GUIDELINES FOR ENVIRONMENTAL MANAGEMENT

CODE OF PRACTICE – ONSITE WASTEWATER MANAGEMENT

Publication 891.2 December 2008

(Note: Publication 891.2 is currently under review.)

This replaces publication 891.1, issued September 2008.

GUIDELINES FOR ENVIRONMENTAL MANAGEMENT

CODE OF PRACTICE – ONSITE WASTEWATER MANAGEMENT

EPA Victoria
40 City Road, Southbank
Victoria 3006, AUSTRALIA

December 2008
Publication 891.2
ISBN 0 7306 7631 5

FOREWORD

This revised *Code of Practice – Onsite wastewater management* provides direction for the management of small onsite wastewater treatment systems. This expanded edition clarifies the scope of application to include greywater treatment systems.

Circumstances have changed since the previous edition in 2003. Climate change and population growth have increased pressure on water supplies in our communities. There have also been advances in onsite wastewater treatment technology and greatly increased sales of greywater treatment systems.

The Code tries to strike an appropriate balance between providing clear direction, certainty and health protection to stakeholders, with sufficient flexibility to tailor designs to meet local conditions. Adaptation to climate change is a necessity for both water security and ecological sustainability, and this new Code will be a valuable guide for the Victorian community.

MICK BOURKE

CHAIRMAN, EPA VICTORIA

Note: With the publication of this Code of Practice, EPA has discontinued a number of publications:

- 629, *Domestic wastewater management series: Development approvals in sewered and unsewered areas* (now covered in this publication)
- 747, *Domestic wastewater management series: Approving household onsite wastewater systems* (now covered in this publication and on the EPA website)
- 748, *Domestic wastewater management series: EPA's certificate of approval system* (now covered in this publication and on the EPA website)
- 812, *Domestic wastewater management series: Reuse options for household wastewater* (now covered in this publication and publication 884, *Greywater use around the home*)
- 893, Septic tanks: Installing, operating and maintaining septic tanks (now covered in Table 3.1 of this publication).

CONTENTS

1 INTRODUCTION

1.1 Purpose of this Code of Practice

This Code has been written so that onsite wastewater systems, used to manage domestic wastewater, protect public health and the environment now and into the future.

This Code describes measures to sustainably manage household wastewater (also known as sewage) and minimise health and environmental risks. It provides guidance on the Victorian legislation and policy framework for onsite wastewater management, and describes the various roles and responsibilities relevant parties have within that framework.

1.2 Scope

This Code replaces EPA publication 891, *Septic tanks code of practice* (March 2003) and publication 891.1, *Code of practice – Onsite wastewater management* (September 2008).

This Code applies to all types of onsite systems treating up to 5000 litres of wastewater per day. These treatment systems plus the associated disposal/recycling systems (i.e., land disposal, outdoor recycling and/or indoor recycling) are referred to as 'septic tank systems' in the *Environment Protection Act 1970*.

This Code applies to:

- onsite systems that treat and dispose of, or recycle, domestic wastewater at unsewered sites
- onsite systems that treat and recycle domestic greywater for garden irrigation, toilet flushing and use in washing machines.

This Code applies to all systems, as defined above, at premises such as:

- single houses
- residential complexes including units, apartments and clusters of homes
- accommodation establishments including motels and hotels
- food businesses
- community and recreation facilities including sporting facilities, halls and public amenities
- schools including pre schools
- commercial and industrial sites
- shopping centres
- camping areas.

The Code sets out issues that need to be considered when:

- planning developments that will use onsite systems to manage sewage
- onsite systems are being selected, designed and installed
- onsite systems are operated and maintained after their installation.

Exclusions

This Code does not apply to the following:

- Systems that treat more than 5000 litres of wastewater per day. These are subject to individual approval via the EPA works approval and licensing process.
- Systems that treat industrial wastewater. These are usually subject to individual approval via the EPA works approval and licensing process. People intending to install a system to treat industrial wastewater should contact EPA to clarify the approval process before installing the system.
- Systems that divert, but do not treat, greywater for reuse. This includes diversion systems that may pass greywater through a coarse filter but do not use a physical, chemical or microbiological treatment process. See section 5.2.1 for untreated greywater reuse.

This Code covers various design elements for onsite wastewater management. However, it is not a design manual and should not be regarded as a replacement for technical information. This Code does not recommend any specific wastewater treatment or disposal/recycling method, nor does it endorse any particular process that may be used by a land assessor when compiling information about site features.

1.3 Legal application

This Code is a legally binding document under clause 32 of the *State Environment Protection Policy (Waters of Victoria)* [SEPP(WoV)], which requires premises occupiers to manage, and councils to issue permits for, onsite wastewater systems in accordance with this Code.

Please refer to sections 6.2.1, 7.1.1 and 7.1.2 for further information on the legal standing of this Code.

The terms 'shall' and 'must' mean a mandatory requirement of the approving authority.

Other terms such as 'should' or 'recommended' indicate desirable procedures or methods.

2 OPTIONS FOR ONSITE WASTEWATER MANAGEMENT

Table 2.1 sets out the various treatment and disposal/recycling options available for onsite wastewater management. See sections 4 and 5 for more detail on the various onsite wastewater management options in sewered and unsewered areas.

2.1 Categories of domestic wastewater

Domestic wastewater can be divided into two categories:

- sewage [all wastewater including greywater and toilet waste (also known as blackwater)]
- greywater (wastewater from the shower, bath, basins, washing machine, laundry troughs, and kitchen – also referred to as sullage)[1].

It is a common misconception that greywater does not contain pathogens and that it is only sewage and blackwater that requires treatment prior to disposal or recycling. Greywater can contain pathogens that, if poorly managed, could present a risk to human health.

2.2 Principal ways to manage domestic wastewater

There are four principal ways to manage domestic wastewater:

1. Discharge sewage offsite to a reticulated sewerage system.
2. Partially treat sewage onsite, then discharge the primary or secondary treated effluent offsite via a reticulated sewerage system for further treatment and/or recycling.
3. Treat and dispose of or recycle sewage onsite.
4. Treat and recycle greywater onsite and discharge blackwater as well as any excess greywater offsite to a reticulated sewerage system (or, if in an unsewered area, to an onsite wastewater treatment system).

Options 1 and 2 are usually managed by statutory authorities and are not subject of this Code. While the collection and reuse of untreated greywater is not subject of this Code, note that options 1, 2 and 3 may include this. See section 5.2.1 for untreated greywater reuse.

2.3 Reticulated sewerage versus onsite wastewater management

The feasibility of providing a reticulated sewerage system should be seriously considered for the development of individual lots and for subdivision proposals that would result in allotments smaller than 10,000 m^2 (one hectare). This area should not be seen as a minimum lot size but as a risk threshold, as lots smaller than 10,000 m^2 may be unable to retain all domestic wastewater on site.

If reticulated sewerage is not available, onsite wastewater treatment and disposal or recycling in accordance with State legislation and policy will need to be considered. See sections 6 and 7 for further information on the roles and responsibilities, and legislation and policy framework, applying to onsite wastewater management.

1 Note that most greywater treatment technologies exclude kitchen wastewater due to the difficulty of treating fats, oils, grease and the high load of organic matter. Some greywater treatment technologies also exclude greywater from the laundry trough due to the potential contamination of greywater through washing of nappies, soiled clothing, paint brushes, etc.

Table 2.1: Onsite wastewater management options

Onsite treatment system types		Disposal options		Effluent recycling options[1, 2]	Maintenance requirements
		Treated effluent	Residual solids		
WATER-BASED	**Primary treatment** Anaerobic (Septic Tank) Aerobic Biological Filter, (including wet composting, vermiculture)	Soil absorption trench Mound	Offsite via desludging contractor, if applicable (Refer to council permit and, if applicable to Certificate of Approval)	None, unless specifically stated in council permit and, if applicable, in Certificate of Approval	Inspection and desludging in accordance with council permit and certificate of approval
WATER-BASED	**Secondary treatment** Aerated Treatment (including cycles of aerobic and anaerobic digestion) Biological Filters (including wet composting, vermiculture) Membrane filtration Reedbeds Sand Filters Trickling Filters (including packed media, packed bed reactors) Wetlands	Soil absorption trench Mound	Offsite via desludging contractor, if applicable (Refer to council permit and Certificate of Approval)	**Outdoor:** Sub-surface irrigation[3,5] Surface irrigation[4,5] **Indoor:** *(only greywater treated to 10/10/10 standard)* Toilet flushing Cold water supply to washing machines	Monitoring and servicing (including desludging) in accordance with council permit and certificate of approval
DRY	**Primary treatment** Dry composting	Soil absorption trench (for urine), if applicable	Refer to council permit and, if applicable, certificate of approval	N/A	Requirements vary (Refer to council permit and certificate of approval)

1 No uses other than those stated are permitted.

2 The listed recycling options for sewage apply to unsewered areas (see section 5.1 for sewage recycling options in sewered areas). The listed recycling options for greywater apply to both unsewered and sewered areas.

3 Sub-surface irrigation means the irrigation of water at a depth of between 100 mm and 300 mm below ground level; i.e., in the biologically active topsoil layer (see AS/NZS 1547). Minimum water quality required: 20/30 standard.

4 Surface irrigation means the irrigation of water to the ground surface. It includes the use of low-rise sprinklers, micro-sprayers, and drip systems under mulch. It excludes the use of hand-held hoses for treated sewage. Treated greywater can be connected to purple coloured child-proof taps that have a removable handle.
Minimum water quality required: 20/30/10 standard.
Sites with sensitive sub-populations such as hospitals, aged care facilities, childcare centres and schools should only use sub-surface irrigation, and not irrigate the surface of children's play areas (such as lawns).

5 Treated sewage or greywater must not come in contact with the edible parts of herbs, fruit or vegetables.

3 ONSITE WASTEWATER SYSTEMS – AN OVERVIEW

An onsite wastewater system is referred to in the *Environment Protection Act 1970* ('the Act') as a 'septic tank system'. It includes both an onsite wastewater treatment system and the subsequent disposal/recycling system, as well as the associated components (e.g., pipes, fittings, land area, etc). Although effluent from onsite wastewater treatment systems has been treated, it needs to be further managed to protect public health and the environment.

It must be noted that the Act defines all types of onsite domestic wastewater systems as 'septic tank systems'. This means that both the treatment system and the disposal/recycling system is defined by the legislation as a 'septic tank system'. However, the term 'septic tank', as commonly used in the water industry, describes only an onsite primary wastewater treatment system using anaerobic conditions. It is therefore important to clearly distinguish which of the two meanings is being used.

3.1 EPA-approved onsite wastewater systems

3.1.1 Wastewater treatment systems

Treatment systems that only treat wastewater to a primary standard (i.e., anaerobic septic tanks or aerobic wet composting) do not require EPA approval for a water quality standard. However, they must comply with the most recent version of Australia/New Zealand Standard AS/NZS 1546.1, *On-site domestic wastewater treatment units – Septic Tanks*. Primary treated wastewater always requires disposal via a soil absorption trench.

Only secondary standard onsite wastewater systems with a certificate of approval ('CA') issued by EPA can be installed in Victoria.

CAs issued for individual onsite wastewater treatment systems contain the following information:

- the treatment system's name and model
- the name of the company that sells the system (generally its manufacturer)
- technological features of the treatment system
- requirements of installation, maintenance, and reporting associated with the treatment system
- the minimum water quality that the treatment system must achieve
- the purposes for which the treated wastewater may be used
- the system's installation manual, maintenance/service manual and owner/occupier's operation instruction manual.

Companies that wish to obtain a CA for their treatment system should access the EPA website (www.epa.vic.gov.au/water/wastewater/onsite/asp) or contact the EPA Information Centre on (03) 9695 2722 for more information on the approval process.

3.1.2 Wastewater disposal/recycling systems

EPA may also issue CAs for wastewater disposal/recycling systems (e.g., soil absorption trenches, surface irrigation systems, etc). These CAs are not issued for individual systems and only state general requirements. EPA does not issue CAs for all types of disposal/recycling systems. For land application systems without a CA, the requirements of the most recent version of Australia/New Zealand Standard AS/NZS 1547, *On-site domestic wastewater management* apply.

3.2 Wastewater treatment processes

There are a number of processes used by onsite wastewater treatment systems. Treatment can involve one or a combination of the following processes.

- Primary treatment:
  - aerobic – physical treatment (e.g., screening, filtration, sedimentation, flocculation, flotation) and digestion under aerobic conditions (e.g., aerobic bio-filter, wet composting)
  - anaerobic – physical treatment (e.g., filtration, sedimentation, flocculation, flotation) and digestion under anaerobic conditions, (e.g., septic tank).
- Secondary treatment (sometimes followed by disinfection of the treated wastewater):
  - biological treatment (aerobic digestion supported by aeration or trickling filters; controlled cycles of aerobic/anaerobic digestion)
  - filtration (through a variety of differently shaped and sized media and membranes);
  - chemical treatment (flocculation, coagulation, precipitation)
  - further biological treatment (e.g., in wetlands, reed beds, sand filters).
- Tertiary treatment:
  - filtration (reverse osmosis)
  - nutrient reduction.
- Other:
  - incineration.

