



Code of Practice for Onsite Sewage Management

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1.0 GENERAL

1.1 Objective

The objectives of the Code of Practice for On-site Sewage Management (the Code) are to ensure the safe disposal/reuse of sewage and to protect the public and environmental health by;

- establishing best management practices for sewage disposal/reuse as a guide for local government, industry and homeowners;
- setting minimum design, installation/modification and land application requirements for on-site sewage systems;
- setting minimum sewage quality requirements for the beneficial reuse of on-site sewage;
- establishing proper procedures to obtain an approval to install an on-site sewage system;
- ensuring that on-site sewage systems are designed, installed/modified, operated and if required decommissioned so when used on a long term basis they;
 - do not pose a risk to public health,
 - do not cause a nuisance, and
 - are appropriately sited and maintained to a satisfactory standard.

This code replaces the Health (Treatment of Sewage and Disposal of Effluent and Liquid Waste) Regulations 1974 and the Code of Practice for the Design, Manufacture, Installation and Operation of Aerobic Treatment Units.

1.2 Scope

This Code sets the minimum requirements for on-site sewage systems in unsewered areas of Western Australia. The code applies to any on-site sewage system serving premises where the sewage is totally or in part of human origin.

Sewage is defined under the Health Act 1911 as “*any kind of sewage, nightsoil, faecal matter or urine, and any waste composed wholly or in part of liquid*”. Sewage includes faecal waste and urine from toilets, shower and bath water, laundry water and kitchen water.

This Code does not cover:

- Wastewater Recycling – proponents should consult the “Guidelines for the Use of Recycled Water in Western Australia”.

- Greywater use in seweraged areas – proponents should consult the “Code of Practice for the Reuse of Greywater in Western Australia”.
- Guidance on how to get an on-site sewage system approved. Manufacturers should consult the “Code of Practice for Product Approval of On-site Wastewater Systems in Western Australia”.
- Subdivision of land - the site investigation requirements in this Code, only apply to individual lots. Where it is proposed to subdivide land, and the subsequent lots are to be serviced by on-site systems, the information contained in this Code, might be useful. However, anyone undertaking an investigation should rely on the relevant sections of AS/NZS 1547 and consult the *Government Sewerage Policy*.

1.3 Legislation

Health Act 1911 and Health (Treatment of Sewage and Disposal of Effluent and Liquid Waste) Regulations 1974

This Code operates under the authority of *Health Act 1911*. The *Health Act 1911* requires sewage and sullage wastes to be collected, treated and disposed of so as to prevent risk to health.

The main legislative requirements concerning sewage are contained in the *Health (Treatment of Sewage and Disposal of Effluent and Liquid Waste) Regulations 1974*. These Regulations detail the requirements to be satisfied with regard to the manufacture, installation and operation of sewage systems.

Plumbing Code of Australia and Plumbing and 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 an on-site sewage system via traps, waste pipes and drains shall be carried out in accordance with the Plumbing Code of Australia and the Plumbing and Drainage Standards AS/NZS 3500.

Australian / New Zealand Standards Adopted

On-site sewage systems and the associated land application area must be designed, accredited and managed in accordance with the following Australian Standards. 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;
- AS/NZS 3500.1 Plumbing and drainage Part 1: Water services; and
- AS/NZS ISO 31000:2009 Risk management – Principles and guidelines

If there is an inconsistency between an Australian Standard and this Code, the Code takes precedent.

1.4 Definitions

Aerobic Treatment Unit (ATU)	A system, which uses the process of aeration followed by clarification to achieve biological treatment of sewage. Note: ATU's are also known as Aerated Wastewater Treatment System (AWTS) ^[3] .
Apparatus	Any apparatus for the bacteriolytic or aerobic treatment of sewage or any other apparatus for the treatment of sewage approved by the Executive Director Public Health and includes any buildings, fittings, works, or appliances used or required in connection with the bacteriolytic or aerobic treatment of sewage, and the disposal of effluent or any residue of such treatment ^[1] .
AS/NZS	Australian Standards/New Zealand Standards (latest version).
Authorised Person	A person who is authorised by the Executive Director Public Health to service an onsite sewerage system.
Blackwater	Wastes discharged from the human body either directly to a dry-vault toilet or through a water closet (flush toilet) and/or urinal ^[3] .
BOD₅ (biochemical oxygen demand)	The measurement of dissolved oxygen used by microorganisms in the biochemical oxidation of organic matter over a 5-day period.
Certificate of Compliance	Has the meaning given to that term in the <i>Water Services Licensing (Plumbers Licensing and Plumbing Standards) Regulations 2000</i> ^[2] .
Installation Certificate	Certification given to the Local Government by the onsite system designer/installer certifying that the system has been constructed, installed and commissioned in accordance with its design including any conditions required by the Local Government and/or EDPH.

Composting Toilet (waterless)	A device that receives and treats human excreta, domestic organic matter and bulking agents, using natural, aerobic stabilisation processes to produce a product that is suitable for disposal ^[4] .
Daily Flow	The volume of sewage flowing into the on-site sewage system during a 24 hour period.
Design Irrigation Rate (DIR)	The loading rate that applies to the distribution of effluent to the design area of an irrigation land application system, expressed in L/m ² /day or mm/day ^[3] .
Design Loading Rate (DLR)	The loading rate that applies to the distribution of effluent to the design area of an absorption trench or bed or mound land application system, expressed in L/m ² /day or mm/day, and equivalent to the LTAR of the land application system reduced by a factor of safety ^[3] .
Desludging	Removal of accumulated sludge and/or scum from a septic tank, other treatment system, pumps sump or holding sump/well.
Dwelling	<p>A building or part of a building that is occupied or intended to be occupied for the purpose of human habitation^[2].</p> <p>A building or part of a building:</p> <ul style="list-style-type: none"> ■ that is occupied or intended to be occupied for the purpose of human habitation by not more than 8 persons; ■ standing on the lot; and <p>the only dwelling standing on that lot ^[4].</p>
Effluent	The liquid discharge from an apparatus and sewage treatment system ^[3] .

[4] Health (Treatment of Sewage and Disposal of Effluent and Liquid Waste) Regulations 1974

Evapotranspiration	The removal of water from soil by evaporation and from plants by transpiration.
Executive Director Public Health (EDPH)	The person holding or acting in the office of Executive Director, Public Health in the Department of Health ^[1] .
Greywater	Sewage from washing machines, laundry tubs, showers, hand basins and baths excluding water closets and urinals.
Groundwater	The body of water in the soil, all the pores of which are saturated with water. If the body of water is present at all times it represents permanent or true groundwater ^[3] .
Irrigation	The distribution of effluent into the topsoil by a shallow subsurface or covered surface drip irrigation system, a shallow subsurface LPED irrigation system or an above ground spray irrigation system ^[3] .
Land application area (LAA)	A designated area of land intended for the disposal of treated sewage for further in-soil treatment and absorption ^[3] .
Land application system (LAS)	The system used to apply effluent from a sewage treatment system into or onto the soils for further in soil treatment and absorption ^[3] .
Long-term acceptance rate (LTAR)	The steady state rate that a land application system can absorb primary or secondary treated effluent for further treatment within the subsoil. It allows for loss to the soil by infiltration through the base and side walls of the system, and other losses to the atmosphere by evaporation and transpiration ^[3] .
Low Pressure Effluent Distribution irrigation (LPED)	A pressure line perforated with drilled squirt holes and nestled in a distribution pipe ^[3] . LPED irrigation line is installed in a 200 mm wide by 200 mm deep trench, in aggregate of 10-15mm. The minimum topsoil depth shall be 250 mm for LPED irrigation.
Non-residential dwelling	In this Code, refers to any premise which is not a dwelling. This includes but is not limited to commercial and industrial

	development (e.g. caravan parks, factories, hospitals, hotels, motels, shopping centres, warehouses and workshops), educational establishments (e.g. schools), nursing homes, and short-term or temporary accommodation (e.g. mining camps), which may include dwellings or accommodation that provide short-term or long-term occupancy.
On-site sewage disposal	Disposal of sewage on a land application area within an individual lot boundary using an apparatus for the treatment of sewage.
On-site sewage system (OSS)	An apparatus for treating human excreta and other wastewaters. An on-site sewage system includes (but is not limited to) a septic tank, waterless composting toilet, or an aerated wastewater treatment system and the land application system.
Permit to Use	A certificate issued by the Local Government (after inspection of the onsite sewage system) that allows the system to be used.
Primary Treatment	The separation of suspended material from wastewater by settlement and/or floatation in septic tanks, primary settling chambers etc, prior to effluent discharge to a secondary treatment process or to a land application system ^[3] .
Public Drinking Water Source Area (PDWSA)	Any area proclaimed under the <i>Metropolitan Water Supply, Sewerage and Drainage Act 1909</i> and the <i>Country Areas Water Supply Act 1947</i> for the management and protection of water sources used for public drinking water supply. PDWSA includes proclaimed underground water pollution control areas, water reserves and catchment areas.
Public health	The physical, mental and social wellbeing of the community.
Recycled Water	Water generated from sewage (including greywater, yellow water, and black water) or from industry that is treated to provide fit-for-purpose water quality for its intended beneficial use ^[5] .
Reticulated sewerage	A network of sewers provided by a licensed water service provider connecting sewage from any development or

	subdivision for disposal off-site.
Secondary Treatment	Aerobic biological processing and settling or filtering of effluent received from a primary treatment process. Effluent quality following secondary treatment is expected to be equal to or better than 20 mg/L 5-day biochemical oxygen demand (BOD ₅) and 30 mg/L suspended solids (SS) ^[3] .
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, so that organic matter contained therein can be partially decomposed (digested) by anaerobic bacterial action in the liquid. The term covers the tanks that are used to treat all wastewater, greywater and blackwater ^[3] .
Setback	The distance that an on-site sewage system or land application system must be situated from any building, boundary, watercourse, body of water or other components of the sewage system.
Sewage	Any kind of sewage, nightsoil, faecal matter or urine, and any waste composed wholly or in part of liquid ^[1] . In this Code the definition of sewage has the same meaning to wastewater.
Site and soil evaluation (SSE)	An assessment of public health, environmental, legal, economic factors and the evaluation of site and soil characteristics in a development area, subdivision or individual lot ^[3] .
Site assessment	An assessment, which incorporates the requirements of a 'site and soil evaluation', and includes a soil profile to a minimum depth of 2.0 metres from the ground level.
Site evaluator / soil assessor	Includes appropriately trained soil scientists, geotechnical engineers, civil and environmental engineers, who undertake land capability or site and soil evaluations ^[3] .
Soil absorption system	Subsurface land application systems that rely on the capacity of the soil to accept and transmit the applied hydraulic load (includes leach drains, drain fields, absorption trenches,

