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ISSUE 5 AUD$9.95 NZ$10.50

ISSN 1833-1416

contents

more houses

features

Editorial

The performance of our homes is evident in winter as we shelter from the cold. Paper thin walls let heat out, and new cracks in the walls and gaps in the floorboards show themselves. Some houses just never seem to get warm. This is where well-designed, passive-solar homes show off their real strength. Homes that capture the warmth of the sun are well-insulated and draft-free, and require minimal extra heating to get you through the cold months. Not only do sustainable homes keep you warm and comfortable and reduce the amount of energy usedæand the associated greenhouse gasesæbut they also save money on your heating bill. With power costs likely to increase, improving the thermal performance of your home is a good investment.

Some householders are also looking at ways they can further cut the environmental cost of heating by using the power of the sun. In this issue we look at solar hydronic heating, which is growing in popularity as a way of heating the home using solar hot water. Indeed, a few of the new and renovated homes in this issue circulate solar hot water through panel heaters or in pipes in the concrete floor to heat the home.

As we spend most of our time indoors during winter another aspect of our homes that becomes apparent is whether they are a healthy environment to be in. We are surrounded by a wide range of materials from carpet, timbers, furnishings and paints that may contain toxic materials. Even if you are conducting simple maintenance around the home, why not spend a bit of time checking that the products you are using are not only safe for the environment but are not bad for your health. In our flooring and paints features we tell you what to look for, the pros and cons of different products and how to maintain a healthy dwelling.

And for those in the southern states in need of an escape to warmer climes, draw some inspiration from the Troppo Architects house on Magnetic Island in Far North Queensland. Designed to be responsive to the hot, humid weather it looks like a great place to sit back and relax, tropical style.

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www.giraffe.com.au

Printing Finsbury Green Printing
Printed on Monza gloss recycled paper with recycled and FSC certified fibre using world's best practice ISO 14001 Environment Management Systems.

Mixed Sources
Product group from well-managed forests and recycled wood or fibre.

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Published by

Published by
Alternative Technology Association

ATA – Not-for-profit organisation promoting renewable energy, water conservation and sustainable building since 1980

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Your Home is a joint initiative of the Australian Government and the design and construction industries.

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ISSN 1833-1416

$9.95 (Aus) $10.50 (NZ) Recommended Retail Price

Mountain views

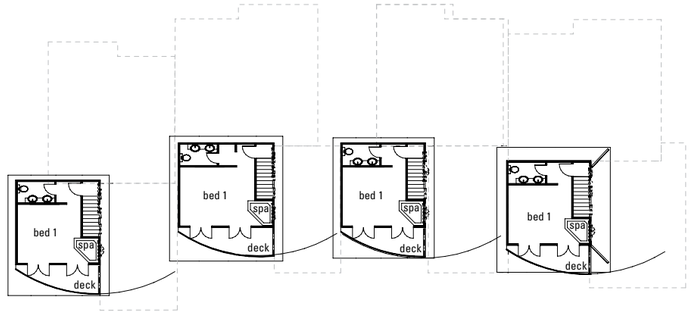
Solar hydronic central heating maintains a toasty internal temperature on the sub-zero Alpine nights.

Luxury alpine accommodation with a 7 Star energy rating

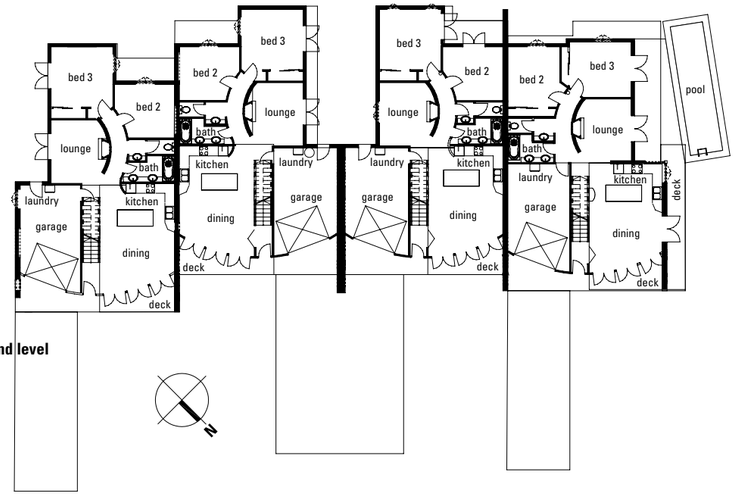
Nestled in the tiny village of Mt Beauty in the foothills of the Victorian Alpine National Park are the aptly named Dreamers tourist apartments. These self-catering apartments boast the rare accomplishment of meeting all the criteria for a 4-star, AAA accommodation rating while simultaneously attaining a best-practice, 7 Star energy rating. Still in its first year of operation, with two apartments open and two more on the way, this luxury accommodation has put environmental sustainability at the forefront of its design.