The treatment processes available are numerous and the number and type of methods is increasing.

3.3 General treatment system design considerations

Onsite wastewater treatment systems are typically designed for regular small flows, and therefore can be adversely affected by surge flows. The volume of surge flows from fittings such as spa baths may be greater than the design capacity of the tank.

Surges have the potential to force solids through the system, leading to high solids levels in the treatment plant effluent, which can clog filters, soil absorption trenches and effluent irrigation pipes. Surge flows should be minimised and, if high surge flows are likely, the system must be designed to deal with them.

An aerated wastewater treatment system (AWTS) may not be suitable for sites where irregular or intermittent flows are likely, such as holiday homes or sporting facilities. Aerated systems should not be switched off when not in use, as the recommissioning period may take several weeks.

There are a number of other factors that can affect the performance and ongoing cost of onsite wastewater treatment systems. Features vary with respect to the type of treatment and can include:

- tank proportions
- tank volume
- sludge storage volume
- partitioning
- wastewater detention time
- aeration capacity
- power availability
- power usage
- maintenance scheduling and quality.

Onsite treatment systems can function for long periods of time if they are well maintained and used solely for the purpose for which they are designed. Many systems that are old or inappropriately used may no longer treat sewage properly.

Table 2.1 shows some of the possible alternative treatment types that may be considered. Consultation with the local council is recommended before any system is selected.

Commercial premises with daily flows of less than 5000 litres a day may need to consider not only the hydraulic aspects of the design but also the capacity of the system to deal with potentially high and irregular organic loadings. Premises in this category include venues such as hotels, motels, guesthouses, bed and breakfast establishments, restaurants, wineries, shops, schools, sport centres and public recreational areas.

Failed systems may not be easy to identify, particularly as contamination of soils and groundwater may be hidden. Section 3.6 provides advice on identifying failing systems.

3.4 General site assessment considerations

Selecting the best wastewater treatment and disposal or recycling option for a specific site needs a thorough assessment of a number of related factors that include, but are not limited to:

- geographic features
- slope
- aspect
- depth to groundwater
- climate
- soil capability (soil type, texture, depth, organic matter, sodicity)
- vegetation cover
- distance to boundaries
- type and function of adjoining properties
- expected wastewater volume generated
- availability of other services; i.e., reticulated water supply
- ongoing management capacity
- land holder preferences
- economic considerations
- beneficial uses of nearby surface and groundwater (e.g., drinking water bores and catchments).

3.5 Operation and maintenance of onsite wastewater systems

The system owner is responsible for ensuring that the onsite wastewater system is functioning at all times.

Onsite wastewater treatment systems and associated disposal/recycling systems must be operated and maintained regularly by accredited service agents and system owners. The specific requirements are outlined in the council permit, relevant CA, and the related maintenance/service manual and owner/occupier's operation instruction manual.

Current CAs can be obtained from www.epa.vic.gov.au/water/wastewater/onsite.asp.

Householders should not expect that any system, once installed, will continue to function as intended without ongoing care and maintenance.

3.5.1 Septic tanks

A new septic tank should be filled with clean water before use to check that the tank is leakproof[2]. Domestic wastewater from the dwelling will contain sufficient biological material to start and continue the treatment process. There is no need to feed or dose the system with starter material.

As the solids are collected and digested by anaerobic bacteria, an organic sludge is produced, and it, together with non-treatable inert material (such as

2 Refer to AS/NZS 1546.1:2008 for information on how to test for leakage.

sand), collects as a layer on the bottom of the tank. Scum is also produced and forms a surface mat on the top of a middle layer of the partially treated, clarified liquid. When this clarified liquid flows out of the septic tank it is called 'primary treated effluent'.

In time, the sludge and scum layers build up and will need to be removed (by pump-out) for the tank to continue to function properly. Without the removal of the scum and sludge materials, discharge of solids to the soil absorption trench may occur.

The level of solids accumulation in the tank cannot be accurately predicted, and will depend on the waste load to the tank. Therefore, the sludge depth should be checked annually. If householders are reluctant to undertake this task, they must employ a contractor to do it.

Pumping out the tank should be undertaken as specified in the council permit. If a septic tank is under a maintenance contract, regular assessment of the sludge and scum layers should be part of the maintenance agreement.

After pump-out, tanks do not need to be washed out or disinfected. They should be refilled with water to reduce odours and ensure stability of plumbing fixtures. A small residue of sludge will always remain, and will assist in the immediate re-establishment of bacterial action.

It is not necessary for householders to add commercial products through the toilet or sink system to dissolve sludge build-up. Such a process is not an alternative to regular pump-out, and has not yet been scientifically shown to be effective.

Householders should keep a record of their septic tank pump-outs, and notify the local council that a pump-out has been undertaken in accordance with the council permit.

It is critical that a septic tank is not used as a rubbish receptacle. Septic tanks are designed solely for the treatment of organic materials. Items such as sanitary napkins, disposable nappies, plastic bags, stockings, clothing, plastic bottles etc. cause the septic tank to fail, and require costly removal of these items.

Detergents, disinfectants and other household materials can affect bacterial action within septic tanks, although if used in the recommended quantities they might not hinder efficient operation. Users need to be aware that, due to the tank volume and the subsequent limited dilution capability, indiscriminate use of disinfectants and cleaners (particularly degreasers and bathroom cleaners) will substantially affect the biomass in the tank and subsequently the digestion process. Consequently, undigested material could be carried over to the land disposal area, causing system failure.

If tanks are inadvertently contaminated or poisoned by household materials, they should be pumped out immediately to allow a fresh start-up of the microbiological ecosystem.

If odour occurs after the commissioning of a system, a cup of garden lime can be flushed down the toilet each day until the odour disappears. If odour continues, seek professional advice.

Refer to the council permit and the manufacturer's recommendations for advice on operation and maintenance. Table 3.1 shows an overview of operation and maintenance recommendations for septic tanks. These requirements also generally apply to other onsite wastewater treatment systems.

3.5.2 Secondary treatment systems

Maintenance requirements for secondary treatment systems are outlined in section 3.5. The specific requirements for individual systems are outlined in the council permit, relevant CA, and the related maintenance/service manual and owner/occupier's operation instruction manual.

3.6 Failing onsite wastewater systems

A failing system is a system that is not achieving the requirements outlined in the:

- relevant CA(s) and the associated guidance provided by the system manufacturer; and/or
- council permit conditions.

Indicators of a failing anaerobic septic tank and associated soil absorption trench are shown in Table 3.2. Generally, these indicators also apply to other types of onsite wastewater systems.

Table 3.1: Operation and maintenance of septic tanks

- Restrict the use of germicides (such as strong detergents, disinfectants, toilet cleaners and bleaches), as they will kill the microflora that make the septic system work.
- Use soapy water to clean toilets and other fixtures.
- Educate yourself about bathroom and laundry products that may be unsuitable for your system, and those that are suitable for septic tanks.
- Use only detergents that have low levels of salts (liquid detergents), phosphorus and chlorine.
- Use of proprietary or chemical additives is not recommended at any time for septic systems – except for lime used as outlined above, to eliminate odours.
- Do not flush rubbish such as sanitary napkins, condoms, cotton buds or disposable nappies down the system.
- Minimise the amounts of oil and fat flushed into the system.
- Use a sink strainer to restrict food scraps entering the septic system.
- Odours may occur on installation or after accidental addition of germicide. If this happens, flush a cup of lime down the toilet each day until odours abate.
- Fill the septic tank with water to reduce odours on start-up and after desludging. Do not wash or disinfect the tank after desludging.
- Ensure that no structures, pavements, driveways, patios etc. are built over the tank and disposal field and that the disposal field is not disturbed.
- Inspect the system at least annually.
- Desludge the tanks as required (see council permit for details).
- Keep a record of the location of the system and all maintenance (including the dates of tank pump-outs, tank inspections and access openings) and send copies of the maintenance reports to the local council as outlined in your council permit. .
- Do not add to or alter any part of your system without council approval.
- Contact the council environmental health officer prior to renovating or extending your home, as your septic system may need to be upgraded.
- Check sludge level, pumps and alarms regularly, as outlined in your council permit.
- Arrange for an accredited service agent to inspect the system on a regular basis, as outlined in your council permit. These inspections should include check-ups and management/maintenance of the sludge level, alarms, appliances, disposal area, and all associated pumps and pipes.

Table 3.2: Indications of failing anaerobic septic tanks and soil absorption trenches

Indications of failing systems may include:

- surface seepage along soil absorption trench lines
- a lush green growth down slope of soil absorption trench lines
- inspection pits and/or soil absorption trench lines consistently exhibiting high water levels
- soil absorption trench lines that become waterlogged following storms
- general waterlogging around the land disposal area
- presence of dead and dying vegetation (often native vegetation) around (particularly downslope of) land disposal areas
- a pungent odour near the tank and land disposal area
- blocked fixtures, with sewage overflowing from the relief point
- high sludge levels within the primary tank (within about 150 mm of inlet pipe, or obstructed flow through the mid baffle)
- a scum surface layer blocking the outflow.

4 ONSITE WASTEWATER MANAGEMENT IN UNSEWERED AREAS

4.1 Options for wastewater treatment and disposal/recycling in unsewered areas

An overview of onsite wastewater management options and associated approved uses is outlined in Table 2.1. A number of different options are permitted for onsite treatment and land disposal or recycling of sewage (see section 4.1.1 for greywater recycling options) in unsewered areas. These include:

- primary treatment tanks (anaerobic or aerobic) followed by disposal via soil absorption trenches or mound systems
- secondary treatment systems that treat wastewater to a quality that allows recycling via sub-surface irrigation or surface irrigation
- dry composting toilets with the solid waste composted and the liquid component (urine) disposed of via soil absorption trenches, or evaporation.

The selection of the land disposal/recycling system needs to be based on the land capability of the site, the standard to which the wastewater has been treated, and the disposal/recycling system's management requirements. Council must be fully satisfied that the type of disposal/recycling system and the associated area (either soil absorption trench or irrigation area) is appropriate. This is to be determined by a land capability assessment, undertaken in accordance with the most recent version of EPA Publication 746, *Land capability assessment for onsite domestic wastewater management* (refer to sections 4.5 and 4.6).

The design of the absorption trench area must include a reserve field (of equal size) that can be commissioned in the event that the primary area fails, proves to be inadequate, or needs to be rested.[3]

Effluent disposal/recycling areas, especially soil absorption trench systems, should be isolated as much as possible from other domestic facilities.

Disposal/recycling areas should be protected from disturbance during construction. Paving, driveway, patio, fence, building extension, sheds or service trenching must not encroach on the disposal/recycling area or on any reserve field.

Care should be taken to protect vegetation growing across soil absorption trench systems, because plants, together with factors such as wind and sun intensity, play a vital role in supporting the disposal of effluent through evapotranspiration.

Regardless of the type of disposal/recycling system adopted, the disposal/recycling area should be clearly identified with signs, to ensure all householders limit their access and impact on the area.

Although every effort may have been made to locate and design the land disposal/recycling system in accordance with the environmental requirements of the site and the predicted hydraulic loading, the long-term function of the system will depend on the actual hydraulic loading and the ongoing maintenance that will make a system work in the long term. System owners are therefore required to maintain their system in accordance with the council permit, and, if applicable, the relevant CA.

4.1.1 Options for recycling treated greywater in unsewered areas

A number of different options are permitted for recycling greywater on unsewered sites. These include the following.

- Recycling greywater indoors only.
  Treated greywater is used for toilet flushing and/or cold water supply to washing machines. For indoor recycling of greywater, a minimum water quality of 10/10/10 standard (see section 8 for definition) has to be met. Excess treated greywater is diverted to the existing blackwater treatment system.
- Recycling greywater indoors and outdoors.
  Treated greywater is used indoors for toilet flushing and/or cold water supply to washing machines, as well as outdoors for sub-surface and/or surface irrigation. Excess treated greywater is diverted to the existing blackwater treatment system.
- Recycling greywater outdoors only.
  In this case there is no need to have a separate greywater treatment system, as secondary treated wastewater can be recycled for garden irrigation. For sub-surface irrigation, a minimum water quality of 20/30 standard (see section 8 for definition) has to be met. For surface irrigation, a minimum water quality of 20/30/10 standard (see section 8 for definition) has to be met.

See section 5 for more information on greywater treatment and recycling systems, their general requirements, approved uses and suggested setback distances.

4.2 Initial planning

Choosing an onsite wastewater treatment system and associated disposal/recycling system that is suitable to the specific site is crucial.

The council permit applicant (normally the property owner) must prove to council that the proposed onsite wastewater treatment system and associated disposal/recycling system will operate sustainably on the property.