	seepage beds and seepage pits).
Soil absorption zone	The volume of dry soil that is required to filter, isolate, and absorb microorganisms, nutrients and particles from sewage within a land application area. Measured from below the base of the proposed sewage disposal system. The minimum path length required is 0.6m ^[3] .
Unsewered	Refers to any development or subdivision that is not connected to reticulated sewerage, and which requires on-site sewage disposal.
Wastewater	The combined blackwater and greywater from a dwelling or premise that is generating domestic wastewater ^[3] .
Watercourse	A watercourse is: <ul style="list-style-type: none"> a) any river, creek, stream or brook in which water flows (including if it is intermittent or occasional; b) any collection of water (including a reservoir) into, through or out of which any thing coming within paragraph a) flows; c) any place where water flows that is prescribed by local by-laws to be a watercourse; and includes the bed and banks of any thing referred to in paragraph a), b) or c).

^[1] Health Act 1911.

^[2] Health (Treatment of Sewage and Disposal of Effluent and Liquid Waste) Regulations 1974

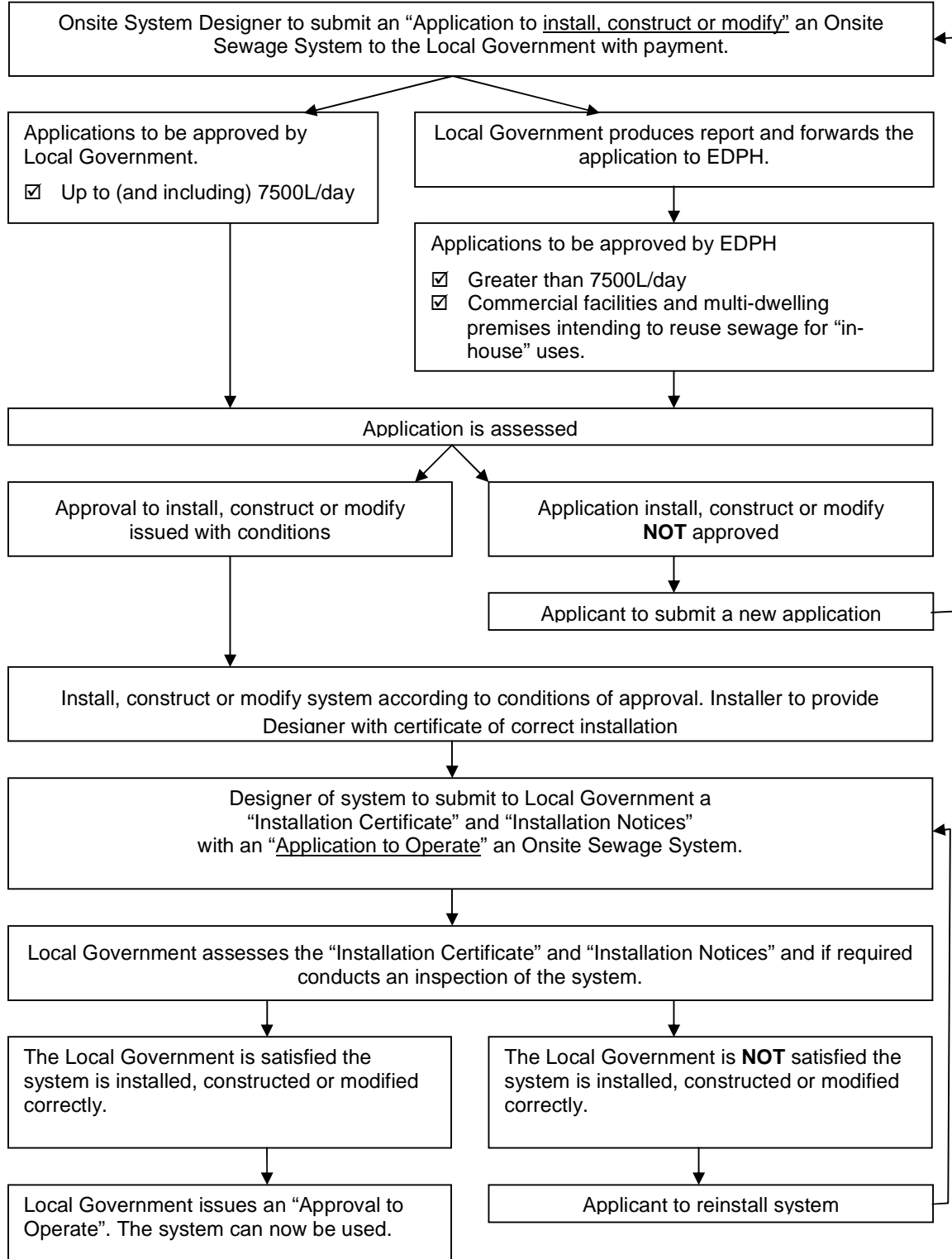
^[3] AS/NZS 1547:2000 On-site domestic wastewater management.

^[4] AS/NZS 1546.2:2008 On-site domestic wastewater treatment units, Part 2: Waterless Composting Toilets.

^[5] Guidelines for the Non-potable Uses of Recycled Water in Western Australia, August 2011.

2.0 APPROVAL PROCESS

The Flowchart 1: Approval Process with the steps involved in making an application.



2.1 Approving Bodies for “Application to install, construct or modify” an Onsite Sewage System

All on-site sewage systems require approval to be installed, constructed or modified from the relevant Local Government in accordance with this Code and the product (apparatus) approval conditions set by the Department of Health.

Depending on the type and size of the system, the system may also require Department of Health approval, see Table 1: Approving bodies for onsite sewage systems.

Table 1: Approving bodies for on-site sewage systems

Approving Body	Sewage Flow Rates
Local Government	<ul style="list-style-type: none">• Up to 7500L/day.
Executive Director Public Health	<ul style="list-style-type: none">• More than 7500L/day of sewage.• Commercial and multi-dwelling premises intending to use sewage for “in house” end-uses.

2.2 “Application to install, construct or modify” an Onsite Sewage System

An Application to Install, Construct or Modify an Apparatus for the Treatment of Sewage form can be obtained from Local Government offices. The applicant must complete the relevant sections in full.

2.2.1 Applications up to and including 7500L/day

This application must include:

1. A completed application form.

2. Site Plan

The site plan must be to scale(1:100) showing the setbacks and location of:

- a) the on-site sewage apparatus
- b) the land application area/s;
- c) any dwellings, buildings or facilities proposed or existing on the property

- d) any water courses on the lot (such as waterways, dams and drainage channels),
- d) any groundwater bores,
- e) the location of any existing sewage system and land application area (if applicable).

3. Specifications of the on-site sewage apparatus

The on-site sewage apparatus must have a current “product approval certificate” issued by the Department of Health.

4. Specifications of the land application system

Full details and dimensions of the land application system must be provided including the calculations for sizing of the area and the loading rates used.

- Where applicable, cross sectional drawings through any proposed trenches, drains, mounds and beds (including dimensions),
- Where applicable, detailed design plans and information for the irrigation pipe work within the land application area.

5. Soil and Site Evaluation Report

The soil and site evaluation report must be in accordance with AS/NZS 1547 (see Section 4: Site and Soil Evaluation).

6. Sewage Loading Certificate

The sewage loading certificate states the design criteria and the limitations associated with the use of the on-site system and incorporates such matters as:

- System capacity (number of persons and daily flow);
- Summary of design criteria;
- Use of water efficient fittings, fixtures, or appliances;
- Allowable variation from design flows (peak loading events);
- Consequences of changes in loading (due to varying sewage characteristics);
- Consequences of overloading the system;
- Consequences of underloading the system;
- Consequences of lack of operation, maintenance, and monitoring attention; and
- Any other relevant considerations related to use of the system.

7. Operation and Maintenance Manual/s

The operation and maintenance guidelines should include the following management and technical matters:

- An outline of the management needs of on-site systems and the roles and responsibilities of those involved;
- Descriptions of the type of on-site system installed including information on how it functions;
- The household activities which are likely to affect the successful operation of the on-site system;
- The management of the sewage treatment unit and the land application system;
- The maintenance needed for the sewage treatment unit, including regular pumping out of sludge or septage;
- The operation and maintenance of distribution boxes, siphons, pumping units, gates, and valves;
- The need for, and extent of, monitoring (such as inspection frequency and testing requirements);
- The maintenance tasks such as care of vents, surface water and sanitary drains, flushing of
- pumped distribution lines and trimming of evapotranspiration plantings;
- The limitations of the system (such as capacity, level of treatment) and the risks associated with operating the system outside those limitations;
- Contact details for emergency services;

8. Maintenance Agreement Certificate

If the system requires regular maintenance by an authorised service person the servicing arrangements, including a copy of any maintenance agreement made with an authorised service Person must be submitted to the property owner and Local Government. The service contract should be for a minimum of two years and should be in place before permit to use is issued.

2.2.2 Application greater than 7500L/day

On-site sewage systems proposed to cater for more than 7500L/day should produce effluent quality of at least a secondary quality.

Applications for commercial premises should include all items as required in applications up to and including 7500L/day.

If the onsite sewage apparatus does not have product approval issued by the Department of Health, then the apparatus is required to be designed by a qualified and experienced environmental engineer or sewage consultant. The design and performance of the sewage system must be certified in writing by an independent technical expert or company. The

tank(s) must be certified in writing by a structural engineer. This certification must be provided as a supporting document to the application submitted to Local Government.

