

# Water Wally

## WASTEWATER MANAGEMENT SYSTEM DESIGN PROPOSAL

Lot 3644 (#56) Redman Road, Williams

**Prepared for:**  
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**September 2023**

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## Introduction

This document has been prepared to describe and support an Onsite Wastewater Management Application for the Spookwood Winery Property (#56 Redman Road, Williams). The proposed development and usage of proposed facilities is considerably different from standard usages and hence the proposed system design may fall outside of current regulations. Suitable design considerations with reference to relevant documentation has been made to support the feasibility of the design and its appropriateness as a wastewater management solution for this proposed development.

Similar design sizing and components of this system have previously been approved by several local governments across Western Australia. Similar systems have also been previously reviewed and supported by the W.A. Department of Health. For more information on these, similar setups, please contact Anthony Smith of Water Wally (the design consultant).

## Background and Development Description

The proposed development consists of 3 small self-contained holiday cabins. The cabins are to be supplied by Eco-Tourism company "Unyoked". Unyoked are a well-established short-term accommodation provider with a large number of cabins in operation across Australia and internationally. You can find out more about Unyoked via their website: <https://www.unyoked.co/>

The cabins are energy and water efficient, holiday accommodation alternatives. They have a small ecological footprint and the wastewater management system, consisting of a waterless composting toilet and small-scale greywater dispersal system, has a minimal/negligible impact on the environment.

The proposal for #56 Redman Road is for up to 3 cabins consisting of:

1 bedroom cabins; maximum of 2 guests allowed per booking and a standard booking duration of 2 nights (representing most bookings). Each cabin will be serviced with a composting toilet, a small bathroom/shower and small kitchenette.



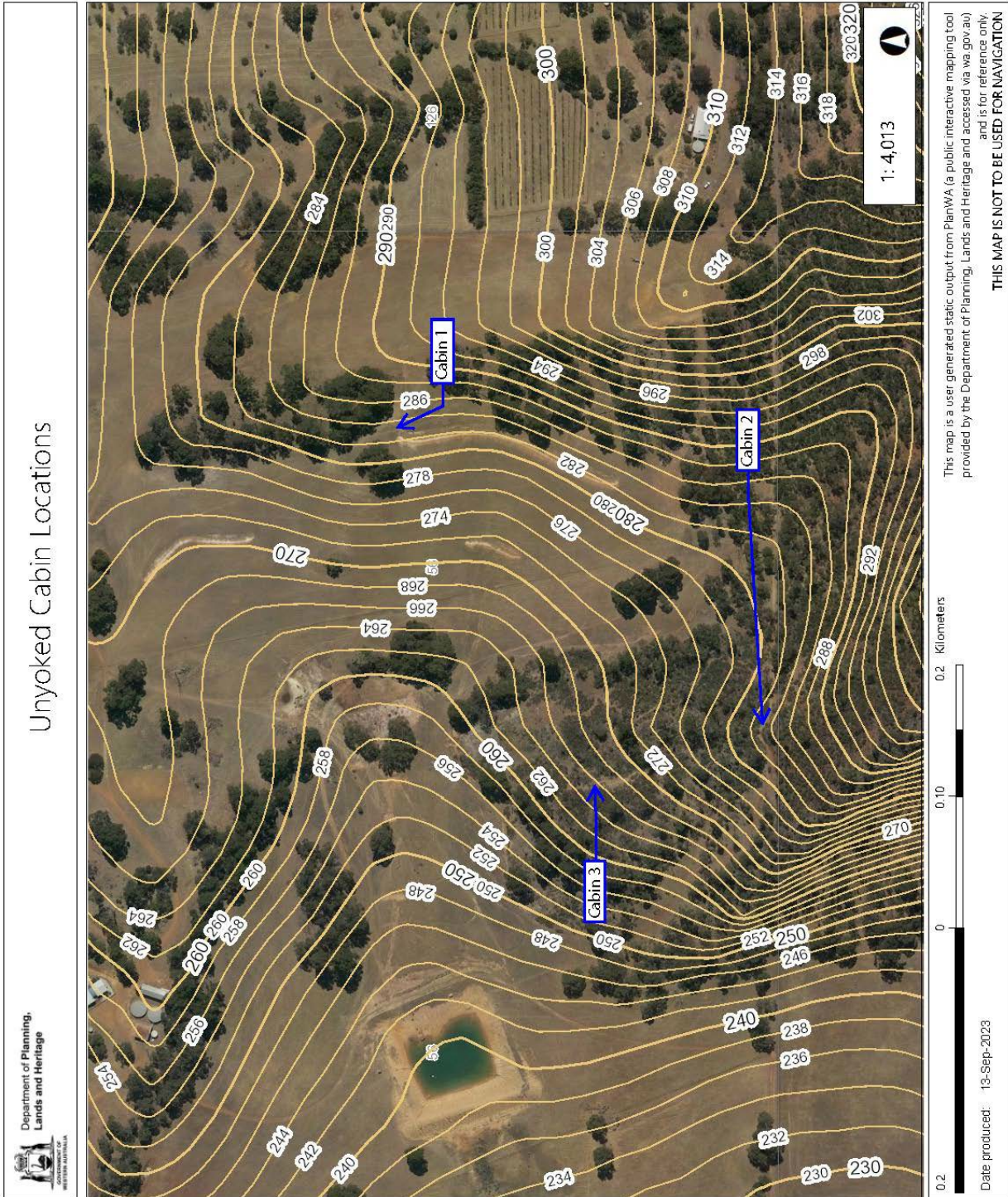
Figure 1: Front view of one of Unyoked cabins in Southwest WA.