3 Note: secondary treated effluent irrigated according to AS/NZS 1547 does not require a reserve area.

When a property developer, potential buyer or land holder considers subdividing or building a residential dwelling, that person must, as a first step, determine whether or not all domestic wastewater could potentially be managed within the property boundaries. This is done by arranging for a professional to undertake a land capability assessment (see section 4.5).

It is important that council pays special attention to the suitability of onsite wastewater system designs when assessing proposals for communal or commercial sites such as schools, food premises, B&Bs, guest/boarding houses, motels/hotels, hostels, and holiday resorts, to ensure that the proposed onsite wastewater system will comply with this Code.

4.3 Wastewater volumes

4.3.1 General considerations

The average water use of a residential dwelling depends on factors such as the number of occupants and how efficiently water is used.

An increase in water use on an unsewered site will generally lead to an increased potential risk to human health and the environment.

Where discharge volumes from a residential dwelling are expected to exceed 2000 litres a day, it is recommended that councils critically assess the reason for this. The routine discharge of volumes exceeding 2000 litres a day may indicate a usage that is not purely domestic in nature.

The following section applies to both private residences and community/commercial premises (schools, guesthouses, etc). It sets out procedures for the estimation of average wastewater volumes produced at dwellings in unsewered areas. The procedures are set out based on water source. These volumes form the basis for designing the capacity of an onsite wastewater treatment system.

Procedures for the estimation of potential peak hydraulic loads (e.g., spa draining) and potential peak organic loads (e.g., wine making for non-commercial purposes) into the system are not listed. The system designer must estimate these on a case-by-case basis.

The onsite wastewater treatment system and associated disposal/recycling system must be designed so that they can deal with irregular surge flows without risking a discharge of untreated or partly treated wastewater into the land disposal/recycling system. Irregular surge flows may occur, for example, during and after entertainment activities taking place at the site.

The volume of wastewater treated and disposed/recycled on site can vary considerably. It depends on the type of premises, the occupancy throughout the year, water availability, and the use of water saving fixtures and fittings.

As a general rule, without alternative information, occupancy can be based upon the number of bedrooms and the 'Typical Domestic Wastewater Flow Design Allowances', as sourced from AS/NZS 1547 and listed in Table 4.1. The table shows the average water usage per person in a range of different scenarios based on life-style and potable water source (rainwater or reticulated/bore water).

A reduction in wastewater volume due to water-reduction fixtures as part of the calculation should only be accepted when council is satisfied that the fixtures are actually existent at the time the system goes online, and that they will not be replaced by higher-flow fixtures in the future (because of already-planned renovations, change of ownership, etc).

Occupancy of a dwelling is calculated as follows:

Number of Bedrooms (No. of BRs) plus one

4.3.2 Dwellings on reticulated town supply ('unlimited' water supply)

In this case, water usage is typically unrestricted and wastewater discharges to the onsite system are expected to be high. Using the flow rates in Table 4.1, the daily wastewater discharge from a house with standard water-reduction fixtures and fittings can be calculated as follows:

Daily wastewater discharge from a house with standard water-reduction fixtures and fittings:

{(No of BRs) + 1} x 145 L = L/household.day

For example, for a three-bedroom home:

(3 + 1) x 145 L = 580 L/household.day

4.3.3 Dwellings on roof water supply, possibly augmented with alternative water sources

In this case, water supply is primarily sourced from building roofs (e.g., house and shed), and potentially augmented with water from a river, creek, dam or bore. Some of this additional non-roof supply may be used within the house and will then be discharged to the wastewater treatment system. These volumes can be substantial.

It can be assumed that the water usage by a dwelling with both roof water plus alternative water supply is similar to that of a dwelling located in an area with

reticulated water supply. Therefore, the daily wastewater discharge from a house with standard water-reduction fixtures and fittings will be the same as calculated in section 4.3.2.

4.3.4 Dwellings on roof water supply only ('limited' water supply)

In this case, the entire water supply is sourced from building roofs (e.g., house and shed).

Householders relying solely on rainwater typically use less water than people on 'unlimited' water supply and have to adapt their average water use to the capacity of their water storage (i.e., rainwater tank).

Using the flow rates in Table 4.1, the daily wastewater discharge from a house with standard water-reduction fixtures and fittings can be calculated as follows:

Daily wastewater discharge from a house with standard water-reduction fixtures and fittings:

{(No of BRs) + 1} x 115L = L/household.day

For example, for a three-bedroom home:

(3 + 1) x 115L = 460 L/household.day

4.3.5 Increases in wastewater production

The average wastewater production at a dwelling can increase due to:

- reticulated water supply becoming available on a site formerly supplied by water from roofs and/or alternative sources. Therefore, councils should consider the impact on the sewage system if a connection to the reticulated water supply is likely
- building renovations, extensions and alterations; for example –
  - an increasing number of occupants;
  - the addition of bedrooms;
  - the installation of spas; and/or
  - the installation of kitchen 'insinkerators'.

The first three items on the above list mainly lead to an increase of the hydraulic load entering an onsite wastewater treatment system. The last item on the above list mainly leads to an increase of the organic load entering a system.

Property owners altering existing dwellings must contact council to discuss the potential increase of hydraulic and organic loads into the existing onsite system. Based on the relevant CAs, Council then determines whether or not the existing onsite system must be adapted. Council may also direct the property owner to engage a professional to make this determination on council's behalf.

If the existing system requires alteration, the property owner must apply for a council permit before the alteration is undertaken.

An increase in wastewater production can lead to the existing onsite wastewater treatment system and associated disposal/recycling system overloading and failing.

4.4 Setback distances (unsewered areas)

Even when onsite wastewater systems are properly designed, installed and maintained, a residual environmental and public health risk always remains. The consequence of failing systems varies and depends upon the particular site and the sensitivity of the environment surrounding the site.

To minimise that residual risk, onsite wastewater systems must be installed in a way that allows for a 'buffer' or 'setback distance' between the system and the surrounding environment (in other words, both the treatment system and the associated disposal/recycling system must be installed the required distance away from the site boundary). Setback distances for onsite systems that dispose/recycle primary/secondary treated wastewater in unsewered areas are listed in Table 4.2. These setback distances are independent of any other buffer distances that may apply to the site.

Council may increase setback distances where it considers that the residual risk to public health and the environment are too high. Council may also reduce setback distances where it considers that the residual risk to public health and the environment is negligible. In either case, councils may seek advice from relevant authorities and stakeholders before making such a decision.

Also, council may need to seek that advice through formal processes (such as planning referrals).

Table 4.1: Typical domestic wastewater flow design allowances*

* Reference: AS/NZS 1547:2000 (page 141). NOTE: when calculating the flow allowance for a premise, use the most recent version of AS/NZS 1547.

Source	Typical wastewater flow allowance in L/person/day (see Note 1)	
	On-site roof water tank supply	Reticulated community or a bore-water supply
Households with standard fixtures (including automatic washing machine)	140	180
Households with standard water-reduction fixtures (see Note 2)	115	145
Households with full water-reduction facilities (see Note 3)	80	110
Households with extra wastewater producing facilities	170	220
Households (blackwater only)	50	60
Households (greywater only)	90	120
Motels/hotels – guests, resident staff – non-resident staff – reception rooms – bar trade (per customer) – restaurant (per diner)	 140 30 20 20 20	 180 40 30 25 30
Community halls – banqueting – meetings	 20 10	 30 15
Restaurants (per diner) – dinner – lunch	 20 15	 30 25
Tea rooms (per customer) – without restroom facilities – with restroom facilities	 10 15	 15 25
School (pupils plus staff) Rural factories, shopping centres	30 30	40 50
Camping grounds – fully serviced – recreation areas	100 50	130 65

NOTES:

1 These flows are minimum rates unless actual flows from past experience can be demonstrated.

2 Standard water-reduction fixtures include dual-flush 11/5.5-litre water closets, shower-flow restrictors, aerator faucets (taps) and water-conserving automatic washing machines.

3 Full water-reduction fixtures include the combined use of reduced-flush 6/3-litre water closets, shower flow restrictors, aerator faucets, front-load washing machines and flow/pressure control valves on all water-use outlets. Additionally, water reduction may be achieved by treatment of greywater and recycling for water closet flushing (reclaimed water cycling).

Table 4.2: Setback distances for primary and secondary treated sewage in unsewered areas[1]

Item	Setback distance[2, 3] (m)
Building	
Wastewater field up-slope of building[4]	6
Wastewater field down-slope of building	3
Allotment boundary	
Wastewater field up-slope of adjacent lot	6
Wastewater field down-slope of adjacent lot	3
Services	
Water supply pipe	3
Potable supply channel (wastewater field up-slope)	300
Potable supply channel (wastewater field down-slope)	20
Gas	3
Underground water tank	15
Stormwater drain	6
Swimming pool	6
Cutting/escarpment	15
Surface waters (up-slope from)	
Dam or reservoir (potable, includes water for food production)[5]	300
Stream, river, waterways (potable water supply catchment)[6]	100
Dam or reservoir (stock & non-potable)[5]	60
Stream or channel (continuous or ephemeral, non-potable)	60
Groundwater bore	
Potable or non-potable	20

1 These distances act as a guide and must be measured horizontally from the defined boundary of the disposal/irrigation area. They do not apply vertically. For streams and dams, the measuring point shall be the 'bank-full discharge level'. See Table 5.3 for setback distances for irrigating with treated greywater.

2 With the exception of groundwater bores, the setback distances may be reduced by up to 50 per cent where all the following conditions are met:

- effluent quality meets 20/30 standard when used for sub-surface irrigation

or

- effluent quality meets 20/30/10 standard when used for surface irrigation

and

- slopes are <5%, or pressure compensated sub-surface irrigation drip lines along the contour.

3 Effluent typically contains high levels of nutrients that may have a negative impact on native vegetation. When considering setbacks, council should consider not only the potential impact of nutrients in regards to the proposed onsite wastewater system, but in regards to other existing onsite wastewater systems located in the same area.

4 Setback distances help protect human health. However, establishing an effluent disposal field/irrigation 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.

5 Does not apply to dams and reservoirs located above ground-level.

6 Means a water course within a Special Water Supply Catchment Area listed in Schedule 5 of the *Catchment and Land Protection Act 1994*.

4.5 Land capability assessment

4.5.1 General considerations

In unsewered areas, a land capability assessment ('LCA') should be undertaken, where applicable, for each site that requires the installation of an onsite wastewater treatment system.

Applicants need to arrange for a suitably qualified soil science professional to carry out the LCA.

The most recent versions of EPA publication 746, *Land capability assessment for onsite domestic wastewater management, the MAV Model Land Capability Assessment Report (Oct 07)* and Australia/New Zealand Standard AS/NZS1547, *On-site domestic wastewater management* set out further parameters that are relevant to this section.

In sewered areas, LCAs are not mandatory for the installation of greywater treatment systems. However, there are irrigation design, operation and maintenance requirements that must be complied with. See section 5.4 for details.

4.5.2 Objectives

The reasons for undertaking an LCA for the onsite management of wastewater are to:

- identify the capability of land areas for sustainable onsite wastewater management
- develop a management regime for onsite wastewater systems, to minimise their environmental impacts and enhance their long-term sustainability.

The term 'land' is used generically and can be interpreted as indicating a broad range of intrinsic environmental features associated with the site or land area.

The assessment of land areas for onsite wastewater management essentially follows a four-stage process:

Stage 1: Develop appropriate land capability assessment criteria.

Stage 2: Develop land inventory (i.e., site data).

Stage 3: Assess land capability (i.e., capability of the land to sustainably absorb the primary treated effluent).

Stage 4: Develop management program.

Proponents may discuss the LCA process with council staff before commencing an assessment, to ensure there is mutual agreement that the process will identify all the constraints that may be associated with the development site.

An LCA for domestic wastewater management purposes can be undertaken during one or more of the following stages within a planning process:

- statewide and regional planning
- general municipal reviews
- applications for rezoning or subdivision
- individual lot development.

The degree of investigation and assessment required at each stage depends on the total land area involved and the type and form of the proposed development.

It is not possible to detail the information needed at each development phase. However, as:

- the development intensity increases
- the site variability increases

or

- the environmental sensitivity increases,

the rigour of the assessment is expected to increase (for example, the range of LCA criteria and the quantity of data collected).

LCAs are considered a critical element in the path to good environmental planning and management. Councils are encouraged to develop their own LCA criteria as part of a municipal onsite domestic wastewater management plan for areas not serviced by a reticulated sewerage scheme.

Figure 4.1 indicates how land capability assessment should fit into the overall land development process.

4.5.3 Development of appropriate land capability assessment (LCA) criteria (Stage 1)

The criteria provide the practical basis which enable councils and other regulators to judge the proposed development. The criteria identify relevant land or environmental features, along with a rating scale.