"Environmental sustainability as we practise it here is site specific. So, for example, we don't have greywater recycling," says Malcolm Lee, Dreamers' building designer and owner, and former lecturer in energy-efficient building design at Melbourne's Swinburne University. "We're on a river flat and the water table is only two feet under the ground, so it's fairly sensitive. Also, with the groundwater so near to the topsoil, watering is not as necessary [as in places where water is less plentiful]."

Passive systems of energy conservation feature strongly at Dreamers. Mal made a conscious decision to build apartments rather than free-standing dwellings, because shared walls enable each unit to "borrow" from next door's warmth

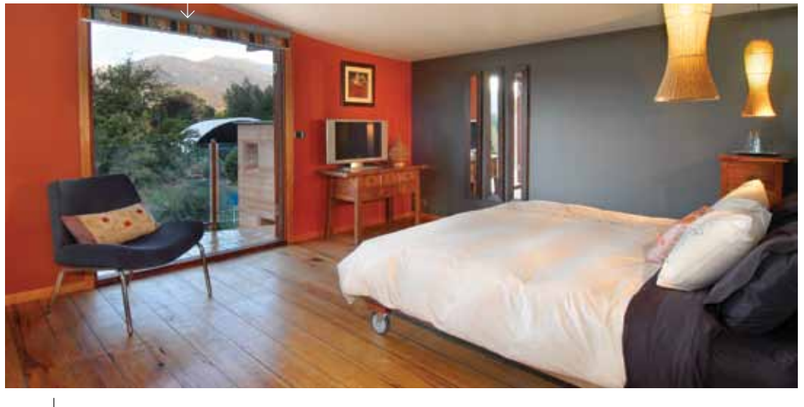


Upper level



Ground level

The upstairs windows are opened at night during summer to release hot air travelling up through the apartment.



All windows are double-glazed to reduce heat loss during winter.

and reduce the need for extra heating. The party walls are made of locally sourced rammed earth, which produces a heavy mass for excellent soundproofing.

The external walls are made from timber studs that are thicker than standard walls, which allows for a greater amount of insulation. Additionally, all ceilings and exterior walls are insulated using polywool batts of greater-than-average thickness. Thermal mass, which helps to hold heat, is provided by the rammed earth walls and concrete bench tops and floors. All windows are double-glazed to reduce heat loss during winter. This combination of a highly insulated external envelope and a significant amount of internal thermal mass creates a stable and pleasant internal temperature that requires little in the way of additional heating.

"This is a challenging climate to design for," admits Mal. "During summer it gets hot in the day but cool at night. In winter it's cold both night and day. In effect, you have to design for two extremes of climate. But that's the point of sustainable design, to use your local microclimate to keep you in your comfort zone."

At Dreamers' apartments, the second storey, which consists of the master bedroom and ensuite, is made from a lightweight timber frame and plasterboard. The effect of rising heat means that the bedroom is warmer than the rooms downstairs all year round. It was designed this way so that during the heat of the day in summer, the cool rooms downstairs could be enjoyed during the day. At night, the bedrooms would have cooled sufficiently thanks to the lightweight structure and a specially designed natural airconditioning system.

Rather than use energy-intensive airconditioning, Mal built a natural evaporative system that draws cool air from a nearby cascading stream into the apartments. This simple, low-impact cooling

Setting the scene

Spectacular views set the framework for a sustainable and fire-safe dream home

The original weatherboard house was given away, while its brick veneer was recycled as fill and 40 per cent of the concrete reinforcing was also recycled.

