluent quality criteria when operated and maintained in accordance with the manufacturer's/designer's instructions; and
- provide easy access for authorised persons to all parts of the system for inspection, maintenance and repairs.

### 7.3. Performance Requirements

The selection and sizing of an onsite wastewater treatment system shall be in accordance with the performance requirements outlined in AS/NZS 1547 (Clause 2.4.1 in 2000 version).

### 7.4. Performance Criteria

The design of onsite wastewater treatment systems, including their capacity requirements, shall be based on the criteria outlined in Sections 5, 6.4 and 6.5 of this Code, and the following subsections of this Code.

#### 7.4.1. Trade Waste

All trade waste discharges must comply with the relevant authority's requirements and must be approved by the relevant authority. For further information see the SA Department of Health Standards for *Connection to a Reticulated Community Wastewater System*. The effluent quality shall be suitable for the method of disposal.

### 7.5. Conventional Septic Tanks

The design, testing, selection and sizing of septic tanks shall be in accordance with the requirements given in AS/NZS 1546.1.

#### 7.5.1. Determination of Septic Tank Capacity

The effective septic tank capacity is obtained by calculating:

$$\text{Effective Capacity (L)} = (S \times P1 \times Y) + (P1 \times DF)$$

Where:

- S = Rate of sludge/scum accumulation per person per year (L/py),
- P1 = Number of persons using the system,
- Y = Desludging frequency (years),
- DF = Daily inflow in litres per person per day (L/pd).

See Section 5.1 and 5.2 of this Code for daily flows and rate of sludge/scum accumulation per year. Appendix E of this code provides design flows and sludge/scum accumulation rates for premises which are not a standard residential premises.

The capacity of the septic tank for residential purposes must be of sufficient volume to accommodate the sludge / scum generated between desludging cycles.

However, it is recognised that in commercial / industrial and non domestic residential premise this may be impracticable, thus resulting in excessively large septic tanks. Subject to acceptance by the relevant authority the desludging frequency may be reduced as per Table 7-1.

**Table 7-1: Sludge/scum capacity and desludging frequency**

<i>Sludge/scum capacity required for a 1 year period</i>	<i>Desludging frequency</i>
Less than 5 000 litres	4 yearly
Greater than 5 000 litres and less than 10 000 litres	2 yearly
Greater than 10 000 litres	1 yearly

See Section 9.4.2 of this Code for sludge disposal requirements.

For recommended capacities of conventional all-waste septic tanks, refer to AS/NZS 1547 (Appendix 4.3A in 2000 version). Note that in SA, all-waste septic tank capacities can be sized using a flow of 150 L per person per day. For example, a 3000 L septic tank can be used for up to 6 EP.

For recommended greywater and blackwater septic tank capacities, refer to AS/NZS 1547 (Appendix 4.3A in 2000 version). It should be noted that in SA a 1620 L tank can be used for up to 6 EP.

### **7.5.2. Septic Tank Appurtenances**

Reducing suspended solids in the septic tank effluent will contribute to the sustainability of the onsite wastewater system and improve the effectiveness of the land application system. To improve the reduction of suspended solids, septic tanks may include or incorporate:

- a two stage tank configuration;
- gas baffled outlet tees;
- various outlet filters as approved by the Department of Health, or
- siphon or pump dosing chamber(s) within the tank or within one of its stages (or chambers).

### **7.6. Aerated Wastewater Treatment Systems**

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The design, testing, selection and sizing of aerated wastewater treatment systems shall be in accordance with the requirements given in AS/NZS 1546.3.

### **7.7. Sand Filters**

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Sand filter treatment systems shall be subject to specific design appropriate to their intended application. A Department of Health product approval must be obtained for each sand filter design, covering the design, installation and operation of the model. The relevant authority then approves installation of the systems in accordance with the Department of Health product approval, and this Code.

### **7.8. Reedbeds**

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Reedbed treatment systems for onsite wastewater management shall be subsurface flow reedbeds. They are subject to specific design, operation and performance requirements. A

Department of Health product approval must be obtained for each reedbed design, covering the design, installation and operation of the model. The relevant authority then approves installation of the systems in accordance with the Department of Health product approval, and this Code.

## 7.9. Greywater diverters and treatment systems

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Greywater diverters and/or treatment systems for onsite wastewater management are subject to specific design, operation and performance requirements. A Department of Health product approval must be obtained for each product, covering the design, installation and operation of the model. The relevant authority then approves installation of the systems in accordance with the Department of Health product approval and this Code. Appendix C gives design, testing and installation requirements for greywater diverters and treatment systems.

Recommendations on the minimum capacities for conventional greywater systems are given in AS/NZS 1547 (Appendix 4.3A, Clause 4.3A3.3 in 2000 version), however in SA, an 1800 L tank can be used for up to 6 EP.

## 7.10. Composting Toilets (wet or dry)

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The design, testing, selection and sizing of composting toilets shall be in accordance with the requirements given in AS/NZS 1546.2 *Waterless composting toilets*.

The composted material must be disposed of in accordance with AS/NZS 1546.2, and have completed a 12 month composting period in the composting toilet system before disposal. The composted material must be buried if disposal is to be onsite.

The burial site for composted material must have the same setbacks from any watercourses, wells or dams as for land application systems utilising secondary treated effluent, as described in Appendix B of this Code.

Composted material must be buried for at least 6 months after a completed composting period of 12 months in the composting toilet system before the site can be used for food crop plantation.

In water protection areas, excess liquid diverted or separated from solids shall be collected in holding tanks along with greywater from hand washing facilities. In other areas, leachate shall be collected as blackwater, or combined with greywater, and applied to land as per primary treated effluent.

## 7.11. Access shafts

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Where it is not practicable to terminate the top of the wastewater system at surface level it will be necessary to provide access shafts fitted with access covers and an inspection opening for access to the inlet fitting finishing at surface level. However, the buried depth of a tank cannot be greater than that specified in the product approval issued by the Department of Health.

To obtain a product approval for an access shaft model, the product manufacturer must submit an application for non-standard systems product approval. See Section 12 of this Code for product approval requirements.

### 7.11.1. Access shafts for Septic Tanks

The inspection opening is to be fitted with a threaded access cap, concrete block surround and cover. Access shafts:

- Shall be terminated 50 mm above the finished ground surface level with the surrounding surface graded away from the shaft,
- Shall have internal dimensions greater than the access opening in the top of the septic tank,
- Shall be effectively sealed at each increment joint to prevent the ingress or egress of water or gas,

- Shall be fixed with non-ferrous child proof fixings, provided the access opening in the top of the septic tank is fitted with an access cover so as to be removable for maintenance,
- where an access shaft and cover is provided it is to be constructed of the same material as the septic tank or other material as approved and be of sufficient strength to withstand all imposed loadings including vehicles where situated in vehicle access areas,
- the access shaft on two compartment septic tanks must be positioned over the dividing compartment wall unless otherwise approved.

#### **7.11.2. Access shafts for other systems**

A tank or tanks used to contain treatment processes that are installed in the ground shall preferably be installed so that the top surface of the tank or tanks is placed at or just above the ground surface.

Inspection and access covers shall be readily accessed and ingress of surface water is to be prevented. If a tank or tanks are installed below ground level, then a watertight access shaft shall be installed above the access and inspection openings. The access shaft shall support the access and inspection covers at or just above finished ground level.

#### **7.12. Other Wastewater Systems**

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The design, testing, selection and sizing of systems not covered in this Code shall be in accordance with the requirements given AS/NZS 1547 (Clause 4.4 in 2000 version) and Section 12 of this Code. The Department of Health will consider an application for product approval for other wastewater systems. Installation requirements will be stated in the product approval for guidance.

#### **7.13. Holding Tanks**

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No holding tanks will be permitted in new land divisions. This requirement should be considered at the early development stages of a PAR and/or land division.

For existing allotments which have site characteristics unsuitable for the installation of an onsite effluent disposal system, the local council should consider their Development Plans or any other Policies which may be applicable to the site, or the possibility of a communal treatment and disposal system before allowing installation of a holding tank. Holding tanks will not be permitted for existing allotments in Water Protection areas without written approval from the Department of Health and other relevant Agencies (such as the EPA and DWLBC).

For existing allotments, the relevant authority may approve pumping from the holding tank to a sewer, STEDS or an effluent disposal system located on another site owned by the owner of the site generating the wastewater, or a site where there is a permanent legally binding agreement between both parties and this arrangement is acceptable to the relevant authority.

Performance requirements and criteria for the design and the structural aspects of holding tanks including testing are given in AS/NZS 1546.1. Specific additional Department of Health requirements are:

- Only Department of Health approved holding tanks can be installed;
- The holding tank shall have an effective capacity equal to at least 4 days daily inflow to the septic tank;
- Plumbing requirements (including venting) as per this Code and AS/NZS 3500.2 or AS/NZS 3500.5;
- The holding tank shall be located so as to permit access for the pump out vehicle;
- Setback distances for holding tanks are the same as for septic tanks;
- The holding tank must be located above the 1 in 10 year return flood event, or have an access shaft raised above the 1 in 10 year return flood event;

- An audible and visible alarm with muting facilities for the audible component shall be provided and be located in a conspicuous position in either the laundry or kitchen to warn that the holding tank requires pumping out within 24 hours;
- The holding tank shall be provided with an automatic system that shuts down the water supply to the premises when the holding tank liquid level is within 100mm of the invert of the inlet pipe.

Where the relevant authority permits the installation of a holding tank for off-site disposal, the owner/occupier of the premises will be required to:

- Provide documentation to the relevant authority that the contents of the holding tank will be collected by an EPA licensed contractor, and disposed of at a site approved by the relevant authority for the disposal of holding tank wastewater (e.g. wastewater lagoon or treatment plant); and
- Ensure the EPA licensed contractor provides copies of tracking sheets of such removals and disposal to the relevant authority and such other authorities as required.

See Section 9.4.2 for more holding tank wastewater disposal options and requirements.

The local council must register the installation of the holding tank in the relevant property file. In the event of sale of the premises, the owner shall advise would-be purchasers of the requirements and obligations.

## 8. Construction and Installation

### 8.1. Scope

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This section of the Code sets out the requirements for the construction and installation of onsite wastewater systems and land application areas to meet the performance requirements of AS/NZS 1547 (Clause 2.5 in 2000 version).

### 8.2. Function and Context of Use

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Correct construction of an onsite wastewater system, including correct installation of any manufactured components will lead to a sustainable system that gives satisfactory service that meets the objectives of this Code.

### 8.3. Performance Requirements

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Construction and installation of onsite wastewater systems shall be in accordance with the performance requirements outlined in AS/NZS 1547 (Clause 2.5 in 2000 version).

### 8.4. Construction and Installation

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Construction and installation of onsite wastewater systems shall be in accordance with AS/NZS 1547 (Clause 4.5.3 in 2000 version), where applicable. Construction and installation shall also be in accordance with the specific requirements of the designer, manufacturer, Department of Health and the local council.

### 8.5. Installation Requirements

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#### 8.5.1. Occupancy

All onsite wastewater systems, including land application systems, must be installed and commissioned prior to occupancy.

#### 8.5.2. Installer

Installation of the land application system and all sanitary plumbing and drainage associated with an onsite wastewater system shall be undertaken by a licensed plumber.

In cases where the designer/manufacturer considers that additional or other qualifications are required for installation of that system (including the land application system), the designer/manufacturer may nominate the appropriate qualifications, level of knowledge or training/expertise suitable for installation of their system..

#### 8.5.3. Further Installation Requirements

Wastewater treatment systems and land application systems shall be installed in accordance with:

- Requirements of designers and/or manufacturers, as approved or accepted by the Department of Health and/or local councils;
- Requirements of the approval conditions stated by the Department of Health and /or local councils;
- AS/NZS 1547 (Clauses 4.5.4 and 4.5.5 in 2000 version);
- AS/NZS 1547 (Appendices 4.5A, 4.5B, 4.5C and 4.5D (where applicable) in 2000 version); and
- Setback requirements detailed in Appendix B.

Aerobic wastewater treatment units must be installed so that the cover and access openings are at least 100 – 150 mm above the finished ground level.

Appendix D of this Code lists suitable plants for reclaimed water (final effluent of secondary treatment) surface irrigation, which should be considered in designing and installing land application systems.

#### **8.5.4. Durable Notice**

The local council may require provision of a durable notice to be permanently located on the property showing, at a minimum:

- Type of system installed;
- Date of system installation;
- Servicing / desludging frequency;
- Prohibited discharges;
- Council details for further information.

#### **8.5.5. Surface Water Diversion**

Where deemed necessary by the relevant authority, measures shall be taken to divert surface and subsurface water away from the land application area. This may be through construction of a diversion drain or cut off drain, as shown in AS/NZS 1547 (Appendix 4.5C in 2000 version).

The base of the cut off drain should be deeper than the base of the land application system, and the outlet from the perforated pipe shall be extended to discharge at ground surface level at a point downslope from the land application area.

### **8.6. Certification**

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#### **8.6.1. Self-certification by Plumber(s)**

Following installation of all onsite wastewater systems, a Certificate of Compliance (in a form approved by the Department of Health) must be provided by the plumber(s) for all plumbing and drainage work to ensure that their work complies with:

- the design;
- any further Department of Health and local council requirements;
- the requirements of this Code; and
- that the system has been installed and commissioned in accordance with the manufacturer's instructions and the approval from the relevant authority.

All plans attached to the Certificate of Compliance should be legible and provide sufficient detail for assessment.