An LCA is often presumed to be a scientific tool. It is in fact a management tool based upon scientific evidence and perceived environmental risk.

Please note that an LCA process does not indicate the social impact of a particular development, nor does it indicate whether a proposal will be economically worthwhile. The system is based upon environmental features alone. The suitability of the development is ultimately based on wider parameters including social, economic and planning considerations.

4.5.4 Land inventory development (Stage 2)

This stage involves the actual gathering and collation of data related to the proposed site.

There can be considerable variability within the environment and within the landscape and soils generally. The data collection effort needs to reflect the variability associated with the development site.

The assessor will need to have a good knowledge of the local geographic processes and it will be critical that the site variability be characterised.

4.5.5 Assessment of land capability (Stage 3)

This stage matches the site inventory findings with the assessment criteria to ascertain the level of environmental risk expected from the proposal, and to highlight the particular features that constrain the development in its present form and on the present location.

This process forms the basis of the overall assessment of the site to sustainably manage sewage effluent. This will inform the appropriate design of the infiltration trench and reserve area.

4.5.6 Management program development (Stage 4)

The management program describes the actions that can be carried out to address the development site's intrinsic land limitations.

Although a proponent may develop a program in good faith, the council must judge the feasibility of the program (in other words, ensure it is practicable).

Ongoing maintenance and monitoring must be integral parts of the program.

The council must assess whether current and future owners of the onsite wastewater systems could implement the program. Some owners may be quite skilled in carrying out specific management programs that may be beyond the capacity of others. A 's173 agreement', as provided for in the *Planning and Environment Act 1987*, may have to be set in place so that future owners are made aware of their obligations.

If council cannot satisfy itself that the management program or potential permit conditions are practicable, the development proposal should not be approved.

4.5.7 Review of LCAs by council

Applicants must submit the LCA and corresponding management program to the municipal council when seeking development approvals.

The LCA should give council a firm base from which to assess a proposal for consistency with council's municipal strategic statements. The LCA should enable the municipality to highlight those areas at potential environmental risk and those areas that will need particular attention.

The onus of proof rests with the proponent to demonstrate that the proposal is environmentally sustainable.

Councils should not approve applications if the proponent's supporting information (including the LCA) is inadequate, or if the proposed management program is impracticable (that is, beyond the capacity of those who will be responsible for operating onsite treatment systems).

The LCA rating identifies the level of risk associated with a development proposal. As the capability of the land decreases, the risk associated with development increases, and the resources needed to manage the risk also increase.

In particular, municipalities should seriously question proposals on land areas where the LCA has highlighted that there is a high or very high risk associated with the proposed development. Such situations should be deemed as unsuitable for small lot subdivision unless council is satisfied that the wastewater management program will be practicable and achievable.

The land capability process should highlight the practices that may be adopted by the proponent for the development to proceed sustainably. In reviewing alternative management programs, the proponent and council will need to consider their short and long-term economic and practical implications, particularly the monitoring requirements.

When development proposals appear to be marginal, municipalities should have the site assessment report independently reviewed. The review should focus on the potentially detrimental environmental effects of the proposed program, together with the sustainability of the identified management program.

The independent reviewer would need to visit the site and conduct further field investigation or laboratory work. However, examination of inventory and LCA reports may enable the municipality to satisfy itself as to the suitability or potential risk of the proposed development.

Because there is sometimes a considerable delay between the phases of subdivision and actual house site development, councils need to track the LCA and the associated recommendations. A more specific land management program may have to be developed when individual lots are developed.

Where there are concerns that an assessment report gives rise to unresolved questions, it is prudent for council and council officers to seek advice from other agencies. These agencies could include water authorities, EPA, Catchment Management Authorities, the Department of Planning and Community Development and the Department of Sustainability and Environment. Councils can also seek technical and planning advice from non-government professionals.

Inappropriate development may result in reticulated sewerage being retrofitted, with significant financial implications.

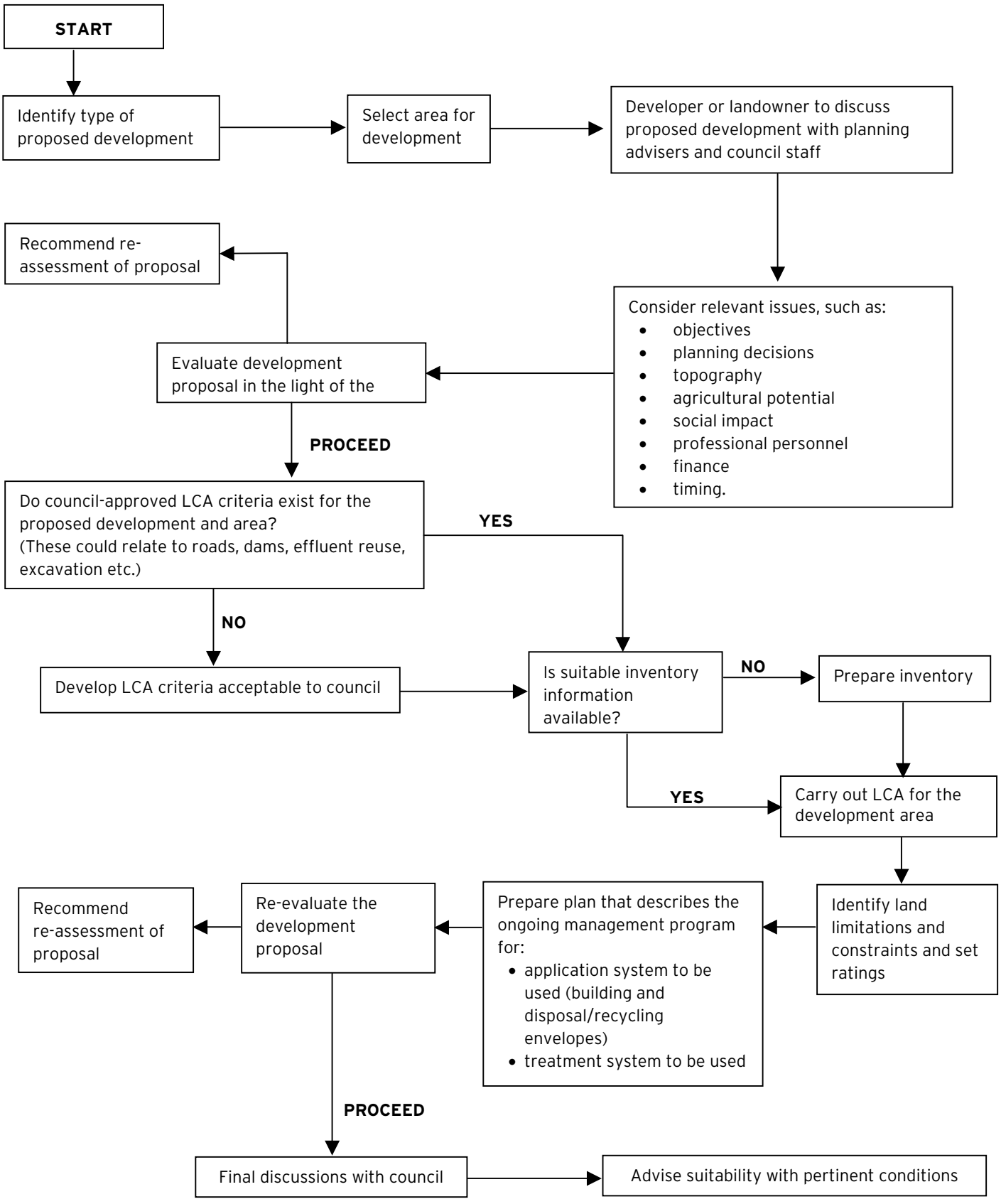


Figure 4.1: Flowchart for residential development where onsite systems are used to manage wastewater

5 ONSITE WASTEWATER MANAGEMENT IN SEWERED AREAS

An overview of onsite wastewater management options and associated approved uses is outlined in Table 2.1.

5.1 Wastewater recycling options

Onsite blackwater recycling is not permitted where reticulated sewerage is available. The consequences of system failure are considered too high and may jeopardise the health of occupants and surrounding neighbours.[4] Recycling treated greywater should be considered as an alternative in sewered areas (see sections 5.2 to 5.6).

5.1.1 New sewerage works

An exception to this rule is where:[5]

- a household has an existing EPA approved secondary treatment system installed prior to the property owners being notified of the intention to sewer the property by the water authority;
- the treatment system treats blackwater to a 20/30/10 standard;
- the system is managed in accordance with the relevant EPA Certificate of Approval (CA); and
- the treated effluent is irrigated in accordance with section 5.4 of this Code.

5.1.2 Composting toilets

Another exception applies where:

- Blackwater is discharged to an EPA-approved composting treatment system and managed in accordance with the relevant EPA Certificate of Approval (CA), and the greywater is recycled and managed onsite in accordance with sections 5.2 to 5.6 of this Code

or

- Blackwater is discharged to an EPA-approved composting treatment system and managed in accordance with the relevant CA, and the greywater is discharged to sewer.

5.2 Greywater recycling

Climate change and population growth have resulted in increasing pressure on drinking water supplies. If treated appropriately, domestic greywater is a resource that can be recycled for indoor and outdoor purposes. Replacing the use of potable water with greywater will reduce both the demand on drinking water supplies and the amount of sewage effluent discharged to the environment.

5.2.1 Untreated greywater (reuse)

Untreated greywater from the bath, shower and clothes washing machine can be bucketed or diverted to water lawns and gardens, as a temporary supply of water during dry weather.

Diversion and bucketing of untreated greywater does not require a council 'septic tank' permit. However, to protect public health and the environment, untreated greywater should be reused in accordance with the most recent version of EPA Publication 884, *Greywater use around the home*, and not stored for longer than 24 hours.

5.2.2 Treated greywater (recycling)

Onsite greywater treatment systems can supply treated greywater for uses described in Table 5.1. However, as these systems provide a permanent supply of greywater, and in some cases the greywater is recycled inside the house, more stringent conditions are applied to their installation and use than those applied to temporary bucketing or diversion of untreated greywater.

Therefore, a council permit is required prior to the installation of the system. The system must be operated and maintained in accordance with the council permit and relevant CA(s) to ensure that public health and the environment are protected.

A greywater system must include:

- an EPA-approved greywater treatment system
- a diversion valve to divert greywater to sewer (or, in unsewered areas, to the blackwater treatment system):
  - during wet weather (only where greywater is recycled via irrigation);
  - when greywater production exceeds demand; and
  - in the event of system failure.

The greywater system may also incorporate:

- a recycling system that includes:
  - one or more effluent irrigation area(s) managed by automatic controls that adjust and match irrigation flows to the needs of the vegetation[6] (e.g., based on soil moisture sensors and/or rain sensors)

  and/or
  - plumbing to indoor fixtures such as the toilet cistern and/or washing machine

4 This position will be reviewed once a process has been adopted for validating onsite wastewater treatment systems in accordance with the Australian Guidelines for Water Recycling (AGWR), NWQMS 2006.

5 State Government policy requires premises to be connected to the sewer where sewerage is provided, unless 'wastewater is reused in accordance with guidance provided by EPA'.

6 Existing irrigation systems may not be suitable for the irrigation of treated greywater, as the system may clog. Also, pressurised irrigation systems are generally more reliable than gravity-fed irrigation systems.

and

- a mandatory service contract between the householder and an accredited service agent.

The greywater system for a specific site must be designed so that the volume of greywater collected matches the household recycled water needs, including the minimum flows required to maintain effective operation of the treatment system

.