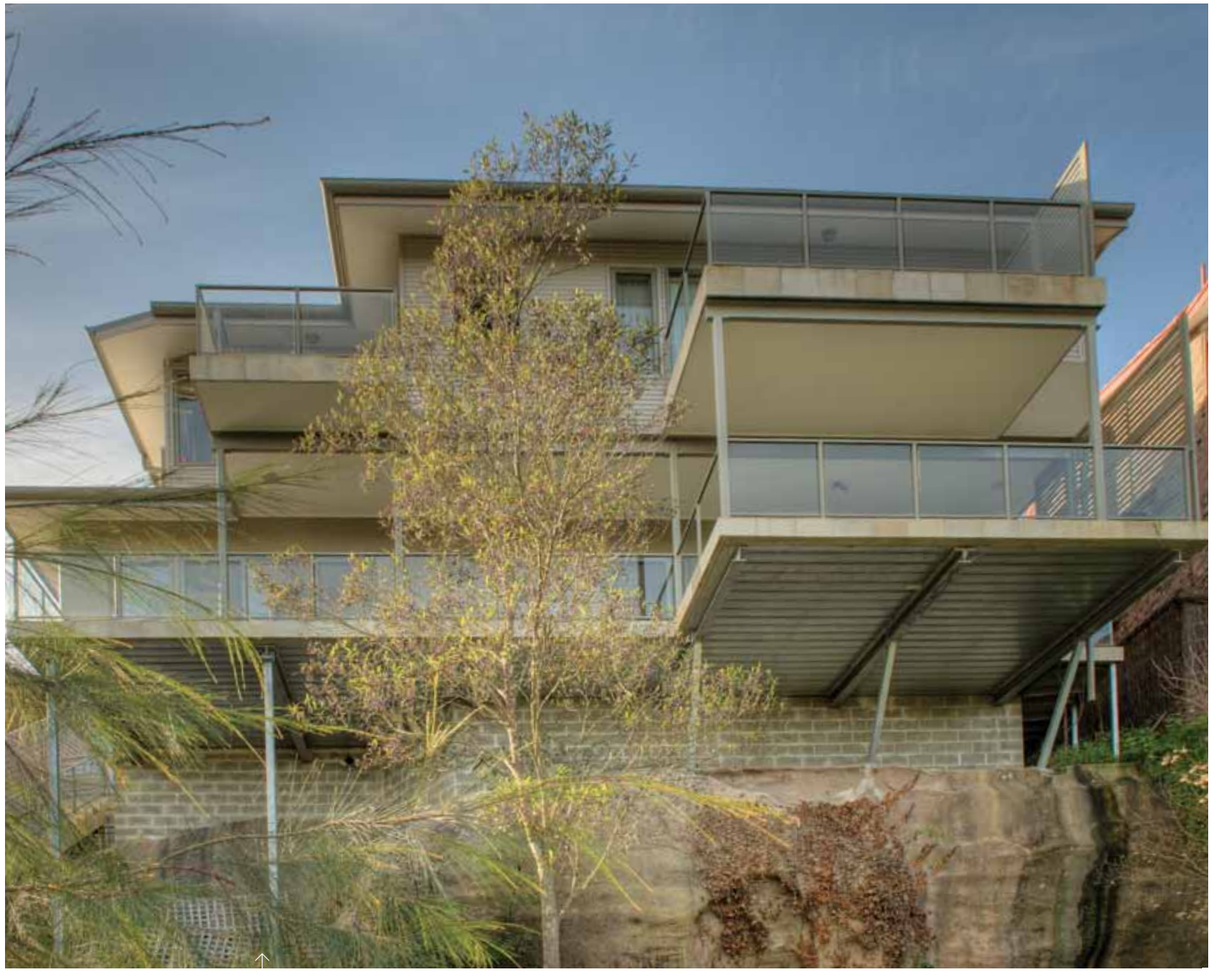
The road to Michelle and Warwick Marshall's home was shrouded in a heavy fog that seemed in no hurry to lift. A worrying sign, I thought, considering the entire house design had been driven by the property's spectacular views. As I left the car, however, the mists began to clear, revealing tantalising glimpses of northern Sydney's Garigal National Park and Middle Harbour.