#### **8.6.2. Independent Certification**

The relevant authority may choose to request independent certification for the system by an appropriately trained professional engineer or scientist, who has experience in design, construction and installation of on-site wastewater treatment systems and land application areas. This may address plumbing, electrical, mechanical and construction / installation requirements. Independent certification should state that the system meets the design requirements and specifications and that all equipment has been installed and commissioned in accordance with the manufacturer's instructions, Department of Health and local council requirements and that it meets the requirements of this Code.

The owner should hold all certification documentation and supply a copy to the relevant authority on request.

## **8.7. Commissioning and Inspection**

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Onsite wastewater systems shall be commissioned and inspected in accordance with AS/NZS 1547 (Clause 4.5.6 in 2000 version).

## **8.8. Deemed to Satisfy**

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Compliance with the acceptable solutions in AS/NZS 1547 (Appendices 4.5A, 4.5B, 4.5C, and 4.5D in 2000 version), subject to the satisfaction of the relevant authority, shall be deemed to satisfy the requirements of this Code.

## 9. Operation and Maintenance

### 9.1. General

Onsite wastewater systems are prone to failure if operated and maintained incorrectly. All onsite wastewater systems require a high degree of user dedication in terms of operation and maintenance to ensure that the design performance of the system is achieved for its expected life.

### 9.2. Operation and Maintenance Procedures

Operation and maintenance procedures are to be set out for all aspects of the onsite wastewater system by the designer, manufacturer and/or installer, including any relevant authority requirements. The administration procedures should ensure that:

- operation and maintenance guidelines are available to all owners and users of an onsite wastewater system;
- operation and maintenance procedures are undertaken to a regular schedule appropriate to the nature and type of treatment and land application system, and in accordance with any manufacturer's/builder's instructions; and
- continuity of operation and maintenance is achieved throughout changes of ownership, occupier and/or use or development of the site.

### 9.3. Operation and Maintenance Guidelines

Operation and maintenance guidelines shall be prepared for all onsite wastewater systems and be provided to the owner/occupier. The relevant authority may request copies of the documents. For assistance in preparing operation and maintenance guidelines refer to AS/NZS 1547 (Clause 3.7.3 and Appendix 3A in 2000 version).

### 9.4. Maintenance & Servicing

#### 9.4.1. Owners

Owners of onsite wastewater systems shall ensure that they hold maintenance and service contracts for their onsite wastewater systems, where applicable under the conditions of approval, and make service records available to the relevant authority on request. Owners shall ensure that all servicing is undertaken by an accredited service provider (see Section 9.5).

Relevant Authority The relevant authority may choose to provide septic tank desludging and maintenance services through themselves or through their agents, and determine measures to recoup expenses.

The relevant authority may also choose to request certification for the work undertaken by other persons or agencies involved in the maintenance and servicing of onsite wastewater systems. A copy of all certification documents must be supplied to the relevant authority.

The relevant authority should ensure that that operation and maintenance documentation be transferred to any new owners of the system. A reminder of maintenance obligations should be included with the rates notice or other regular communication. The relevant authority may request that owners of onsite wastewater systems provide copies of maintenance / servicing contracts and associated records.

#### 9.4.2. Septic Tank Sludge Disposal

Septic tank de-sludging must be carried out by an EPA licensed contractor, and sludge shall be disposed of in accordance with the South Australian Biosolids Guidelines (1996). The South Australian Biosolids Guidelines (1996) provides information in relation to the land spreading of

septic tank sludge. This clause applies only to the contents of septic tanks and does not apply to holding tank wastewater.

#### **9.4.3. Holding Tank Wastewater Disposal**

Holding tank wastewater must be taken to a wastewater treatment plant or wastewater treatment lagoon, as approved by the relevant authority, and is not to be spread on land. Where it is the contention of a waste contractor or relevant authority that transporting holding tank wastewater to a treatment plant/lagoon is not reasonable, then approval to land spread can be sought from the relevant authority and the Department of Health. If both parties give approval, then notification of the spreading site must be provided to the EPA prior to the spreading occurring.

### **9.5. Service Providers**

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Servicing of an onsite wastewater system must be undertaken by a qualified service provider who is listed on the recognised service providers list held by the Department of Health<sup>2</sup>. Training and qualifications obtained from interstate accredited training agencies are acceptable. Servicing must be undertaken in accordance with the manufacturer's or designer's instructions.

### **9.6. Service Related Obligations for Onsite Wastewater Treatment Systems**

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#### **9.6.1. Initial Service Policy**

The manufacturer, designer/installer or their authorised representative must furnish a 12-month initial service policy to the owner. The initial policy must contain provisions for the number of inspection/service visits over the 12 months as required under the approval conditions for onsite wastewater treatment systems.

#### **9.6.2. Extended Service Policy**

The manufacturer, or designer/installer (for built in-situ systems) or the authorised representative must inform the owner of their obligations to maintain an extended service contract where applicable after the initial 12 months. Agents other than the authorised representative of the manufacturer or the designer/installer (for built in-situ systems) may hold extended service contracts.

#### **9.6.3. Stand-by Parts**

In the event that a mechanical or electrical component must undergo off-site repairs, the service operator must maintain a stock of mechanical and electrical components that may be temporarily installed until repairs are complete. The service operator must ensure the onsite wastewater treatment plant is operational while off-site repairs are carried out.

#### **9.6.4. Availability of Service**

Emergency service must be available within 24 hours of a service request.

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<sup>2</sup> As a guide the application submitted to the Department of Health should include:

- a) a brief account of the applicants past experience in undertaking servicing of onsite wastewater treatment plants;
- b) evidence that the applicant has qualifications and / or undertaken an appropriate training course;
- c) any information the applicant considers appropriate in support of the application.

## 10. Inspection and Monitoring

### 10.1. Purpose

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The performance of onsite wastewater systems should be monitored by the relevant authority to ensure that performance objectives are met and data is collected to assist in public health and environmental management decisions. The extent of the inspection and monitoring program is dependent on the system's complexity, the method of land application and the system's location.

### 10.2. Objectives

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The objectives of the inspection and monitoring program are:

- to protect the health of the residents of the premises and neighbours;
- to identify and trouble-shoot problems in their early stages before they become serious and expensive to correct;
- to ensure necessary maintenance, repair or component replacement is undertaken;
- to maintain an accurate record of the performance, condition and types of onsite wastewater systems and associated land application systems within the local council area;
- to protect wells and other local drinking water sources from contamination;
- to protect aquatic life in local rivers, lakes and coastal waters and prevent the need for costly rehabilitation efforts; and
- to undertake the program in a manner that is fair and reasonable to those concerned.

### 10.3. Records Management

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The relevant authority shall maintain accurate records management systems for all onsite wastewater systems in their area, including approval, installation and servicing details, and should ensure that owners hold copies of these details. The location of installed systems should be geo-referenced where possible.

### 10.4. Inspection and Monitoring Program

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An inspection and monitoring audit program should be carried out by the local council or a person contracted by the local council, for all onsite systems installed within their council areas. The type and frequency of inspections should be determined by the site conditions, resource sensitivity and the complexity and number of systems. Scheduling inspections during seasonal rises in groundwater levels can allow monitoring of performance during "worst case" conditions.

Together with reports submitted by service operators, information obtained through the local council's inspection and monitoring program can be used to determine the need for maintenance, repair or replacement of onsite wastewater systems.

### 10.5. Annual Performance Monitoring

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All onsite wastewater system installations that provide secondary or further treatment (including aerated systems and composting toilets) shall undergo annual performance monitoring, in accordance with the following subsection.

#### 10.5.1. Annual Performance Monitoring Requirements

By the 1 March of each year, the manufacturer/designer/installer shall provide the Department of Health with a list of all installations over the past calendar year, in a format required by the Department of Health.

### **Annual Performance Monitoring Selection Criteria**

- The onsite wastewater treatment systems shall be selected at random by the Department of Health from a complete list of installations in yearly order in SA;
- A maximum of 10% of the first 100 onsite models installed and an additional 1% thereafter for each year of manufacture, shall be selected;
- If the manufacturer has less than 10 units installed at least one must be tested;
- The maximum number of systems tested per model will under normal circumstances be limited to 20 per year.
- Testing of composting toilets must be undertaken on the end product which has undergone the full 12 month composting period.

For each randomly selected installation, the manufacturer/designer/installer, or the local council (where applicable) shall arrange for sampling and testing for BOD<sub>5</sub>, SS, thermotolerant coliforms, disinfectant concentration (where applicable) and any further parameters that might be specified by the manufacturer or Department of Health together with citing of the service history.

Sampling must be undertaken by a NATA accredited laboratory or an independent body as agreed to by the Department of Health in accordance with sample locations specified in the product design approval by the Department of Health.

Samples are to be analysed and reported on by a NATA registered laboratory and samples for disinfectant concentration, where required, are to be determined on site.

### **10.5.2. Performance Monitoring Responsibilities**

Responsibilities for arranging performance monitoring will depend on the type and age of the system.

#### **First year of installation**

- For wastewater treatment systems covered by an AS/NZ Standard, the manufacturer will be responsible for performance monitoring;
- For non-standard systems (see Section 12 of this Code), the designer will be responsible for performance monitoring.

#### **Second and subsequent years of installation**

- Performance monitoring will be arranged by the relevant authority, who may determine measures to recover associated costs.

## 11. Product Approval for Systems Covered by AS/NZS

### 11.1. Scope

This section of the Code sets out the minimum requirements for Department of Health product approval of a prefabricated onsite wastewater system covered by an AS/NZ Standard.

This section applies to onsite wastewater systems up to a capacity of 20 EP, and the requirements of the relevant AS/NZ Standard may be extrapolated accordingly. Requirements for systems above this capacity will be determined by the Department of Health and therefore these systems will be assessed under Section 12 of this Code.

### 11.2. Legislation

To ensure that human health, safety and environmental objectives are met the *Public & Environmental Health Act 1987* and its Wastewater Systems Regulations require that require that an onsite wastewater product to be marketed and installed in South Australia must comply with a design specification approved by the Department of Health. The particular product must satisfy the requirements of the Department of Health.

It should be noted that a product approval must be gained for the manufacture and sale of a system in SA, however, the installation approval shall rest with the relevant authority.

### 11.3. Model Approval Procedure

The manufacturer should make preliminary contact with the Department of Health to discuss application requirements.

The procedure for obtaining product approval for each prefabricated onsite wastewater treatment plant model is shown in the form of a flow chart in Figure 11.1 and is described in the following sections.

Any approval for a product will be subject to conditions and be granted for a period of five years (or a period as determined by the Department of Health) after which time it will become void unless the approval is renewed prior to this date. See Section 11.12 for renewal requirements.

### 11.4. Application Criteria

An application for product approval must be submitted to the Department of Health, in the format determined by the Department of Health. The application for product approval must contain:

- 1) The prescribed fee;
- 2) Copies of certification documentation from an independent product certification agency accredited by JAS-ANZ, showing certification of the onsite wastewater treatment system to a relevant product certification program in accordance with Section 11.6;
- 3) A certification evaluation report prepared by the product certification body detailing the testing methods used, inclusion of all log sheets, comparing performance against the test criteria and detailing the security arrangements adopted to ensure testing integrity;
- 4) Documentation that the laboratories used for offsite chemical and bacteriological determinations are National Association of Testing Authorities (NATA) registered to carry out analyses for the parameters specified;
- 5) A statement of the warranty and guaranteed service life of the prefabricated onsite wastewater treatment system and all components;
- 6) A complete and detailed specification of the prefabricated onsite wastewater treatment system describing the basis for design, effluent quality, materials, methods of construction, servicing

intervals and manner of operation of all equipment supplied and giving capacity and efficiency of motors, pumps, and aerators;

- 7) Drawings as detailed in Clause 11.11.1 of this Code; and
- 8) A copy of the product literature specified in Clauses 11.11.2, 11.11.3 and 11.11.4 of this Code.

A preliminary application may be submitted for comment and clarification prior to commencement of any tests and submission of a formal application. Under no circumstances will a preliminary approval be issued.

## **11.5. Existing Interstate or Overseas Approval**

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If interstate or overseas approval has already been obtained, then an application can be made to have the system approved in South Australia without the performance testing requirement set down in this Code.

Such product approval will only be given where it can be shown that the testing procedure carried out is of an equivalent standard to that required under this Code. If the Department of Health considers that the performance testing is not to an equivalent standard then the Department of Health may require testing procedures as per this Code or other limited testing.

The responsibility rests with the applicant to provide all necessary information to allow the Department of Health to make a decision in these matters. However, this does not prevent the Department of Health making any independent investigation it considers appropriate.

## **11.6. Product Certification**

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Prior to obtaining product approval from the Department of Health, the manufacturer must obtain certification to an approved product certification program, for each onsite wastewater treatment system model. The product certification program must include initial performance testing of the onsite wastewater systems, and ongoing surveillance of the manufacturer's quality systems, to meet the requirements of AS/NZS 1546.1, 1546.2 and 1546.3, whichever is applicable, and the requirements of this Code.

The manufacturer shall arrange for the product certification program to be undertaken through an independent product certification agency. See Section 11.7 for the requirements of the product certification agency and sampling / laboratory testing requirements.

**Note:** *A manufacturer wishing to obtain an approval outside of South Australia should check the requirements of the relevant regulatory authority before proceeding with the product certification program.*

### **11.6.1. Performance Requirements**

Unless stated otherwise in this Code, the function, context of use and performance requirements given in AS/NZS 1546.1 for Septic Tanks, 1546.2 for Composting Toilets and 1546.3 for Aerobic Systems must apply to a prefabricated onsite wastewater treatment system. Specific performance requirements are stated in the following subsections.

### **11.6.2. Structural Performance Requirements**

The structural performance requirements for wastewater treatment systems shall be in accordance with:

- AS/NZS 1547 (Clause 4.3.3 and 2.4.2.3 in 2000 version),
- AS 1546.1, and
- Any other requirements specified by the Department of Health.

