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ISSN 1833-1416

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Editorial

It's been a busy time for *Sanctuary* staff. A month ago, we launched our website and dispatched our first e-Newsletter.

Sanctuary is a child of the Alternative Technology Association, and for the first few years of its life the magazine's sole online home consisted of a page on the ATA website (www.ata.org.au).

However as *Sanctuary* grew in sales and popularity, it became a bit like the 20-something kid with a paid job who still lived with their parents. It was time to fly the nest.

Sanctuary online (www.sanctuarymagazine.org.au) marries the *Sanctuary* experience with a bit of technical wizardry. House profiles have been sited on a Google Maps portal, so you can zoom straight to your climate zone to find houses that have been designed with your conditions in mind.

Feature articles and featurettes live on a page called Sanctify Your Home. It has a three-dimensional house that you run your cursor over and explore. When you click on bits of the house – Lighting, Solar Panels, Windows – the relevant articles pop up, and you can pick the ones you like the look of.

There's a shop, of course, where you can subscribe or buy back issues, and all the usual About Us, Contact Us stuff.

The most dynamic aspect of the site is the e-Newsletter (you'll find the latest copy on the website). It's our way of giving devoted readers a little something extra. Last month we gave away 20 copies of "*A Greener House*", an investor's guide to sustainable renovations. There'll be plenty more freebies like that in future editions, as well as the latest news and events, so jump to it and sign up today.

But before we get carried away with all this talk about websites and e-Newsletters, let's not forget the main game. It is still the magazine. In fact, far from forgotten, we think this is our best issue yet.

Let us know what you think.

Michael Day & Verity Campbell
Co-Editors

Feedback?
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Supported by the Australian Government through the *Your Home* project.

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.

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

For further information go to www.yourhome.gov.au

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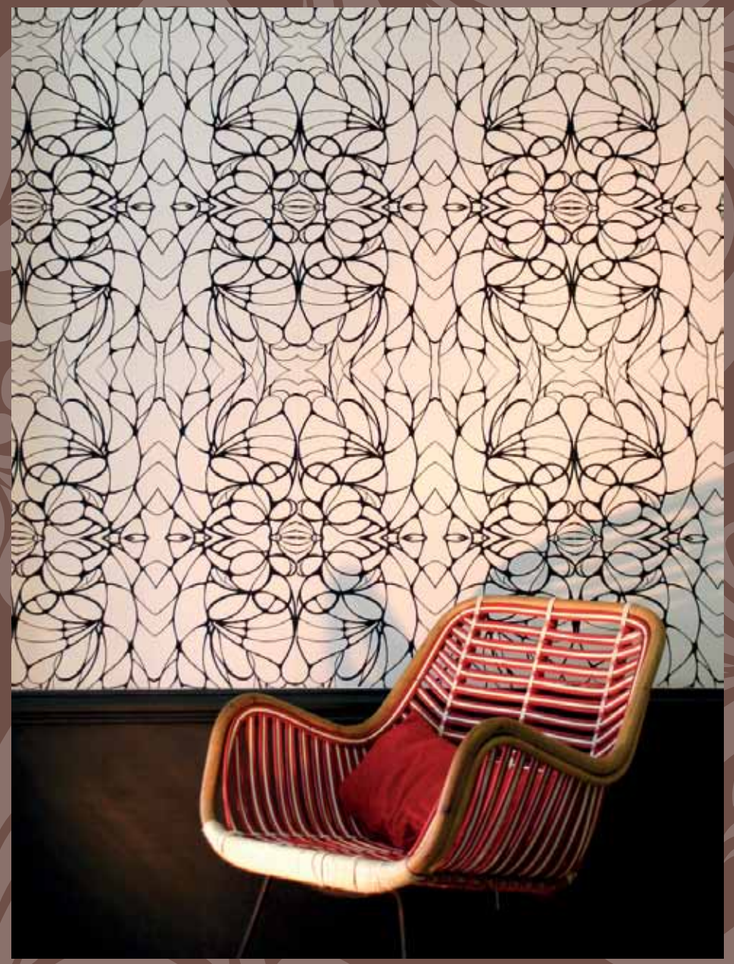
For the home