Michelle and Warwick have lived on the site since 1999 when they bought a basic, brick-veneer weatherboard cottage. According to Michelle it was like living in a tent—hot in summer and freezing cold in winter—albeit one pitched in a great location.

"We fell in love with both the block and the bushland that surrounds it," she says. "We'd always planned to renovate to take better advantage of the views, but when we brought our building designer Dick Clarke to the site, **even though he prefers to work with the existing structure rather than demolish and rebuild, he reluctantly recommended rebuilding from scratch."**

The views drove the design, but it meant that the building would need to face away from the sun and require a combination of intriguing roof angles to maximise passive and direct solar access. Five years later, the new house sits perched at the edge

“Even though it took a while for our dream to come to fruition, we weren’t in a hurry, wanting it to be right”



The house is perched at the edge of a six-metre sandstone platform with balconies cantilevered out into space to capitalise on the beautiful views to the south.

of a six-metre sandstone platform with balconies cantilevered out into space to capitalise on the outlook to the south.

From the start, an important priority was minimising the building’s environmental impact and maximising its sustainable features, including the use of recycled and sustainable materials wherever possible. The original weatherboard house was given away, while its brick veneer was recycled as fill. Forty per cent of the concrete reinforcing was also recycled.

Building designer Dick Clarke says: “The project faced several challenges, including a council restriction on the height of the building, a structural issue regarding the balcony overhang, and serious concerns about the threat of bushfires, thanks to the home’s position at the top of a bushland escarpment.”

A bushfire’s intensity can double for every 10 degrees of slope, and research has shown that many houses survive the initial fire front only to succumb to burning embers igniting timber decks, eaves, gutters and window frames.

“With this in mind we opted to have no timber on the bush side (the balconies are suspended concrete slabs, rather than timber decks), as well as fire-rated finishes throughout the exterior and windows protected with screen inserts,” Dick says.

The atrium with a centrally located water feature surrounded by subtropical plants helps cool the house naturally with cool air being drawn up through the house.

“A cleared area below the house is also intended to help slow a bushfire’s momentum, while the gutters have been leaf screened, which has the added advantage of keeping the home’s rainwater supply clean.”

A dedicated firefighting reserve of 5000 litres of water is maintained at the bottom of the custom-designed in-ground concrete rainwater tank. It also has an outlet that the fire brigade can access in an emergency. The tank itself is concealed under a terrace, but is positioned away from internal floor areas. This provides a thermal break, keeping the cold rainwater away from the living floors. Similarly, the three concrete balconies are disconnected from the main structure of the house at the wall line, providing a thermal break to help control inside temperatures.

The house is amazingly light and comfortable inside, even on a winter’s morning. To optimise passive heating and cooling, Dick divided the floor plan into three components. “The two-storey main living area is one room wide to allow the sun to enter from the north, filling the rooms with light and warming the high thermal mass of the concrete floor and internal brick walls,” he says. “This helps with the retention and slow release of heat at night, while allowing the building to look south.”

The two other components are a home studio/

Strong and durable strandwoven bamboo is used for the flooring of the upstairs room.

Tropical attraction

On Far North Queensland's Magnetic Island is a back-to-basics house, built to respond to the tropical weather

> "This house is basically like living on a big veranda, or under the canopy of a rainforest tree—at a comfortable temperature"

The house is highly responsive to changes in the weather, a characteristic that's essential to pleasant tropical living.

Remember camping holidays when you were a kid? They were all about living outdoors and not wearing shoes—for weeks! It's a pity that in adult life many of us have lost touch with the simple pleasure of living outdoors. Instead, we've cosseted ourselves in nests of airconditioned solid brick.

Troppo Architects has spent the last 28 years creating houses that celebrate, rather than spurn, the outdoors. Their buildings, found mostly in regional or remote areas of Australia, are devoted to the notion of living in and with the environment. And, unlike the family tent from those early camping trips, Troppo's intelligent and responsive houses are designed to make tropical living not only comfortable, but fun too.