2.3 “Application to Operate” an Onsite Sewage System

An onsite system shall not be operated without a “Approval to Operate” issued by the Local Government. Before an on-site sewage system can be used, the Local Government must either inspect the on-site sewage system and the land application area (before excavations are back-filled) to ensure that it is installed correctly or receive a “Installation Certificate” from a certified Onsite System Designer (or designers’ Person, or the installer/constructor acting as the ‘designer’) or by independent technical experts. If satisfactory, the Local Government will issue an “approval to operate” for the system to be used.

2.4 Approval Expiry

An approval to install, construct or modify is valid for a period of 2 years or any other lesser period as specified in the approval issued by the Local Government or EDPH.

Where approval is granted and the installation, construction or modification has commenced but it not completed within 2 years and a new approval to continue has not been granted, the owner of the system shall as soon as practicable after the expiration of that period, ensure that the apparatus is decommissioned in accordance with section 7.7.

3.0 ROLES AND RESPONSIBILITIES

3.1 Onsite System Designer

On-site system designers are responsible for the design of the system and certifying that the system has been installed as designed. Designers may include professional engineers, soil scientists, drainage contractors or plumbers with appropriate training, competence, and experience in design and installation practice. Designers must ensure they:

- Have completed an appropriate accredited training course.
- Completed a design report appropriate to the scale and extent of the on-site system.
- On completion of the installation, issue a “Installation Certificate” that certifies the system has been installed/constructed in accordance with its design and any other conditions set by the Local Government and/or the Department of Health.
- Prepare a set of “as constructed” plans/details to be lodged with the Local Government and the owner/occupier.
- Prepare a set of Operation and Maintenance guidelines specific to the on-site sewage system as designed and installed/constructed. These should be lodged with the application form with a copy to the owner/occupier.
- Submit to the owner and the Local Government copies of the
 - a. Design Report
 - b. Sewage Loading Certificate
 - c. As constructed plans
 - d. Installation Certificate
 - e. The Site and Soil Evaluation Report

3.2 Site Evaluator and Soil Assessor

Site evaluators and soil assessors must ensure they:

- Have completed an appropriate accredited training course.
- Evaluate the capacity of the site and its soil for accepting treated sewage.
- Complete a site and soil evaluation report appropriate to the scale and extent of the on-site system and submit to the Onsite System Designer.
- Certify the soil evaluation procedure has been undertaken in accordance with AS1547 and any other requirements of Local Government and/or Department of Health.

- Complete a Geotechnical Report if required by Local Government and/or Department of Health.

3.3 On-site System Installer

On-site system installers must ensure they:

- Have completed an appropriate accredited training course.
- Consult with the Onsite System Designer with respect to the intention of the design, and the installation/construction methods and procedures which are essential to achieve design integrity.
- Provide the Onsite System Designer a certificate of correct installation so that a Installation Certificate can be completed. (Note: the “Installation Certificate” is issued by the Onsite System Designer)
- Certify with the Onsite System Designer that all equipment incorporated as part of the sewage system has been installed in accordance with the manufacturer’s instruction and in accordance with any other conditions set by the Department of Health and/or Local Government.
- Issue to the owner and onsite system designer a Certificate of Correct Installation, certifying that the system has been installed correctly.

3.4 Local Government

To manage on-site sewage systems effectively Local Governments must:

- Assess applications – consider all relevant issues when approving the installation or operation of an on-site sewage system, particularly health and environmental issues at the site.
- Ensure that the proposed on-site system is an apparatus approved by the Department of Health, and that the application takes into account the products’ conditions of approval.
- Assess the site and soil evaluation report, flow rates, land application calculations for trench, bed, mound or irrigation designs. It is not responsibility of the Local Governments to do the calculations or design the land application system for the property owner. However, the Local Government must review the land application calculations before setting the conditions of approval.
- Set conditions of approval – specify site and system specific conditions of approval to operate and maintain facilities.

- Assess the Certificate of Completion, Installation Certificate and Installation Notices and where required inspect the system to ensure the conditions of approval are met.
- Issue the Approval to Operate as per Figure 1.
- Monitor systems – check regularly to make sure applicants comply with approval conditions, including the requirement for regular servicing if required.
- Communicate with applicants – and help applicants understand their responsibilities, how to manage risks and operate the systems effectively.
- Keep and maintain records of all onsite sewage systems approved. Records shall be kept for the duration of life of the apparatus.

3.5 Plumbers

All plumbing work must be undertaken by a plumber licensed under the Water Services Coordination (Plumbers Licensing) Regulations 2000 and must comply with the Metropolitan Water Supply Sewerage and Drainage By-laws 1981.

3.6 Authorised Service Persons

On-site sewage systems achieving secondary treated effluent quality such as ATUs and greywater treatment systems require ongoing maintenance. Authorised Service Persons must ensure they:

- Have completed an appropriate accredited training course and/or be accredited in writing by the system manufacturer.
- Service the apparatus in accordance with the manufacturer specifications
- Completed a service report form appropriate to the on-site system. The report shall state if the apparatus is functioning correctly or alternatively if remedial action is required, what maintenance was conducted. The report shall include details of the conditions of the land application area(s) during the inspection. This report must be forwarded to the Council and the property owner after each service.
- Where there is a change in ownership of a property, the Authorised Service Person should take reasonable steps to inform the new owner of the operation and maintenance requirements.

3.7 Property Owners

The property owner must ensure that:

- The onsite sewage system is operated and maintained in accordance with the Manufacturers instructions and the Local Government and/or Department of Health conditions of approval.
- Relevant application and approval has been obtained from the Local Government for the onsite sewage system.
- If a person other than the owner is using the system then the property owner must make sure that the person have a copy of the manufactures instructions and that the person is fully aware of any responsibilities they may have in relation to the system.
- Facilitate the regular maintenance of the apparatus by the authorised service Person.
- Ensure that the system is not modified, dismantled, altered or the loading certificate exceeded, see section 6.2.2.

4. SITE AND SOIL EVALUATION

4.1 Scope

This section of the Code sets out the Site and Soil Evaluation (SSE) procedures for individual lots. A separate site evaluation shall be carried out for each individual property unless the assessment of the subdivision showed wide areas of homogeneous soils, or Local Government approves otherwise.

The purpose of the SSE is to ensure all sewage is treated and contained on-site by identifying the most suitable land application area. The selection and design of the onsite sewage system depends on site and soil conditions. These conditions include the nature and depth of the soil, slope, proximity to creeks, rivers, coastal water or groundwater, existing instability or the potential for instability, climate, accessibility and lot size.

4.2 Site and Soil Evaluator Competencies

The SSE should only be conducted or overseen and signed off by qualified and experienced soil scientists, in accordance with AS/NZS 1547, to the satisfaction of Local Government.

4.3 Site and Soil Evaluation Procedure

A SSE shall be undertaken in accordance with AS/NZS 1547 and shall consist of a staged process including a:

- Desktop Study,
- Site and Soil Check,
- Site and Soil Assessment, and
- Site and Soil Evaluation Report.

All site and soil information must be compiled in the Site and Soil Evaluation Report and submitted to Local Government.

The soil assessor uses the information collected during the site and soil assessment, to assign a soil category to the soils within the area identified as the potential location for the land application area. An estimate can also be made of design loading rates (DLR)/ design irrigation rates (DIR) values appropriate to the proposed treatment and land application systems suitable for the site soils. The Site and Soil Evaluation Report must clearly identify,

an estimated soil category and DLR/DIR. This report is used by the designer to select and confirm details of an appropriate on-site sewage system for the proposed lot, incorporating any adjustment to DLR/DIR values judged necessary to provide appropriate factors of safety in design.

The SSE report must include a site plan (to scale) that clearly identifies the location of all boreholes and soil pits, and potential locations for the land application area and any reserve area requirements.

The requirements of a SSE may be varied by the Local Government, based on existing site information or where health and environmental impacts are considered minimal, in accordance with AS/NZS 1547. Conversely, a geotechnical report or additional information may be required by Local Government in areas considered to have a higher level of risk due to site constraints, health or environmental impacts and/or volumes of sewage to be produced.

Example report sheets for use in compiling the SSE report are available in AS/NZS 1547:

- Site plan – Individual lot
- Site information sheet
- Site-and-soil Evaluation Form – Individual lot
- Soil Permeability Field Record Sheet – Example

5. INSTALLATION AND CONSTRUCTION REQUIREMENTS

5.1 General requirements

To ensure the highest levels of competence, all persons involved in the design, installation, operation, maintenance, and performance monitoring procedures of onsite sewage systems shall be adequately trained in the operational aspects of their work, and understand the potential health and environmental risk.

- Installation of on-site sewage systems shall be in accordance with:
 - AS/NZS 1547, AS/NZS1546.1, AS/NZS 1546.2, AS/NZS1546.3, as applicable,
 - The requirements of the designer, as approved or accepted by the Local Government and/or the Department of Health,
 - The approval conditions set by the Local Government and/or the Department of Health, and
 - The specific requirements of the apparatus manufacturer as approved by the Executive Director Public Health.

- On-site sewage systems including the location and size of the land application area shall not be modified without approval from the Local Government and where applicable, the Department of Health.
- On-site systems shall be installed and commissioned (once approval is granted) prior to occupancy.
- On-site systems are to be located within the lot boundary on which the building and associated on-site sewage system is installed.
- On-site systems shall comply with the setback distances as detailed in section 8.2.3 of this Code.
- Onsite systems shall be sited to not affect any structural elements of buildings and site developments, and with reasonable access for future maintenance, clearing of blockages and pumpout operations.
- Surface waters and storm water shall be diverted away from the onsite system including the land application area. This may be through construction of a diversion drain or cut off drain, as shown in AS/NZS 1547.

5.1.1 Installer Competencies

Installation of the on-site sewage system and the land application system shall be undertaken by a certified installer who has attended the appropriate accredited training program see Section 3.4.3 of this Code.

There will be a 3 year transitional time period for all installers to become certified from the time of this documents' publication.