[1]



[1] Publisher Textile now produces its entire wallpaper range in a high quality non-woven base that is made from recycled materials and at least 70 per cent of the cellulose/ plant fibre sourced from FSC-certified forests. All colours are in durable water-based inks on an easy-to-use wide format paper. Wallpapers are hand-printed in their Sydney studio and cost from $250 to $500 per 10m roll.

www.publishertextiles.com.au

[2] If you want to give a new lease of life to a tired piece of furniture, look to cloth fabric's screen printed range. Their fabrics include a 100 per cent certified organic cotton, as well as hemp and linen. Dyes are water-based and all fabric is produced by hand in a tin shed in country NSW.

www.clothfabric.com

[2]

[3] If you're about to paint the exterior of your home or even a room, consider adding Thermilate to your paint. It's a ceramic based, non-toxic additive that dramatically improves the insulating qualities of paint. It works by reflecting radiant heat, which means it'll help keep heat out of the home (when added to external paints) or help keep heat in (when used with internal paints). The technology is based around 'microspheres', tiny vacuum-filled ceramic balls developed in conjunction with NASA. Thermilate costs around $45 for a 440g sachet, which is enough for four litres of paint. It's widely available in hardware stores.

www.thermilate.com.au

[3]

[4] If you're undertaking a renovation or new build and you like the aesthetic of downlights you should choose LED downlight fittings (fitted with quality LEDs), as these will give as good a light brightness as traditional halogen downlights but will consume considerably less energy and have a longer life span. Cree LED Lighting Solutions produce the quality Cree LR6 fitting, while the compact Hotbeam CeeLux HB13 fitting produces light equivalent to a 35W halogen and uses under 13W of power.

www.cutter.com.au/proddetail.php?prod=cut796

www.hotbeam.com

[4]

[1]

[5] Halogen downlights have long been known as low voltage but that doesn't mean they use little energy. The standard 50W halogen downlight and transformer uses around 60 watts of power. You can replace those energy-hungry low-voltage halogen downlights with low-wattage LEDs via a simple bulb replacement – and in most cases there's no need to even change transformers. Before you make the switch, you need to bear in mind that LED downlights fitted in halogen sockets will provide slightly less illumination than halogen downlights, but it's a small price to pay for all the energy saved!
Available from the Alternative Technology Association for $33.50 (15% discount for ATA members).

www.ata.org.au

[5]

[6]

[6] Jardan Australia makes a range of Good Environmental Choice Australia (GECA) furnishings with FSC timbers, CFC-free 100 per cent recyclable foams and leather which can be sourced from chrome-free processing and organic dye tanneries. They also have a returns policy, so at the end of your couch's life you can return it to Jardan for them to reupholster or recycle. Their Clementine series includes this low storage unit, which is made with an Australian eco-ply carcass in a range of finishes.

www.jardan.com.au

[7] Jimmy Possum's range of furniture includes the Chello table which is made from recycled Victorian ash. The table top is recycled floorboards while the legs and base are from reclaimed struts and trusses sourced from construction timbers. Their Nikko lounge suite (pictured) can be made with recycled Victorian ash and a chrome-free leather process. All furniture is made in Jimmy's Bendigo factory in Victoria.

www.jimmypossum.com.au

[7]

[8]

[8] While polished timber floors are increasingly popular, unless they're insulated underneath the heat loss through the floors can be considerable. To improve their insulative performance you could use rugs or overlay carpets. Exclusive floors has a range of (imported) jute, seagrass, coir and sisal floor coverings that are made without the need for dyes. Make your choice depending on the aesthetic you're after and the wear and tear you expect the carpet to get.

www.exclusivefloors.com.au

[9]