**11.6.3. Effluent Compliance Criteria**

Effluent that is to be of secondary quality, in accordance with AS/NZS 1547, shall meet the effluent compliance criteria detailed in AS/NZS 1546.3.

**11.6.4. Hydraulic Flow Requirements**

The testing requirements for hydraulic flows for aerobic treatment units will be in accordance with AS/NZS 1546.3. Hydraulic test flows for EP values higher than that shown in AS/NZS 1546.3 will be extrapolated accordingly, up to 20 EP, subject to agreement from the Department of Health.

**11.6.5. Organic Loading Requirements**

Residential wastewater systems with standard sanitary fixtures shall be designed with a daily organic load of 70 grams BOD<sub>5</sub> per person per day (raw sewage), and a daily organic load of 50 grams BOD<sub>5</sub> per person per day after the primary treatment stage (septic tank).

**11.6.6. Composting Toilet End Product Quality**

Composting toilet end product quality shall meet the requirements of AS/NZS 1546.2.

**11.6.7. Nutrient Compliance Criteria**

Where a prefabricated wastewater treatment plant achieving secondary quality or better is specifically designed to reduce the concentration of nitrogen and/or phosphorus in the final effluent, the manufacturer shall nominate the nutrient concentration in the effluent prior to commencement of compliance testing. The independent product certification agency shall include the nominated nutrient concentrations in the tests required under AS/NZS 1546.3 and as determined by the Department of Health.

The nitrogen and phosphorus concentration in the effluent shall be assessed on 90% of the samples, with 95% confidence limits<sup>3</sup>, taken over the three test periods having either a nitrogen and/or phosphorus concentration less than or equal to the concentration nominated by the manufacturer.

Where specific nutrient levels are requested by the Department of Health the unit must comply with the approved criteria for its lifetime.

**Note:** *If the nitrogen and phosphorus concentrations do not meet the criteria nominated, the manufacturer can request that recognition be given to the nitrogen and/or phosphorus concentration determined in the above evaluation by the Department of Health.*

**11.7. Product Certification Agency**

The product certification agency must be an independent product certification agency accredited by JAS-ANZ.

All laboratories used for offsite effluent / end product quality determinations must be National Association of Testing Authorities (NATA) registered to carry out analyses for the parameters specified. Sampling must be undertaken by a NATA accredited laboratory or an independent body as agreed to by the Department of Health and the product certification agency, and directly transported and delivered to a NATA accredited laboratory, to carry out analyses for the parameters specified. Where applicable, residual disinfectant and dissolved oxygen samples must be analysed on site.

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<sup>3</sup> This means that the plant has been assessed as capable of producing an effluent where 90% of the samples will have less than the stated effluent concentration.

## **11.8. Design and Manufacture**

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A prefabricated onsite wastewater treatment system must be designed and manufactured in accordance with AS/NZS 1546.1, 1546.2 or 1546:3, whichever is applicable.

## **11.9. Marking**

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The minimum marking requirements for a prefabricated onsite wastewater system shall be in accordance with AS/NZS 1546.1, 1546.2 or 1546:3, whichever is applicable.

## **11.10. Guaranteed Compliance and Service Life**

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By applying for and accepting an approval pursuant to the procedures in this Code, the manufacturer of a prefabricated onsite wastewater treatment system guarantees that the product is:

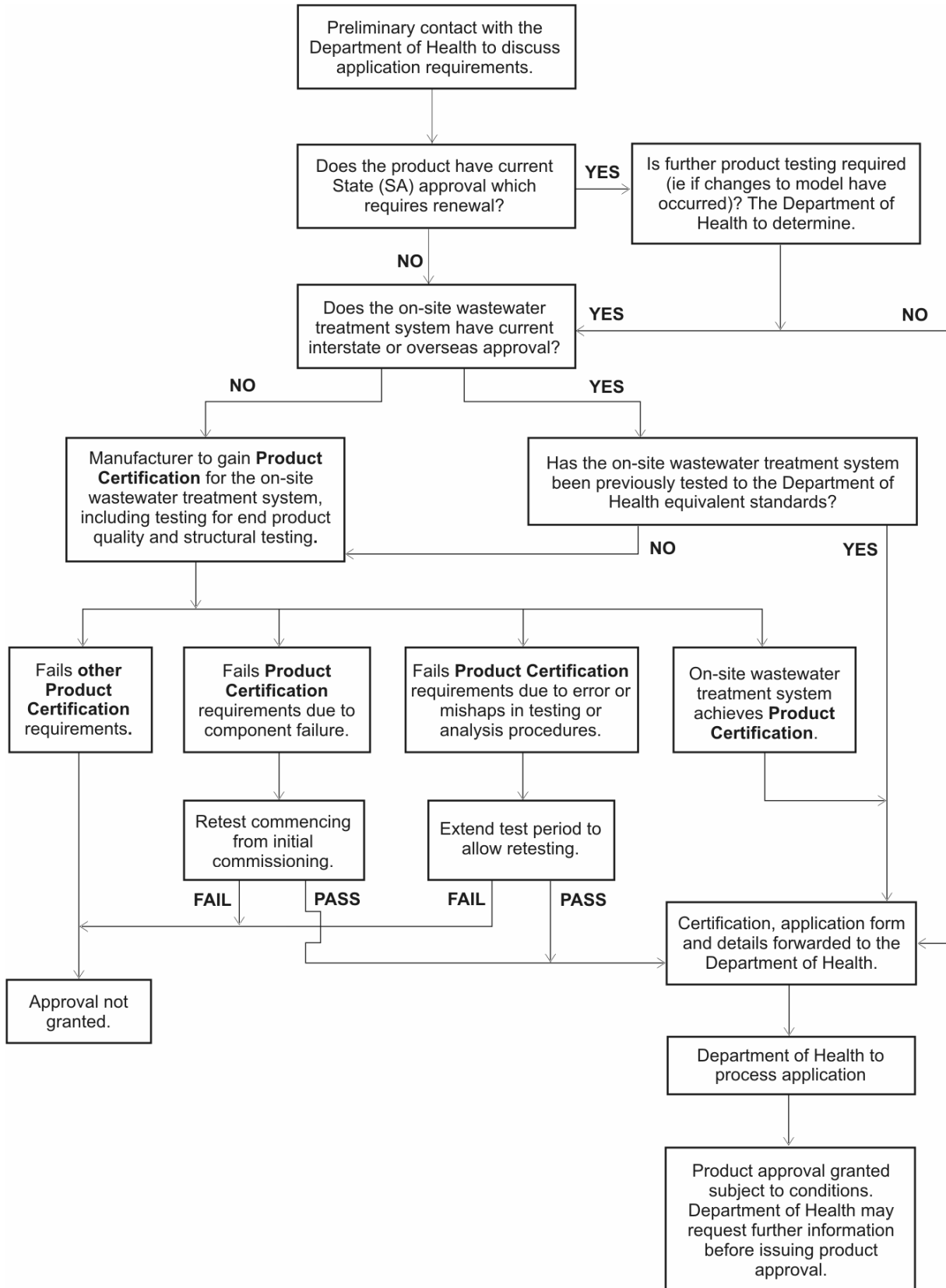
- manufactured and supplied as approved;
- built in accordance with an approved product specification; and
- fit for use.

The manufacturer shall nominate the guaranteed service life of the system. The service life of a system means the period for which that system is designed and rated to comply with the test criteria reliably, using the components specified.

The service life of components means that period for which they are designed and rated to perform reliably to specification and may vary from the performance life of the system. The guaranteed service life of components shall be as follows:

- All metal fittings, fasteners and components of the onsite sewage treatment plant other than the pumps and motors shall be of non-corroding material and shall have a service life of at least 15 years;
- All mechanical and electrical parts shall have a minimum service life of 5 years and minimum warranty period of 12 months.

Figure 11-1: Product Approval Procedure



## **11.11. Product Literature**

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The manufacturer must produce and submit to the Department of Health the following drawings and manuals for approval, as indicated in the following subsections.

### **11.11.1. Drawings**

Three copies of drawings must be provided on A3 format. They must be full engineering drawings to scale and dimensioned and contain a full listing of all components with name, model, size, description, function, material of manufacture, location in the plant and include any wiring diagrams.

The components to be shown must include the electric motor(s), gearbox, compressor, pump(s), valves, diffusers, media, filters, vents, pipe work, scum collection and sludge pumping equipment, brackets, electrodes, float switches, control panel and the arrangement of the alarm.

### **11.11.2. Owner's Manual**

Each onsite wastewater system must be accompanied by an owner's manual prepared by the manufacturer. The authorised representative must provide the manual to the owner at the time of system installation or on occupation of the premises. The manual must be written so as to be easily understood by the intended reader and must include, at a minimum:

- The product's model designation;
- A statement confirming that the product meets the requirements of this Code;
- A clear statement of examples of the types of wastewater/waste that can be effectively treated by the product;
- A list of household substances that, if discharged to the treatment plant, may adversely affect the integrity of the product, the process, or the environment;
- Comprehensive operating instructions that clearly delineate proper function of the treatment plant, operating and maintenance responsibilities of the owner and authorised service personnel, and service-related obligations of the manufacturer or system builder;
- Requirements for the periodic removal of sludge from the system;
- A course of action to be taken if the product is to be used intermittently or if extended periods of non-use are anticipated;
- Detailed methods and criteria to be used to identify product malfunction or problems;
- A statement instructing the owner to reference the label in the event that a problem arises or service is required; and
- The name and telephone number of an appropriate service representative to be contacted in the event that a problem with the product occurs.

### **11.11.3. Installation Manual**

Manufacturers must provide comprehensive and detailed installation instructions to authorised representatives. The manual must be written so as to be easily understood by the intended reader and must include, as a minimum:

- A numbered list of product components and an accompanying illustration, photograph, or print in which the components are respectively identified;
- Design, construction, and material specifications for the components of the product;
- Wiring schematics for the treatment plant's electrical components;
- Off-loading and unpacking instructions including safety considerations, identification of fragile components and measures to be taken to avoid damage to the product;

- A process overview of the function of each component and the expected function of the product when all components are properly assembled and connected;
- A clear definition of product installation requirements including plumbing and electrical power requirements, ventilation, air intake protection, bedding, hydrostatic displacement protection, water tightness, slope and miscellaneous fittings and appurtenances;
- Repair or replacement instructions in the event that a product possesses flaws that would inhibit proper functioning and a list of sources where replacement components can be obtained; and
- A detailed start-up procedure.

#### **11.11.4. Operation and Maintenance Manual**

Manufacturers must provide comprehensive and detailed operation and maintenance instructions to authorised service personnel. The manual must be written so as to be easily understood by the intended reader and shall include, at a minimum:

- A maintenance schedule for all components;
- Requirements and recommended procedures for the periodic removal of residuals from the product;
- Recommended methods for collecting effluent samples or end products; and
- The expected effluent produced by the operational system.

#### **11.12. Renewal of Product Approval**

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Department of Health product approval shall normally be valid for a period of five years. In some cases the Department of Health may choose a lesser period for the product approval. Six months prior to the expiry date, the manufacturer must submit an application to the Department of Health for renewal of the approval. The application shall contain requirements 1, 5, 6, 7, 8 and 9 listed in Clause 11.4 of this Code. Assessment for renewal of product approval shall take into account all application documentation requirements and the annual performance monitoring results undertaken by the manufacturer as described in Clause 10.5 of this Code.

Any modifications or variations of the approved design shall be submitted for separate consideration and variation of approval by the Department of Health, which may require further documentation and / or product testing.

## 12. Product Approval for Non-Standard Systems

### 12.1. Scope

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This section of the Code sets out the minimum requirements for system approval by the Department of Health of a particular product to be built/manufactured which is not covered by the AS/NZS Standards for onsite wastewater systems. Onsite wastewater systems of capacities greater than 20 EP will be considered as non-standard systems and this Section of the Code will be applicable.

### 12.2. Legislation

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To ensure that human health, safety and environmental objectives are met, the *Public & Environmental Health Act 1987* and its Wastewater Systems Regulations (2007) require that an onsite wastewater product to be marketed and installed in South Australia must comply with a design specification approved by the Department of Health. The particular product must satisfy the requirements of the Department of Health.

It should be noted that a product approval must be gained for the design and sale of a system in SA, however, the installation approval shall rest with the relevant authority. If the proposed method of land application of treated effluent does not conform to the requirements of this Code, the land application system will be subject to the same requirements of non-standard system approval.

### 12.3. Non-Standard Systems Approval Procedure

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The manufacturer/designer should make preliminary contact with the Department of Health to discuss application requirements.

The procedure for obtaining non-standard system approval for a product is shown in the form of a flow chart in Figure 11-1 and is described in the following sections.

Any approval for a product will be subject to conditions and be granted for a period of five years (or a period as determined by the Department of Health) after which time it will become void. See Clause 12.13 of this Code for renewal requirements

For systems proposing reuse other than land disposal uses as described in this Code, the system will be assessed as a non-standard system. Installation must follow the requirements of the Department of Health product approval and of this Code.

