

**Quoin Flinders Island**

Development Application Report

Site Civil & Hydraulic  
Infrastructure Requirements

June 2016

Ref: DAR 07915 – Quoin Development Application V2



## Introduction

This report relates to the development proposal to be known as Quoin – located adjacent to Mt Killiecrankie on the northern end of Flinders Island. The proposal is for a maintenance shed and new owners house.

## The Site

The Quoin property is located on the northern end of Flinders Island, near the township of Killiecrankie and is adjacent to Mount Killiecrankie. Farming activities are undertaken on the 1220 acres of land. The western portion of the site bounds the beach and ocean and consists of undulating coastal sand dunes. The Quoin proposal is located in this eastern portion of the site.

Currently an access track extends from the main house located near Palana Road down to a house on a separate title near the beach front in an east-west orientation. The boundary of the property to the south is connected to Killiecrankie Road via an unnamed road. It is proposed to access the new owners house is accessed from this point. An internal farm track is already used to the site.

## Services Discussion

In the establishment of stand-alone infrastructure for water supply, it is proposed to collect rainwater from the roof, store it rainwater tanks and reticulate to the point of use. To deliver acceptable outcomes to this scheme the Standards Australia HB230-2008 Rainwater Tank Design and Installation Handbook will be followed. Fire-fighting water supply tanks will have to be considered in concert with the domestic water supply.

For wastewater disposal, the sand soil stratum is suitable for standard septic systems. The grouping and size of development in each location is at a domestic scale and hence the requirements of AS1547:2012 – On-site Domestic Wastewater Management are appropriate.

In the upgrade of access roads, the rural character needs to be maintained while providing suitable all weather access, for patrons, service vehicles and emergency services. The design of the road network will be in accordance with IPWEA standards & Guidelines for Development in Bushfire Prone Areas of Tasmania.

## Water Supply

Discussion on water supply has focussed on the rainwater harvesting. This method of water supply has to be tested to establish if this design philosophy is sustainable into the future. The simple idea of rainwater harvesting is to collect roof water, and have a storage connected to a constant pressure pump to supply the dwelling. At this use point the water will be treated with a UV filter and then consumed.

### Diagram 1 – Rainwater Harvesting Schematic

To test the sustainability of the model the supply and usage scenarios need to be examined. This examination is a Water Balance Model. The Model is a month by month examination of water capture and usage. The capture and usage is divided into building groups. The reference in the model is to the areas shown on the site master plan.

In the water balance model for the site Water Capture is determined by two factors, monthly average rainfall measured in millimetres and building roof area in metres square. Water Usage is controlled by a number of variables, including



occupation rates, number of days per month and consumptions rates. The monthly rainfall figures adopted and the monthly occupancy rates for projected maximum demand are listed in Table 1.

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
<b>Rainfall mm</b>	43	36	48	56	72	67	74	71	62	52	53	53
<b>Occupancy %</b>	76	76	76	66	44	44	44	44	50	50	76	76

**Table 1 – Monthly Rainfall and Occupancy Rates**

Rainfall Figures from Bureau of Meteorology for Killiecrankie Flinders Island TAS. Occupancy Rates from Business Plan Projections by 333

The Water Balance Model showed that the site requirements are deficient at the anticipated occupancy rates and that additional roof capture area is required. To manage the shortfall, it is proposed to capture and store water from the Maintenance Shed located on the main access track. The calculated roof area to make up the shortfall is 600m<sup>2</sup>. The assumptions used to calculate the water balance are shown in the following Table 2.

Building Group with Master Plan Reference	Roof Area m <sup>2</sup>	Consumption Rate
Maintenance Shed (8)	600	200 litres per day
Owners Residence (11)	323	600 litres per residence per day

**Table 2 – Consumption Rates for Building Groups**

Consumption Rates from HB 230-2008 and AS1547-2012 adapted to reflect usage in different types of buildings

The Owners Residence will have to be filled via a tanker or a reticulated pump system as they are at a high elevation. In Table 3 the required tank sizes are shown for each building group.

Building Group with Master Plan Reference	Number of Tanks	Tank Size
Maintenance Shed (8)	5	23650 Litre
Owners Residence (11)	1	23650 Litre

### On-Site Wastewater Management

The preliminary discussions with the geotechnical consultant have confirmed the suitability of the sand for absorption of septic treated wastewater. The new house site residence will be collected with sewer pipes, treated in a suitably sized septic tank and disposed by the absorption trenches. Keeping this treatment system close to the source will be the most economical and effective solution.

Final design of the maintenance shed and new house site will be completed at the final design phase. Preliminary septic tank sizing has been determined in accordance with AS1547:2012 and is shown in Table 4.

Building Group with Master Plan Reference	No. Septic Tanks	Septic Tank Size
Maintenance Shed (8)	1	3000 Litre
Owners Residence (11)	1	3500 litre

**Table 4 – Septic Tank Sizing for Each Building Group**

In accordance with Table J1 – AS1547:2012


### Conclusion



This report has shown that water supply for Quoin can be made from a rainwater harvesting method with a high level of confidence based on the established water balance model. On-Site Wastewater Management is a simple application of the guidelines in AS1547:2012 with the use of septic tanks and absorption trenches.

The road is already established network and meets the access needs of all resort users and emergency services.

The fire-fighting requirements for water supply & the road network will be provided in accordance with the Guideline.



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