



## **ARID ZONE SUSTAINABLE HOME DESIGN GUIDELINES**

### **V2.0**

Building a new home is a major investment – to make the most of that investment it makes sense to design it so that it is appropriate for the Alice Springs climate and contains energy and water efficient fittings and appliances. This will ensure that the home is comfortable to live in, has lower running costs and higher re-sale value. Incorporating these elements helps to ‘future proof’ the home against any increases in energy and water costs.

These voluntary guidelines have been developed by Alice Solar City in conjunction with DKA CoolMOB and the Department of Natural Resources, Environment, the Arts and Sport Waterwise program. The purpose is to provide guidance for new home buyers in Alice Springs regarding best practice in new housing in terms of energy and water efficiency.

These criteria are by no means exhaustive, nor are they meant to preclude the use of innovative design and/or construction methods to achieve a similar result.

In the majority of cases, complying with the criteria listed in these guidelines involves little or no additional cost in the new home build process. Where additional expenditure is incurred, these measures will make the home more comfortable naturally and lead to reduced on-going energy and water bills, thus should be considered a good long term investment.

There are various publications for new home buyers / builder wanting more detailed information on sustainable housing. *Your Home* is a suite of consumer and technical guide materials and tools developed to encourage the design, construction or renovation of homes to be comfortable, healthy and more environmentally sustainable. Visit [www.yourhome.gov.au](http://www.yourhome.gov.au) for more information. A good local publication is *Sustainable Housing in Central Australia*, copies of which are available from the Alice Solar City Smart Living Centre.

## 1. BUILDING ENVELOPE

The design of the house should be appropriate for Alice Springs climatic conditions. Alice Springs experiences daytime maximums in the high 30's during summer and generally the air is dry. During winter, night time temperatures can fall below zero. During spring temperatures can fluctuate and rain and storms are more likely to occur.

**To satisfy this element, the house should either:**

- Achieve 6 stars when assessed under the *AccuRate* house energy rating system.

**OR**

- The design and construction of the house meets the essential criteria listed below.

### Key building design criteria

Issue	Criteria	Essential or desirable criteria	Criteria met? ✓
<b>Orientation</b>	Long axis of house to run as close to East – West as possible, with a maximum of 30 degrees off North.	Desirable	
<b>Roof</b>	White or very light colour material with $\leq$ 0.35 solar absorption (in accordance with BCA <sup>#</sup> 2007)	Essential	
	Sufficient unshaded north facing roof space (ideally at approximately 22 degree pitch) to allow for solar hot water (4 m <sup>2</sup> ) and solar photovoltaic system (10m <sup>2</sup> ).	Essential	
	A roof space that is ventilated and has an ability to be a closed (complete seal not necessary).	Desirable	
<b>Shading</b>	North facing windows (and walls) of living areas should be protected by an eave that is calculated at 45% of the height of the vertical to the base of glass. Any shading beyond this should be adjustable / removable to allow seasonal variation.	Essential	
	West, east and south facing walls and windows of living areas should be protected from direct sunlight by	Essential	

	combination of eaves that are a minimum of 1 metre or verandahs, with external vertical shading provided by external blinds, awnings or landscaping (deciduous trees and vines).		
<b>Insulation</b>	Roof – sarking (double side preferred) Ceiling – minimum R3.3 Walls – minimum R1.5	Essential	
<b>Windows/glass doors</b>	All glass to have minimum WERS* cooling rating of 3 stars and minimum heating rating of 1 star.  Minimise use of unprotected windows / glass in east and west facing walls  All glass should be shaded or have ability to be shaded from October – March (refer to <i>Shading</i> above).	Essential	
<b>Zoning</b>	Carport/garage to be positioned on west side of house. Alternatively, a closable non-living space or bedroom (i.e. storage room, bathroom or Laundry). Living and bedroom spaces should be located on the north side of house.	Desirable	
<b>Cross Ventilation</b>	Windows and door openings to be situated to allow for cross flow ventilation	Essential	
<b>Ceiling height</b>	Internal wall heights to be minimum 2.6m	Desirable	

#Refers to Building Code of Australia

\*Refers to Window Energy Rating Scheme – a scheme that rates thermal performance of windows ([www.wers.net](http://www.wers.net))

## 2. APPLIANCES AND FITTINGS

The type of appliances used in a home can have a major impact on the amount of energy consumed in houses. The following criteria apply to the appliances that are 'fixed' elements in the home.

### Energy

Issue	Criteria	Essential or desirable criteria	Criteria met? ✓
<b>Water heating</b>	Solar hot water system – minimum 300 litre system for houses with 3 or more bedrooms.  Must have over-temperature protection and one-shot relay booster switch installed (where applicable).	Essential	
	Hot water recirculation device installed under sink.	Desirable	
<b>Cooling system</b>	Ceiling fans in all living spaces and bedrooms – preferably low noise and reverse function for winter.	Essential	
	Where an a/c is deemed necessary – ground mounted, ducted evaporative system, with system in a shaded position, preferably south facing walls to reduce direct heat load on the unit and easy access for annual maintenance.  Self-closing vents at all outlets.  Curtains and pelmets or holland blinds installed	Essential*	
<b>Lighting</b>	Low wattage lighting (either Compact Fluorescent Lamps (CFL), linear fluorescent or Light Emitting Diode (LED) used in all fittings).	Essential	