### 12.4. Application Criteria

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An application for product approval must be submitted to the Department of Health, in the format determined by the Department of Health. The application for non-standard product approval must contain:

- 1) The prescribed fee;
- 2) Copies of certification documentation from an independent product certification agency accredited by JAS-ANZ, showing certification of the onsite wastewater treatment system to a relevant product certification program in accordance with Section 12.6;
- 3) A certification evaluation report prepared by the product certification agency detailing the testing methods used, inclusion of all log sheets, comparing performance against the test criteria and detailing the security arrangements adopted to ensure testing integrity, as required by the Department of Health;
- 4) Documentation that the laboratories used for offsite chemical and bacteriological determinations are National Association of Testing Authorities (NATA) registered to carry out analyses for the parameters specified, where applicable;

- 5) A statement of the warranty and guaranteed service life of the product and all components;
- 6) A complete and detailed specification of the product describing the basis for design, effluent quality, materials, methods of construction, servicing intervals and manner of operation of all equipment supplied and giving capacity and efficiency of motors, pumps, and aerators;
- 7) Drawings as detailed in Clause 11.11.1 of this Code; and
- 8) A copy of the product literature specified in Clauses 11.11.2, 11.11.3 and 11.11.4 of this Code.

A preliminary application may be submitted for comment and clarification prior to commencement of any tests and submission of a formal application. Under no circumstances will a preliminary approval be issued.

## 12.5. Existing Interstate or Overseas Approvals

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If interstate or overseas approval has already been obtained, then application can be made to have the system approved in South Australia without the performance testing requirement set down elsewhere in this Code.

Such non-standard product approval will only be given where it can be shown that the testing procedure carried out is of an equivalent standard to that required under this Code. If the Department of Health considers that the performance testing is not to an equivalent standard or the results are not satisfactory then the testing procedures of this Code or modified testing as specified by the Department of Health will need to be undertaken.

The responsibility rests with the applicant to provide all necessary information to allow the Department of Health to make a decision in these matters. However, this does not prevent the Department making any independent investigation it considers appropriate.

## 12.6. Product Quality Assurance

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Prior to obtaining product approval from the Department of Health, the manufacturer/designer must obtain certification to an approved product certification program, for each onsite wastewater model. The product certification program must include initial performance testing of the onsite wastewater system, and ongoing surveillance of the manufacturer's/designer's quality systems, to meet the requirements of this Code and any further Department of Health requirements.

The manufacturer shall arrange for the product certification program to be undertaken through an independent product certification agency. See Section 12.7 for the requirements of the product certification agency and sampling / laboratory testing requirements.

**Note:** *A manufacturer/designer wishing to obtain approval outside South Australia should check the requirements of the relevant regulatory authority before proceeding with the product quality assurance program.*

### 12.6.1. Test Site and Procedure

Where possible, the test site is to be at a specified test facility or at a location acceptable to the testing agency and the Department of Health.

- a) The raw wastewater must not be pre-treated by chemical addition and should have characteristics within the ranges listed in Table 12-1.

**Table 12-1: Raw Wastewater Characteristics**

<i>Parameter</i>	<i>Characteristic</i>
BOD <sub>5</sub>	150-300 mg/L
SS	150-300 mg/L
Total Nitrogen	20-100 mg/L
Total Phosphorus	6-25 mg/L

- b) The test plant shall be installed, commissioned, operated and maintained according to the system builder's instructions. The system builder is responsible for ensuring the system is free of defects and is operable.
- c) The product shall be placed under test over a period of twenty-six (26) weeks. During the test period, samples of the final effluent (or in the case of composting toilets, the composted material) from the product shall be collected and tested weekly in accordance with the procedure set out in AS/NZS 1546.1, 1546.2 or 1546.3, whichever is applicable. If none of these standards are determined applicable by the testing agency and the Department of Health, then the procedures will be as determined by the testing agency in consultation with the manufacturers and the Department of Health.
- d) The samples for BOD<sub>5</sub>, total suspended solids, thermotolerant coliforms and disinfectant residual shall be taken from the outlet of the disinfection chamber or other locations approved by the Department of Health.
- e) All compliance checking, monitoring, testing and sampling is to be performed by a testing agency as defined in Clause 12.7 of this Code.
- f) The samples for BOD<sub>5</sub>, total suspended solids and thermotolerant coliforms and any other parameters determined by the Department of Health shall be directly transported and delivered to a laboratory, registered by NATA to carry out analyses for the parameters specified. Analyses for disinfectant concentration shall be tested onsite immediately after sampling.
- g) All testing shall be done at the cost to the applicant.

#### **12.6.2. Variations of Performance Evaluation Test Procedure**

The performance evaluation test procedure set out in Clause 12.6.1 may not be appropriate for certain treatment plant configurations. The Department of Health may vary the performance evaluation testing procedure to ensure the plant is tested under the appropriate operational conditions.

#### **12.6.3. Structural Performance Requirements**

The structural performance requirements for non-standard wastewater treatment systems are to be in accordance with:

- AS/NZS 1547 (Clause 4.3.3 and 2.4.2.3 in 2000 version); and
- AS 1546.1; or
- Any other testing requirements specified by the Department of Health.

#### **12.6.4. Effluent Compliance Criteria**

Effluent that is to be of secondary quality, in accordance with AS/NZS 1547, shall meet the effluent compliance criteria detailed in AS/NZS 1546.3.

Composting toilet end product quality shall meet the requirements of AS/NZS 1546.2.

#### **12.6.5. Hydraulic Flow Requirements**

See Section 11.6.4 of this Code.

#### **12.6.6. Nutrient Compliance Criteria**

Where a product is specifically designed to reduce the concentration of nitrogen and/or phosphorus in the final effluent, the manufacturer shall nominate the nutrient concentration in the effluent prior to commencement of performance testing. The independent testing agency shall include the nominated nutrient concentrations in the tests required.

The nitrogen and phosphorus concentration in the effluent shall be assessed on 90% of the samples, with 95% confidence limits<sup>4</sup>, taken over the six month test period having either a nitrogen and/or phosphorus concentration less than or equal to the concentration nominated by the manufacturer.

Where specific nutrient levels are requested by the Department of Health the unit must comply with the approved criteria for its lifetime.

**Note:** *If the nitrogen and phosphorus concentrations do not meet the criteria nominated, the manufacturer can request that recognition be given to the nitrogen and/or phosphorus concentration determined in the above evaluation by the Department Health.*

### 12.6.7. Greywater Treatment and Diversion Systems

Performance testing of greywater treatment and diversion systems must be in accordance with Appendix C and the relevant sections of this Code.

### 12.6.8. Other non standard systems

Performance testing of other non standard systems will be determined by the Department of Health on application.

## 12.7. Product Quality Assurance Agency

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The product certification program is to be performed by an independent product certification agency accredited by JAS-ANZ.

All laboratories used for offsite effluent / end product quality determinations must be National Association of Testing Authorities (NATA) registered to carry out analyses for the parameters specified. Sampling must be undertaken by a NATA accredited laboratory or an independent body as agreed to by the Department of Health and the product certification agency, and directly transported and delivered to a NATA accredited laboratory, to carry out analyses for the parameters specified. Where applicable, residual disinfectant and dissolved oxygen samples must be analysed on site.

## 12.8. Design Requirements

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### 12.8.1. Design Parameters

A Product shall be designed to perform on premises under the following loads:

- a) a minimum daily flow of 150 litres per person (see Table 5-1 for greywater and blackwater system flows) ;
- b) average daily BOD<sub>5</sub> of 70 grams per person (raw wastewater);
- c) average daily total suspended solids of 70 grams per person (raw wastewater);
- d) average daily BOD<sub>5</sub> of 50grams (after primary treatment);
- e) average daily suspended solids of 50 grams (after primary treatment);
- f) average daily total nitrogen of 15 grams per person (where applicable);
- g) average daily phosphorus of 2.5 grams per person (where applicable).

### 12.8.2. Design Considerations

The product shall be designed to:

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<sup>4</sup> This means that the plant has been assessed as capable of producing an effluent where 90% of the samples will have less than the stated effluent concentration.

- a) provide adequate capacity for the design wastewater flow, storage of solids and frequency of discharge;
- b) avoid the likelihood of cross contamination between internal chambers;
- c) ensure even distribution of liquid over any filter bed that may form part of the treatment process;
- d) ensure that the entire structure and its associated inspection and access covers and/or extensions, are integrally sound and the likelihood of damage by penetration of roots, entry of groundwater, or entry of nuisance insects is avoided;
- e) provide access for maintenance, desludging and clearing of blockages;
- f) avoid access by unauthorized people;
- g) provide, where required, a disinfection unit designed in accordance with Clause 12.9;
- h) avoid foul air and gases accumulating within the system or entering buildings;
- i) prevent damage from superimposed loads or normal ground movement;
- j) perform with normal maintenance for the specified serviceable life;
- k) provide an effluent pump chamber that permits ease of maintenance or replacement of an effluent pump;
- (l) provide insulation against noise.

### **Liners**

Liners used to prevent the ingress of groundwater and the egress of wastewater shall be of durable material and conform to the relevant Australian Standard.

### **Tanks and Fittings**

A tank or tanks used to contain the treatment process and associated fittings and extensions comprising the product shall be constructed of durable materials. The tank or tanks shall be watertight, capable of withstanding loads imposed on the roof and walls and shall be constructed and installed so that they will not float in areas with a high water-table level or when the tank is emptied.

### **Design Loads on Tanks**

All tanks that comprise all or part of the product shall be designed to withstand loads in accordance with AS/NZS 1546.1 for Septic Tanks or as required by the Department of Health.

### **Construction of Tanks**

The manufacture, construction, materials and testing of tanks forming part of a product shall comply with AS/NZS 1546.1 for Septic Tanks.

### **Emergency Storage Capacity**

Products containing wastewater sludge / effluent in liquid form should have sufficient emergency storage capacity contained within the product, without cross contamination occurring between any chambers, to the satisfaction of the Department of Health.

**Note:** *Where it can be demonstrated that the product does not need as much storage, the emergency storage capacity may be reduced.*

### **Selection of Materials**

The materials and products used in the manufacture and/or construction of the product shall be selected to ensure satisfactory service for the serviceable life of the plant. Factors to be taken into consideration include:

- (a) the type of usage likely to occur and the nature of the wastewater to be treated;

- (b) the nature of the ground and the possibility of chemical attack there from;
- (c) the physical and chemical characteristics of the materials and products used;
- (d) the possibility of abrasion by solids in the flow or chemical attack;
- (e) the range of temperatures likely to be encountered; and,
- (f) UV degradation.

### **Mechanical Equipment**

Mechanical equipment shall:

- (a) be durable, require minimal maintenance and shall be adequately protected from the aggressive environment;
- (b) be readily accessible for maintenance or replacement;
- (c) be suitable for continuous and intermittent operation; and
- (d) be suitable for all imposed loads.

### **Electrical Equipment**

All electrical components for and incidental to the product shall be in accordance with AS/NZS 3000.

Where there is any possibility of an explosive gas mixture developing near a motor, the motor shall be intrinsically safe.

All electrical equipment shall be readily accessible for maintenance or replacement, and shall be suitable for continuous and intermittent operation.

### **Effluent Pumps**

Effluent pumps shall have performance characteristics that match the hydraulic requirements of the irrigation system to be installed in the land application area.

### **Alarm System**

An alarm system shall be provided to indicate an electrical or mechanical malfunction as follows:

- (a) alarms shall be provided to indicate failure of mechanical equipment and pumps;
- (b) the alarm system shall comprise audible and visible alarms with muting facility for the audible alarm. The muting facility shall reset to audible after 24 hours; and
- (c) alarms shall be located in readily visible positions from within the dwelling or as required by the regulatory authority.

#### **12.8.3. Noise**

The maximum permissible noise level with all equipment (except the alarm) operating shall be 40 dB(A) measured on fast response at a distance of 1 m from the nearest item of noise emitting equipment or comply with a relevant current standard.

## **12.9. Disinfection**

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### **12.9.1. General**

Methods of disinfection include, but are not limited to chlorination, ozonation and ultraviolet irradiation.

The disinfection chamber and/or apparatus shall have a capacity sufficient for the disinfection process to meet the microbiological criteria as set out in Clause 12.6.4.

**Note:** *Thermotolerant coliforms are recommended as general indicators of faecal contamination. Although an effluent may have a low count of thermotolerant coliforms and is disinfected this does not necessarily imply the absence of pathogenic bacteria, protozoa and viruses.*

### **12.9.2. Disinfection apparatus**

The disinfection apparatus shall:

- a) be capable of adjustment to alter the disinfection rate;
- b) be designed to prevent backflow from the disinfection apparatus;
- c) be linked to the alarm system to warn of failure, if the disinfection device is electronically controlled; and
- d) be designed to prevent hydraulic short-circuiting within the chlorine contact chamber.

Requirements for chlorine disinfection are set out in AS/NZS 1546.3.

### **12.10. Marking**

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The following minimum information shall be marked on the product:

- a) the manufacturer's name or trademark;
- b) date of construction and installation;
- c) design capacity;
- d) product identification;
- e) top load or any other load limitations
- f) contact details for service
- g) Weight of product; and
- h) Lifting and transport instructions, where applicable.

All marking shall be permanent, legible and clearly visible.

### **12.11. Guaranteed Compliance and Service Life**

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Refer to Clause 11.10 of this Code

### **12.12. Product Literature**

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Refer to Clause 11.11 of this Code.