5.1.2 Installation Notices

The Local Government shall require provision of an installation notice/s to be permanently located on the property. Any new property owner/occupier on a change of ownership/tenancy shall be advised of this location. The installation notice shall include the following:

- Type of system installed;
- Date of system installation;
- Operation and Maintenance manuals for the apparatus and land application system including contingency plan and troubleshooting guide;
- As constructed plans, showing the location of all parts of the onsite system;
- Prohibited discharges;
- Manufacturer details for further information;
- Design Report;
- Sewage Loading Certificate.

5.2 Commissioning and Inspections

On-site sewage systems shall be commissioned and inspected in accordance with AS/NZS 1547 and with the manufacturer's instructions, Department of Health and Local Government requirements.

Septic Tanks shall be commissioned in accordance with AS/NZS 1546.1 On-site Domestic Wastewater Treatment units, Part 1: Septic Tanks.

Composting Toilets shall be commissioned in accordance with AS/NZS 1546.2 On-site Domestic Wastewater Treatment units, Part 2: Waterless Composting Toilets.

Aerobic Treatment Units shall be commissioned in accordance with AS/NZS 1546.3 On-site Domestic Wastewater Treatment units, Part 3: Aerated Wastewater Treatment Systems.

5.2.1 Certificate of Compliance by Plumber

Installation of all sanitary plumbing and drainage associated with an on-site sewage system shall be undertaken by a licensed plumber. Following installation of all on-site sewage

systems, a Certificate of Compliance must be provided by a licensed plumber(s) for all “drainage plumbing” work associated with the construction and installation of an approved “apparatus for the treatment of sewage” (as well as any associated maintenance and repair work) up to the point of entry of the apparatus into the treatment tank.

5.2.2 “Certification of Compliance with Design” by Designer/Installer

The Designer/Installer of a system must certify on completion of the installation that the system has been installed/constructed in accordance with its approved design and any other conditions set by the Department of Health and/or Local Government. This certification must be provided to the Local Government.

5.2.3 Independent Certification for Large Commercial Systems

The Department of Health and/or the Local Government may choose to request independent certification for the system in writing by a qualified engineer or sewage consultant based on both the design and performance parameters demonstrating the correct size, design, treatment effectiveness, installation and durability of all parts of the apparatus, a maintenance and servicing plan for the system including procedures for breakdown and failure of the system.

The Department of Health may require an Independent third party engineering certification when a proposed project:

- Has a minimum operating design life of 20 years.
- Is designed to treat sewage from more than 1,000 people.
- Is complex or innovative.
- Design submission is incomplete or confusing; or
- Involves the appointment of designers/contractors based outside Australia.

The tank(s) must be certified in writing by a structural engineer.

The construction and installation of the system is required to be certified in writing by the installer, and must be provided in writing to Local Government prior to Local Government issuing a “Permit to Use” for the system. The certification must state that all equipment has been installed and commissioned in accordance with the manufacturer’s instructions, Department of Health and Local Government requirements and that it meets the requirements of this Code.

6. ON-SITE SEWAGE APPARATUS

6.1 Scope

All on-site sewage systems are an “Apparatus for the Treatment of Sewage” as defined under Section 3(1) of the *Health Act 1911*, and as such, the Executive Director Public Health, must approve their design, manufacture and use. This ensures that all systems available to the general public comply with the relevant regulations and are safe, compatible with household plumbing, and will provide effective long-term operation. For new apparatus to receive Executive Director Public Health approval the apparatus must be certified against the relevant Australian Standard and carry a watermark license.

A current list of all on-site sewage systems approved by Department of Health for use in Western Australia and advice on choosing the most appropriate system can be obtained from Local Government offices or the Department of Health website www.public.health.wa.gov.au.

Manufacturers wishing to get an on-site sewage apparatus approved need to consult the Department of Health’s “*Code of Practice for Product Approval of On-site Wastewater Systems in Western Australia*”.

6.2 General Function and Performance requirements

The function of an on-site sewage apparatus is to receive and treat sewage so as to produce an effluent appropriate for the intended land application area. In doing so the on-site sewage apparatus must:

- provide treatment capacity to meet expected hydraulic and organic loadings from the premises discharging sewage;
- provide a reliable treatment process that will achieve the effluent quality criteria nominated in section 7.21 of this Code, when operated and maintained in accordance with the manufacturer’s instructions; and
- provide easy access for authorised persons to all parts of the apparatus for inspection, maintenance and repairs.

Onsite sewage apparatus must comply with the performance requirements and criteria specified in AS/NZS 1547.

6.2.1 Prohibited Uses and discharges

No person should permit or cause, unless otherwise approved by the Local Government and/or Executive Director Public Health, any of the following substances to be discharged into an on-site sewage system as it may harm, impair or decrease its effective operation:

- any surface or subsoil drainage, rain water from any pavement or roof, or overflow water from rainwater tanks or flushing systems, or other relatively clean water;
- any inflammable or explosive materials that are not readily soluble in water, or any materials which when mixed with sewage or water are liable to form explosive compounds or to interfere with the treatment process.
- any insoluble matter or articles, dead animals, or rubbish whatsoever; or
- any liquids or solids that are bactericidal in effect in such quantity as to affect the proper functioning of the septic tank.
- any back flush waters from a swimming pool or water softener,
- any matter or substance, which in the opinion of the Local Government is likely to impair the effective working of an on-site sewage system.

6.2.2 Interfering with an apparatus

- No person should modify, dismantle, remove, alter or change the mode of operating an apparatus without first obtaining written permission from the Local Government and/or Executive Director Public Health. This does not include Authorised Service Person conducting servicing or the desludging of an apparatus.
- No person shall cause or permit the discharge into an apparatus of any matter which may interfere with the efficient operation of the apparatus.
- Where daily flow rate changes and the loading certificate for an apparatus is exceeded, a new application for approval must be submitted.

6.2.3 Use of damaged or defective apparatus

- No person shall use an apparatus that becomes damaged or defective.
- The owner of any premises shall not permit any person to use any apparatus which is damaged or defective.
- The owner/occupier of the premises shall notify the Local Government of any apparatus that becomes damaged or defective.

6.2.4 Pumps

Pumps must be provided with an audible and visible (indicator light) alarm system, to show an electrical or mechanical malfunction, which is activated when the liquid level reaches the high liquid level. The alarm system shall include audible and visual alarms in a prominent location on the site, with a temporary muting option for the audible alarm. The muting facility on an audible alarm shall reset to audible after 24 hours. Alarms shall be located in a position where it is readily visible and audible from within the dwelling or as required by the Local Government.

Onsite sewage systems that incorporate a pump, must maintain at least a 24-hour emergency storage volume above the high-water-level alarm sensor.

6.2.5 Siting of Onsite Sewage Apparatus

A structure must not be erected above any onsite sewage apparatus or drainage line if that structure —

- (a) obstructs free access to the apparatus; or
- (b) has walls on more than 3 sides.

Onsite apparatus shall be sited so as to not affect any structural elements of any buildings and site developments, in compliance with setback conditions and with consideration for future maintenance access.

6.2.6 Mosquito-proof cowls

All educt and back vents used in connection with septic tanks, pump tanks, aerobic treatment units, sewage apparatus, and soil absorption systems shall be fitted with an approved mosquito proof cowl and so be maintained by the owner.

6.2.7 Emptying a tank or other sewage storage component of an apparatus

Where the Environmental Protection (Liquid Waste) Regulations 1996 do not apply, a tank or other waste storage component of an apparatus shall be emptied:

- a) in a manner; and
- b) by a person, approved by the Local Government.

6.3 Septic Tanks

All septic tanks manufactured for sale in Western Australia must be approved by the Department of Health. A list of approved septic tank manufacturers is available on the Public Health website www.public.health.wa.gov.au.

Septic tanks must comply with the requirements of AS 1546.1 On-site domestic wastewater treatment units Part 1: Septic Tanks.

6.3.1 Partition of a septic tank

When the capacity of a septic tank exceeds 2045 litres the tank shall be divided into 2 chambers by means of a fixed durable partition, and the partition shall be located so that the capacity of the first chamber is twice that of the second chamber.

6.3.2 Outlet Filters

As recommended in AS 1546.1, an outlet filter should be installed on all septic tanks. Outlet filters are devices which control the discharge of suspended solids in the effluent leaving the septic tank by preventing carryover of gross solids and scum.

6.4 Aerobic Treatment Units (ATU's)

All aerobic treatment units (ATU's) manufactured for sale in Western Australia must be approved by the Department of Health. A list of approved ATU's is available on the Public Health website www.public.health.wa.gov.au.

ATU's must comply with the requirements of AS/NZS 1546.3 On-site domestic wastewater treatment units Part 3: Aerated Wastewater Treatment Systems. Additional fixtures such as spa baths and food waste disposal units are not permitted to be used in conjunction with ATU's.

The land application area/s serving an ATU is an integral part of the system and must be installed by the person responsible for installing the ATU.

6.5 Composting Toilets

All composting toilets manufactured for sale in Western Australia must be approved by the Department of Health. A list of approved composting toilets is available on the Public Health website www.public.health.wa.gov.au.

Composting toilets must comply with the requirements of AS 1546.2 On-site domestic wastewater treatment units Part 2: Waterless Composting Toilets.

Excess liquid from a composting toilet shall be collected as blackwater, or combined with greywater, and disposed of in accordance with the Department of Health product approval conditions and the installation approval conditions issued by the Local Government.

Residential dwellings with a composting toilet installed require a greywater system that is approved to receive kitchen wastewaters. It should be noted that greywater diversion devices must not be used for kitchen greywater. In most cases a sedimentation tank sized correctly should be installed.

6.6 Alternative Toilets

All alternative toilets such as the dry type septic tank, dehydrating, incineration and chemical toilets manufactured for sale in Western Australia must be approved by the Department of Health. A list of approved alternative toilets is available on the Public Health website www.public.health.wa.gov.au.

6.7 Sand and Textile Filters

All sand and textile filter treatment systems manufactured for sale in Western Australia must be approved by the Department of Health. A list of approved sand and textile filters is available on the Public Health website www.public.health.wa.gov.au.