	<p>Lighting switches should be in groupings of a maximum of 4 lights.</p> <p>Where recessed light fittings are used, must be 240 volt GU10 fittings, using CFL or LEDs lighting only (no 12 volt lighting).</p> <p>External lighting to be fluorescent, including PAR38 (with motion sensors where required for security lighting).</p> <p>Any recessed light fittings to be installed allowing maximum insulation in ceiling by using a suitable heat guard.</p>		
<b>Other appliances</b>	Where any of the following appliances are included in the new home package, they must be a minimum of 4 star (fridge, freezer, washing machine, dishwasher)	Essential	
<b>Solar photovoltaic power systems</b>	A 1 - 2kW solar photovoltaic system is installed on the building.	Desirable	
<b>Electricity metering</b>	Smart meter installed with in-house display unit (monitoring usage and PV system output where applicable).	Desirable	

## Water

Despite the low rainfall, Alice Springs residents are among the highest residential water users anywhere in Australia on a per capita basis. The average Alice Springs household uses around 535,000 litres of water per year. That's 1,500 litres of water per household each day.

In addition to conserving this precious natural resource and reducing water bills, many of these measures will also reduce energy costs due to reduced hot water use.

Issue	Criteria	Essential or desirable criteria	Criteria met? ✓
<b>Water pressure</b>	Pressure reduction valve installed.	Desirable	
<b>Bathroom</b>	3-star WELS rated shower head.	Essential	
	Shower lever to allow water to be temporarily switched off while maintaining temperature	Essential	
	Shower timer installed	Desirable	
	5 star WELS rated basin (hand washing) taps	Essential	
	4 star toilet suite (4.5 / 3L)	Essential	
<b>Kitchen</b>	4 star WELS rated taps	Essential	
	4 star WELS rated Dishwasher	Essential	
<b>Laundry</b>	4 star WELS rated front load washing machine	Essential	
<b>Rainwater Harvesting</b>	Guttering installed 9000L or greater rainwater tank/water wall/water bladder connected to the toilet, washing machine or hot water system#. System should include: <ul style="list-style-type: none"> <li>○ gutter mesh, Leaf Eater Rain Head (or similar), tank screen</li> <li>○ first flush diverter</li> </ul>	Desirable	

	<ul style="list-style-type: none"> <li>○ overflow to stormwater</li> <li>○ filtration system fitted directly to or after pump (to remove sediment)</li> <li>○ automatic tank top-up device OR automatic mains water supply switch to ensure constant water supply to toilet/washing machine</li> </ul>		
<b>Waste water treatment</b>	<p>Option 1: Approved greywater diversion device to divert greywater to subsurface irrigation. Waste water taken from washing machine OR shower.</p> <p>Option 2: Approved greywater diversion device to divert greywater to subsurface irrigation. Water taken from laundry AND bathroom</p> <p>Option 3: Approved wastewater treatment system to treat all household waste water for use in garden irrigation.</p>	Desirable (one option only)	
<b>Garden</b>	Minimal turf area and minimal paved area (unless they are used away from the house to avoid reflected ground heat build-up).	Desirable	
	Drip irrigation system zoned by water needs of plants i.e. separate controls for turf, natives, other etc. All systems to have timer controls, set to minimal hours/day, adjusted seasonally.	Essential	
	Local native, water efficient species planted*.	Essential	
	Mulch (not rocks or pebbles) on all garden beds.	Essential	
	Landscape design to incorporate contours / swales which harvest rainwater and prevent run-off into stormwater.	Essential	

	Drip irrigation on all garden beds.	Essential	
	All hoses to have trigger nozzles.	Desirable	
	Trees for shade*	Essential	
<b>External passive cooling through micro climate</b>	A garden carefully planned to benefit from naturally induced cooling (can assist in reducing the need to operate the a/c for long periods in the summer).	Desirable	

\*Note – where a grey water system is used, plants may need to be tolerant of increased nutrient levels from greywater. Select appropriate detergents and soaps to minimise nutrients.

#Assumes tank maintained in accordance with Department of Health guidelines.

Further information see DHCS website;

[http://www.health.nt.gov.au/Environmental\\_Health/Waste\\_Management/index.aspx](http://www.health.nt.gov.au/Environmental_Health/Waste_Management/index.aspx)

[http://www.health.nt.gov.au/Environmental\\_Health/Water\\_Quality/index.aspx](http://www.health.nt.gov.au/Environmental_Health/Water_Quality/index.aspx)

NT-approved Greywater Diversion Devices register;

[http://www.nt.gov.au/health/docs/cdc\\_envhealth\\_register\\_greywaterdiverters.pdf](http://www.nt.gov.au/health/docs/cdc_envhealth_register_greywaterdiverters.pdf)

NT-approved Aerated Wastewater Treatment System

[http://www.nt.gov.au/health/docs/cdc\\_envhealth\\_register\\_Aerated\\_Wastewater%20Treatment%20Systems.pdf](http://www.nt.gov.au/health/docs/cdc_envhealth_register_Aerated_Wastewater%20Treatment%20Systems.pdf)

NT-approved Biological Filter Systems

[http://www.nt.gov.au/health/docs/cdc\\_envhealth\\_register\\_Biological\\_Filter%20Systems.pdf](http://www.nt.gov.au/health/docs/cdc_envhealth_register_Biological_Filter%20Systems.pdf)