### **12.13. Renewal of Product Approval**

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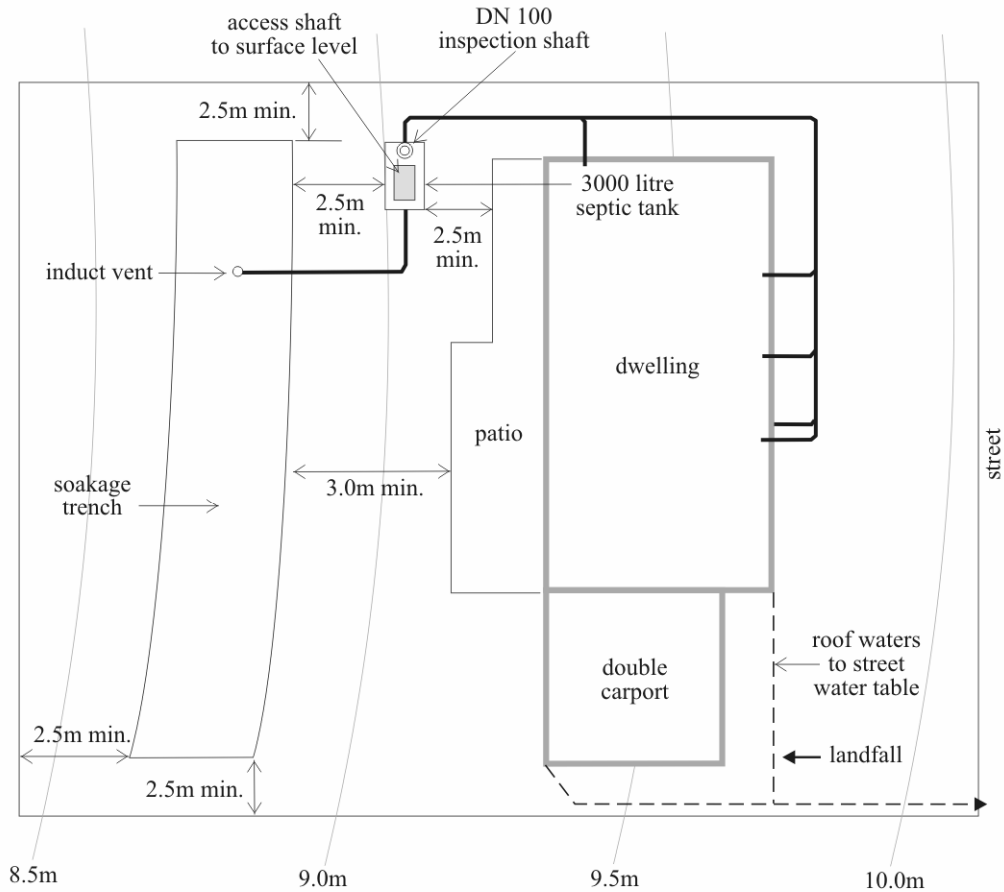
Product approval shall normally be valid for a period of five years. In some cases the Department of Health may choose a lesser period for the product approval. Six months prior to the expiry date, the manufacturer must submit an application to the Department of Health for renewal of the approval. The application shall contain requirements 1, 5, 6, 7, 8 and 9 listed in Clause 12.4 of this Code. Assessment for renewal of product approval shall take into account all application documentation requirements and the annual performance monitoring results undertaken by the manufacturer as described in Clause 10.5 of this Code.

Any modifications or variations of the approved design shall be submitted for separate consideration and variation of approval by the Department of Health, which may require further documentation and / or product testing.

# APPENDIX A – Onsite Wastewater System Schematic Diagrams

(Informative)

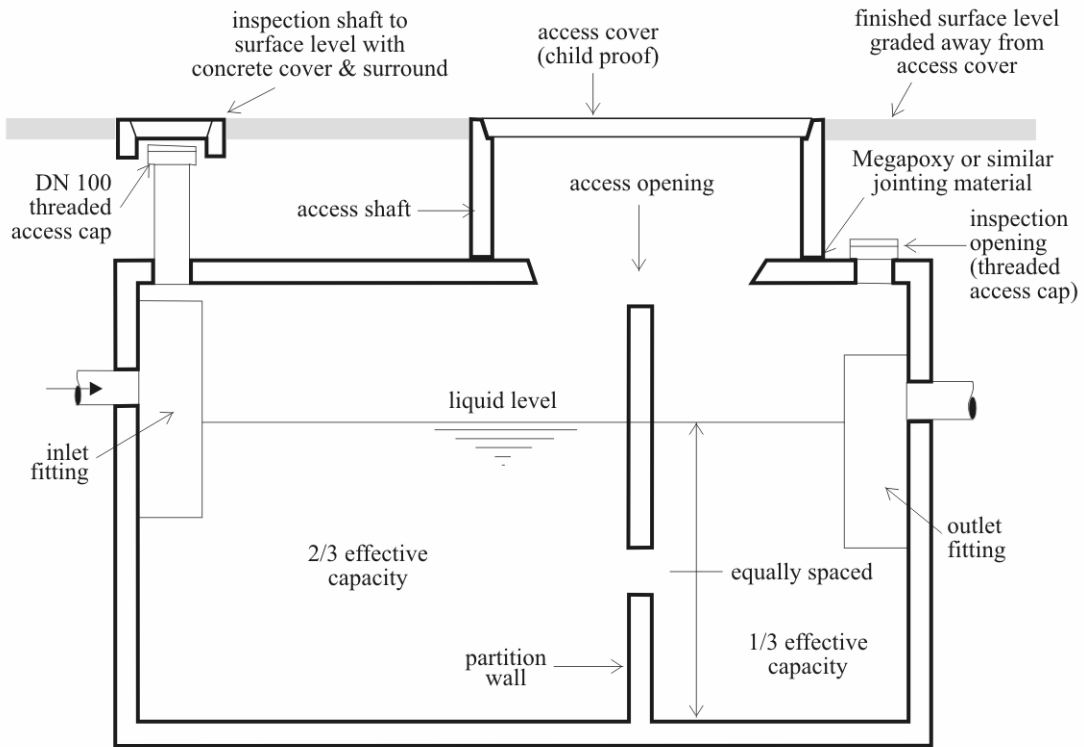
Figure A-1: Typical System Layout –Soakage Trench



All plumbing in accordance with AS/NZS 3500.2

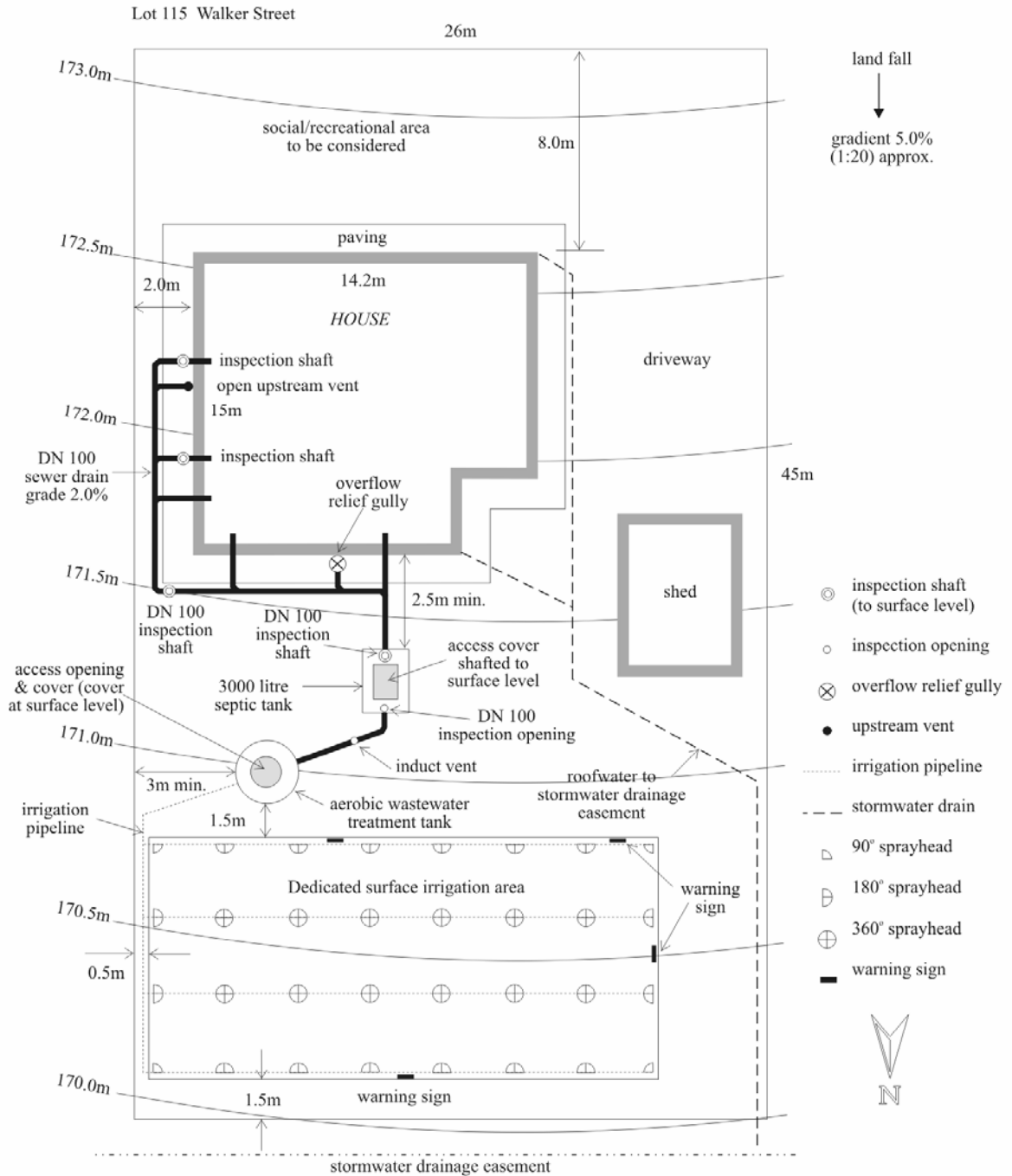
Schematic - not to scale

**Figure A-2: Typical Septic Tank Design**



*Schematic - not to scale*

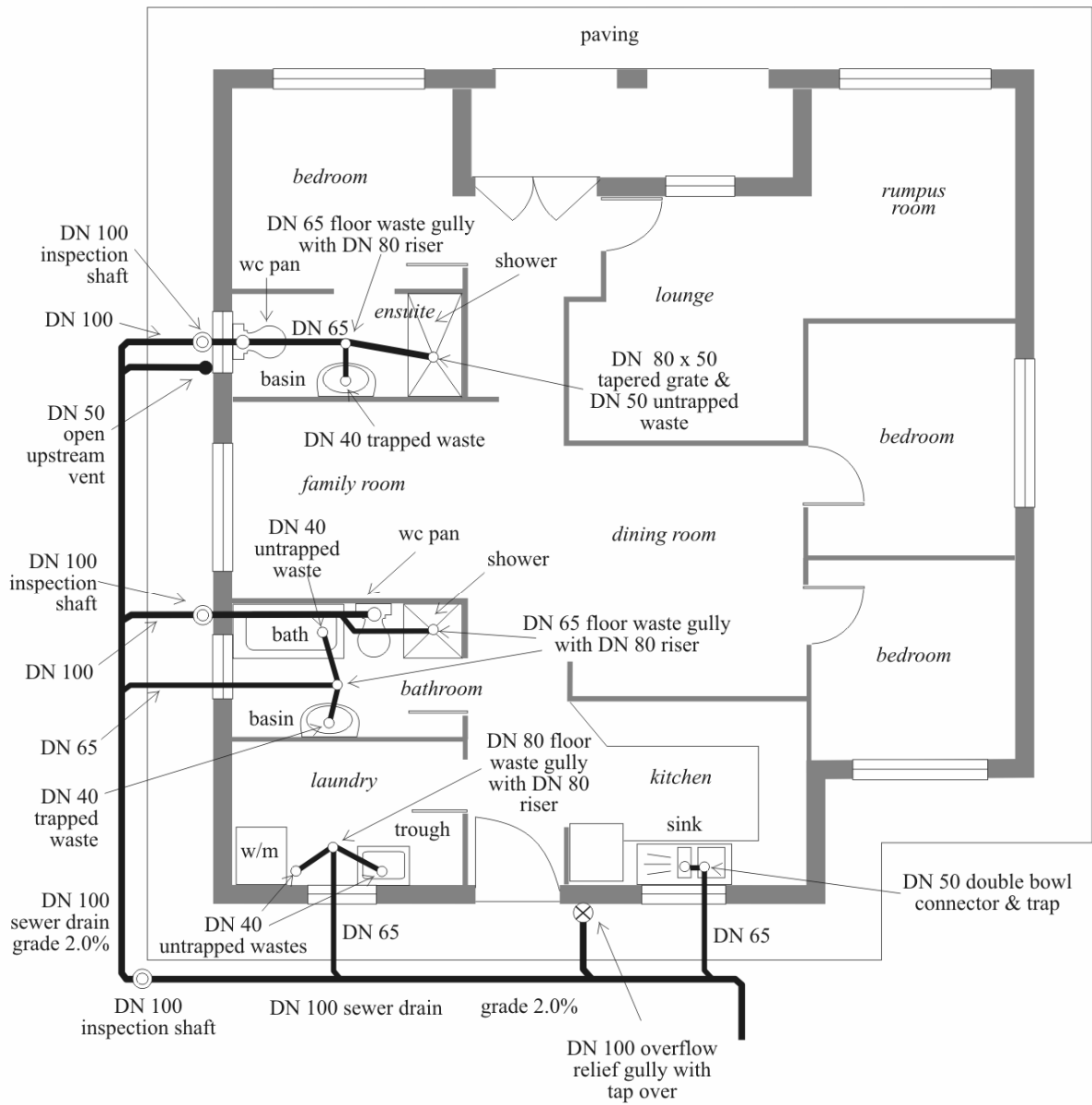
Figure A-3: Typical Site Layout Plan – Aerobic System with Surface Irrigation



All plumbing in accordance with AS/NZS 3500.2

Schematic - not to scale

**Figure A-4: Typical Building Layout - Underfloor Plumbing**



All plumbing in accordance with AS/NZS 3500.2

*Schematic - not to scale*

## APPENDIX B – Setback Distances

### *Normative (required under the Code)*

The topography of the site and location of a wastewater system to dwellings, boundaries, watercourses and other physical and environmental structures will have implications for the stability and desired performance of each attribute.