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

6.8 Decommissioning disused on-site Sewage Systems

The owner of a property is responsible for the decommissioning of any disused apparatus for the treatment of sewage (such as disused septic tanks and aerobic treatment units), when a property is connected to the reticulated sewerage.

Only licensed and approved persons can decommission septic tanks.

Contact your Local Government Environmental Health Officer for a list of licensed and approved person's in your area.

An on-site sewage system must be decommissioned when:

- There is a material change in the use of the premises, (for example the conversion of a residence to a child care centre). Decommissioning must occur within 60 days from the day on which the change in use occurred.

- The ownership of the property has changed. Decommissioning must occur within 60 days after ownership of the property has changed.
- The foundations for a building on the premises are to be built closer than 1.2 metres from the apparatus or
- A building is to be constructed above the apparatus. Decommissioning must occur before building works commence.

7. LAND APPLICATION SYSTEMS

7.1 Scope

The Land Application System (LAS) is the system used to apply effluent from an on-site sewage system into or onto the soil for further in-soil treatment and absorption.

The Land Application Area (LAA) is the designated area of the land where the land application system is located and where the effluent is applied onto or into the ground.

Land Application Systems broadly fall into two main categories:

- Soil absorption systems (also known as leach drains) e.g. absorption trenches and evapo-transpiration beds
- Irrigation Systems e.g. covered surface drip irrigation system, a shallow subsurface LPED (low pressure effluent distribution) irrigation system or an above ground spray irrigation system.

7.2 Design Requirements

The land application system must be designed using the hydraulic loadings in section 5 and be able to receive, treat and absorb the effluent evenly over the entire area.

Land-application systems shall be sited and installed so that:

- They are located on the lot on which the building and associated on-site sewage system is installed.
- They comply with the required setback distances (see section 8.2.2 of this Code).
- Run-off or seepage of effluent is prevented.
- Effluent is distributed evenly over the land application area.
- The land application system is clearly delineated with the position of underground pipes either marked on the ground or on a scaled plan.
- Where practical, they are exposed to prevailing winds, not shaded from the sunlight, and are placed where nearby plants can help evapo-transpire the effluent.
- Land slope is not be greater than 20%.
- The area is not subject to significant stormwater run-on or upslope seepage. If run-on does occur, stormwater must be diverted around the land application area (LAA) using suitable means, such as earth banks, grass swales, or grated drains. Subsoil drains should be installed upslope if the area is subject to seepage.

7.2.1 Effluent Quality Requirements

The level of sewage treatment determines the disposal method of the effluent. Below ground (sub-soil) irrigation methods are preferred, as they minimise the likelihood of exposure to sewage. Below ground disposal of sewage does not require disinfection while surface irrigation of sewage must be of secondary quality and be disinfected in accordance with AS/NZS 1547.

Effluent quality requirements for the different land application systems shall be in accordance with table 10 below.

Table 10: Acceptable Land Application System's based on treatment method.

Treatment method	Water Quality Criteria	Acceptable Land Application System
Primary Treated Effluent from Septic Tank	n/a	Soil Absorption Trench/Bed Evapo-transpiration Bed Mound
Secondary Treated Effluent with no disinfection	<20 mg/L BOD, <30mg/L suspended solids	Soil Absorption Trench/Bed Evapo-transpiration Bed Mound Subsurface drip
Secondary Treated Effluent with disinfection	<20 mg/L BOD, <30mg/L suspended solids, <10 E.coli/100mL, ≥1mg/L total chlorine	Surface Spray Covered Drip

7.2.2 Setback Requirements

The design of a land application system shall meet all required setbacks. For the situations not covered in Tables 11 & 12 below, including all multi-dwelling and commercial systems, AS/NZS 1547 provides requirements for locating a land application area on a lot.

Table 11: Horizontal Setback Distances for Single Residential Dwellings.

Land Application System	Site Feature	Setback
All Land Application Systems	Public Water Supply Production Bores located in Public Drinking Water Source Areas ⁴	100m
	Potable Private Bore	30m
	Non-potable ⁵ Private Bore	20m
	Watercourses used for agriculture, aquaculture and stock watering	50m
Soil Absorption System – Trenches, Beds and mounds	Property boundary	3m up-slope
		1.8m down-slope
	Building	6m up-slope
		3m down-slope
	Driveways, paved surfaces	1.2m
	Sub-soil/open drains	6m
	Swimming pool	6 up-slope
		3 down-slope
Irrigation System – Dripper	Property boundary	0.5m
	Building	0.5m up-slope
		1.8m down-slope
	Driveways, paved surfaces	0.5m
	Sub-soil/open drains	3.0m
	Swimming pool	1.0m
Irrigation System – Spray	Property boundary	1.8m
	Building	3m up-slope
		1.8m down-slope

	Driveways, paved surfaces	1.8m
	Sub-soil/open drains	6m
	Swimming pool	6m up-slope
		3m down-slope

NOTES:

1. Establishing a land application area upslope of a building may have implications for the structural integrity of the building. This issue is beyond this Code's scope and should be examined by a building professional on a site-by-site basis.
2. Separation distances from boundaries may need to be increased
3. For description of Public Drinking Water Supply Areas (PDWSA) contact the Department of Water, www.water.wa.gov.au. For details on minimum recommended setback buffer distances in PDWSAs please refer to Appendix 2 of the Government Sewerage Policy
4. Where a bore is established to draw ground water solely for garden purposes only (not for animal or human consumption), the Local Government may approve a distance of less than 30 meters. The Local Government will determine the set back distance (which should be as far as practicable, away from the land application area). The Local Government must request the owner provide in writing a statement that the bore water is for garden purposes only.
5. For details on minimum recommended buffer distances in environmental sensitive areas please refer to Appendix 3 of the Government Sewerage Policy

Table 12: Vertical Setback Distances from Bedrock and Groundwater

	Distance in Meters ^{1,2}
Highest known Groundwater level	0.6 – 1.5m
Hardpan or bedrock ³	0.6 – 1.5m

NOTES

1. The distance is dependant on soil type, minimum distance can be used for loams and clays, and the maximum should be used for gravels and sands.
2. The depth is measured from the base of the disposal/irrigation system (ie trench bottom, bed base or dripper tube).
3. Bedrock for the purposes of this Code is unbroken solid rock and includes shallow cap rock formations.

7.2.3 Minimum Land Application Area

The minimum land application area required to dispose/reuse the treated effluent into or onto the soil depends mainly on the type of soil and the level of treatment. Table 13 represents the minimum land application area required in square metres per each litre of effluent produced per day.

Table 13: Minimum Land Application Area required per soil type per each litre of effluent produced per day

Soil category ¹	Soil texture	Minimum Land Application Area Required (m ²) ¹	
		Primary Treatment ²	Secondary Treatment ³
1	Gravels and sands	0.377	0.2
2	Sandy loams	0.377	0.2
3	Loams	0.477	0.25
4	Clay loams	0.689	0.286
5	Light clays	1.284	0.333
6	Medium to heavy clays	1.284 *	0.5

Notes:

1 Soil category is to be determined by undertaking a *site and soil evaluation (SSE)* as per AS/NZS 1547 *On-site domestic wastewater management*. Indicative permeability and drainage classes are required to be determined in the SSE.

2 Minimum required land application area, including setback distances, has been determined using Recommended Design Loading Rates for trenches and beds extrapolated from Table L1 AS/NZS 1547:2012

3 Minimum required land application area, has determined using Design Irrigation Rate for irrigation systems extrapolated from Table M1 of AZ/NZS 1547:2012 *On-site domestic wastewater management*.

* To enable use such soil for land application system soil modification will be required.

7.2.4 Designated Land Application Areas (LAA)

The size and location of a land application area (LAA) forms an integral part of the approved sewage system. The land application area shall be maintained as a permanent dedicated area for the purposes of effluent disposal.

Land application areas shall not, unless otherwise approved by Local Government, be:

- Paved, sealed or covered with a surface treatment;
- Have any structure erected above it;

- Subject to vehicular traffic or located less than 1.2m from an area that is subject to vehicular traffic;
- Altered or reduced in size without approval from the Local Government;
- Be kept in a manner which compromises the servicing and maintenance of the on-site treatment system;
- Subject to regular foot traffic such as pathways and clothesline areas.

7.2.5 Landscaping Requirements

The land application area shall be landscaped to prevent pooling of effluent or run-off from the area by: the installation and use of bunds, cut-off drains, or improved surface drainage as appropriate. Alternatively, the land-application system shall be shaped to shed rainfall. All roof waters must be diverted away from the disposal area.

7.2.5.1 Landscaping Requirements for Soil Absorption Systems

The surface of trenches, beds and mounds must be planted with shallow rooting grasses and/or shrubs that tolerate wet conditions and have a high evapo-transpiration capacity. Such plants shall be suitable for local conditions and be salt and nutrient resistant.

It is recommended that shrubs be planted no closer than one (1) meter from the sidewall of a bed or trench and small trees (<5m) no closer than five (5) meters. Large trees, such as, eucalypts, figs or mangoes should be planted no closer than 20 metres from the beds. A good rule of thumb is to plant the shrub/tree a little more distance away from the bed than it would grow in height i.e. a shrub that will grow 3m in height, is planted 3m plus away.

7.2.5.2 Landscaping Requirements for Irrigation Systems

Irrigation areas shall comply with the following requirements:

- Have at least two warning signposts, complying with AS 1319, at the boundaries of the irrigation area. The signs must be clearly visible to property users, with wording such as, "Recycled Water – Avoid Contact – DO NOT DRINK".
- The irrigation/ distribution lines, sprinklers and fixtures used must be purple in colour or have a purple line to indicate recycled sewage.
- Shall not be used for the growing of vegetables or food plants where the spray may contact the plant. If covered surface drip irrigation is used, fruit and nut trees may be allowed by Local Government, provided the produce has no contact with the treated effluent.
- Maintain a minimum depth of 300mm of natural topsoil or imported topsoil above any underlying limiting layer (eg rock, hard pan or clay), to store the applied effluent, to support the growth of plants and to maximize evapo-transpiration.