One of their recent creations—the Wallaby Way House—is hidden away in a pine forest on Magnetic Island, an idyllic droplet of land just off the coast of Far North Queensland, near Townsville. Apart from stunning natural views, the house is also privy to cooling tropical sea breezes and dramatic downpours. **With this in mind, the architect has designed the house as a permeable, flexible pavilion with extensive veranda spaces protected from the elements by wide overhangs.** The idea is to allow the occupants to enjoy the outdoors while remaining sheltered from its excesses. "Only about 20 per cent of the external walls of the house are actual walls," says Troppo architect Zammi Rohan. "The rest is windows, doors, louvres, shutters, timber batten breezeways and insect screens."

During its years designing houses for tropical climates, Troppo Architects has built up a collective knowledge about shelter while respecting and celebrating the peculiarities of environment, climate and place. The firm's philosophy is to provide flexible living choices, and the Wallaby Way House epitomises this. "It's the embodiment of our understanding of what it's like to live in the tropics," says Zammi.

Troppo worked closely with owner Norm Brice on this project. Norm runs his own engineering

Perfect prefab

Erected in a day, a modular sustainable home that will only get better with age

One autumn day, when the broad Western Plains views were delivering the full "sunlit plains" cliche, a semitrailer backed down Judy Cameron and Graeme Webb's driveway and dropped off their living room/kitchen, bedroom and ensuite.

A couple of hours later, a second semi delivered the other part of the couple's new 11-square home—an interconnecting module containing an entry foyer, laundry, a main bathroom (with ensuite), an open study and a guest bedroom for the children and grandchildren.

Both fully fitted-out modules were set down on 14 steel-screw pylons, which made for a very light footprint on the scenically spectacular site located on the border of the Otway Ranges forests and the volcanic plains southwest of Melbourne.

While it took the drivers and the five on-site workers only a couple of hours to set down and set up this prefabricated, sustainable house, it took a couple more days to connect the blackwater and greywater systems. After that, realising this fully-functioning home was simply a case of adding water!

Judy was so thrilled that her instant house was exactly what she'd envisioned, she could have moved in then and there—only a practical consideration stopped her. "It took a month longer, because we had to have water in the tank."

Energy-efficient LED and compact fluorescent lighting have been used throughout the house.

As empty-nesters, the couple decided to realise their dream of swapping a big, conventional house in Geelong to live simply and sustainably, with a five-acre permaculture garden, in a rural place with magnificent views and a sense of like-minded community.

They opted to go the prefab route for the simple reason that the whole region is in the throes of gang-buster development and they couldn't find a builder interested in doing a small sustainable house. "My neighbour couldn't even get a builder to quote!" recalls Judy.

While it took two years of groundwork to secure the right site, it took mere minutes of internet-work to find what they were looking for in prefabricated housing.

Following online recommendations, Judy found a new Melbourne company called Modscape, which is creating sustainable prefabricated housing in a western suburbs factory. She inspected Modscape's display units at the factory, and walked into one that she "could just see on the block. I just had to have it!"

The house is surrounded by wide expanses of spotted gum decking, which lead the eye to the magnificent views.

First principles

Physical and psychological elements are combined to create an eco family home

The photovoltaic cells, placed over the front doorway, create an entry canopy and capture the best of the northerly sun.

Architect Ric says being "environmental" comes naturally to someone who has been raised in the countryside in a post-war environment. Ric's parents' generation were acutely aware of the limited availability of food, water and energy, and instilled in Ric and other post-war children an appreciation of resources and sustainable living. Butt says that growing up in the Riverina district in central southern New South Wales ensured that "sustainability was automatic."