#### 1. Septic Tanks

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Unless otherwise specifically approved, all septic tanks must be positioned:

- at least 3 m from any building, boundary and effluent disposal system, unless otherwise specified by a structural engineer;
- at least 10 m from a watercourse, bore or dam used or likely to be used for human or domestic purposes; and
- on land above the 1 in 10 year return period flood event (where located in close proximity to a watercourse).

#### 2. Sand Filters, Reedbeds and Other Built In-situ Designs

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The wastewater treatment system must be lined or constructed so as to be impermeable, must be positioned so as to be:

- at least 3.0 m from any building, boundary, septic tank and pump sump;
- at least 10 m from any bore, dam and watercourse used or likely to be used for human or domestic purposes;
- positioned down slope (where practical) from any building located on the site;
- at least 1.5 m from the irrigation disposal area;
- located above the 1 in 10 year return flood event; and
- above the 1956 flood level (where applicable for sites adjacent the River Murray).

#### 3. Aerobic or Other Manufactured Wastewater Treatment Products

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The aerobic wastewater treatment system must be positioned so as to be:

- at least 1.5 m from the surface or shallow subsurface irrigation area;
- at least 3.0 m from any buildings or boundaries;
- located above the 1 in 10 year return flood event; and
- at least 10 m from any bore, dam and watercourse used or likely to be used for human or domestic purposes.

#### 4. Disposal or Irrigation System Setback Distances from Buildings/ Structures

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##### 4.1 Subsurface Effluent Disposal Systems

Subsurface effluent disposal systems must be positioned at least:

- 2.5 m from septic tanks, pumping tanks, allotment boundaries, diversion trenches, soakage trenches, soakage wells, or any other subsurface disposal system;
- 3.0 m down slope from a building or a swimming pools, or where the site is flat, 3 m from any point of the building or swimming pool;
- 6.0 m upslope from a building or swimming pool.

## 4.2 Surface Spray, Drip and Shallow Subsurface Irrigation Systems

On a flat or gently sloping site (i.e. gradient less than 1:100), surface or shallow subsurface irrigation systems must be positioned at least:

- 0.5 m from allotment boundaries;
- 1.5 m from aerobic or other wastewater treatment products, or septic tanks;
- 1.5 m from buildings, including those erected on adjoining allotments; and
- 3.0 m from pools including surrounding paved areas;

On a sloping site (i.e. gradient greater than 1:100), surface or shallow subsurface irrigation systems must be positioned at least:

- 0.5 m down slope from allotment boundaries;
- 1.5 m upslope from allotment boundaries;
- 1.5 m down slope and 3.0 m upslope from buildings, including those erected on adjoining allotments;
- 3.0 m upslope from a lower cut face/bench; and
- 3.0 m down slope and 6.0 m upslope from swimming pools including surrounding paved areas;

**Note:** *Where it is intended to locate the surface or shallow subsurface irrigation area upslope of a building, the footing design engineer should be consulted to determine the likely impact on the building footing and the need for any additional requirements such as diversion trenches. Confirmation of the footing design engineer's requirements should be provided with the application.*

**Note:** *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, such as those described in the SA Reclaimed Water Guidelines.*

## 5. Land Application System Setbacks from Bedrock, Groundwater and Inland or Coastal Waters

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### 5.1 Vertical Setbacks from Bedrock and Groundwater

The soil depth between the base of the disposal / irrigation area and bedrock must be greater than 0.6m. Bedrock for the purpose of this Code is unbroken solid rock and includes shallow cap rock formations found in many parts of South Australia.

The unsaturated soil depth between the base of the disposal / irrigation area and the predicted average wet-season water table height must be  $\geq 0.6\text{m}$  and must extend at least 0.5m beyond each side of the land disposal area.

### 5.2 Horizontal Setbacks to Inland and Coastal Waters

The horizontal setback is the (nearest) distance from the effluent disposal / irrigation area to the top of bank of a watercourse.

Sandy soils are described as soils with a permeability  $> 3\text{m/d}$  (as described in AS/NZS 1547:2000 Appendix 4.2A).

### 5.2.1 Water Protection Areas (not including River Murray Water Protection Area)

**Table B-1: Horizontal Setbacks for Water Protection Areas**

<i>Effluent Quality for subsurface or above surface application</i>	<i>Horizontal Setback</i>
Primary effluent or septic tank effluent	Not permitted
Secondary effluent	50m
Nutrient reduced effluent *	50m

*Also see Section 6.5 of this Code*

### 5.2.2 River Murray Water Protection Area

Onsite wastewater disposal can only be considered where a wastewater disposal field can be located at least 100 m from pool level of the River Murray and lakes, or above the 1956 flood level, whichever is greater.

**Table B-2: Horizontal Setbacks for River Murray Water Protection Area**

<i>Effluent Quality for subsurface or above surface application</i>	<i>Horizontal Setback</i>
Primary effluent or septic tank effluent	Not permitted
Secondary effluent; or Nutrient reduced effluent*	100m from pool level of the River Murray, or above the 1956 flood level, whichever is greater

### 5.2.3 Coastal Areas

In Coastal Areas, the determination of setback distances must take into account the requirements of the Department of Health, the Coast Protection Board, and all relevant Development Plans. This includes taking into consideration requirements for erosion and sea level rise over time.

The Department of Health requirements for setback distances in coastal areas are in Table B-2.

**Table B-2: Horizontal Setbacks in Coastal Areas**

<i>Effluent Quality for subsurface or above surface application</i>	<i>Horizontal Setback</i>
Primary effluent or septic tank effluent – subsurface only	<ul style="list-style-type: none"> <li>• 70m from the mean high water spring along coastal foreshore areas; or</li> <li>• &gt; 70m if required by the Coast Protection Board Policies, or the relevant Council's Development Plan</li> </ul>
Secondary effluent or further treated effluent	<ul style="list-style-type: none"> <li>• 50m from the mean high water spring along coastal foreshore areas; or</li> <li>• &gt; 50m if required by the Coast Protection Board Policies, or the relevant Council's Development Plan</li> </ul>

#### 5.2.4 All Other Areas

This section applies to all other areas not described in Section 5.2.1 – 5.2.3 of this Appendix. It includes watercourses used for agricultural, aquacultural and stock purposes.

**Table B-3: Horizontal Setbacks in Other Areas**

<i>Effluent Quality for subsurface or above surface application</i>	<i>Horizontal Setback</i>
Primary effluent (or septic tank effluent) in sandy soils – subsurface only	70m
Primary effluent (or septic tank effluent) in soil types other than sandy soils – subsurface only	50m
Secondary effluent in sandy soils	50m
Secondary effluent in soil types other than sandy soils	30m
Nutrient reduced* effluent in sandy soils	30m
Nutrient reduced* effluent in soil types other than sandy soils	20m

\* Total Nitrogen ≤ 10mg/L, Total Phosphorous ≤ 5mg/L

#### 5.3 Disposal or Irrigation Systems Setbacks from Wells or Dams

The setbacks required for effluent disposal systems from any well or dam used or likely to be used for domestic purposes is show in Table B-4.

**Table B-4: Horizontal Setbacks from Wells or Dams**

<i>Effluent Quality for subsurface or above surface application</i>	<i>Horizontal Setback</i>
Primary effluent or septic tank effluent in sandy soils	70m
All other types of effluent quality and soil types	50m

## APPENDIX C – Onsite Domestic Greywater Systems

### *Normative (required under the Code)*

#### 1. Intent

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The general intent of this Code, including Scope, Site and Soil Evaluation, Design, Construction and Installation, Operation and Maintenance and Product Approval, applies to a greywater system.

Greywater diversion and/or treatment systems will be considered as non-standard systems and Section 12 of this Code will be applicable, in addition to the product approval requirements outlined in this Appendix.

#### 2. What is Greywater?

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Domestic wastewater is made up of 'Greywater' and 'Blackwater':

- Greywater is wastewater generated from bathrooms (showers, baths, spas, and hand basins), kitchens (sinks and dishwashers), and laundries (washing machines, troughs). Greywater from kitchens may not be used for certain greywater systems due to potential for solids to cause odour issues.
- Blackwater is wastewater generated from toilets and urinals, and is contaminated with faeces and urine.

On average, each person generates approximately 150 L of wastewater per day. Of this, greywater flow constitutes approximately 100 L, 10% of which is generated in the kitchen, 35% in the laundry, and 55% in the bathroom.

#### 3. Greywater Contaminants

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The quality of greywater is highly variable due to factors such as water source, efficiency of appliances and fixtures, individual habits, associated products (e.g. soaps, shampoos, detergents etc.) and other site specific characteristics.

It is assumed by many that greywater is "clean" and "safe for reuse" as it does not contain blackwater. However, greywater may contain high levels of:

- Disease causing organisms (Bacteria, Viruses, Protozoa, Helminths).
- Suspended matter, organic matter, fats and oils, including but not limited to dirt, lint, food, hair, body cells and fats, and traces of faeces, urine, and blood.
- Chemicals derived from soaps, shampoos, dyes, mouthwash, toothpaste, detergents, bleaches, disinfectants, caustic dishwashing powders and other products (eg. Boron, Phosphorus, Sodium, Ammonia and other Nitrogen based compounds).

Management of greywater systems is essential to remove disease causing organisms, suspended and organic matter, as well as excess nutrients.

Greywater systems can be separated into two types: Domestic Greywater Diversion Devices (DGDD), which divert greywater without storage or treatment, and Domestic Greywater Treatment Systems (DGTS), which collect and treat greywater to a higher quality, often with storage.

## **4. Approvals**

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### **4.1 Product Approvals**

Product approvals are required for devices that divert, treat or reuse greywater before they are sold and or marketed in South Australia. Approvals are issued by the Department of Health in accordance with this Appendix and Section 12 of this Code. SA Water may have additional requirements (for plumbing and for systems installed in SA Water sewered areas) that are usually incorporated into the Department of Health product approvals process.

### **4.2 Installation Approvals**

Approved devices that divert, treat or reuse greywater require an installation approval from the relevant authority in accordance with this Code, the product approval, and as per instructions provided by the product manufacturer. An application fee is charged for installation approvals and for inspecting the installation before the system is commissioned.

## **5. Product Approval Requirements**

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### **5.1 Design Criteria**

- a) The greywater treatment / diversion system must be designed, manufactured/constructed and installed in accordance with the relevant sections of this Code, and meet the relevant pre-approval testing requirements outlined in this Appendix and Section 12 of this Code.
- b) The greywater treatment / diversion system must be designed to treat / divert all nominated greywater streams arising from the domestic premises.
- c) Where it is intended to install a greywater treatment / diversion system in a sewered area (or other reticulated system), the system shall be capable of connection to the sewer (or other reticulated system) such that:
  - Approval is obtained from the owner/operator of the system;
  - An overflow to the environment will not occur should there be a failure of the greywater treatment / diversion system. The system (and any associated storage tanks) must be designed to provide automatic overflow to sewer (or other reticulated system); and
  - The operator may manually direct greywater to the sewer (or other reticulated system) during periods of rain or other circumstances adverse to the discharge of treated greywater.
- d) Where it is intended to install a greywater treatment / diversion system in a non-reticulated area, the system shall be capable of connection to an effluent disposal system (as agreed in discussion with the relevant authority).
- e) Cross connection prevention controls shall be installed in accordance with AS/NZS 3500.1.
- f) The greywater treatment / diversion system must be designed to perform continuously and without any interventions between specified servicing intervals, performed by the maintenance contractor.
- g) The greywater treatment / diversion system must be constructed / installed in accordance with the design specifications, Department of Health product approval requirements, relevant authority's approval conditions, and in accordance with good trade practices so as to allow ease of access for maintenance and with regard to the health and safety of users, operators and persons maintaining the system.
- h) The greywater treatment / diversion system must be constructed so as to make appropriate provision for access to and removal of contents in a safe and sanitary manner (Refer AS/NZS 1546.1).
- i) Untreated greywater must not be stored for more than 24 hours.

- j) An in-line strainer/filter is required and must be designed for easy removal of lint, hair and other larger particles.
- k) The greywater treatment / diversion system shall be capable of venting through the educt vent pipe on the house drainage system, or be separately vented in accordance with AS/NZS 3500.2.
- l) All components shall be securely fixed to withstand all loads encountered during the transportation, installation and normal operation.

#### **5.1.1 Specific Criteria for Domestic Greywater Treatment Systems (DGTS):**

- a) The DGTS must be designed to treat the greywater stream for a minimum of 6 EP based on 100L/p/d (mains water supply).
- b) Any tanks and/or vessels and their lids used to contain the DGTS shall be accompanied by technical information supporting the design to the satisfaction of the Department of Health.

#### **5.1.2 Specific Criteria for Domestic Greywater Diversion Devices (DGDD):**

- a) No kitchen waste is to be diverted into the DGDD.
- b) The manufacturer must provide a recommended soil effluent percolation rate for the irrigation design (if the DGDD comes with an irrigation component).
- c) Installation instructions to be provided on each unit for sale (including pipe material, diameter, orientation etc).

#### **5.2 SA Water Requirements**

All greywater products and installations must be certified in accordance with the Plumbing Code of Australia and the installation must comply with AS/NZS 3500 and, where the installation is in an SA Water sewered area, other SA Water requirements. All greywater diversion systems which are diverted to SA Water's sewerage system must be approved by SA Water prior to installing the system.