- Mulch over a covered drip irrigation area shall be maintained at all times at a thickness of 50mm.
- The minimum standard for pipe work must be polyethylene complying with AS 2698. Installation of pipe work must comply with AS/NZS 3500, be suitable for use with wastewater and buried at least 150mm underground. Potable pipes are not permitted under any circumstances for use in the irrigation system.
- Care must be taken in the selection of the type and placement of the spray heads to ensure the plume is contained totally within the LAA. This may require the installation of 90⁰ and/or 180⁰ sprays around the perimeter.
- Sufficient space must be provided on the site for domestic, social and recreational activities. For single domestic occupancies this must be a minimum of 100 m². The Local Government may exempt non-residential premises from this requirement. NOTE: The social and recreational area does not include the building and perimeter paving, foot and vehicle access, vehicle parking, setbacks, carports, garages and storage sheds, etc

7.3 Land Application Systems

7.3.1 Soil Absorption Systems

Soil absorption systems are known in Western Australia as “leach drains” or “french drains”. In AS/NZS 1547 they are known as an “Absorption Trench”, “Absorption Bed” or “Mound”.

Absorption Trenches (leach drains) can be made of one or a combination of the following: aggregate, concrete and/or plastic.

The soil absorption systems approved for use in Western Australia are:

1. A Department of Health approved design. For list of approved concrete and plastic leach drains see the Public Health website www.public.health.wa.gov.au;

OR

2. An AS/NZS 1547 standard design. The designs covered in AS/NZS 1547 include:

- Absorption trenches and absorption beds
- Evapo-transpiration/absorption/seepage (ETA) systems
- Mounds

7.3.1.1 Absorption Trenches and Beds (Leach Drains)

Absorption trenches are for use on lots, which are reasonably flat, although when properly designed absorption trenches can also be used on sloping sections where soil absorption is

good. Effluent flows out the trenches and then soaks into the surrounding soil. The soil and bacteria in the soil treat the effluent further.

The dimensions of absorption trenches vary, however the dimensions (width and depth) will determine infiltrative area and therefore the length of trench required. The minimum spacing between adjacent trenches and beds (sidewall to sidewall) is 1000mm for sands and 2000mm for clay loams to light clays.

Where more than one trench is needed, trench lengths should be equal and effluent should be distributed evenly via a splitter box, diverter or sequencing valve. Trench lengths should be designed to ensure that effluent is evenly distributed and reaches the far end of each trench. Individual trench length should be less than 20 metres for passive systems, or 25 metres for pressure dosed trenches.

Trenches and beds shall be constructed in accordance with AS/NZS 1547.

Trench and bed dimensions shall be determined from the following equation:

$$L = \frac{Q}{DLR \times W}$$

Equation 2

Where:

L	=	trench length in meters (m)
Q	=	design sewage daily flow in litres per day (L/day) The design sewage daily flow can be taken from Section 5
DLR	=	Design Loading Rate in mm/d The DLR can be found in AS/NZS 1547 Recommended Design Loading Rates for Trenches and Beds
W	=	width of trench in meters The absorptive width of a trench is calculated by
W	=	Trench width (base) + (2 x effective depth of aggregate/drain)

See appendix 4: Figure 1: Absorption Trench: On-site Effluent Disposal Systems for further details on design and a worked example.

7.3.1.2 Evapotranspiration Absorption Trench/Beds

ETA systems (evapo-transpiration-absorption) use subsurface infiltration of effluent into the soil and evapo-transpiration by plants. ETA systems can be used in areas with low

permeability soils. Some ETA systems are sealed on the base, and thus rely on evaporation only.

ETA systems shall be constructed in accordance with AS/NZS 1547.

ETA system must be sized by using a water balance calculation, see AS/NZS 1547 for further details. The water balance determines the volume of storage in the gravel bed. This ensures the bed does not overtop in prolonged wet periods when evapotranspiration losses are lower than inputs from rainfall and effluent load.

See appendix 7: Figure 4: Evapotranspiration Absorption (ETA) Trench/Bed: On-site Effluent Disposal Systems and Patterson Dr RA, 'Evapotranspiration Bed Designs for Inland Areas', Lanfax Laboratories, Armidale, 2006.

<http://www.lanfaxlabs.com.au/papers/Technical%20Sheet%20%20Evapotranspiration-aug06.pdf> for further details on design.

7.3.1.3 Mounds

Mound systems are elevated absorption beds also known as inverted leach drains, constructed on the surface of the soil and are filled with medium-grade sand to provide suitable filtering for treatment of the effluent, before it soaks down into the groundwater table. The surfaces of the mound are grassed or planted with shrubs.

The mound systems should be installed areas with relatively flat slopes and where:

- the natural water-table can approach the ground surface,
- there are shallow soils overlying rock or hardpan,
- soils are imperfectly drained, poorly drained or very poorly drained.

Mounds shall be constructed and sized in accordance with AS/NZS 1547. Mounds shall be sized according to the loading rate for the sand fill, on the underlying soil basal area, and when slopes are involved, on the vertical or horizontal linear loading rate of the soil below the toe area of the mound. The size of the basal area, which is that area beneath and down-slope of the distribution bed, shall be calculated using the DLR for the soil as given in AS/NZS 1547.

See appendix 8: Figure 5: Mound Systems: On-site Effluent Disposal Systems or Converse JC and Tyler EJ, 'Wisconsin Mound Soil Absorption System: Siting Design and Construction Manual', University of Wisconsin-Madison, 2000 for further details on design and a worked example.

7.3.1.4 Ponds

All ponds used for the disposal of sewage must be constructed in accordance with plans, specifications and dimensions approved by the Executive Director, Public Health and complying with the following conditions:

- a) the pond shall be surrounded by a 1.8meter wire mesh fence, with a locked access gate, and
- b) the inner banks shall be kept clear of weed growth at all times.

7.3.2 Irrigation Systems

Irrigation systems approved for use in Western Australia are:

- 1 Sub-surface Drip Irrigation – drip irrigation installed at 100mm below the soil surface.
- 2 Covered Surface Drip Irrigation (or Sub-strata) – drip irrigation where the drip irrigation lines are placed on the top of the ground surface and covered with a minimum of 100mm of mulch, bark or woodchips.
- 3 Surface Spray Irrigation – sewage is applied to the ground surface from sprinklers above ground level with coarse droplets. This is only permitted where sewage has been treated and disinfected prior to irrigation.
- 4 Low Pressure Effluent Distribution (LPED) – irrigation though low pressure effluent lines that are perforated with drilled squirt holes and nestled in a distribution line installed 100mm below the soil surface.

Irrigation systems must be constructed and installed in accordance with AS/NZS 1547. As such all pipes and fittings should comply with AS/NZS 4130 and AS/NZS 4129 or with AS/NZS 1477. The use of garden hoses and fittings is not permitted. Drip lines should be of purple colour to indicate sewage. Irrigation systems are only suitable for secondary-treated effluent that complies with the effluent-quality requirements of AS/NZS 1547.

The irrigation system must not connect to the reticulated water supply.

A full hydraulic design must be carried out. Irrigation systems shall be sized using the DIR in AS/NZS 1547 Table M1 Recommended Design Irrigation Rate (DIR) for Irrigation Systems.

See appendix 3: Figure 2: Sub-surface Drip Irrigation: On-site Effluent Disposal Systems for further details on design and a worked example and appendix 4: Figure 3: Surface Spray Irrigation: On-site Effluent Disposal Systems for further details on design and a worked example.

The DIR values in AS/NZS 1547 adopt a conservative approach to design-irrigation rates. Where design experience, and/or research results, and/or performance practice can

demonstrate that less conservative approaches provide an equal result in achieving performance objectives they can be adopted. Justification for their adoption shall form part of the final design report to the Local Government.

8. OPERATION AND MAINTENANCE

8.1 General

Operation and maintenance (O&M) of on-site sewage systems is essential for their long term viability. O&M procedures are needed to help achieve sustainable and effective long term performance from the sewage system so that it complies with public health and environmental requirements.

Onsite sewage systems are prone to failure if operated and maintained incorrectly. All onsite sewage systems require a high degree of user dedication in terms of operation and maintenance to ensure that the design performance is achieved for its expected life. All on-site sewage systems, or components of systems, have a finite life and will at some time require replacement. This should be acknowledged by all stakeholders and explained to homeowners by manufacturers and Local Governments.

8.2 Operation and Maintenance Guidelines

All onsite sewage systems shall have operation and maintenance manuals for all aspects of the onsite sewage system. The designer, manufacturer and/or installer must ensure that operation and maintenance manuals are provided to all owners and operators of an onsite sewage system at the time of installation or on occupation of the premises. For further details on the content of operation and maintenance guidelines see AS 1547:2012.

8.3 Responsibilities of Owners/Operators

- Owners must ensure the details and requirements for the system operation, maintenance and monitoring (including plans, design reports, loading certificate, equipment brochures etc) are retained on the property and are readily accessible to the occupier.
- Owners of onsite sewage systems shall ensure that they hold maintenance and service contracts for their onsite sewage systems, (where applicable under the conditions of product approval) and make service records available to the relevant Local Government on request. Owners shall ensure that all servicing is undertaken by an authorised service provider.
- Owners should keep records of maintenance carried out for the past 5 years.
- On-site sewage systems must be maintained and operated, to not pose any risk to public health and or the environment.
- On-site sewage system must be operated and maintained in accordance with the approval conditions set by the Local Government and the Department of Health.

Property owners must keep their onsite sewage system in good working order. If any of the following warning signs are evident, the property owner or occupier should contact an authorised service Person immediately and inform the Local Government that repair or maintenance work is underway. Warning signs of a problem with a system which has not been maintained and where absorption areas have become blocked or clogged include:

- The land application area becoming wet or soggy with wastewater ponding on the surface of the ground;
- Drains and toilets running slowly;
- A smell of effluent near the treatment system or land application area;
- The grease trap being full or blocked.