Table 5.1: Approved uses of treated greywater[1]

Treatment	Appropriate use of greywater sourced from and recycled on *single domestic premises*		Appropriate use of greywater sourced from and recycled on *multi-dwelling[2]/commercial[3] premises*	
Secondary treatment (20/30 standard) (≤5000L/day)	Subsurface irrigation	Yes	Subsurface irrigation	Yes[4]
	Surface irrigation	No	Surface irrigation	No
	Toilet flushing	No	Toilet flushing	No
	Washing machine	No	Washing machine	No
Secondary treatment and disinfection (20/30/10 standard) (≤5000L/day)	Subsurface irrigation	Yes	Subsurface irrigation	Yes[4]
	Surface irrigation	Yes	Surface irrigation	Drip only[4]
	Toilet flushing	No	Toilet flushing	No
	Washing machine	No	Washing machine	No
Advanced secondary treatment and disinfection (10/10/10 standard)[7] (≤5000L/day)	Subsurface irrigation	Yes	Subsurface irrigation	Yes[4]
	Surface irrigation	Yes	Surface irrigation	Drip only[4]
	Toilet flushing	Yes	Toilet flushing	AGWR standard only[6]
	Washing machine	Yes[5]	Washing machine	AGWR standard only[6]

1. This table only refers to recycling greywater that has been treated in an EPA-approved greywater treatment system. For information on the reuse of untreated greywater, refer to section 5.2.1. Greywater may not be recycled for any purposes other than those outlined in this table. Treated greywater must not come in contact with the edible parts of herbs, fruit or vegetables. Greywater may contain contaminants originating from products such as bleach, paint and dye. Greywater potentially containing such contaminants may not be sufficiently treated in a greywater treatment system and should therefore be discharged to sewer (in sewered areas). In unsewered areas, the use of these products should be avoided altogether. When greywater is sourced from the laundry and recycled via garden irrigation, liquid detergents should be used, as powder detergents contain a high amount of salt which may be detrimental to plant and soil health.
2. Multi-dwelling premises: one site with numerous buildings, some or all of which are connected to one common onsite greywater treatment system.
3. Commercial premises: see section 1.2.
4. Sites with sensitive subpopulations such as hospitals, aged care facilities, childcare centres and schools should only use sub-surface irrigation, and not irrigate children's play areas (such as lawns).
5. It should be noted that greywater recycling for clothes washing may not always result in the desired outcome, especially when washing light-coloured clothes.
6. Recycling greywater for internal use at multi-dwelling and commercial premises is not recommended unless the system that has demonstrated compliance with the Australian Guidelines for Water Recycling (AGWR), including the ongoing operation and management (refer to section 5.5.2).
7. Note that 10/10/10 standard is not 'Class A' standard. 'Class A' standard is only applicable for larger systems that treat more than 5000 litres of wastewater per day (refer to EPA Publications 464.2, Use of Reclaimed Water and 1015, Dual pipe water recycling schemes – health and environmental risk management).

Further explanations of the terms used in this table are in the glossary in Section 8.

5.2.2.1 *Options for recycling treated greywater on sewered sites*

- Recycling greywater indoors only:
  Treated greywater is used for toilet flushing and/ cold water supply to washing machines. Excess treated greywater is diverted to the sewer.
- Recycling greywater indoors and outdoors:
  Treated greywater is used for toilet flushing and/or cold water supply to washing machines, as well as for sub-surface and/or surface irrigation. Excess treated greywater is diverted to the sewer.
- Recycling greywater outdoors only:
  Treated greywater is used for sub-surface and/or surface irrigation. Excess treated greywater is diverted to the sewer.

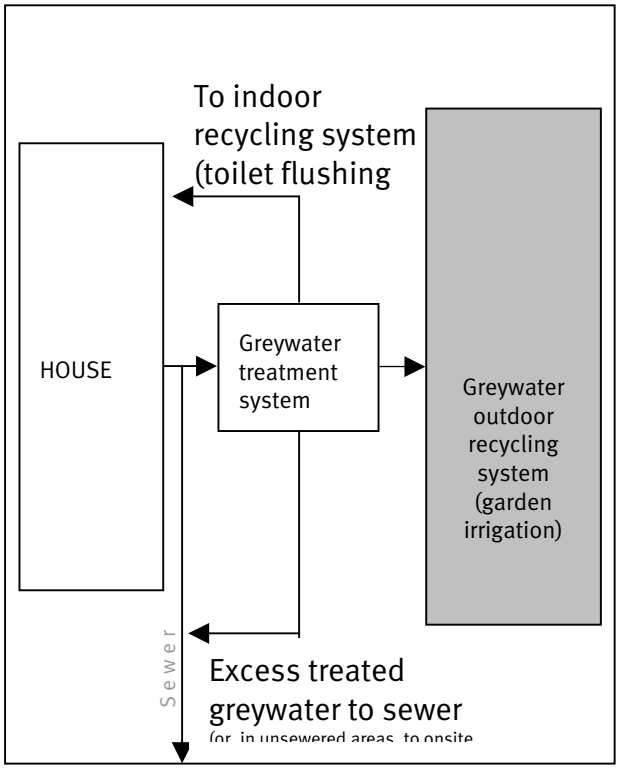


Figure 5.1: Greywater recycling options in sewered areas

5.3 EPA-approved greywater treatment systems

Persons who wish to install a greywater treatment system on their property must obtain a council permit prior to the installation. Council may only issue permits for greywater treatment systems that hold a Certificate of Approval (CA) that is current at the time council receives the permit application (refer to www.epa.vic.gov.au/water/wastewater/onsite.asp). EPA issues the CA. Greywater treatment system manufacturers who wish to have their greywater treatment system approved for use in Victoria, should contact EPA for advice on the approval process.

5.4 Garden irrigation with treated effluent

Onsite wastewater systems (i.e., the treatment system plus the recycling system) used for garden irrigation must be designed, installed and maintained to ensure:

- soil saturation or surface runoff does not occur
- effluent is treated to a water quality standard as described in Table5.1
- the irrigation area contains good quality soil (native or imported top soil) to support the growth of healthy plants
- the irrigation system is designed, installed and operated to ensure that the irrigation rate and volume of treated greywater applied to the designated irrigation area does not exceed the plants' or soils' needs (pressurised irrigation systems are preferred)
- premises occupiers monitor their gardens and use information about plant type, soil type and soil profile to ensure the irrigation rate meets their plants' needs. The irrigation rates in Table 5-2 are based on soil type as outlined in the most recent version of AS/NZS 1547, *On-site domestic wastewater management* and can be used as a basis if plant requirements are unknown.

Table 5.2: Soil irrigation rates

Soil type	Irrigation rate (litres/m^2.day)
Sands and gravels	5
Sandy loams	5
Loams	4
Clay loams	3.5
Light clays	3
Medium to heavy clays	2

- soil moisture sensors and/or rain sensors are integrated into the irrigation system to automatically divert treated effluent to sewer (or to blackwater systems in unsewered areas) prior to the soil becoming saturated
- the irrigation system is protected from solids being carried over from the treatment system;
- treated effluent is contained within allotment boundaries and not discharged to drains, waterways or groundwater
- flush valves are installed to allow periodic flushing to clean the irrigation system
- the setback distances listed in Table 5.3 are complied with
- a failsafe diversion to sewer (or to blackwater systems in unsewered areas) if the system fails as a result of power failure or malfunction

- public amenity is protected by avoiding effluent pooling, odour and noise
- treated effluent does not come in contact with the edible parts of herbs, fruit or vegetables
- warning signs with the symbols and/or words indicating 'Recycled Water – Do Not Drink' are clearly displayed on the treatment unit and the irrigation area
- that outdoor recycled water taps are coloured purple, have a removable child-proof handle and are located at least 300mm from any drinking water tap.

Further general requirements are listed in section 5.6.

5.5 Toilet flushing and clothes washing with treated greywater

5.5.1 Single domestic premises

Greywater treatment systems that achieve a minimum 10/10/10 standard (see section 8 for definition) of water quality are approved for toilet flushing and cold water supply to washing machines, as well as sub-surface and surface irrigation for single domestic premises.

Table 5.3: Setback distances for areas irrigated with treated greywater[1]

Item	Setback distance (m)
Allotment boundary[2]	
Up-slope of adjacent lot	1
Down-slope of adjacent lot	0.5
Services[3]	
Potable supply channel (irrigation area up-slope)	150
Potable supply channel (irrigation area down-slope)	10
Underground water tank	3
Stormwater drain (above-ground)	2
Swimming pool	2
Cutting/escarpment	10
Surface waters (up-slope from)	
Dam or reservoir (potable, including food production)[4]	150
Stream, river, waterways (potable water supply catchment)[5]	50
Dam or reservoir (stock & non-potable)[4]	30
Stream or channel (continuous or ephemeral, non-potable)	30
Groundwater bore[1]	
Potable or non-potable	20

1. These distances act as a guide for irrigation of treated greywater in both sewered and unsewered areas, and for irrigation of treated sewage from existing secondary treatment systems as described in section 5.1.1. Distances must be measured horizontally from the defined boundary of the irrigation area to the nearest point of the defined feature. They do not apply vertically. For streams and dams, the measuring point shall be the 'bank-full discharge level'. Setback distances to protect the structural integrity of buildings and other structures should be assessed by a building professional on a site-by-site basis.
2. Distribution pipes must be located at least half a metre from the property boundary.
3. Where possible, irrigation systems should not be installed over the top of services and structures (e.g., water supply, gas supply and telecommunications services). Exceptions may be applicable where appropriate management controls are used to satisfy councils that health and environmental risks will be managed.
4. Does not apply to dams and reservoirs located above ground-level.
5. Means a water course within a Special Water Supply Catchment Area listed in Schedule 5 of the *Catchment and Land Protection Act 1994*.

They must be designed, installed and maintained to ensure:

- an appropriate back-up supply of water is provided in the event that the supply of recycled greywater fails
- the system automatically diverts untreated or partially treated greywater to sewer if the system fails as a result of a malfunction or power failure
- all plumbing work is undertaken by a licensed plumber in accordance with AS/NZ 3500:2003, *National Plumbing and Drainage Code*, which is consistent with the Victorian Plumbing Industry Commission's *Recycled Water Plumbing Guide* (this specifies the use of management controls such as backflow prevention devices and purple coloured pipes).

Additional general requirements are listed in section 5.6.

Further information about plumbing requirements (e.g., regarding toilet water supply back-up) can be obtained from the Plumbing Industry Commission (www.pic.vic.gov.au).

5.5.2 Multi-dwelling/commercial premises

The use of treated greywater for indoor purposes, from systems treating less than 5000 litres per day, in multi-dwelling or commercial premises is not recommended unless the system is designed, operated and maintained in accordance with the *Australian Guidelines for Water Recycling: Managing Health and Environmental Risks* (Phase 1), (2006) ['AGWR'].

The risks to human health from greywater recycling in multi-dwelling/commercial premises are higher without robust ongoing validation and management controls. The current Victorian regulatory framework does not accommodate the higher risk management measures required. However, the AGWR provides a suitable framework.

5.6 General requirements for treated effluent

Treated effluent must not be:

- consumed by humans or animals
- used for bathing or showering
- used to top-up swimming pools or spas
- used for car washing
- used for hosing pavements and other hard surfaces
- used for food preparation or washing dishes or kitchen appliances
- used for irrigating in a way that it will contact edible parts of herbs, fruit or vegetables
- piped to hot water services
- stored with rainwater or stormwater.

Permit applicants must satisfy council through the submission of a management plan that:

- if treated greywater is stored, a free chlorine residual (or a free bromine residual measured as chlorine equivalent) between 0.2 (minimum) and 2.0 (maximum) mg/L is maintained, unless it has been demonstrated that 10cfu *E.coli*/100mL or less can be maintained in the storage of treated greywater at all times
- there will be no discharge of greywater beyond the allotment boundary:
  - no vertical discharge to perched or permanent groundwater tables
  - no horizontal discharge due to poor irrigation practices (e.g., droplet size, throw and plume height/width must be controlled when surface irrigating).

It is the system owner's responsibility to ensure that the greywater system (i.e., the greywater treatment system plus the recycling system) is installed and maintained in accordance with:

- the council permit
- the relevant EPA Certificate of Approval for the greywater treatment system, including associated maintenance manuals (available at www.epa.vic.gov.au/water/wastewater/onsite.asp)
- if applicable, the relevant 'generic' CA for the greywater recycling system (i.e., the CA for surface irrigation systems or the CA for sub-surface irrigation systems).

Prior to installing a greywater treatment system, the licensed plumber should notify the Plumbing Industry Commission.

Table 5.4 provides values for greywater flows that can be used as default values for designing household greywater recycling systems.

Table 5.4: Recommended estimates for greywater flows[1]

Greywater source	
Source	**Volume/day[2]**
Household bathroom	60 litres/person
Household laundry	40 litres/person
Recycled Greywater Use	
Use	**Volume/day[2]**
Washing machine	35 litres/person
Toilet flushing	30 litres/person

1: Adapted from AS/NZS 1547, *On-site domestic wastewater management*.

2: The estimates assume a top-loading washing machine and standard water devices.

6 ROLES AND RESPONSIBILITIES

Several groups are involved in managing onsite wastewater systems. Each of these groups plays a role in ensuring that health and environmental values are protected.

This section describes the responsibilities of the following as they relate to managing onsite wastewater systems:

- EPA Victoria
- local government
- land capability assessors
- building surveyors
- onsite treatment system installers
- disposal/recycling system designers and installers
- servicing agents
- property owners.

6.1 Environment Protection Authority of Victoria (EPA)

EPA administers the *Environment Protection Act 1970* and SEPP (WoV).

EPA is responsible for:

- producing guidance for onsite wastewater management, including this Code and other documents; and
- issuing CAs for particular onsite wastewater treatment systems that have undergone and complied with the relevant testing criteria[7], as well as issuing 'generic' CAs that describe general requirements for disposal/recycling systems (e.g., surface irrigation systems, subsurface irrigation systems).

6.2 Local government

6.2.1 Statutory responsibilities

Within its area of jurisdiction, local government is responsible for developing, implementing and administering various environmental policies and legislation, including the *Planning and Environment Act 1987*, *Environment Protection Act 1970*, State environment protection policies, codes of practice and relevant guidelines.