#### **5.3 Product Testing Criteria for Domestic Greywater Treatment Systems**

- a) The test DGTS shall be installed on a premises that is representative of a domestic greywater source, including all intended greywater source components such as laundry, kitchen, bath, shower and hand basins.
- b) Approval for installation and operation of the DGTS test site shall be obtained from the Department of Health.
- c) Test water is to be diverted to sewer (or other wastewater system) immediately after treatment and all required samples / tests have been undertaken. Permission must be attained from the owner/operator of the sewerage (or other) system.
- d) The following are to be considered and included when selecting and setting up a test site:
  - Minimum flow requirements are continually received over at least the 26 week monitoring program. Average flows are to be +/- 20% of the nominated hydraulic capacity.
  - Greywater to the DGTS is not to be absent for more than 3 consecutive days.
  - Premises are to be occupied full time and on continual basis over the 26 week monitoring period.
  - Premises and residents shall not be employees of, or associated with, the manufacturer, nor in any way connected with any company or individual associated with the manufacturer.
  - The greywater influent to the DGTS shall be metered and readings recorded weekly.
  - Appropriate diversion plumbing is made available in the case of DGTS failure, to either the sewer or other appropriate available wastewater system.

- e) The manufacturer shall ensure that the premises are returned to its original condition, or to the satisfaction of the owner of the premises and the Department of Health, once testing has been completed.
- f) The test period for the DGTS shall be 26 weeks from the date of commissioning. The DGTS shall be commissioned in accordance with the manufacturer's recommended procedure.
- g) The following data described in Table C-1 shall be obtained at the described intervals from grab samples collected over the 26 week monitoring period.

**Table C-1: Frequency of Sampling**

<b>Parameter</b>	<b>Influent</b>	<b>Effluent</b>
<i>Required</i>		
<i>E.coli</i> (or Thermotolerant coliforms)	every 12 days	every 6 days
BOD <sub>5</sub>	every 12 days	every 6 days
SS	every 12 days	every 6 days
Free Chlorine (where used)	every 12 days	every 6 days
Turbidity (where necessary)	every 12 days	every 6 days
<i>Optional (manufacturer to nominate)</i>		
TKN	every 12 days	every 6 days
TN	every 12 days	every 6 days
TP	every 12 days	every 6 days

- h) Other data to be recorded at a minimum interval of every 6 days includes:
  - DGTS inflow reading;
  - Types of detergents and chemicals used at the premises;
  - Site notes and comments (including reuse and irrigation area); and
  - Service records for servicing undertaken during the monitoring period.
- i) Sample locations: The final effluent grab samples shall be taken from the outlet chamber or point from the DGTS prior to disposal. The influent samples shall be taken upstream of all process units associated with the DGTS, including coarse filters.
- j) The samples for BOD<sub>5</sub>, TKN, SS, turbidity, total nitrogen, total phosphate and *E.coli* (or Thermotolerant coliforms) shall be directly transported and delivered to a NATA registered laboratory, registered to carry out analyses for the parameters specified. Analyses of total chlorine or other chemical disinfectant concentration shall be tested onsite immediately after sampling.
- k) Nutrient removal testing criteria must be discussed with the Department of Health prior to testing.
- l) All alarms are to be tested (including those alarms used for online monitoring).

#### **5.4 Compliance Criteria**

Treatment processes and onsite controls are to be designed so as to achieve sufficient pathogen reduction (assessed as log reductions) of bacteria, protozoa and virus in accordance with the National Guidelines for Water Recycling (draft for public consultation) and Department of Health requirements.

The following criteria are based on a single domestic onsite greywater system. Criteria for communal systems or a series of connected onsite systems from different dwellings will be assessed by the Department of Health separately.

Due to the large variability in microbial variations in greywater, the use of mean values is considered to provide a balanced assessment of microbial contamination. Compliance criteria therefore have been based on mean values for all parameters.

- a) Greywater treated to a secondary standard must meet the effluent quality requirements specified in Section 12.6.4 of this Code however mean values are to be used rather than medians or 90<sup>th</sup> percentiles.
- b) The compliance criteria for accreditation of a DGTS where the treated effluent is to be used for toilet flushing or unrestricted garden watering shall be as follows:
  - The samples shall have a mean BOD<sub>5</sub> less than or equal to 20mg/L with no sample greater than 30mg/L;
  - The samples shall have a mean total turbidity less than or equal to 2 NTU, with no sample greater than 5 NTU;
  - The samples shall have a mean *E.coli* (or thermotolerant coliform) count not exceeding 1 orgs/ 100 mL with no sample greater than 10 orgs/100 mL;
  - Where chlorination is used for disinfection, the total chlorine concentration shall be greater than or equal to 0.5 mg/L in all samples taken;
  - Where UV disinfection is used, the minimum dose shall be 100 mJ/cm<sup>2</sup>;
  - Under some circumstances (for example for new or innovative technologies) as determined by the Department of Health, phage spike testing may be required. In such circumstances, at least 3 – 5 tests on both the inlet and outlet of the DGTS (total 6 – 10 tests) are required. The procedure is to be undertaken by a NATA accredited laboratory. The test should indicate a Log 4 phage removal.
  - Other compliance criteria may be required by the Department of Health, as determined necessary.

## 5.5 Online Monitoring Requirements for Greywater Treatment Systems

- a) All DGTS are required to have an alarm system as per Section 12.8 of this Code.
- b) For effluent to be used for toilet flushing or unrestricted garden watering, online monitoring must incorporate:
  - Continuous monitoring for turbidity at the outlet of the treatment system. The turbidity must be less than or equal to 2 NTU. If the turbidity exceeds 2NTU for over 30 consecutive minutes, supply of the product water is to be stopped and not recommenced until the turbidity is reduced to below 2 NTU.
  - For UV disinfection, a minimum dose of 100mJ/cm<sup>2</sup> is required. An alarm must indicate when this is not achieved.
  - Monitoring requirements for other technologies (eg membrane filtration) need to be discussed with the Department of Health prior to application. Failure of the DGTS to achieve these monitoring requirements shall result in alarm, automatic shut-off and diversion of the greywater being treated to sewer.

## 5.6 Disposal and Reuse Options

- a) For greywater diversion devices:
  - Land application is to be via approved subsurface disposal or subsurface irrigation (provided soil testing is undertaken for each installation), in accordance with AS/NZS 1547 and Section 5 of this Code;
  - A dedicated irrigation area is required for irrigation using a DGDD. Irrigation of vegetable patches and other plants used for human consumption is not permitted. Irrigation of fruit and nut trees is allowed in some circumstances.

- b) For greywater treatment systems achieving secondary treatment:
- Land application can be via surface or shallow subsurface irrigation, or subsurface disposal in a dedicated area in accordance with AS/NZS 1547 and Section 5 of this Code.
  - A dedicated irrigation area is required for treated greywater of secondary quality. Irrigation of vegetable patches and other plants used for human consumption is not permitted. Irrigation of fruit and nut trees is allowed in some circumstances.
- c) Under certain conditions, effluent from greywater treatment systems of a quality better than secondary treatment can be used for:
- Toilet flushing; and
  - Unrestricted garden watering.

**Note:** *The required water quality is to be verified through the nominated pre-approval testing regime and online monitoring is required. These requirements are dependent on the final usage and treatment technology and should be discussed with the Department of Health prior to application.*

## **5.7 Operation and Maintenance**

- a) Low phosphorous detergents should be used where greywater is recycled for land applications.
- b) The greywater system shall be operated and maintained in accordance with the manufacturer's recommendations, Department of Health product approval, relevant authority's installation approval, the requirements of this Code and any other SA Water requirements.

## APPENDIX D – Suitable Plants for Surface Irrigation

### (Informative)

**Note:** This list is only intended to provide a selection of trees, shrubs and other plants which may be considered suitable for the surface irrigation disposal area. However, because of wide climatic and soil variations it is essential that further investigations be made with your local plant nursery before finalising your plant choice to suit your particular locality and site conditions.

#### TREES

<b>Botanical name</b>	<b>Common name</b>	<b>Approximate height in metres</b>
<i>Agonis flexuosa</i>	Willow Myrtle	5 - 6 m
<i>Banksia spp.</i>		3 - 10 m
<i>Casuarina glauca</i>	Swamp Oak	6 - 12 m
<i>Casuarina stricta</i>	Drooping She Oak	3 - 5 m
<i>Casuarina cunninghamiana</i>	River She Oak	6 - 10 m
<i>Callistemon viminalis</i>	Red Bottlebrush	3 - 6 m
<i>Callistemon salignus</i>	White Bottlebrush	3 - 6 m
<i>Eucalyptus robusta</i>	Swamp Mahogany	6 - 9 m
<i>Eucalyptus saligna</i>	Sydney Blue Gum	15 - 20 m
<i>Eucalyptus grandis</i>	Flooded Gum	10 - 20 m
<i>Eucalyptus camaldulensis</i>	River Red Gum	15 - 20 m
<i>Eucalyptus cosmophylla</i>	Cup Gum	5 - 6 m
<i>Hymenosporum flavum</i>	Native Frangipani	3 - 6 m
<i>Melaleuca armillaris</i>	Bracelet Honey Myrtle	3 - 4 m
<i>Melaleuca quinquenervia</i>	Broad Paperbark	5 - 7 m
<i>Melaleuca nesophila</i>	Western Tea Myrtle	2 - 4 m
<i>Syzygium paniculatum</i>	Bush Cherry	8 - 10 m
<i>Tristania laurina</i>	Kanuka	3 - 5 m

## SHRUBS

<i>Botanical name</i>	<i>Common name</i>	<i>Approximate height in metres</i>
<i>Abelia x grandiflora</i>	Abelia	2 - 3 m
<i>Acacia floribunda</i>	Gossamer Wattle	2 - 4 m
<i>Acacia longifolia</i>	Sallow Wattle	2 - 4 m
<i>Acacia iteaphylla</i>	Flinders Range Wattle	2 - 3 m
<i>Argyranthemum frutescens</i>	Marguerite Daisy	1 m
<i>Cyperus alternifolius</i>	Umbrella Grass	0.5 - 1 m
<i>Cyperus papyrus</i>	Papyrus	1 - 2 m
<i>Senna spp. ( S. artemisioides )</i>		1 - 3 m
<i>Chamelaucium uncinatum</i>	Geraldton Wax	2 - 4 m
<i>Dryandra formosa</i>		1 - 3 m
<i>Eremophila spp.</i>		1 - 2 m
<i>Grevillea spp. (apart from G. rosmarinifolia)</i>		1 - 3 m
<i>Hebe spp.</i>	Veronica	0.5 - 1 m
<i>Iris pseudacorus</i>	Yellow Flag Iris	0.5 - 1 m
<i>Melaleuca decussata</i>	Cross leaved Honey Myrtle	1 - 2 m
<i>Phormium tenax</i>	New Zealand Flax	2 - 2.5 m

## PERENNIALS/GROUND COVER

<i>Botanical name</i>	<i>Common name</i>	<i>Approximate height in metres</i>
<i>Aster novi-belgii</i>	Perennial Aster	0.5 - 1 m
<i>Canna</i>		1 - 2 m
<i>Chrysanthemum maximum</i>	Shasta Daisy	1 m
<i>Impatiens spp.</i>		0.4 m
<i>Salvia uliginosa</i>	Bog Salvia	0.4 m
<i>Viola hederacea, eminens or sieberana</i>		0.4 m

## CLIMBERS

<i>Botanical name</i>	<i>Common name</i>	<i>Approximate height in metres</i>
<i>Bougainvillea spp.</i>		variable
<i>Clematis microphylla</i>		variable
<i>Hardenbergia violacea</i>	Purple Coral Pea	variable
<i>Hibbertia scandens</i>	Snake Vine	variable
<i>Jasminum grandiflorum</i>		variable
<i>Jasminum polyanthum</i>		variable
<i>Jasminum officinale</i>	Common Jasmin	variable
<i>Kennedia rubicunda</i>	Dusky Coral Pea	variable
<i>Passiflora spp.</i>	Passion Flower	variable
<i>Vitis coignetiae</i>	Glory Vine	variable

## APPENDIX E – BOD<sub>5</sub> Loading and Flow Rates

*Normative (required under the Code)*

### BOD<sub>5</sub> LOADING & FLOW RATES FOR SEPTIC TANK EFFLUENT & RAW SEWAGE

<i>Premises</i>	<i>Fixtures</i>	<i>Sludge / scum rate</i>		<i>Daily inflow rate</i>		<i>BOD<sub>5</sub></i>	
		<i>Number of persons</i>	<i>Rate: litres/person/year</i>	<i>Number of persons</i>	<i>Rate: litres/person/day</i>	<i>Septic Tank Effluent</i>	<i>Raw Sewage</i>
		<b>P1</b>	<b>S</b>	<b>P2</b>	<b>D.F.</b>		
<i>Note: Calculate each use and add to obtain total capacity</i>							
<b>CARAVAN PARKS</b>							
Permanent occupation	wc/urinal; basin; bath shower; laundry; kitchen sink	Total number of sites x 3.5	80	Total number of sites x 3.5	150	180grams per site per day	234
Casual occupation	wc/urinal; basin; bath shower; laundry; kitchen sink	Average number of sites occupied per year x 3.5	48	Total number of sites x 3.5	100	160grams per site per day	208
<b>CHILD DAY CARE CENTRES</b>							
	wc/urinal; basin; bath shower; laundry; kitchen sink	Total number of staff of children & staff	48	Total number of children and staff	50 if in-house laundry 35 if external laundry service	40 grams per person per day - including staff and children	52

