EASY BLUE

WATER SAVINGS PROGRAM

Water Audit and Water Savings Action Plan:

Bright Chalet

December 2011

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1 EXECUTIVE SUMMARY

Bright Chalet was selected to participate in the Easy Blue program, an initiative run by the North East Greenhouse Alliance, on behalf of City of Wodonga, Rural City of Wangaratta, Alpine, Indigo and Towong Shires, in partnership with the North East Catchment Management Authority, North East Water and Goulburn Murray Water. The program is intended to help businesses in North East Victoria understand and reduce their water use, and through that adapt to a low water future.

Bright Chalet is located on Delaney Avenue, Bright. It is a hotel which has a total of 26 rooms, a kitchen/restaurant, and a bar. This report is a result of Bright Chalet's participation in the program. It uses a methodology of estimating water use values for various areas of consumption around the site based on information gathered during the site visit, and calibrating them against total water consumption as per site water bills. This allows the estimation of the effectiveness of water savings measures.

This process has led to the following conclusions:

- On average the facility uses about 2,485kL/yr of water at a cost of approximately $5,465/year at current water rates.
- 7% of the facility's total potable water usage could be saved by undertaking the simple steps of installing flow restrictors in all amenity and hand washing taps, reducing toilet flushing volumes, installing water conservation signage in showers, and replacing the site's pre-rinse spray nozzle with a newer model.
- This would lead to expected annual water savings of 172kL/year.
- The estimated cost to implement the savings measures is $2,025.
- The payback period for these measures is 3.8 years, for ongoing annual savings of $538/year.
- Further possible water savings measure for the site are the installation of new dual flush toilets and a rainwater system for pool filling and garden irrigation, but these measures are more expensive and have longer payback periods.

We strongly recommend that Bright Chalet take up the recommendations made in this report (especially the implementation of the Tier 1 water savings measures), and in doing so save both water and money.

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Document Control

Project Name: Water Audit and Water Savings Action Plan
Bright Chalet

Report for: Michael O'Sullivan, Manager
Bright Chalet

DOCUMENT CONTROL

Version	Date	Prepared by	Reviewed by	Approved by
1	16/12/11	JS	CRB	GHD

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2 FACILITY WATER CONSUMPTION

2.1 Water Consumption Levels and Water Pricing

Bright Chalet provided copies of their water bills for March 2010 to March 2011. This showed that annual water consumption is approximately 2,485kL/year, a figure which has been used as the baseline water consumption at the site for the purposes of this report.

Water is supplied to the site by North East Water. The current (2011-2012 financial year) cost of water for the site is $2.20/kL, making for annual water consumption charges of $5,465/year.

2.2 Specific Water Consumption (KPI)

Given that the site is a hotel, the most applicable business activity indicator is the number of guest nights per year. For this report, on the basis of discussions with Chalet staff, this has been estimated at 20,075 total or 55 persons in the hotel for each night of the year. Thus the specific water consumption for the site is 123L/guest night.

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2.3 Water Metering Information

The site is supplied by a total water meter located near the front boundary. The facility currently has no smart metering system in place.

Figure 1: The Main Water Meter at Bright Chalet

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3 WATER BALANCE

3.1 Site Visit

A site visit was carried out on November 22nd, 2011. Data gathered during this facility visit included:

- Number of staff working at the site
- Number of guests staying at the site
- Location of site water meters
- Number and flow rates of amenity taps and other hand basin taps
- Number, flush volumes and types of toilets and urinals where applicable
- Site water use patterns
- General site water management practices and water conservation behaviour observed, or their lack thereof

The site visit also demonstrated that many water savings measures have already been put in place at the site, for example the removal of the plugs in the hotel rooms to prevent use of the spas and installing low flow showerheads. Bright Chalet should be commended for having already taken these steps.

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3.2 Water Balance

From the findings of the site visit and the supplied overall consumption information, the Water Balance for the facility has been prepared.