Council is responsible for:

- assessing land development proposals
- assessing onsite wastewater management permit applications
- developing council management programs
- developing domestic wastewater management plans.

7 Refer to EPA website www.epa.vic.gov.au/water/wastewater/onsite.asp for the relevant testing criteria

The *Planning and Environment Act 1987* at s12 (2) (b) states that, as a planning authority, local government:

> '...must take into account any significant effects which it considers the scheme or amendment might have on the environment or which it considers the environment might have on any use or development envisaged in the scheme or amendment...'

Section 60 of the *Planning and Environment Act 1987* covers what a council planning department must consider before deciding upon an application.

6.2.1.1 Assessing land development proposals

When assessing land development proposals in unsewered areas, local government must ensure that it considers:

- 'any significant effects which the responsible authority considers the use or development may have on the environment or which the responsible authority considers the environment may have on the use or development' [s60(1)(iii)]
- 'any strategic plan, policy statement, code or guideline which has been adopted by a Minister, government department, public authority or municipal council.' [s60(b)(ii)].

Councils are responsible for ensuring that new residential subdivisions are provided with reticulated sewerage at the time of subdivision or that the allotments created are capable of treating and retaining wastewater within their boundaries.

When preparing amendments to planning schemes to allow rural residential development, local government must consider *Ministerial Direction No 6*, Rural Residential Development. This direction requires local government to consider and comply with *Guidelines for Rural Residential Development*. Council must develop an explanatory report that shows how an amendment complies with these guidelines. This report must include an assessment of the locality's health and hazard-related features that could affect or be affected by the rural residential development in an unsewered area. This assessment must include a soil absorption testing program for which 'the results must show compliance with... *State Environment Protection Policy (Waters of Victoria)*.'

Where there are concerns that a proposed subdivision (or rezoning) may cause environmental degradation, or that certain parts of an assessment report raise unresolved questions, it is prudent for council and council officers to seek advice from other agencies. These agencies could include water authorities (particularly if sewer is nearby), EPA, catchment management authorities, the Department of Planning and Community Development and the Department of Sustainability and Environment. Councils can also seek technical and planning advice from non-government professionals.

A land capability assessment addressing onsite wastewater management should be carried out as early as possible in the planning phase, to ensure council has addressed its duty of care obligations. Council should be aware that as development densities increase, there may be a risk to the environment from cumulative detrimental effects.

Refer to sections 7.1.1 and 7.1.2 for further information on councils' legal responsibilities under the *Environment Protection Act 1970* and SEPP (WoV).

6.2.1.2 Assessing onsite wastewater management permit applications

Local government assesses applications for permits to install and operate onsite wastewater systems under the *Environment Protection Act 1970* (s53). Permits may be issued with conditions. Council must refuse to issue a permit if:

- the proposed onsite wastewater treatment system and associated disposal/recycling system is contrary to any State environment protection policy

or

- the onsite wastewater treatment system does not hold a current Certificate of Approval (CA) from EPA. Current CAs are listed online at www.epa.vic.gov.au/water/wastewater/onsite.asp.

Council must ensure that the proposed disposal/recycling system complies with State regulation (i.e., relevant CA, this Code, other EPA guidance documents) or, if no relevant State regulation exists, with the most recent version of Australia/New Zealand Standard AS/NZS1547, *On-site domestic wastewater management*.

The council permit application requirements are discussed further in section 6.9.1.

Once systems are installed and operating, council should assess the annual reports submitted by system owners, to ensure that inspections, maintenance and effluent quality testing results (if applicable) of each installed system is in accordance with the relevant EPA CA.

EPA approval of an onsite wastewater system for use in Victoria does not mean that the system will always achieve the necessary outcomes at a specific site. The suitability of a system for a particular site depends on factors including lot size, climate, soil capability, number of people using the system and whether the property is occupied full or part-time. Council must decide if a proposed onsite wastewater treatment system and associated disposal/recycling system is suitable for a particular site. This decision is generally based on a land capability assessment (LCA) of the site that has been prepared for the property owner.

This Code cannot anticipate every potential environmental impact that may be associated with a development using onsite wastewater systems. Council therefore needs to have a high degree of confidence and certainty about the investigation and conclusions made by land capability assessors.

Although there is no simple way to guarantee work quality, council needs to satisfy itself that persons undertaking land capability assessments are suitably qualified. Refer to section 6.4 for further information on this.

6.2.1.3 Council management programs

Councils should develop onsite wastewater management programs that ensure:

- onsite wastewater is managed so that there is no danger to human health
- developments using onsite systems only proceed after they have been demonstrated to be environmentally sustainable
- domestic wastewater treatment occurs via EPA-approved on-site systems
- the disposal/recycling of treated wastewater occurs in accordance with EPA guidance
- wastewater is confined within the allotment boundaries
- programs for ongoing management of onsite systems are feasible and achievable
- inspection, monitoring, and reporting programs are carried out, with the results being assessed and, if applicable, acted upon.

Council may also consider the use of maintenance agreements that are linked to the title of the property to ensure that future owners comply with any wastewater management requirements. This may be achieved using the provisions of s173 and s181 of the *Planning and Environment Act 1987*.

6.2.1.4 Domestic wastewater management plans

Where relevant, councils should develop a municipal domestic wastewater management plan ('DWMP') to meet their responsibility of regulating onsite wastewater management.

A DWMP is a planning and management document that provides a mechanism for the development, implementation and review of programs to protect public health, the environment and local amenity.

The DWMP should be seen as one of a number of local planning strategies integrated and consistent with other council and local initiatives such as corporate plans, waste management programs, municipal strategic statements, environment management strategies, conservation strategies, stormwater management plans and public health plans.

The DWMP should articulate the council's policy on and commitment to sustainable wastewater

management. This should be developed in conjunction with the local community.

A DWMP can establish processes to ensure early and comprehensive consideration of wastewater management in the planning cycle.

The Municipal Association of Victoria (MAV) and EPA have developed a model DWMP based on trials conducted by a number of councils across Victoria, representing urban fringe, provincial city and remote rural municipalities.

The model plan, available from the MAV (www.mav.asn.au/), assesses key issues including costs, impacts and barriers confronted when developing a Domestic Wastewater Management Plan.

6.3 Department of Human Services

The Department of Human Services (DHS) administers the *Health Act 1958*. DHS is responsible for providing advice to EPA and Local Government about public health policy related to wastewater management.

6.4 Land capability assessors

An LCA is required for all sites in unsewered areas where the installation of an onsite wastewater system is proposed.

An LCA is not required for sites in sewered areas where the installation of a greywater treatment system is proposed, provided the scheme complies with the generic conditions described in section 5.6.

Developers or individual landowners (not EPA or councils) are responsible for engaging a suitably qualified soil science professional to undertake an LCA of their site. Such professionals must be aware of the requirements of EPA, councils and other government agencies.

The assessment must be sufficiently rigorous to allow council to be fully informed when preparing permit conditions for the development, especially those in regards to environment protection controls.

The assessment of a particular site must be more than an audit of the provisions and recommendations set out in this Code.

Land capability assessors may need to provide councils with verification of the following requirements:

Qualifications

The assessor must have suitable professional training and experience. Personnel undertaking or supervising data gathering and assessment should have a relevant and acceptable tertiary qualification from a reputable training institution in a discipline such as engineering or science, including soil science, agricultural science, environmental science, chemistry, or geography. The qualifications should include specific knowledge of soil and soil processes.

Experience

Knowledge of similar work having been undertaken, or references from councils and other bodies may allow council officers, developers or individual landholders to judge the competency and capacity of individuals and organisations to carry out land assessments.

Professional membership

Assessors should be accredited members of an appropriate professional body. In some instances, professional bodies will certify the competence of members to undertake particular works.

Professional indemnity

Individuals should hold relevant indemnity insurance to a level that will offer protection to the council if problems arise in the future due to inadequate assessment. Land assessors should not be undertaking assessments in areas where they do not hold insurance. Council may wish to verify the status of the policy with the insurance underwriter or actually see the relevant parts of the indemnity policy.

Independence

Assessors need to fully appreciate the consequences of their advice over the long term. 'Consultants should place their responsibility for the welfare, health and safety of the community and environment before their responsibility to sectional or private interests' (*Code of Ethics,* Engineers Australia). Assessors need to satisfy themselves that the particular management program and/or equipment recommended are the most appropriate in the particular circumstances and are suited to the proponent in regards to system maintenance.

It is recommended that land capability assessors familiarise themselves with the expectations of individual councils through consultation with the relevant staff prior to an assessment.

6.5 Building surveyors

Private building surveyors are able to issue building permits. For any unsewered allotment that requires the installation of any onsite wastewater system or involves the erection of a building over an existing onsite system, surveyors must obtain a 'Consent and Report' from the relevant council at two stages of the building approval process:

- before issuing a building permit
- before issuing an occupancy permit.

The Minister for Planning and Local Government has directed that an occupancy permit for a building must not be issued unless the necessary consents have been obtained *(Minister's Guideline 97/02)*.

These requirements ensure that:

- building permits are not issued for an unsewered property where suitable wastewater management arrangements cannot be made; and
- occupancy permits are issued only when the installation of the onsite wastewater system has been approved by the council.

6.6 Onsite wastewater system installers

Onsite wastewater systems must be installed by licensed plumbers. As onsite wastewater systems vary, specialist knowledge is often required to ensure that the particular system is installed in compliance with EPA and council requirements and the manufacturer's instructions.

Before installation the installer:

- must ensure the wastewater system complies with the:
  - relevant EPA certificate of approval (CA)
  - council permit and site assessment report
  - manufacturers specifications
  - *Victorian Plumbing Regulations 2008*
- must provide a number of documents to council and the property owner/occupier including:
  - evidence of product approval (quality assurance certification)
  - statement of warranty and of service life
  - schematic drawings of the system
  - statement regarding electricity usage (in kilowatt hours per year)
  - installation manual
  - maintenance/service manual including service report template
  - owner or occupier's operation instruction manual
- should notify the Plumbing Industry Commission if installing a greywater treatment system.

After installation the installer must:

- ensure the installed system complies with the relevant CA and council permit
- supply a certificate of compliance to council;

Refer to section 6.7 for the design and installation of the associated disposal/recycling systems.

Anyone engaging a contractor to install an onsite wastewater system should verify the following about the installer.

Knowledge

System installers need a good knowledge of the system to ensure it will be installed correctly and perform satisfactorily. There are many types of wastewater treatment systems approved by EPA and the number of approved systems is increasing. There are often features associated with a particular system that require specific knowledge. For example, a number of package treatment systems require pump selection and alarm systems to match the expected wastewater loading, together with specific council permit needs. Also, irrigation systems, especially those that are gravity-fed, may fail due to incorrect installation and should therefore be installed by an experienced professional.

Insurance

Individual installers must carry relevant insurance to protect other parties in case of system failure due to faulty installation. This insurance may go beyond the product liability insurance that is attached to the main treatment plant, irrigation system, etc., and can include the works associated with the siting, installation and commissioning of the facility.

6.7 Disposal/recycling system designers and installers

Land disposal systems (e.g., soil absorption trenches), areas for further wastewater treatment (e.g., mounds, reedbeds, sand filters), and land recycling systems (i.e., irrigation areas) must be designed in accordance with the relevant EPA CA, or if there is no relevant CA, the most recent version of Australia/New Zealand Standard AS/NZS1547, *Onsite domestic wastewater management*.

Indoor recycling systems (i.e., toilet flushing and cold water supply to washing machines) must be designed in accordance with the *Victorian Plumbing Regulations 2008*.

6.8 Service agents

EPA CAs and council permits detail maintenance requirements to be performed by service agents, as well as reporting requirements to council.

Service agents should be suitably trained by the system manufacturer in the installation, operation and service requirements of the system. Service agents must be accredited in writing by the system manufacturer, in accordance with the relevant CA.

The prescribed servicing must occur at the frequency nominated in the council permit and relevant CA to maintain system performance.

The service agent should complete a service report stating that the system is functioning correctly or, alternatively, what remedial action is recommended. This report should be forwarded to council and the property owner.

6.9 Property owners

The property owner must apply to council for a permit to install an onsite wastewater system. The information that council requires to support the permit application is discussed in section 6.9.1. The permit to install must be obtained prior to installation of the system. After installation of an onsite wastewater

system and before it is used, the property owner must obtain a 'Certificate to Use' from the local council.

Prior to any system alterations, the property owner or occupier must obtain a new council permit. The property owner or occupier must also contact council prior to any house alterations, as a new permit may be required (for example, for an extension).

Property owners should satisfy themselves that contractors and consultants are qualified to undertake works on their property (refer to sections 6.4, 6.6 and 6.8).

