



## **Wastewater Management Guide for moveable Tiny Houses 2022**

This guide aims to assist with understanding wastewater management obligations and options in the context of moveable tiny houses.

The Australian Tiny House Association focuses on moveable tiny houses, which can be:

- A Tiny House built on a transportable structure with the ability to be moved.
- A Tiny House on Wheels (THOW) constructed on a trailer designed to road legal dimensions, which can be moved.

This Guide relates primarily to moveable Tiny Houses, which may require council approval for permanent occupation.

Wastewater management regulations, policies and processes vary widely across state jurisdictions. This document should be used as a general guide only. Readers are advised to consult with their local authorities and qualified professionals before making any decisions regarding on-site sewage management system (OWMS) design and/or installation.

This Guide does not hold any legal or regulatory status.

## Introduction

To legally occupy a permanent or semi-permanent structure on an unsewered site in Australia it is necessary to have a lawful means of disposing wastewater and sewage.

On-site Wastewater Management Systems (OWMS) are site-specific and are designed to treat wastewater and safely dispose of the treated wastewater. Water NSW state they can include: “septic tanks, biological filter systems; aerated wastewater treatment systems and composting toilets (wet and dry)”.

**Please note** there may be legal consequences for failure to obtain the relevant approvals before installing and commissioning an OWMS. Each state/territory has its own regulatory regime, but there are generally penalties for illegal sewage management facility installation and/or malfunction.

## Acronyms

AWTS	Aerated wastewater treatment system
B.O.D.	Biological oxygen demand
DA	Development application
LAA	Land application area
SSE	Site and Soil evaluation
LCA	Land capability assessment
OWMS	On-site wastewater management system
THOW/S	Tiny house on Wheels/Skids

## Definitions

Blackwater	Wastewater from a flushing toilet and kitchen sink*
Bio System	Bio system treats wastewater without needing costly large mechanical aerators to run, repair or replace.
Excess Fluid	The small amount of fluid which drains from a waterless toilet system chamber
Greywater	Wastewater which flows from the kitchen*, bathroom and laundry and does <i>not</i> include ‘blackwater’ from a flushing toilet
Greywater Pre-filter	A filter designed to remove most solid particles from greywater
Land Application Area	A dedication area of land that is used to dispose of treated wastewater.
Land Capability Assessment	A report that assesses the viability of onsite wastewater management on a site where there is no reticulated sewerage
Septic System	A septic system treats your wastewater on site and is usually placed underground on the land your house is built on

Site and Soil Evaluation	The WA Department of Health note the site and soil evaluation as “examines the various aspects of a site in relation to sewage collection, treatment and on-site disposal to ensure adequate management over time”.
Wastewater	All effluent which emanates from a household, including blackwater from toilets and greywater from the kitchen, bathroom and laundry
Waterless Toilet	A toilet which does not use flushed water to carry the waste away from the pedestal

*\*AS NZS 1547-2012, which is generally regarded as the authoritative reference for OWMS, defines greywater as “The domestic wastes from a bath, shower, basin, laundry, and kitchen, but excluding toilet and urinal wastes. It may contain pathogens”.*

*\*Kitchen wastewater is deemed as greywater in the Australian Capital Territory, New South Wales, Northern Territory, South Australia, Victoria, Tasmania, Western Australia but is considered blackwater in Queensland so approved methods of treatment and disposal will depend on local policies and site characteristics.*

## Wastewater Management Options

The options available for wastewater management are largely determined by where the tiny house is located and the type of toilet system installed. Scenarios generally fall into one of the following four categories:

1. Has flushing toilet/s and access to a local government or other communal sewerage system
2. Has flushing toilet/s and permanently located on an unsewered site
3. Has waterless toilet/s and permanently located on an unsewered site
4. Has waterless toilet/s and not permanently located

### **Category 1 – Flushing toilet/s and access to a local government or other communal sewerage system**

If a tiny house is located at site where access to a ‘sewer main’ is available, it is advisable to take advantage of that connection. It is the most practical and cost-effective wastewater management option and it may be compulsory to connect to a sewer system where one is available.

Local authority approval is required to connect to a municipal sewerage system. Fees and charges apply. Any connection must be installed by a licensed plumber who will also lodge information with the relevant authorities.

Waterless toilets that satisfy AS1546.2 and are accredited in the local authority may still be installed, but installation and operation are subject to local government approval and may be conditional.

At some sites greywater could be diverted and used for irrigation and is subject to council approval.

**Category 2 - Flushing toilet/s and permanently located on unsewered site**

As with all *unsewered* sites, an OWMS application will need to be submitted to council and the local council should be consulted in the first instance to determine its requirements. OWMS applications may require the engagement of a suitably qualified person, such as a soil scientist, environmental engineer or geo-tech to undertake a site assessment for proposed effluent area. This could be called a Site and Soil evaluation (SSE) or Land Capability Assessment (LCA) in your State. The assessment includes soil tests and a series of calculations to determine the suitability of the site and the required size and design of the OWMS.

These calculations take into consideration factors such as the volume and nature of wastewater from the household, the porosity of the soils, the slope of the site, the local vegetation and rainfall patterns and proximity to boundaries and water courses. The report may also identify appropriate location/s for the leach beds, trenches or other effluent disposal areas.

Systems installed under this category could include: aerated wastewater treatment systems, worm farm or Bio systems and septic systems.

Because a household with flushing toilets produces both *blackwater* and *greywater*, the system will typically need to treat the effluent to the level stipulated in the approval - see '*Primary, secondary & tertiary treatment*' section below.

**Category 3 - Waterless toilet/s and permanently located on unsewered site**

You may need to consult a suitably qualified person to prepare a SSE or LCA before submitting an OWMS application with council.