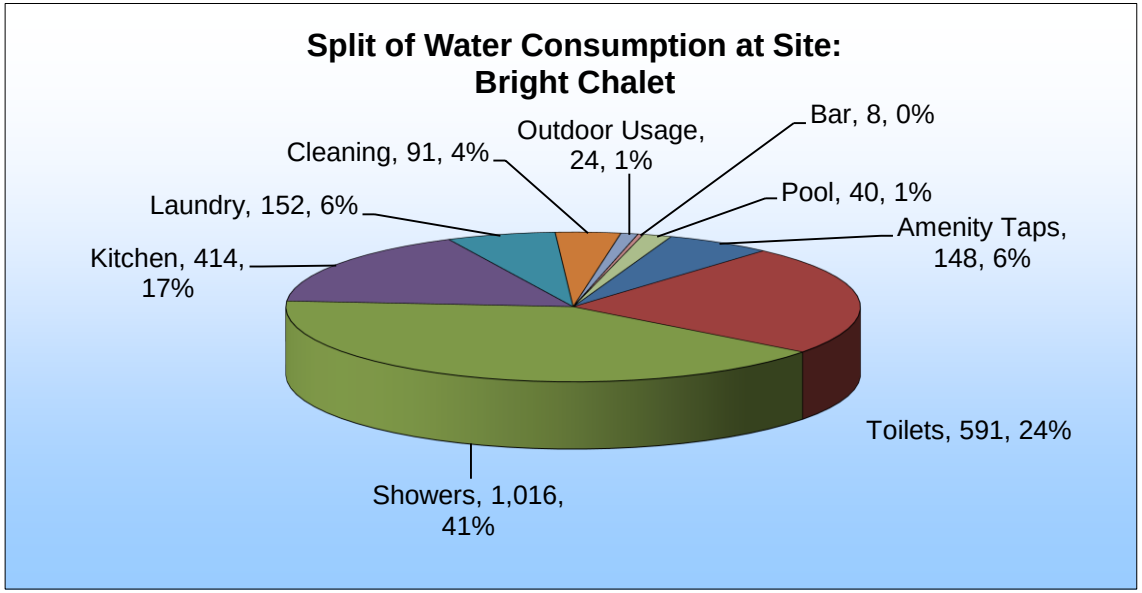

Figure 2: Water Use at Bright Chalet (in kL and % of total)

As Figure 2 shows, the major water consumer at the site is guest showering, which consumes 41% of site water use. Other significant contributors are toilet flushing (24%), kitchen water use (17%), and amenity taps in guest rooms (6%).

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3.3 Water Use Line Diagram

The following single line diagram describes how water is supplied to, is used within, and is disposed from the site:

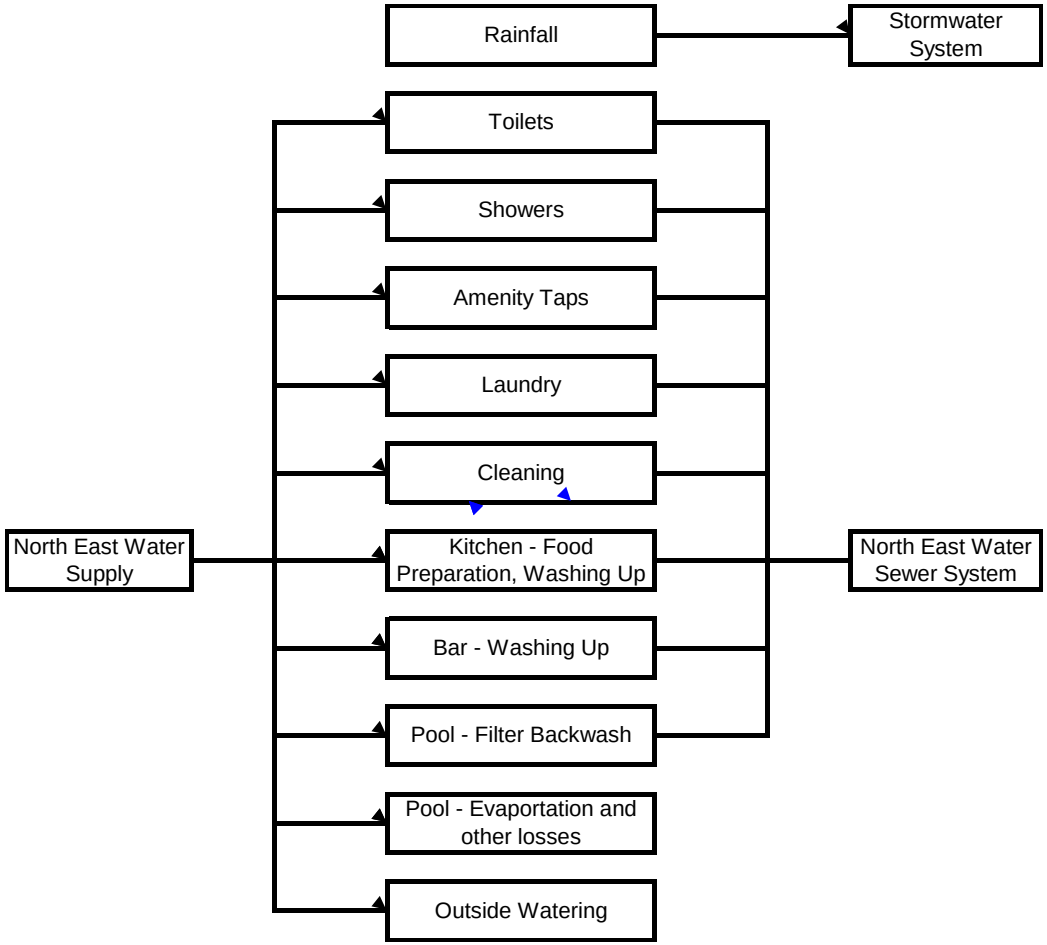

Figure 3: Single Line Diagram for Bright Chalet

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4 POSSIBLE WATER SAVINGS

During the preliminary facility visit, flow rates & volumes of indicative fittings were measured where possible. Other areas, such as the water used in the pool backwash and laundry were observed or estimated through discussions with staff. The water savings below are split up into two groups – Tier 1 measures, whose reasonable payback period means that it makes commercial sense to implement straight away; and Tier 2 measures, which push the payback out to levels which should be considered in any expanded water conservation program.

4.1 Description of Possible Savings – Tier 1

4.1.1 Amenity Taps

The flow rates in the amenity (bathroom) taps in the hotel guest rooms were measured to be approximately 8L/min. The Water Efficiency and Labelling Standards Scheme (WELS), operated by the Australian Government provides an independent source of information about the water efficiency of devices such as showerheads, toilets, urinals, taps and dishwashers. The WELS scheme states that a flow rate of 4L/min is sufficient for amenity use. The installation of flow restrictors could thus bring their flow rate down with no loss of effectiveness. Given that there are 26 guest rooms in the hotel, a total of 26 flow restrictors would be needed.

Figure 4: Example of an Amenity Tap at Bright Chalet

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4.1.2 Toilets Flush Reductions

The toilets in the guest rooms are equipped with very large cisterns, using an estimated 12L for a full flush, and 6L for a half flush. An image of such a toilet is shown in Figure 5. As a point of reference, the most efficient modern toilets use as low as 4.5L for a full flush and 3L for a half flush.

Figure 5: Example of a Toilet at Bright Chalet

Water savings can therefore be achieved by reducing the amount of water used for toilet flushing at the hotel. Furthermore, it is possible to do this while avoiding expensive replacements of the entire toilets. It may be possible to adjust the floatation arm within the cistern so that it does not fill all the way to the top after a flush occurs. An alternative method is to place an object of a certain volume (even something as simple as a house brick) within the cistern to displace water, thus reducing the volume of each flush. We recommend that up to 2L of volume could be introduced to each cistern without compromising the flush's effectiveness. Either of these methods could be expected to reduce toilet flush volumes by approximately 10%. Also,

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both methods are very inexpensive, and could be implemented by hotel staff (a nominal allowance of $250 for them has been made in the costings for this measure).

However, given that the pan (the porcelain part) of the toilet is not designed for very low flush volumes, care should be taken to ensure that the flush reduction is not so great that the flushes fail to clear the pan. If this does occur, a process of trial and error can be used to minimise the flush volume, but ensure it remains effective.

4.1.3 Showering

The showerheads at the site have already been swapped to low flow models. However, further water savings could be possible in the showers through the installation of some simple signage in the bathrooms, encouraging users to minimise shower times. An example of such signage which is supplied by City West Water in Melbourne is shown in Figure 6. A similar message could be delivered in the hotel's signage, with its tone adapted for use in a hotel. Plastic versions which hang on shower tap hands are also an effective alternative.

Figure 6: Example Water Conservation Signage for Showering

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4.1.4 Kitchen

The water efficiency of the kitchen at the Chalet is already quite good. For example the washing up sink is equipped with a pre rinse spray nozzle, as shown in Figure 7:

Figure 7: Pre Rinse Spray Nozzle at Bright Chalet

However, there are now more water efficient heads which can be used with these pre-rinse spray nozzle assemblies, which can significantly reduce water use with no reduction in effectiveness. We therefore recommend that such a head is installed on the Chalet's pre rinse spray nozzle.