Maintenance will be performed at the cabins on a regular basis in between bookings or during periods of vacancy. Cleaners will be tasked with the upkeep of the cabins in between bookings and perform a review of the cabins' facilities at every checkout.

Figure 2: View of the standard cabin kitchen facilities.



Figure 3: Site plan and proposed cabin locations:



## Fixtures and water consumption / hydraulic loading

### Water Supply

Each cabin will be serviced with a reticulated water supply originating from roof catchment from an existing shed/structure on the property. All water supply will be potable and compliant with relevant drinking water standards and regulations.

### Fixtures

Each cabin will have:

- 1 x waterless toilet
- 1 x hand basin
- 1 x shower
- 1 x small kitchen sink

Note: no laundry facility

### Hydraulic loading

- No wastewater is produced from the waterless toilet. A small, excess liquid drain will be installed, as per the toilet manufactures specifications.
- Actual wastewater production volumes have been recorded during the operation of Unyoke's fleet of cabins. Data on actual, recorded water usages can be provided upon request.

The average daily hydraulic load production has been estimated at 100L/day (for two people). Applying a 30% allowance, for instances of higher water use, equates to a **maximum daily hydraulic loading of 130L/day.**

### Low impact, sustainable tourism

Cabin guests are encouraged to embrace a minimalist lifestyle during their stay to minimise environmental impacts and promote sustainable tourism.

Specifically, guests are encouraged to minimise water usage and all efforts are made to ensure that water usage is kept to a minimum (e.g low water usage fixtures) and greywater friendly biodegradable soaps etc. are provided for guest usage.

## Toilets

There are several composting toilet models, approved by the WA Department of Health, which would be suitable for this application. A model of composting toilet which is on the WA Department of Health approved list is to be used and the model chosen should have suitable capacity for the proposed use.

Guests of the cabins are informed on how to use the toilet with a wall note in the toilet area.

The toilet will be installed according to the manufacturer requirements.

In compliance with Health Dept. regulations and guidance from *AS/NZS 1546.2:2008 – On-site domestic wastewater treatment units – Waterless Composting Toilets*, the composted end-product from the toilet will be buried on site away from human contact and in non-food related plant areas.

## Greywater

Greywater from all sources (shower, handbasin and kitchenette), will be managed with a simple, passive settling and absorption style land application system. The design of this system is based on design principles taken from Australian Standards AS/NZS 1547:2012, scaled down to accommodate the small wastewater volumes from the cabins.

Kitchen water will pass through a small grease trap to capture grease, oils, fats and food scraps upstream of the main sedimentation/settling tank. This will allow ease of access and maintenance/disposal of captured solids wastes (greases and food scraps etc). Partially clarified water will flow from the grease trap into the main sedimentation/settling tank.

Greywater from the shower and handbasin will flow directly into the main sedimentation/settling tank combined with the partially clarified water from the kitchenette grease trap.

Clarified greywater will then flow from the sedimentation/settling tank into a simple land application absorption trench in accordance with AS/NZS 1547:2012.

## Grease Trap

Although the guests are encouraged to minimise grease, fat, oil and food scraps going down the kitchen sink, the installation of a small grease trap will reduce the organic loading of the sedimentation tank and piped trench system as well as making maintenance of the system manageable by staff.



Assuming a maximum kitchen water production of 20L/day (10L per person), a grease trap of 20L capacity or larger will give a retention time of at least 1 day and hence will allow the grease trap to perform effectively.

Nominated Grease Trap: Everhard 45L Domestic Grease Trap



<https://www.everhard.com.au/product/45-litre-domestic-grease-trap/>

Note – the above-mentioned grease trap is a recommendation only and other, similar, and suitably sized grease traps, may also be suitable.

### **Sedimentation/Settling Tank**

A tank of 300L capacity will enable a retention time of 2.3 days, similar to the design capacity of septic tanks ( $300 / 130 = 2.3$ ).

Nominated Tank: AWWS 300L Settling tank (custom order)

<https://www.greyflow.net.au/>

Note – the above-mentioned settling tank is a recommendation only and other, similar, and suitably sized tanks, may also be suitable.

### **Piped Trench/Bed System**

Utilising design principles from AS/NZS 1547:2012 and with reference to the Grey to Green system (W.A. Department of Health 'approved greywater disposal system'), the greywater disposal Land Application Area will be beds 2m wide and length calculated below:

- At the site of Cabin 1 (test hole 4), **Soil Category 4 – Clay Loam (moderately structured)**, DLR = 15

Length of bed (2 meters width) required =  $130 / (15 \times 2) = 4.3\text{m Length}$

- At the site of Cabin 2 (test hole 5), **Soil Category 3 – Loam (moderately structured)**, DLR = 25

Length of bed (2 meters width) required =  $130 / (25 \times 2) = 2.6\text{m Length}$

- At the site of Cabin 3 (test hole 6), **Soil Category 3 – Loam (moderately structured)**, DLR = 25

Length of bed (2 meters width) required =  $130 / (25 \times 2) = 2.6\text{m Length}$

#### Installation

The greywater disposal system will be assembled and installed in accordance with AS/NZS1547:2012 and/or the approved product design and sizing document for the Grey 2 Green System as specified by the Department of Health.

The conventional piped trench will be clear of all rocks, tree roots and debris to the depth of the drain bottom and to comply with all setbacks as specified relevant regulatory documentation. Stormwater will be diverted away from the piped trench area.