Using waterless toilets eliminates blackwater from the wastewater, which may allow for a much simpler (and less expensive) OWMS. The OWMS application will consist of two parts:

1. the specifications and accreditation of the waterless toilet system
2. the design and layout of the greywater-only system

Greywater-only systems are very site-specific, and the design, location and size of the system will be determined by factors specific to the site as noted in the SSE or LCA. In the absence of blackwater, the treatment level required is typically lower than for flush toilet households. A primary treatment system may be enough for the greywater, if the site is suitable.

Follow the manufacturer's instructions on the disposal of liquid waste from a waterless toilet.

**Category 4 - Has waterless toilet/s and not permanently located**

The use of flushing toilets may not be the best solution in a tiny house as it may be moved infrequently.

The options available for wastewater management in tiny houses which are infrequently moved are quite limited. While the use of waterless toilet systems minimizes or eliminates the effluent from the toilet, disposing of the greywater can still present some challenges. When greywater is stored for any length of time, the oxygen is depleted and can initiate an *anaerobic* process which will produce foul gases such as hydrogen sulfide, methane and carbon monoxide.

Depending on your local authority you may be able to discharge your greywater immediately through subsurface irrigation, or alternatively collect the greywater in a tank for discharge or taken off site for disposal.

## Wastewater System Design

The system design and the level to which the effluent must be treated before it is reintroduced to the landscape, and the method by which this is done, will be determined by the LCA findings and council. At particularly sensitive sites, and in areas such as water catchments, the wastewater may need to be treated to a level higher than would be necessary at less sensitive sites.

In general, blackwater will need to be treated to at least secondary level before being dispersed below ground or treated to a tertiary level where above ground dispersal (via drippers/sprinklers) has been approved by council.

Greywater may only need primary treatment before dispersal below ground.

When required by the approval authority the area of land needed to disperse the effluent – the land application area (LAA) - will be determined by site characteristics described in the SSE or LCA using a ‘water balance’ calculation – a ‘water in/water out’ calculation using factors such as the volume of effluent, soil porosity, slope, vegetation, and local rainfall patterns. The location of the LAA will be determined by factors such as soil types, slope and proximity to water courses and boundaries.

Such assessment is normally only necessary for larger scale development. A single dwelling may not need to go through this process, at the discretion of the approval authority.

### **Cost comparison of waterless and flushing toilets as of February 2022**

NB: it is advisable to obtain your own quotes as the costs may vary around Australia.

Waterless toilet:

- SSE or LCA report ~ \$2,000
- Accredited waterless toilet ~ \$1,500-\$2,500
- Grease trap, course filter and sub-soil irrigation ~ \$5,000\*
- Approximate total ~ \$9,000

*\*Becomes redundant when TH is relocated.*

Flushing toilet/s:

- SSE or LCA report ~ \$2,000
- Toilets & plumbing ~ \$1,500-\$2,500
- AWTS or septic tank and plumbing ~ \$12,000 - \$20,000\*
- Approximate total ~ \$20,000

*\*Becomes redundant when TH is relocated.*

## Primary, Secondary & Tertiary Treatment

### Primary Treatment

Primary treatment is simply the removal of solid matter from the wastewater. This is done in a variety of ways including settling in a tank, where sewage and kitchen waste is included, or through the use of filters when kitchen waste is excluded.

Primary treated greywater is generally disposed of in a sub-surface system such as absorption trenches, evapo-transpiration beds or sub-surface irrigation and is often used to water lawns and gardens if permitted by the regulator.

### Secondary Treatment

Secondary treatment utilises naturally occurring biological processes to remove nutrients, some organic compounds, and smaller particles the primary treatment couldn't remove. It can also reduce the *B.O.D.* of the wastewater.

Secondary treatment systems must be “product certified” to Australian Standard AS1546.2:2017 to be recognised as such. Secondary treatment may be a minimum requirement for households with flushing toilets.

### Tertiary Treatment

Tertiary treatment systems utilise advanced treatment options for pollutant removal from the wastewater and disinfection using a variety of methods including anoxic zones, ozone, UV radiation and chlorination. This is necessary when the wastewater is going to be recycled.

Systems such as this may not suit some off-grid households due to the energy consumed by pumps and blowers.

## Key Points

OWMS are site specific and there are numerous factors at play in determining the appropriate size and design including:

- Site characteristics
- Size of household
- Council policies
- Type of toilets installed

Start by consulting your local authority to see what requirements they have; they may suggest contacting a suitably qualified consultant prior to lodging an application for approval. A locally based geo-tech will normally be familiar with the local council and its policies and preferences regarding OWMS.

Moveable tiny houses present a particular challenge as any permanent land-based infrastructure will become redundant when the tiny house is relocated.

The installation of flushing toilets will increase the size, complexity, and cost of an OWMS.

## Acknowledgement

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## Government Publications

### **New South Wales**

[On-site single domestic wastewater management](#)

### **Victoria**

[Regulatory framework for on-site wastewater management systems](#)

[About greywater](#)

### **South Australia**

[On-site Wastewater Systems Code](#)

[Greywater](#)

### **Queensland**

[Queensland Plumbing and Wastewater Code guidelines](#)

[Installing greywater systems](#)

### **Tasmania**

[On-site wastewater management systems](#)

[Greywater](#)

### **Western Australia**

[Wastewater systems](#)

[Approved greywater system](#)

**Northern Territory**

[Wastewater management](#)

[Greywater re-use](#)

**Australian Capital Territory**

[Water and Sewerage Act 2000](#)

[Greywater use](#)

**Other References**

AS NZS 1547-2012

[NSW Planning Portal](#)

[NSW Easy Septic Guide](#)

[Water NSW Types of Wastewater treatment and application \(disposal\) systems](#)

[Your home wastewater reuse](#)