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4.2 Description of Possible Savings – Tier 2

4.2.1 Toilet Upgrades

A more expensive, but much more effective, means of reducing flush volumes in the guest room toilets is to replace them with peak water efficient models, with flush volumes of 4.5L for a full flush and 3L for a half flush. If budget is not available to undertake these upgrades immediately, 4.5L/3L flush toilets should at least be incorporated into any future guest room amenity upgrades.

4.2.2 Rainwater Harvesting

The installation of a small rainwater harvesting system is also a possibility for the site. The most suitable non-potable water demands that can be replaced with rainwater are the site irrigation and pool water use. To satisfy these demands, water can be harvested from the shed containing skiing equipment located next to the main Chalet building, and stored in a rainwater tank. To minimise costs for the system, it will not include dedicated pipework linking up the tank with the irrigation and pool system at the site. Rather, a standard flexible garden hose will be used to direct the rainwater to each demand, which can be connected/disconnected as needed.

A representation of the recommended rainwater harvesting system for the site is shown in Figure 8:

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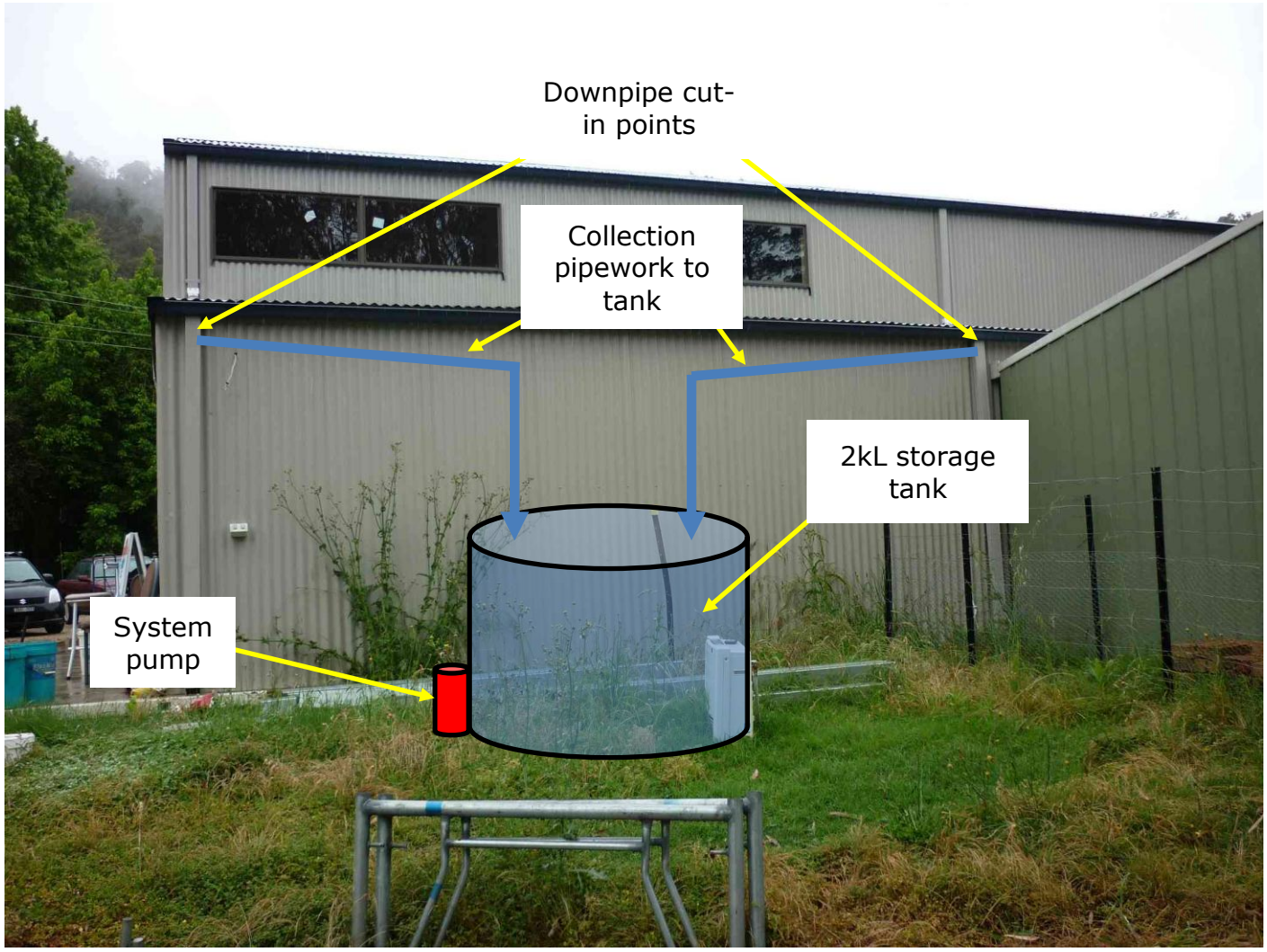