Property owners must ensure that the onsite wastewater system is operated, maintained and monitored in accordance with the council permit and the CA requirements. A CA may require a property owner to pay for regular sampling of treated wastewater to ensure system compliance. If someone other than the property owner will be using the system (such as tenants, gardeners, landscapers), then property owner must make sure that these individuals are aware of any responsibilities they may have in relation to the system.

A person who fails to comply with permit conditions could be subject to enforcement action.

Property owners may need to review their household public liability insurance policy to ensure the onsite wastewater system is included.

Anyone who becomes responsible for the operation and maintenance of an onsite system (such as new property owners) must make themselves aware of the responsibilities they are acquiring. Thus, they should familiarise themselves with the type of system in place, the system's location, its performance, the potential relevance of existing garden plants (in regard to evapotranspiration), and the ongoing management program required by the council permit and the CA. Specific conditions regarding each system can be obtained directly from council. A number of councils have advice available for new residents to assist with land management expectations on new and existing properties. The solicitor or real estate agent involved in the property purchase may also be of assistance.

6.9.1 Council permit application procedure

6.9.1.1 Permit to Install

Before installing or modifying an onsite wastewater system (that is, an onsite wastewater treatment system plus the associated disposal/recycling system), the system owner must apply to council for a permit to install the system.

Applications for a council permit must contain sufficient information to enable the council to properly assess the application. The application must show that the proposed system will meet design, installation, performance and maintenance requirements for the proposed wastewater flow, site characteristics and associated wastewater disposal/irrigation.

To enable council staff to adequately assess the system and the potential environmental and public health impact, the application must include the following information:

- a scaled locality plan showing the location of the premises, the direction of north, street or lot number and title description, or a copy of land title with property details
- a scaled site plan showing the layout of the proposed onsite wastewater treatment system and associated disposal/recycling system in relation to relevant existing and proposed site features
- proposed measures that show how:
  - stormwater will be prevented from entering the onsite wastewater system
  - run-off from driveways and other hard surfaces will be prevented from entering the onsite wastewater system
  - wastewater will be prevented from discharging beyond the site boundary
- in unsewered areas, the land capability assessor's report on the physical features of the property, the land capability of the proposed land use and summary details of the wastewater management program (refer to section 4.5).

Council will assess whether or not the application demonstrates that wastewater will be managed in accordance with this Code and relevant CAs.

If council refuses to issue a permit, the system must not be installed.

6.9.1.2 Permit to use

Following a review of the installation (often prompted by completion advice in the form of a copy of the Plumbing Industry Compliance Certificate), council will inspect the installation for the purpose of issuing a permit to use. It is an offence under the *Environment Protection Act 1970* to commission a system before the permit to use has been issued.

Seek advice from your local government about their particular requirements.

7 LEGISLATION AND POLICY FRAMEWORK

7.1 Environmental legislation and policies

7.1.1 Legislation

The *Environment Protection Act 1970* ('the Act') provides for the control of water, air and land pollution, waste and noise. EPA administers the Act. Part IXB of the Act specifically deals with septic tank systems (all onsite wastewater systems treating up to 5000 litres per day)[8]. It sets out a two-tier approval process for septic tanks and onsite wastewater treatment systems whereby:

- EPA approves manufactured and commercial onsite treatment technologies which treat up to 5000 litres per day, as well as generic disposal/recycling methods, via a certificate of approval ('CA') system
- local government issues permits for the installation, maintenance and monitoring of individual systems treating up to 5000 litres per day and the associated disposal or recycling systems (these permits must be issued and managed in accordance with this Code and the relevant EPA CAs).

7.1.2 Policies

The Act provides for the formulation and adoption of State environment protection policies ('SEPPs') by Government. SEPPs identify beneficial uses of the environment to be protected, environmental objectives appropriate to those uses, and plans and programs for the attainment of those objectives. SEPPs are statements of Government policy and bind State Government agencies, local government, the private sector and individuals.

This Code describes the steps that responsible parties should follow to meet the requirements of SEPP (WoV) with regard to onsite wastewater management.

Clause 32 of SEPP (WoV) sets out the management controls for onsite domestic wastewater and provides the legal requirement for councils to issue permits for onsite wastewater systems in accordance with this Code.

7.1.2.1 *Provision of sewerage*

SEPP (WoV) is a comprehensive policy that, among other things, sets out requirements for managing domestic wastewater (Clauses 32–34). For example, councils are required to ensure that new subdivisions are either provided with sewerage, or that wastewater can be treated and retained within allotment boundaries. The policy also directs councils to consider this Code when they determine whether or not wastewater could be retained within allotment boundaries.

7.1.2.2 *Wastewater recycling*

Clause 34 of *SEPP (WoV)* requires premises to be connected to the sewer where sewerage is provided, unless 'wastewater is reused in accordance with guidance provided by EPA and is retained onsite'. See section 5 for wastewater recycling options in areas where reticulated sewerage is available, or is being introduced.

7.1.2.3 *Offsite wastewater discharge in unsewered areas*

Offsite discharge may only be approved where council is satisfied that the applicant has demonstrated all of the following:

- the subdivision occurred prior to 15 March 1988
- the effluent cannot be retained on site
- the discharge will be consistent with *SEPP (WoV).*

7.1.2.4 *Protection of groundwater*

SEPP (Groundwaters of Victoria) requires that groundwater be protected and the cumulative effects of individual waste discharges not harm beneficial uses.

It directs that best practice approaches be used to ensure that groundwater quality is kept as close as practicable to background levels.

7.1.3 EPA guidance

EPA has developed guidance documents that provide detailed information on specific aspects of best practice onsite wastewater treatment, recycling and management. These supporting documents, to be read in conjunction with this Code, are the most recent versions of:

- EPA publication 760, *Guidelines for aerated on-site wastewater treatment systems*
- EPA publication 746, *Land capability assessment for onsite domestic wastewater management*.

7.1.4 Australian Standards

Australian Standards relevant to onsite wastewater management that should be read in conjunction with this Code include:

8 It must be noted that the Act defines all types of onsite domestic wastewater systems as 'septic tank systems'. This means that any treatment system as well as the disposal/recycling system is defined by the legislation as a 'septic tank system'. However, the term 'septic tank', as commonly used in the water industry, describes an onsite primary wastewater treatment system using anaerobic conditions. It is therefore important to clearly distinguish between the two meanings of this term.

- AS/NZS 1546.1, *On-site domestic wastewater treatment units, Septic tanks*
- AS/NZS 1546.2, *On-site domestic wastewater treatment units, Waterless composting toilets*
- AS/NZS 1546.3, *On-site domestic wastewater treatment units, Aerated wastewater treatment systems*
- AS/NZS 1547, *On-site domestic wastewater management*.

Onsite treatment systems and associated disposal/recycling systems must be designed, installed and operated in accordance with the above Australian Standards (and any new relevant Australian Standards that may be issued from time to time). If there is any inconsistency between the Australian Standards and this Code and relevant CAs, the Code and relevant CAs take precedence.

Figure 7.1 shows the relationship between the Act, SEPPs, this Code and Australian Standards.

7.2 Planning legislation and policies

The key legislation relating to land development in Victoria is the *Planning and Environment Act 1987*. Two objectives of the planning framework established under this Act are:

- to enable land use and development planning and policy to be easily integrated with environmental conservation and resource management policies
- to ensure that the effects on the environment are considered when decisions are made about the use and development of land.

7.2.1 Planning schemes

The *Planning and Environment Act 1987* requires each council to ensure that all land use and development takes place in accordance with the planning scheme for its municipal district. Each planning scheme contains State planning policies on the environment and requires that any development not connected to reticulated sewerage be designed to ensure wastewater can be contained on an individual allotment in accordance with this Code. The ability of proposed developments to meet this requirement should be assessed at the rezoning, subdivision or development stages.

The *Planning and Environment Act 1987* establishes a range of tools to ensure that the objectives set out in planning schemes are met. These include municipal planning statements, local planning policies and a planning permit process. These are described in section 6.2.1, where their links with onsite domestic wastewater management are outlined.

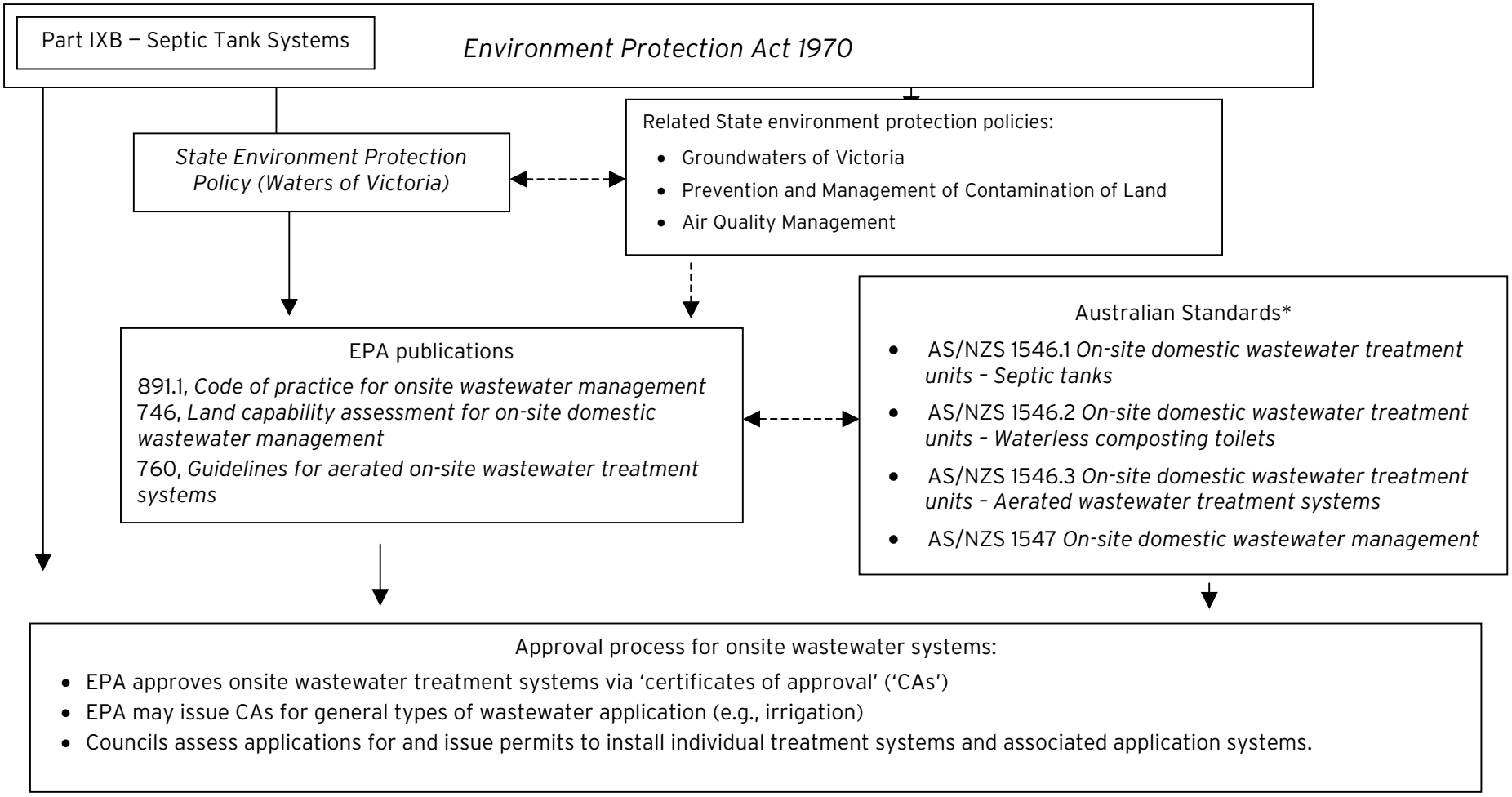
7.2.2 Ministerial Direction No. 6

The *Planning and Environment Act 1987* allows the Minister for Planning to issue Directions that must be implemented by responsible authorities. *Ministerial Direction No. 6* requires planning scheme amendments allowing 'rural residential' developments to be accompanied by a report demonstrating how the development would comply with the publication *Guidelines for Rural Residential Developments* and contain wastewater in allotment boundaries.

7.3 Links between environmental and planning legislation and policies

It is the Victorian Government's intention that environmental and planning legislation and policies are consistent and mutually supportive. This intent is demonstrated by the objectives of the *Planning and Environment Act 1987* listed in 7.2.2 and by SEPP (WoV), which emphasises the need for councils and EPA to work together to implement the policy.

Also, SEPP (WoV), planning schemes and *Ministerial Direction No. 6* all stress that responsible authorities must ensure that developments not provided with reticulated sewerage only proceed when they are satisfied that sewage will be treated and retained within the proposed allotment boundaries.



- Australian Standards apply, except when they are not consistent with this Code and relevant CAs.