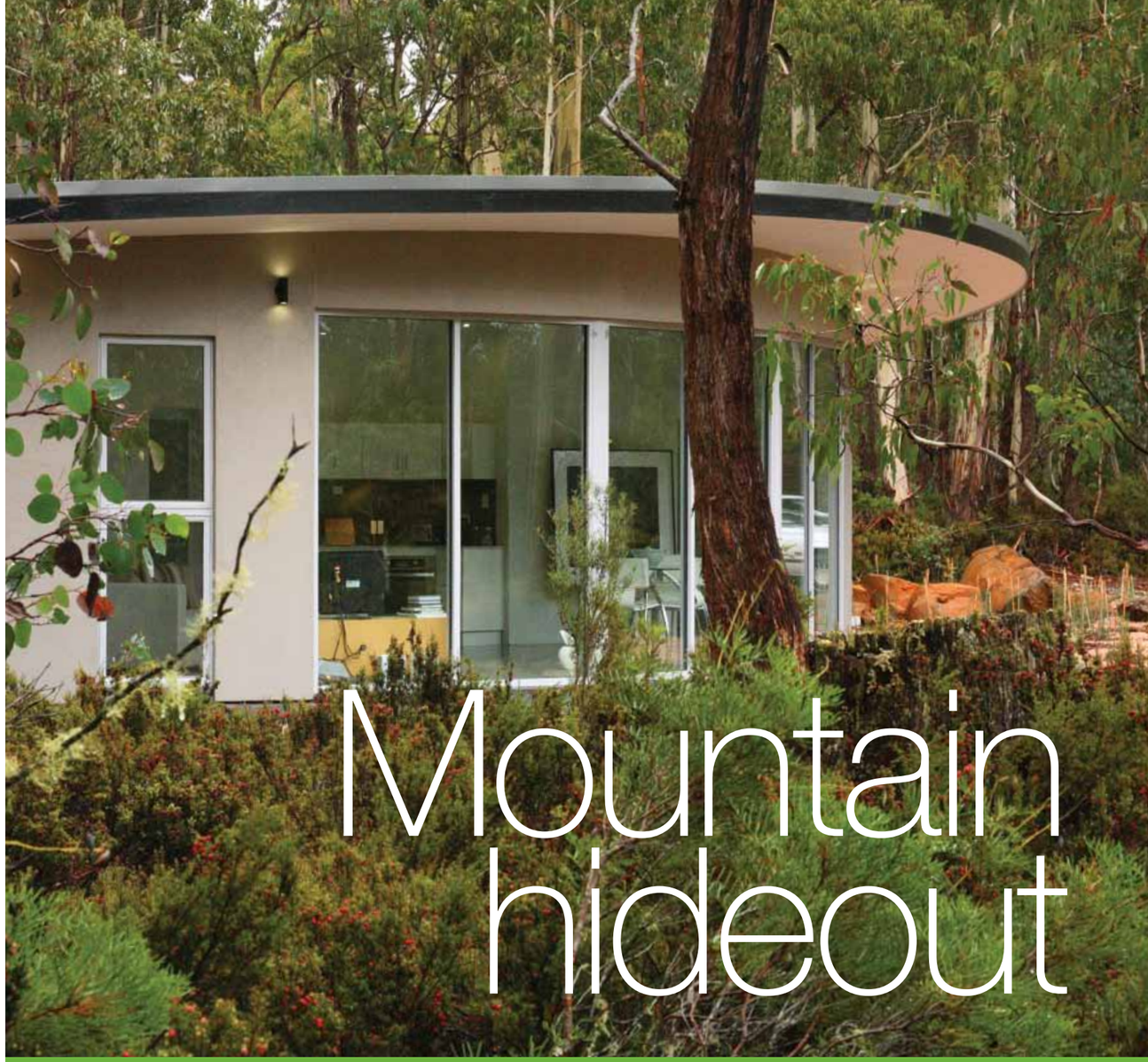
"Power, energy and water were precious. Everything was recycled. We saved nails, roofs and sheds. We had to fix everything."

The shade screens can be adjusted to stop summer sun from entering the house, allow winter sun through the windows or can be swung low to provide complete window shading and total internal privacy.

gas cooking and solar hot water.

Its watersaving credentials come courtesy of a greywater system which collects water from the showers and laundry and provides water to the toilets and garden. A rainwater tank collects further water for the garden. "It is no longer necessary or desirable to have unsustainably large houses that require more than their share of resources to heat and cool when you can build a house using simple principles to virtually eliminate heating and cooling requirements," Ric says.