Figure 8: Possible Rainwater Harvesting Layout for Bright Chalet

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Thus two downpipes on one of the sides of the shed would be cut into, and redirected to a 2kL slimline storage tank installed along the side of the building. Overflows from the tank would be directed back into the existing downpipes. A pump would be installed alongside the tank, with a connection point to use a hose to either fill the pool or use the site's irrigation system.

Water Conservation Group's rainwater harvesting modelling indicates that this system could save 66kL/year of water (see appendix for modelling outputs).

4.3 Other Areas of Water Consumption

The following other areas of water consumption were noted during the site visit, but are not amenable to water savings measures:

- Cleaning: On the basis of discussions with Chalet staff, current cleaning practises seem to be of acceptable water efficiency (for example, the floor of the kitchen is mopped rather than sprayed down)
- Bar and Kitchenette Practices: other than the pre rinse spray nozzle upgrade described in section 4.1.4, water use in the kitchen and bar at the site is efficient
- Pool and Outdoor Use: The suggested means for reducing potable water use in these areas is replacement with rainwater, as described in section 4.2.2.

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5 WATER SAVINGS ACTION PLAN

The recommendations produced in this report provide a clear action plan to achieve water savings at Bright Chalet. As per the above listing of possible water savings measures, this action plan can be broken down into Tier 1 and Tier 2 actions. We recommend that Tier 1 actions are undertaken as soon as possible, while Tier 2 actions are programmed for future implementation.

Tier 1 Actions:

- Install flow restrictors in the amenity taps in the hotel's guest rooms
- Reduce flush volumes in the existing toilets in the hotel's guest rooms
- Install water efficiency signage regarding shower use in the bathrooms in the hotel's guest rooms
- Upgrade the pre rinse spray nozzle in the hotel's kitchen

Tier 2 Actions:

- Upgrade the toilets in the hotel's guest rooms to peak water efficient models
- Install rainwater harvesting for garden and pool use

The following table summarizes these water savings measures, and presents the total potential savings that could be realised at the site, the investment required to achieve them, and the resulting payback period. According to this information:

- By implementing Tier 1 measures, the facility can save 7% of its total water consumption or 172kL/year, for an outlay of $2,025.
- By implementing Tier 2 measures, the facility can save a further 11% of its total water consumption or 275kL/year, for an outlay of $32,500.

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Table 1. Potential Water Savings at Bright Chalet

Possible Water Savings, Costings & Payback
Project: ***Bright Chalet***

Water Consumption kL/yr	2,485
Cost of Water and Sewer $/kL	$2.20
Cost of Warm Water $/kL	$2.50

Item	Measure	Water Savings kL/yr	Total Savings $/yr	Budget Cost	Payback yrs
Amenity Taps	Install flow restrictors on amenity hand basin taps in guest rooms	59	$175	$1,025	5.9
Toilets	Reduce flush volumes in toilets, either by modifying cistern float arm or introducing displacement volume in cistern	41	$91	$250	2.7
Showers	Install some water conservation related signage in guest rooms	51	$226	$250	1.1
Kitchen	Upgrade pre-rinse spray gun nozzle	21	$46	$500	11.0
Total for Tier 1 Measures		**172**	**$538**	**$2,025**	**3.8**
Toilets	Upgrade toilets to 4.5L full flush, 3L half flush models	255	$560	$26,000	46.4
Rainwater Harvesting	Install rainwater harvesting system for outdoor water use and pool filling	20	$44	$6,500	147.7
Total for Tier 2 Measures		**275**	**$604**	**$32,500**	**53.8**
Total for All Measures		**447**	**$1,142**	**$34,525**	**30.2**