Figure 7.1: Relationship between the *Environment Protection Act 1970*, State environment protection policies, this Code of Practice and Australian Standards

8 GLOSSARY

10/10/10 standard: water quality standard indicating an effluent quality of ≤10 mg/L BOD_5, ≤10 mg/L suspended solids and *E.coli* ≤10 cfu/100 mL. Greywater of this quality may be recycled indoors via toilet flushing or cold-water supply to washing machines. It may also be used for surface and subsurface irrigation.

20/30 standard: water quality standard indicating an effluent quality of ≤20 mg/L BOD_5 and ≤30 mg/L suspended solids. Wastewater including greywater of this quality may be recycled outdoors via subsurface irrigation.

20/30/10 standard: water quality standard indicating an effluent quality of ≤20 mg/L BOD_5, ≤30 mg/L suspended solids and *E.coli* ≤10 cfu/100 mL. Wastewater including greywater of this quality may be recycled outdoors via surface and subsurface irrigation.

Absorption: the disappearance of a liquid through its incorporation into solid material, i.e., the uptake of effluent into the soil by capillary action.

Accredited service agent: a person who has been suitably trained by the system manufacturer in the installation, operation and service requirements of the system and is accredited by the system manufacturer in writing to undertake the service.

Aerobic: 'organisms and processes that require oxygen', i.e., microbiological digestion and assimilation of organic matter through the use of oxygen.

Aerated wastewater treatment system (AWTS): a system that bubbles air through the wastewater held in a tank in order to provide the micro-organisms with a source of oxygen to facilitate aerobic biological digestion of organic matter.

Anaerobic: 'living or occurring without oxygen', i.e., microbiological digestion and assimilation of organic matter in the absence of oxygen.

Australia/New Zealand Standard: A document produced by Standards Australia or Standards New Zealand. A voluntary national standard code or specification prepared under the auspices of Standards Australia or Standards New Zealand. Standards are mandatory when referred to in regulations, and are enforceable in contracts when called up in contract documents.

Biochemical oxygen demand (BOD_5): the amount of oxygen consumed by chemical processes and micro-organisms to break down organic matter in water over a five-day period, measured in milligrams per litre (mg/L).

BOD_5: see biochemical oxygen demand.

Blackwater: wastewater from toilets containing faeces and urine.

CA: see 'Certificate of approval'.

Certificate of approval (CA): A statutory document that allows for the installation of onsite wastewater treatment systems or, in some instances, onsite wastewater disposal/recycling systems in Victoria. Current CAs, including associated documentation (installation manual, maintenance/service manual and owner/occupier's operation instruction manual), can be obtained from www.epa.vic.gov.au/water/wastewater/onsite.asp).

cfu: colony-forming units.

Council: a municipal council/local government body.

Desludging: see 'Pump-out'.

Disposal: to get rid of a waste product via air (an evaporation pond), land (soil absorption trench), fire (incineration, steam) or water (discharge to surface waters), with no intention of beneficial reuse.

Disposal field: the area of land utilised for the disposal of partially treated sewage to groundwater via a soil absorption trench. The base of the trench is typically dug 600 mm below the ground surface. The trench is built up to a height of 300 mm and then a layer of 300 mm of native soil is backfilled on top to bring the soil up to the original ground level. The trench location and design will include setback distances from existing and proposed buildings, patios, driveways, fences etc.

Domestic wastewater: see 'Sewage'.

Drinking water: water suitable for human consumption without any risks to health.

E.coli: *Escherichia coli* – a species of bacteria in the faecal coliform group that is found in large numbers in the intestines of animals and humans. Its presence in freshwater indicates recent faecal contamination and is measured in 'colony-forming units' (cfu) per 100 mL of water.

Effluent: water flowing out of a wastewater treatment system.

Ephemeral stream or channel: a stream or channel that carries water for a considerable portion of time, but that occasionally or seasonally ceases to flow.

Greywater: domestic wastewater from sources other than the toilet, urinal or bidet (i.e., from showers, baths, spas, hand basins, washing machines, laundry troughs, dishwashers and kitchen sinks).

Groundwater: underground water contained in or flowing through soil or rock.

Infiltration: the gradual movement of water into the pore spaces between soil particles.

Irrigation: the artificial supply of water to land and vegetation.

Micro-organism: an organism that is invisible or barely visible to the unaided eye (e.g., bacteria, viruses, protozoa).

Nutrients: substances that are used in an organism's metabolism and that must be taken in from the environment; for example carbohydrates, fats, such as proteins and vitamins. Nutrients are molecules that include elements such as carbon, nitrogen, phosphorus, potassium, calcium, magnesium and a range of trace elements.

Onsite domestic wastewater system: see 'Onsite wastewater system'.

Onsite wastewater disposal/recycling system: the system or method for disposal/recycling of treated wastewater.

Onsite wastewater recycling: recycling of domestic wastewater sourced from, treated and used at a single residential site.

Onsite wastewater system: is the same as a 'septic tank system' as defined in the *Environment Protection Act 1970*. It includes an onsite wastewater treatment system plus the subsequent disposal/recycling system.

Onsite wastewater treatment system: a treatment system that treats up to 5000 L/day of wastewater.

Pathogen: a disease-causing micro-organism.

Pollution: any harmful or undesirable change in the physical, chemical or biological quality of air, water or soil as a result of the release of chemicals, heat, radioactivity or organic matter.

Potable water: see 'Drinking water'.

Potable water supply catchment: means an area declared as a water supply protection area as defined in section 27 of the *Water Act 1989*.

Precautionary principle: a principle of the *Environment Protection Act 1970*: 'Where there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.'

Primary treatment of wastewater: the physical processes of screening, filtration, sedimentation, flocculation and flotation to remove organic and inorganic matter from wastewater.

Pump-out: the removal of biological sludge and inert sediment from a septic tank, including the surface crust (scum) material. A pump-out should not drain tanks dry, because some residual sewage is needed to provide a seed source of digesting micro-organisms.

Qualified person: a person who holds relevant qualifications, or a person who is experienced and accepted by a professional body to practise in the pertinent area.

Recycling: treating wastewater to a standard that is appropriate for its intended use; e.g., treating greywater to a 10/10/10 standard for use in toilet flushing, then using that water accordingly.

Reserve field: a duplicate land disposal area reserved for use when the original land disposal area needs to be rested.

Reuse: using a waste product in its present form for another purpose; e.g., diverting (reusing) untreated greywater to water the garden.

Reticulated water: water suitable for human consumption that is delivered to a dwelling through a network of pipes.

Scum: material that floats on top of the liquid in an anaerobic sewage treatment tank (i.e., septic tank).

Secondary treatment: biological treatment following primary treatment of wastewater. Disinfection to kill pathogens may also occur.

SEPP (WoV): *State Environment Protection Policy (Waters of Victoria)*.

Septic tank: a tank that temporarily holds wastewater. In a septic tank, wastewater is primarily treated through filtration, sedimentation, flocculation and flotation to remove organic and inorganic matter from wastewater in combination with anaerobic microbiological digestion.

Septic tank system: as defined within the *Environment Protection Act 1970* (section 53J) '...means a system for the bacterial, biological, chemical or physical treatment of sewage, and includes all tanks, beds, sewers, drains, pipes, fittings, appliances and land used in connection with the system'. In essence this includes a wastewater treatment system (all types of onsite wastewater treatment systems, including septic tanks), as well as associated wastewater storage tanks, distribution pipes and the associated wastewater disposal/recycling system and area.

Service agent: see 'Accredited service agent'.

Sewage: as defined within the *Environment Protection Act 1970* (section 53J) '...means any waste containing human excreta or domestic wastewater...'.

Sewerage: the pipework and ancillary equipment associated with the collection and transport of sewage, and the equipment and processes involved in treating and discharging the effluent.

Sludge: the material that rests on the bottom of a septic tank. It can include inert matter (such as sand, glass and plastics) and biosolids (organic material produced by biological processes).

Soil absorption trench: an infiltration or soak-away trench installed at a depth of 300 to 600 mm below ground level, which facilitates the disposal of primary treated sewage.

Subsurface irrigation: the irrigation of water at a depth of between 100 mm and 300 mm below ground level, i.e. in the biologically active topsoil layer. Minimum water quality required for subsurface

irrigation with treated sewage or greywater is 20/30 standard (20 mg/L BOD_5 and 30 mg/L SS).

Sullage: household greywater that does not contain human excreta, but may still contain pathogens, nutrients and potentially harmful chemicals.

Suspended solids (SS): a measure of the solids in water, expressed in milligrams per litre (mg/L).

Surface irrigation: the irrigation of water to the ground surface. It includes the use of low-rise sprinklers, micro-sprayers, and drip systems under mulch, but excludes the use of hand-held hoses for treated sewage. Treated greywater can be connected to purple coloured child-proof taps that have a removable handle. Irrigation spray heads must not spray beyond the property boundary. Minimum water quality required for surface irrigation with treated sewage or greywater is 20/30/10 standard (20 mg/L BOD_5, 30 mg/L SS and 10 cfu E.coli/100 mL).

Sustainable: able to continue indefinitely without any significant negative impact on the environment or its inhabitants.

Treatment: a process or series of processes that remove contaminants from wastewater, whereby the physical, chemical and biological characteristics of wastewater are altered.

Topsoil: the top layer of the soil, typically containing plant roots, organic material and an active microbiological ecosystem, which is usually more fertile than the underlying layers.

Turbidity: the cloudy or muddy appearance of water that is an indication of fine solids suspended in the water, measured by a light penetration test and expressed in nephelometric turbidity units (NTU).

Water table: the surface of a body of groundwater, below which the geological parent material is completely saturated with water.

9 REFERENCES AND BIBLIOGRAPHY

The following references may assist in achieving best practice management of onsite wastewater systems:

Environment Protection Act 1970.

Planning and Environment Act 1987.

Environment Protection (Scheduled Premises And Exemptions) Regulations 2007.

State Environment Protection Policy (Groundwaters of Victoria), Publication S160.

State Environment Protection Policy (Waters of Victoria), Publication S13.

Victorian Plumbing Regulations 2008.

Department of Energy, Utilities and Sustainability (2007): *NSW Guidelines for Greywater Reuse in Sewered, Single Household Residential Premises*.

EPA Victoria publication 760 (2002): *Guidelines for Environmental Management – Guidelines for aerated on-site wastewater treatment systems*.

EPA Victoria publication 746 (2003): information bulletin, *Land capability assessment for onsite domestic wastewater management*.

Municipal Association of Victoria (MAV) (2007): *Model Land Capability Assessment Report*.

National Water Quality Management Strategy (2006): *Australian Guidelines for Water Recycling: Managing Health and Environmental Risks* (Phase 1).

Standards Australia (2008a): AS/NZS 1546.1, *On-site domestic wastewater treatment units – Septic Tanks*.

Standards Australia (2008b): AS/NZS 1546.2, *On-site domestic wastewater treatment units – Waterless composting toilets*.

Standards Australia (2008c): AS/NZS 1546.3, *On-site domestic wastewater treatment units – Aerated wastewater treatment systems*.

Standards Australia (2000): AS/NZS 1547, *On-site domestic wastewater management*.

10 FURTHER INFORMATION

EPA Information Centre

40 City Road
Southbank 3006
Tel: (03) 9695 2722 Fax: (03) 9695 2785

www.epa.vic.gov.au

Information about domestic wastewater treatment systems is listed on the EPA website. Click on 'Water', 'Wastewater', 'Onsite wastewater treatment systems'.

EPA regional offices

Gippsland

7 Church Street, Traralgon 3844
Tel: (03) 5173 9800 Fax: (03) 5174 7851

North East

27–29 Faithful Street, Wangaratta 3677
Tel: (03) 5720 1111 Fax: (03) 5721 2121

North West

43 Williamson Street, Bendigo 3550
Tel: (03) 5438 1000 Fax: (03) 5443 6555

South Metro

35 Langhorne Street, Dandenong 3175
Tel: (03) 8710 5555 Fax: (03) 9794 5188

South West

State Government Offices
Cnr Little Malop St & Fenwick St, Geelong 3220
Tel: (03) 5226 4825 Fax: (03) 5226 4632

Local government

Municipal Association of Victoria
Level 12, 60 Collins Street, Melbourne 3000
Tel: (03) 9667 5555

www.mav.asn.au

Contacts for professional associations

Soil scientists

Australian Institute of Agricultural Science and Technology
Tel: (03) 9637 8481

www.aiast.com.au

Australian Society of Soil Science Inc
PO Box 1349, Warragul 3820
Tel: (03) 5622 0804

www.asssi.asn.au

Engineers

Engineers Australia – Victoria Division
21 Bedford St, North Melbourne 3051
Tel: (03) 9329 8188

www.vic.ieaust.org.au

Environmental health officers

Environmental Health Australia
PO Box 378, Diamond Creek 3089
Tel: (03) 9438 5960

www.eha.org.au

Accredited planners

Planning Institute Australia – Victoria Division
Suite G-05, 60 Leicester Street, Carlton 3053
Tel: (03) 9347 1900

www.planning.org.au