8.4 Local Government

Local Government must ensure on-site sewerage systems are serviced regularly in accordance with the Local Government Approval and the Department of Health product approval.

The Local Government may choose to undertake septic tank desludging and/or provide maintenance services through a contractor or other Persons.

The Local Government should undertake regular performance monitoring of installed on-site sewage systems to determine the ongoing performance of on-site sewage systems. This may include sampling and testing of effluent or recycled water quality, land application system assessment and/or other sampling, testing or monitoring as determined by the Local Government.

8.5 Maintenance of Septic Tanks

Maintenance requirements for septic tanks are as follows:

- Regular desludging;
- Regular cleaning of any grease trap;
- Exposure of the vent and/or access cover of the septic tank;
- Regular inspection and cleaning of the outlet filter;
- Ensuring all access openings are maintained so as to be gas and water tight.

An effective maintenance program should include annual checking to ensure a free capacity equal to one third of the effective liquid depth within the detention zone as measured in the

first compartment. If the accumulation of sludge and scum has decreased the capacity below this level, then the tank requires desludging.

8.6 Maintenance of Composting Toilets

The maintenance requirements for composting toilets includes removal of composted material. The frequency with which compost requires removal will depend on the size of the unit and the level of use. The composted material must be disposed of in accordance with AS/NZS 1546.2, the manufacturer's instructions and must have completed a 12 month composting period before disposal. The composted material must be buried if disposal is to be onsite. The cover of soil over the composted material must be at least 75mm.

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 section 7.2.2 of this Code.

8.7 Maintenance of Aerobic Treatment Units and other secondary treatment systems.

Aerobic Treatment Units and other secondary treatment systems (including greywater treatment systems) must be serviced by an authorised service person on a regular basis as per the conditions of product approval issued by the Department of Health.

The maintenance schedule should where applicable include tests and checks of the following:

- sludge buildup;
- turbidity;
- disinfection equipment;
- air supply to aeration tank; or flow distribution and slimes growth on filter media; or growth on biodiscs;
- noise levels from electric motors, pumps, and aerator;
- alarms - air supply, water level, chlorine tablet supply;
- effluent filter (cartridge in effluent pipeline);
- irrigation system;
- land application area - plant condition, evidence of surface water.

Damaged, malfunctioning equipment etc must be repaired or replaced as soon as practicable without impacting on the continued operation of the unit.

All inspection/manhole openings must be secured in place after each servicing.

The land application area must be maintained to a standard that prevents it from being a risk to public health or creating a nuisance. Such maintenance is to prevent the occurrence of spray drift, misting, pooling and run-off of effluent.

Spray irrigation areas must be maintained to ensure that appropriate warning signs are always visible to persons undertaking any activity near a land application area.

8.8 Authorised Service Persons

Maintenance on an Aerobic Treatment Unit or a secondary treatment system can only be carried out by service persons that are:

- authorised by the manufacturer of the system for the servicing of their system; or
- authorised by the Executive Director Public Health.

A list of authorised service persons is available on the web at www.public.health.wa.gov.au or at your Local Government.

Applicants seeking approval, to be 'Authorised Persons' shall apply in writing to the Executive Director Public Health at the Department of Health. The application along with any supporting documentation, such as references, service reports and maintenance agreements will then assessed against the minimum criteria outlined in the "Guidelines for becoming an Authorised Service Person for domestic aerobic treatment units".

8.8.1 Maintenance Reports by Authorised Service Providers

Authorised Service providers must provide a copy of each service record to, and notify, the Local Government if the owner/operator does not renew a service contract.

Where the installation of the system has been approved by the local government, a maintenance report is required to be prepared in duplicate after each inspection. The duplicate being retained by the authorised person, and the original forwarded to the local government.

Where the installation of the system has been approved by the Executive Director Public Health, a maintenance report is required to be prepared in triplicate after each inspection. The triplicate being retained by the authorised person, the duplicate forwarded to the Executive Director Public Health and the original forwarded to the local government.

Further Information

Comments and questions about on-site sewage can be directed to the **Water Unit** at the Department of Health.

Web:	http://www.public.health.wa.gov.au
Mail:	Water Unit Environmental Health Directorate Department of Health PO Box 8172 Perth Business Centre WA 6849
Phone:	(08) 9388 4999
Fax:	(08) 9388 4910

This document is available in alternative formats on request for a person with a disability.

Copies of Australian Standards are available from

Standards Australia

Internet: www.standards.org.au

SAI Global Customer Service Phone: 13 12 42 Fax: 1300 65 49 49

Email sales@saiglobal.com

Information on Public Drinking Water Source Areas, water reserves, catchment areas and flood prone areas is available from:

Department of Water

PO Box K822

Perth WA 6842

Phone: (08) 6364 7600

Fax: (08) 6364 7601

Web: <http://www.water.wa.gov.au>

Information on Environmental Sensitive areas is available from:

Department of Environment and Conservation

Locked Bag 104

Bentley Delivery Centre WA 6983

Phone: (08) 6467 5000

Fax: (08) 6467 5562

Web: <http://www.dec.wa.gov.au>

Resources and Helpful Websites

Converse JC and Tyler EJ, 'Wisconsin Mound Soil Absorption System: Siting Design and Construction Manual', University of Wisconsin-Madison, 2000

Department of Agriculture, Soil-Landscape Mapping In South-Western Australia Resource Management Technical Report 280 November 2004

Department of Agriculture, Soil Groups Of Western Australia A Simple Guide To The Main Soils Of Western Australia Resource Management Technical Report 246 June 2002

Department of Agriculture, Land resources in the South-West Agricultural Region, A shire-based summary of land degradation and land capability, Resource Management Technical Report 330

For mapped information at <http://spatial.agric.wa.gov.au/slip/> and Go to Maps

Patterson Dr RA, 'Evapotranspiration Bed Designs for Inland Areas', Lanfax Laboratories, Armidale, 2006.

<http://www.lanfaxlabs.com.au/papers/Technical%20Sheet%20%20Evapotranspiration-aug06.pdf>

Appendix

Appendix 1: FORM: Application to Construct, Install or Modify an Apparatus

HEALTH ACT 1911

HEALTH (TREATMENT OF SEWAGE AND DISPOSAL OF EFFLUENT AND LIQUID WASTE) REGULATIONS 1974

APPLICATION TO CONSTRUCT, INSTALL OR MODIFY AN APPARATUS FOR THE TREATMENT OF SEWAGE

Applicant details				
Company Name				
Name of Evaluator				
Address		Post code		
Phone		Fax		
Signature of Evaluator		Date of Assessment		
The site details				
Lot number		House number		
Street Name				
Town/Suburb		Post Code		
Business Name				
Local Government				
Premise details				
Type of Dwelling	New	<input type="checkbox"/>	Existing	<input type="checkbox"/>
	Single Dwelling	<input type="checkbox"/>	Multiple Dwelling	<input type="checkbox"/>

	Domestic/Residential		<input type="checkbox"/>	Commercial/Industrial		<input type="checkbox"/>
Number of Bedrooms	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>
Lot size (m ²)						
Spa on premises				Volume of spa (litres)		
Equivalent population (potential maximum occupancy)						
Per capita sewage production (litres per person per day)						
Expected Sewage Quantity (litres/day)						
Water supply to premises	Reticulated Mains Water <input type="checkbox"/>		Bore <input type="checkbox"/>	Rainwater Tank <input type="checkbox"/>		
Assessment of the site						
Note this does not need to be a geotechnical report. A geotechnical report will only be required after initial assessment of the application identifies the application as having a higher level of risk due to site conditions and/or volumes.						
Aspect/Exposure of the land application area (sun/wind)	High <input type="checkbox"/>		Moderate <input type="checkbox"/>		Poor <input type="checkbox"/>	
Slope of land application area	Negligible	<input type="checkbox"/>	Less than 10-20%	<input type="checkbox"/>	Greater than 20%	<input type="checkbox"/>
	Upslope diversion drain required	<input type="checkbox"/>	Downslope runoff prevention bund required	<input type="checkbox"/>	Terracing required	<input type="checkbox"/>
Is a domestic groundwater bore present on-site	Less than 30m	<input type="checkbox"/>	Greater than 30m	<input type="checkbox"/>	Used for drinking	<input type="checkbox"/>
Approximate distance to nearest sewer connection point	Less than 90m		<input type="checkbox"/>	Greater than 90m		<input type="checkbox"/>
Distance to dams, drains, intermittent watercourses	Less than 50m		<input type="checkbox"/>	Greater than 50m		<input type="checkbox"/>
Flood potential	Land application area above 1 in 100 year		<input type="checkbox"/>	Electrical components above 1 in 100 year flood		<input type="checkbox"/>

	flood level		level	
Public water supply production bores	Less than 100m	<input type="checkbox"/>	Greater than 100m	<input type="checkbox"/>
Assessment of the Soil (must be assessed in accordance with AS/NZS 1547)				
Depth to bedrock or hardpan (m)		Depth to water table (m)		
Overall soil category assigned				
<ol style="list-style-type: none"> At least two test holes are to be dug in a central location in the primary and reserve land application areas. These holes should be MADE SAFE and marked after site assessment to allow for future Local Government inspection if required. Minimum depth of test holes for surface irrigation is 600mm Minimum depth of test holes for subsurface irrigation, trenches, leach drains or transpiration areas is 1000mm 				
The on-site sewage system				
Onsite Sewage Treatment System				
Type				
Name/Model				
Manufacturer				
Capacity/Sizes				
Disinfection type				
Health Dept WA Approval Number				
Service Person				
Land Application System (the size of land application area must be justified with calculations in accordance with AS/NZS 1547).				
Subsurface Drip Irrigation	<input type="checkbox"/>	Evapo-transpiration	<input type="checkbox"/>	

Surface Drip Irrigation		<input type="checkbox"/>	Leach Drain/Absorption Trench		<input type="checkbox"/>
Surface Spray Irrigation		<input type="checkbox"/>	Mound		<input type="checkbox"/>
In-house use		<input type="checkbox"/>	Other (specify)		<input type="checkbox"/>
Number of trenches/beds/irrigation areas			Total Land Application Area (m ²)		
Length (m)		Width (m)		Height (m)	
Depth (m)		Spacing (m)			
Name/Model					
Manufacturer					

This application must include:

1. A completed application form.

2. Site Plan

The site plan must be to scale(1:100) showing the setbacks and location of:

- a) the on-site sewage apparatus
- b) the land application area/s;
- c) any dwellings, buildings or facilities proposed or existing on the property
- d) any water courses on the lot (such as waterways, dams and drainage channels),
- d) any groundwater bores,
- e) the location of any existing sewage system and land application area (if applicable).