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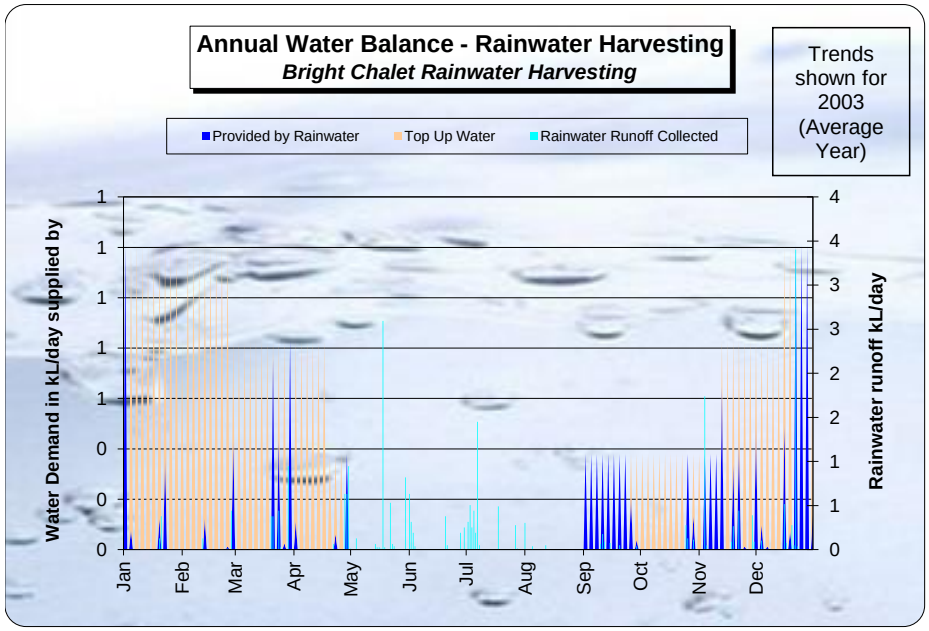
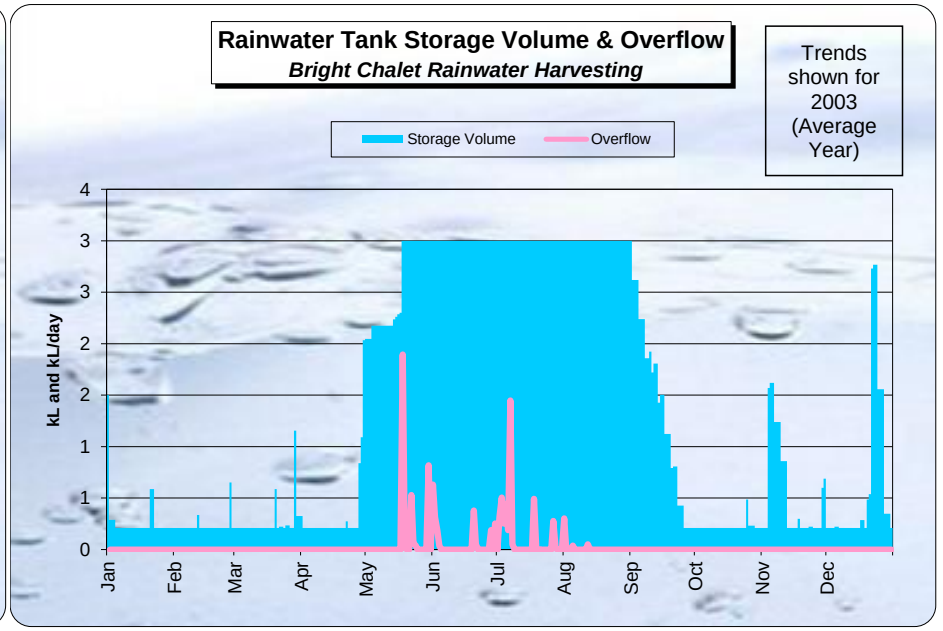
6 APPENDIX: RAINWATER MODELLING OUTPUTS

Model Input		Comments
Reference rainfall station	Wangaratta	avg annual rainfall: 625mm
Rainfall collection area m2	**70**	1988 to 2007
Runoff coefficient	0.9	Roof Surface
Initial loss mm	1	
Price of Water $/kL	$2.20	
Rainwater used for	Pool, Irrigation	
Typical consumption & pattern	64kL/year	
Tank Size kL	**3.0**	43 mm of rain to fill empty tank

Model Output - average for 1988 to 2007		Comments
Avg Available rainwater kL/yr	36	only 57% of demand, increase collection area if possible
Avg Water demand kL/yr	64	
Avg Overflow volume kL/yr	16	
Avg Top up water kL/yr	43	
Avg Potable water savings kL/yr	**20**	
Avg % Potable water saved	**33%**	
Avg % Available rainwater utilised	**56%**	
Avg Cost Savings $/yr	**$44**	





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