Designer: Strine Design (Ric Butt) **www.strinedesign.com.au**
Builder: Strine Building
Location: North Watson, ACT
Photographer: David Somlyay and Lisa McKelvie
Features:
- 1kW BP Solar photovoltaic solar power system
- 250 litre Endless Solar evacuated-tube hot water system
- 4500 Colorbond rainwater tank
- Smartflo guttering
- Perpetual Water greywater system
- Strine Precast insulated concrete wall panels
- Insulco batts roof insulation
- Strine adjustable shade screens
- Solar chimneys
- Biowall
- Compact fluorescent and LED lighting
- Caroma Liano 5 Star water-efficient taps and shower heads



Mountain hideout

A contemporary bush retreat in Tasmania's alpine heartland

When you have owned your land for 20 years before you decide to build on it, you have had plenty of time to think about your house-to-be. When you bought the land to preserve its trees—and the land also happens to be on the edge of a World Heritage Area and national park—then you can bet you'd be after a house that's as environmentally-friendly as they come.

That was just the case when Alan Edwards and Gail Walker were planning their house near Cradle Mountain in Tasmania's alpine heartland. Dedicated bushwalkers who normally reside in Queensland, Gail and Alan have been visiting this part of the world for many years. "We were drawn to the remoteness and pristineness of the area," says Gail, "so when it came to designing a house here we wanted our footprint to be as minimal as possible."

Enter environmental designer Mark Dewsbury of Launceston-based design practice Carawah. A researcher at the University of Tasmania in sustainable housing and designer of many environmentally friendly homes, Mark is well versed both in the theory and practice of sustainable living spaces. "It's about maintaining a balance between the built environment and what was already there," says Mark.

Out of the blue

Apartment living designed for the lush, tropical climate of central Queensland

The gardens are irrigated with water-efficient sprinkler and dripper systems that tap into stored underground water collected from the roof areas.

There has been something of a revolution in the picturesque Queensland town of Yeppoon. A non-violent one, of course, and modest in the scheme of things, but one that may well change the way government, developers, and builders think and (fingers crossed) will one day be the norm—a sustainable commercial development.

As with all revolutions, this one was fuelled by enthusiasm and driven by someone who would not take no for an answer, Queensland-born developer Dominic Stower. "I started with just the idea, no capital but a lot of passion," explains Dominic, who is sole operator of his company, Sustainable Synergies Pty Ltd. "I was back in Yeppoon to see my parents for Christmas 2002. At the time I was working in property development in Brisbane. Just seeing how beautiful it is here, I knew this place was ripe for something, so I came up with the idea of Capricorn Blue."

Before long, he had secured his block of land on a handshake deal and the project was under way.

"I wanted Capricorn Blue to be as sustainable as possible. I had first read about sustainability about five years ago at a home show, of all things, and I just knew it was right."

"We did this the hard way," smiles Dominic. "No money, architects that didn't understand what I wanted to achieve, council politics and a builder

Hidden secret

An autonomous bush retreat that you will want to keep to yourself

Every room in the house has breathtaking views of the valley below.

What do you do when you find a great holiday house? Do you tell everyone and risk never being able to rent it again? Or keep it to yourself and feel horribly guilty? Boorman Eco Retreat in Queensland's Sunshine Coast hinterland poses just this dilemma. It's a self-sufficient luxury holiday house in a sublime location, at one with its environment. As you step over the threshold a blanket of calm envelops you. You will not want to leave.

Located on 125 acres of pristine bushland, the house sits on a plateau and looks down over the Obi Obi Valley. Designed by Mapleton-based architect Philip Boorman, **the house is just one-room wide and this, combined with plenty of windows and timber floors, evokes a sense of veranda living.**

Philip has been interested in designing with the environment in mind for quite some time. "My architectural design work has been evolving toward eco-housing over the last 20 years. World events have focused people's minds in this direction recently." His years of experience show in a house that is comfortable, stylish and smart.

Corrugated steel features on the external walls and roof and ethically sourced spotted gum is used on the portico and eaves. The lines are clean and spare but familiar at the same time, reminiscent of homestead living. Inside, a variety of timbers and