3. Specifications of the on-site sewage apparatus

The on-site sewage apparatus must have a current “product approval certificate” issued by the Department of Health.

4. Specifications of the land application system

Full details and dimensions of the land application system must be provided including the calculations for sizing of the area and the loading rates used.

- a) Where applicable, cross sectional drawings through any proposed trenches, drains, mounds and beds (including dimensions),

- b) Where applicable, detailed design plans and information for the irrigation pipe work within the land application area.

5. Soil and Site Evaluation Report

The soil and site evaluation report must be in accordance with AS/NZS 1547.

6. Sewage Loading Certificate

The sewage loading certificate states the maximum volumes the system can handle. The certificate specifies the design criteria and the limitations associated with the use of the on-site system and incorporates such matters as:

- a) System capacity (number of persons and daily flow);
- b) Summary of design criteria;
- c) Use of water efficient fittings, fixtures, or appliances;
- d) Allowable variation from design flows (peak loading events);
- e) Consequences of changes in loading (due to varying sewage characteristics);
- f) Consequences of overloading the system;
- g) Consequences of underloading the system;
- h) Consequences of lack of operation, maintenance, and monitoring attention; and
- i) Any other relevant considerations related to use of the system.

7. Operation and Maintenance Manual/s

The operation and maintenance guidelines should include the following management and technical matters:

- a) An outline of the management needs of on-site systems and the roles and responsibilities of those involved;
- b) Descriptions of the type of on-site system installed including information on how it functions;
- c) The dwelling activities which are likely to affect the successful operation of the on-site system;
- d) The management of the sewage treatment unit and the land application system;
- e) The maintenance needed for the sewage treatment unit, including regular pumping out of sludge or septage;
- f) The operation and maintenance of distribution boxes, siphons, pumping units, gates, and valves;
- g) The need for, and extent of, monitoring (such as inspection frequency and testing requirements);
- h) The maintenance tasks such as care of vents, surface water and sanitary drains, flushing of
- i) pumped distribution lines and trimming of evapotranspiration plantings;
- j) The limitations of the system (such as capacity, level of treatment) and the risks associated with operating the system outside those limitations;
- k) Contact details for emergency services;

8. Maintenance Agreement Certificate

If the system requires regular maintenance by an authorised service person the servicing arrangements, including a copy of any maintenance agreement made with an authorised service Person must be submitted.

Appendix 2: FORM: Application to Use Apparatus

HEALTH ACT 1911

HEALTH (TREATMENT OF SEWAGE AND DISPOSAL OF EFFLUENT AND LIQUID WASTE) REGULATIONS 1974

APPLICATION TO USE AN APPARATUS FOR THE TREATMENT OF SEWAGE

Installation details			
Approval to construct, install or modify – Approval Number			
Address of Installation			
		Post code	
Local Government			
Applicant details			
Name/Company Name			
Address			
		Post code	
Phone		Fax	
Signature of Applicant			
Installer details			
Name/Company Name			
Address			
		Post Code	
Phone			
Signature of installer			

Owner details			
Name/Company Name			
Address			
		Post code	
Phone			
Signature of owner			

Appendix 3: DAILY SEWAGE FLOW RATES

A3.1: Residential Dwelling Sewage Flow Rates

On-site sewage systems and land application system capacities for residential dwellings shall be determined from the daily sewage flow generated based on the number of bedrooms. This method takes into consideration the potential future occupancy.

To estimate the quantity of sewage generated in a household follow the steps below:

Step 1. Calculate the number of occupants of a home as follows

2 persons for first bedroom + 1 person per additional bedroom

Step 2. Calculate each person's daily sewage flow allocation using the table below.

Number of persons x daily sewage flow = Total Daily Sewage Flow

Table 2: Design number of occupants based on number of bedrooms

Number of Bedrooms	Number of occupants for Design Purpose (effective persons)
1	2
2	3
3	4
4	5
5	6
6	7

Table 3: Typical Domestic Sewage Design Flow Allowances

Residential Premises	Typical sewage flow allowance (L/person/day)	
	On-site roof water tank supply	Scheme water supply
All sewage (with standard fixtures)	120	150

(Table from AS/NZS 1547)

Example: 4 bed house with standard fixtures with reticulated water supply

4 bedrooms = 5 persons

5 persons x 150L/p/d = 750L/day

Table 4: Typical Domestic Sewage Flows Allowances for each fixture

Fixture	Sewage Treatment Device	Daily Flow (litre/person/day)
Toilet only	Blackwater Tank	50
Toilet + handbasin	Blackwater Tank	60
Handbasin + shower + bath + laundry	Greywater Tank	90
All wastewaters	Septic Tank	150

(Table from AS/NZS 1547)

Note: Design flow allowance for kitchen wastewater is 10 L/person/day. This is deduced by subtracting the black water and the bath, handbasin, shower, and laundry water from the total of 150 L/person/day.

A3.2 Residential Septic Tank Capacities

Septic tank capacities are based on a minimum settling/treatment volume allowance of:

- 200L/person for all-wastewaters,
- 60L/person for blackwater and

- 120L/person for greywater.

This is conservative to ensure there is capacity to cope with peak discharge rates or temporary or unusual overloads. The size of the tank will need to be increased if spa baths are to be connected (see section 5.1.2).

Septic tanks must be sized to retain the average daily flow for at least 24 hours to settle the solids and float the scum effectively and store the accumulated sludge over a 3-5 year period.

Table 5: All-Wastewaters Septic Tank capacities

Population Equivalent (persons)	Number of Bedrooms	Design Flow (L/day)	Tank capacity (litres)
1 – 5	1 – 3	1000	3000
6 – 7	4	1000 – 1400	3500
8	5	1400 – 1600	4000
9 – 10	6	1600 – 2000	4500

(Table from AS/NZS 1547)

Table 6: Greywater Septic Tank Capacities – for use with Composting Toilets in unsewered areas

Population Equivalent (persons)	Number of Bedrooms	Design Flow (L/day)	Tank capacity (litres)
1 – 5	1 – 3	600	1800L
6 – 7	4	600 – 840	2100L
8	5	840 – 960	2400L
9 – 10	6	960 – 1200	2700L

(Table from AS/NZS 1547)

Table 7: Blackwater Septic Tank Capacities

Population Equivalent (persons)	Number of Bedrooms	Design Flow (L/day)	Tank capacity (litres)
1 – 5	1 – 3	300	1500L
6 – 7	4	300 – 420	1800L
8	5	420 – 480	2100L
9 – 10	6	480 – 600	2500L

(Table from AS/NZS 1547)

Spa Baths

A spa bath is a fixture, having a capacity of less than 680 litres which incorporates facilities for injecting air bubbles or jets of turbulent water. Spas that have a capacity of greater than 680 litres are considered to be spa pools and must have a separate on-site treatment system. Systems which are connected to spa baths require either a separate system or an increased hydraulic loading allowance, in accordance with Table 8.

Table 8: Hydraulic Design Criteria for Spa Baths

Spa Bath Capacity	Hydraulic Load
Spa capacity < 120 L	No Increase
Spa capacity 121 L – 370 L	250 L
Spa capacity 371 L – 680 L	500 L

A3.3 Commercial Premises

For commercial premises the design sewage flow rates should be taken from the table 9.

Table 9: Typical Sewage Flow rates from Commercial Premises

	Typical Sewage Design Flows (Litres/person/day)
Hotel	
- guest, resident staff	180
- non-resident staff	40
- reception rooms	30
- bar trade (per customer)	25
- restaurant (per diner)	30
Motel, Boarding School, Caravan Park	140
Public building (frequent use)	30
Public building (infrequent use)	10
School (pupils plus staff)	45
Factories and shops (based on the number of persons therein on any 8 hour shift)	70
Tea Rooms/Coffee Shop (per customer)	
- without restroom facilities	15
- with restroom facilities	25

Notes: These flows are minimum rates unless actual flows from past experience can be demonstrated. Flow rates should be calculated on peak occupancy rates.

A3.4 Commercial Premises Septic Tank Capacities

The size of septic tanks for commercial premises shall be determined by

1. Providing for retention of the average daily flow for at least 24 hours, and
2. Providing for sludge and scum accumulation over a 5-year period. This may be achieved by adding a standard sludge allowance of 1820L for all sewage or 1360L for blackwaters only.

Sizing of Commercial Septic Tank Capacity (Litres) shall be based on the following formula:

Basic Sludge Allowance (S)	+	Number of persons x Daily Flow (N x DF)	=	Tank Capacity
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Equation 1: Sizing of Commercial Septic Tanks

Where:

Basic Sludge Allowance (S) = 1820L for all sewage or 1360L for blackwaters only.

Daily inflow (DF) = litres per person per day, calculated from Table 8.

The calculation of the daily inflow shall always be made using the maximum daily load.

With certain types of commercial premises the installation of a grease trap may be essential. The requirement for, sizing and location of the grease trap shall be the responsibility of the Local Government. Full details shall be included on the application form and plans.

Appendix 4: Figure 1: Absorption Trench (also known as leach drains) On-site Effluent Disposal Systems

Appendix 5: Figure 2: Sub-surface Drip Irrigation On-site Effluent Disposal Systems

Appendix 6: Figure 3: Surface Spray Irrigation On-site Effluent Disposal System

**Appendix 7: Figure 4: Evapotranspiration Absorption (ETA)
trench/bed On-site Effluent Disposal Systems**

Appendix 8: Figure 5: Mound Systems On-site Effluent Disposal Systems



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