<i>Premises</i>	<i>Fixtures</i>	<i>Sludge / scum rate</i>		<i>Daily inflow rate</i>		<i>BOD<sub>5</sub></i>	
		<i>Number of persons</i>	<i>Rate: litres/person/year</i>	<i>Number of persons</i>	<i>Rate: litres/person/day</i>	<i>Effluent</i>	<i>Raw Sewage</i>
<b>CHURCHES, PUBLIC HALLS etc.</b>							
	wc/urinal; basin; kitchen sink; (tea service area only)	Average daily number over 7 day period	25 up to 4 days use/week 40 over 4 days use/week	Highest daily number 7 day period	8	8 grams per person per day	10.4
Addition:	where kitchen area provided for catering		Add 10 to either of above		Add 5 to above	plus 5 grams	6.5
<b>CLUBS</b>							
Membership entry only	wc/urinal; basin; bath/shower; kitchen sink; tea service area only	Average daily number over a 7 day period	35	Highest daily number 7 day period	30	15 grams per person per day plus	19.5
Licensed area bar trade only	wc/urinal; basin; bar sink; glass washer	Average daily number over a 7 day period	5	Highest daily number 7 day period	10	5grams per person per day plus	6.5
Licensed area bar & restaurant/meals area	wc/urinal; basin; bar sink; dishwasher	Average daily number over a 7 day period	10	Highest daily number 7 day period	15	5 grams per person per day plus 20 grams per employee	6.5
<b>UNITS / FLATS</b>							
	wc; basin; bath shower; laundry; kitchen sink	2 per bedroom, or as determined by Council	80	2 per bedroom, or as determined by Council	150	50 grams per person per day	70

Premises	Fixtures	Sludge / scum rate		Daily inflow rate		BOD <sub>5</sub>	
		Number of persons	Rate: litres/person/year	Number of persons	Rate: litres/person/day	Effluent	Raw Sewage
<b>COFFEE / TEA SHOPS / KIOSKS</b>							
e.g. light refreshments and prepared food, cakes etc.	wc/urinal; basin; kitchen sink;	Average daily number over a 7 day period	30	Highest daily number 7 day period	10	10 grams per person per day plus	13
<b>CONSTRUCTION CAMPS - TEMPORARY</b>							
	wc/urinal; basin; shower; laundry; kitchen sink; dishwasher	Total number of persons using facilities	80 x by number of years to be used	Total number of persons using facilities	150	50 grams per person per day	65
<b>HOLIDAY CAMPS</b>							
e.g. scout, youth & church centres with casual occupation	wc/urinal; basin; shower; kitchen sink;	Total number of beds (single)	48	Highest daily number using facilities	100	50 grams per person per day	65
<i>Note: Staff and or residential caretaker data to be included where applicable</i>							
<b>HOSPITALS &amp; NURSING HOMES</b>							
Accommodation & resident staff	wc/urinal; basin; shower; laundry; kitchen sink; dishwasher	Total number of beds plus resident staff	80	Total number of beds plus resident staff	150	200 grams per bed per day	260

<i>Premises</i>	<i>Fixtures</i>	<i>Sludge / scum rate</i>		<i>Daily inflow rate</i>		<i>BOD<sub>5</sub></i>	
		<i>Number of persons</i>	<i>Rate: litres/person/year</i>	<i>Number of persons</i>	<i>Rate: litres/person/day</i>	<i>Effluent</i>	<i>Raw Sewage</i>
<b>HOSPITALS &amp; NURSING HOMES (cont.)</b>							
Non resident staff	wc/urinal; basin; kitchen sink; (tea service area only)	Number of employees per shift x number of shifts	25	Number of employees per shift x number of shifts	30		
	with shower			as above	10		
<b>HOTELS / MOTELS / LIVE IN CONFERENCE CENTRES</b>							
	wc/urinal; basin; bath/shower; laundry; kitchen sink;	Total number of beds (single equivalents)	48	Total number of beds (single equivalents)	100	80 grams per room/unit per day, plus	104
Permanent residents staff etc	wc/urinal; basin; bath/shower; laundry; kitchen sink;	Total number of live in staff	80	Total number of live in staff	150	50 grams per person per day - permanent resident/ staff, plus	65
Bar trade	wc/urinal; basin; kitchen sink; glass washer	Average daily number over a 7 day period	5	Highest daily number 7 day period	10	10 grams per person per day - bar trade, plus	13

<i>Premises</i>	<i>Fixtures</i>	<i>Sludge / scum rate</i>		<i>Daily inflow rate</i>		<i>BOD<sub>5</sub></i>	<i>BOD<sub>5</sub></i>
		<i>Number of persons</i>	<i>Rate: litres/person/year</i>	<i>Number of persons</i>	<i>Rate: litres/person/day</i>	<i>Effluent</i>	<i>Raw Sewage</i>
<b>HOTELS / MOTELS / LIVE IN CONFERENCE CENTRES (cont.)</b>							
Dining room lounge area non-resident use	wc/urinal; basin; kitchen sink; dishwasher	Average daily number over a 7 day period	10	Highest daily number 7 day period	15	10 grams per person per day - dining room, lounge area, plus	13
						20 grams per person per day - non-resident staff, or	26
Non resident staff	wc/urinal; basin; kitchen sink; (tea service area only)	Number of employees per shift x number of shifts	25	Number of employees per shift x number of shifts	30	25 grams per person per day - non-resident staff shower provided	32.5
	with shower			as above	10		
<b>MEDICAL CONSULTING ROOMS</b>							
e.g. doctors, dentists etc. staff	wc/urinal; basin; kitchen sink; (tea service area only)	Number of persons using system per shift x number of shifts	40	Number of persons using system per shift x number of shifts	30	20 grams per person per day-staff, or	26
	with shower			as above	10	25 grams per person per day-staff - shower provided, plus	32.5
Consulting rooms		Per consulting room	80	Per consulting room	100	40 grams per consulting room per day	52

<i>Premises</i>	<i>Fixtures</i>	<i>Sludge / scum rate</i>		<i>Daily inflow rate</i>		<i>BOD<sub>5</sub></i>	<i>BOD<sub>5</sub></i>
		<i>Number of persons</i>	<i>Rate: litres/person/year</i>	<i>Number of persons</i>	<i>Rate: litres/person/day</i>	<i>Effluent</i>	<i>Raw Sewage</i>
<b>PUBLIC SWIMMING POOLS</b>							
including kiosk eg take away food	wc/urinal; basin; kitchen sink; (tea service area only)	Average daily number over a 7 day period	20	Highest daily number 7 day period	20	10 grams per person per day, or 15 grams per person per day - shower provided, plus 20 grams per employee per day	13 19.5 26
<b>PUBLIC TOILETS</b>							
	wc/urinal; basin	Average daily number over a 7 day period	20	Highest daily number 7 day period	5	10 grams per person per day	13
Addition:	where shower provided	as above	5	as above	10	15 grams per person per day	19.5
<b>RESTAURANTS</b>							
No liquor licence	wc/urinal; basin; kitchen; sink; dishwasher	Average daily number over a 7 day period plus staff	35	Highest daily number 7 day period plus staff	15	10 grams per meal per day - no liquor licence, or	13
With liquor licence	wc/urinal; basin; kitchen; sink; dishwasher; glass washer	Average daily number over a 7 day period plus staff	35	Highest daily number 7 day period plus staff	20	15grams per meal per day with liquor licence, plus 20 grams per employee per shift	19.5 26

<b>Premises</b>	<b>Fixtures</b>	<b>Sludge / scum rate</b>		<b>Daily inflow rate</b>		<b>BOD<sub>5</sub></b>	<b>BOD<sub>5</sub></b>
		<i>Number of persons</i>	<i>Rate: litres/person/year</i>	<i>Number of persons</i>	<i>Rate: litres/person/day</i>	<i>Effluent</i>	<i>Raw Sewage</i>
<b>REST HOMES, BOARDING &amp; LODGING HOUSES</b>							
Accommodation & resident staff	wc/urinal; basin; bath/shower; laundry; kitchen sink	Total number of beds plus resident staff (single equivalents)	80	Total number of beds plus resident staff (single equivalents)	150	50 grams per person per day plus	65
Non resident staff	wc/urinal; basin; kitchen sink; (tea service only)	Number of employee's per shift x number of shifts	25	Number of employee's per shift x number of shifts	30	20 grams per non-resident employee per day, or	26
	with shower			as above	10	25 grams per non-resident - shower provided	32.5
<b>ROAD-HOUSES / SERVICE STATIONS</b>							
Staff	wc/urinal; basin; kitchen sink; (tea service only)	Number of employee's per shift x number of shifts	25	Number of employee's per shift x number of shifts	30	20 grams per employee per shift or 25 grams per employee per shift - plus	26 32.5
	with shower			as above	10	10 grams per car per day, plus	13

<i>Premises</i>	<i>Fixtures</i>	<i>Sludge / scum rate</i>		<i>Daily inflow rate</i>		<i>BOD<sub>5</sub></i>	<i>BOD<sub>5</sub></i>
		<i>Number of persons</i>	<i>Rate: litres/person/year</i>	<i>Number of persons</i>	<i>Rate: litres/person/day</i>	<i>Effluent</i>	<i>Raw Sewage</i>
<b>ROAD-HOUSES / SERVICE STATIONS (cont.)</b>							
Public toilets	wc/urinal; basin	Average daily number over a 7 day period	20	Highest daily number over a 7 day period	5	200 grams per bus per day	260
	with shower	as above	5	as above	10		
Restaurant take away and sit down meals	wc/urinal; basin; kitchen sink	Average daily number over a 7 day period	10	Highest daily number over a 7 day period	10		
<b>SCHOOLS &amp; KINDERGARTENS</b>							
Including kiosk facilities eg take away food	wc/urinal; basin; kitchen sink	Total number of students plus staff	25	Total number of students plus staff	20	15 grams per person per day - staff and students, or	19.5
Where canteen facilities provided eg plated hot and cold meals	kitchen sink dishwasher	as above	10	as above	5	5 grams per person per day - staff & students	6.5
	with shower			per 100 students	100	20 grams per person per day - staff & students plus	26

<i>Premises</i>	<i>Fixtures</i>	<i>Sludge / scum rate</i>		<i>Daily inflow rate</i>		<i>BOD<sub>5</sub></i>	<i>BOD<sub>5</sub></i>
		<i>Number of persons</i>	<i>Rate: litres/person/year</i>	<i>Number of persons</i>	<i>Rate: litres/person/day</i>	<i>Effluent</i>	<i>Raw Sewage</i>
<b>SEMINAR / CONFERENCE ROOMS (maximum capacity)</b>							
No meals	wc/urinal; basin; kitchen sink (tea service area only)	Total seating capacity plus staff	25	Total seating capacity plus staff	30	20 grams per person per day, or	26
Meals no liquor licence	wc/urinal; basin; kitchen sink; dishwasher	Total seating capacity plus staff	35	Total seating capacity plus staff	35	25 grams per person per day, or	32.5
Meals with liquor licence	wc/urinal; basin; kitchen sink; dishwasher; glass washer	Total seating capacity plus staff	35	Total seating capacity plus staff	40	30 grams per person per day	39
<b>SHOPPING CENTRES</b>							
Staff	wc/urinal; basin; kitchen sink (tea service area only)	Number of employee's per shift x number of shifts	25	Number of employee's per shift x number of shifts	30	150 grams per 100 square metres per day, or	195
						20 grams per employee per day	26
Public	wc/urinal; basin	Average daily number over a 7 day period	20	Highest daily number over a 7 day period	5		
Shop Facilities	double bowl sink basin	Per shop	20	Per shop	40		
Supermarket	double bowl sink basin; cleaners sink	Per supermarket	40	Per supermarket	500		

<i>Premises</i>	<i>Fixtures</i>	<i>Sludge / scum rate</i>		<i>Daily inflow rate</i>		<i>BOD<sub>5</sub></i>	<i>BOD<sub>5</sub></i>
		<i>Number of persons</i>	<i>Rate: litres/person/year</i>	<i>Number of persons</i>	<i>Rate: litres/person/day</i>	<i>Effluent</i>	<i>Raw Sewage</i>
<b>SPORTS CENTRES</b>							
e.g. health and fitness clubs; squash courts; indoor cricket; basketball	wc/urinal; basin; kitchen sink (tea service area only)	Average daily number over a 7 day period	25	Highest daily number over a 7 day period	40	30 grams per person per day, plus	39
						20 grams per employees per shift	26
<b>STAFF ABLUTIONS, WORK PLACE INSTALLATIONS</b>							
e.g. factories; commercial office	wc/urinal; basin; kitchen sink (tea service area only)	Number of employee's per shift x number of shifts	25	Number of employee's per shift x number of shifts	30	20 grams per employee per shift, or	26
	with shower					as above	10
Where canteen facilities provided for kiosk meals eg pies, pasties, sandwiches	kitchen sink			as above	2	5 grams per employee per shift, or	6.5
Where plated meals provided e.g. hot/cold meals prepared onsite	kitchen sink; dishwasher	as above	10	as above	5	10 grams per employee per shift	13

<b>Premises</b>	<b>Fixtures</b>	<b>Sludge / scum rate</b>		<b>Daily inflow rate</b>		<b>BOD<sub>5</sub></b>	<b>BOD<sub>5</sub></b>
		<i>Number of persons</i>	<i>Rate: litres/person/year</i>	<i>Number of persons</i>	<i>Rate: litres/person/day</i>	<i>Effluent</i>	<i>Raw Sewage</i>
<b>WINE TASTING</b>							
	wc/urinal; basin; kitchen sink; glass washer	Average daily number over a 7 day period	5	Highest daily number over a 7 day period	8	8 grams per person per day - wine tasting, plus	10.4
						15 grams per person per day - meals dining, plus	19.5
staff			25		30	20 grams per employee per day - non-resident staff	26