[10] Exhibit Lighting Décor has launched a range of bamboo laminate furniture, the Lobo. Lobo tables and chairs are made in a natural and stained range and are available from their Melbourne and Sydney stores.

www.exhibit.net.au

[10]

[9] Kent Gration has made a name from a stylish range of furniture crafted from one of the world's most rapidly renewable resources, bamboo. His Zhu lamp ($350 to $550), pictured above, features a elegant bamboo veneer shade (and it's flat-packable), while his Costello seat ($850), pictured below, features finely detailed vertical and horizontal bamboo-laminate cross hatching.

www.wambamboo.com.au

[9]

Beautiful economy

Recycled and recyclable, the ingenious structure of this house is also its most striking feature

by Michael Day

> The *pièce de résistance* of the house is its future-proofing. The uniformity of the structural sections means that it can respond to the needs of future occupants

Murray van der Veer

The house comprises two pavilions. The northern pavilion is designed smaller to minimise overshadowing

On the back of a ridge running along NSW's Barrenjoey peninsula, on a 750 metre Northern Beaches block, architect Andrew Coomer built his inspired riposte to the fibro "beach box".

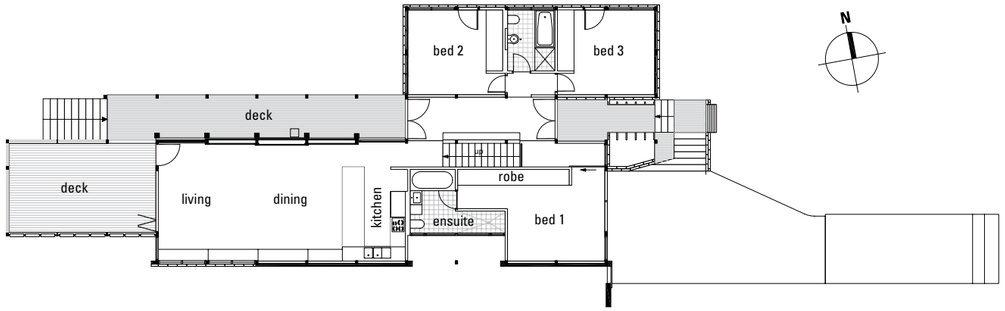
After more than 10 years in commercial architecture, Andrew elected to switch to residential architecture in 2003. His first project was his family home. "It was my first house and I had all these ideas of what I wanted to do, and I think I proved with it that my designs and ideas work."

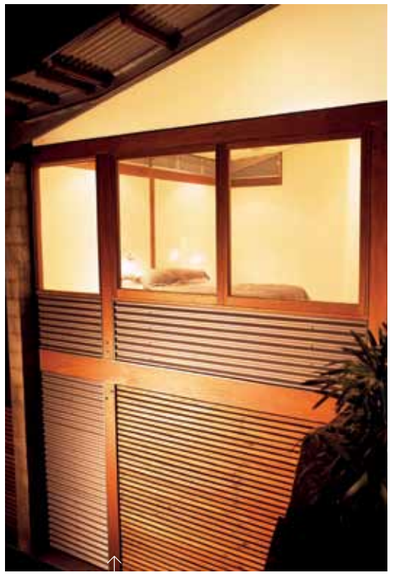
The house is an expression of Andrew's strong and logically consistent aesthetic, as well as his environmental convictions.

The influence of Glenn Murcutt and Richard Leplastrier can be seen in the economy and lightness of touch of Andrew's design, including the way structural materials are expressed, both internally and externally. Above all, this is an exceptionally well thought-out building.

Says Andrew, "I really don't think there is anything I would change either in terms of materials and finish or in how the house interacts with the environment."

In stark contrast to its many brick veneer neighbours, where bricks give a misleading impression of solidity, this house is a study in





Each building is comprised of a sandstone base, steel walls, recycled hardwood frame, and clear and translucent glazing

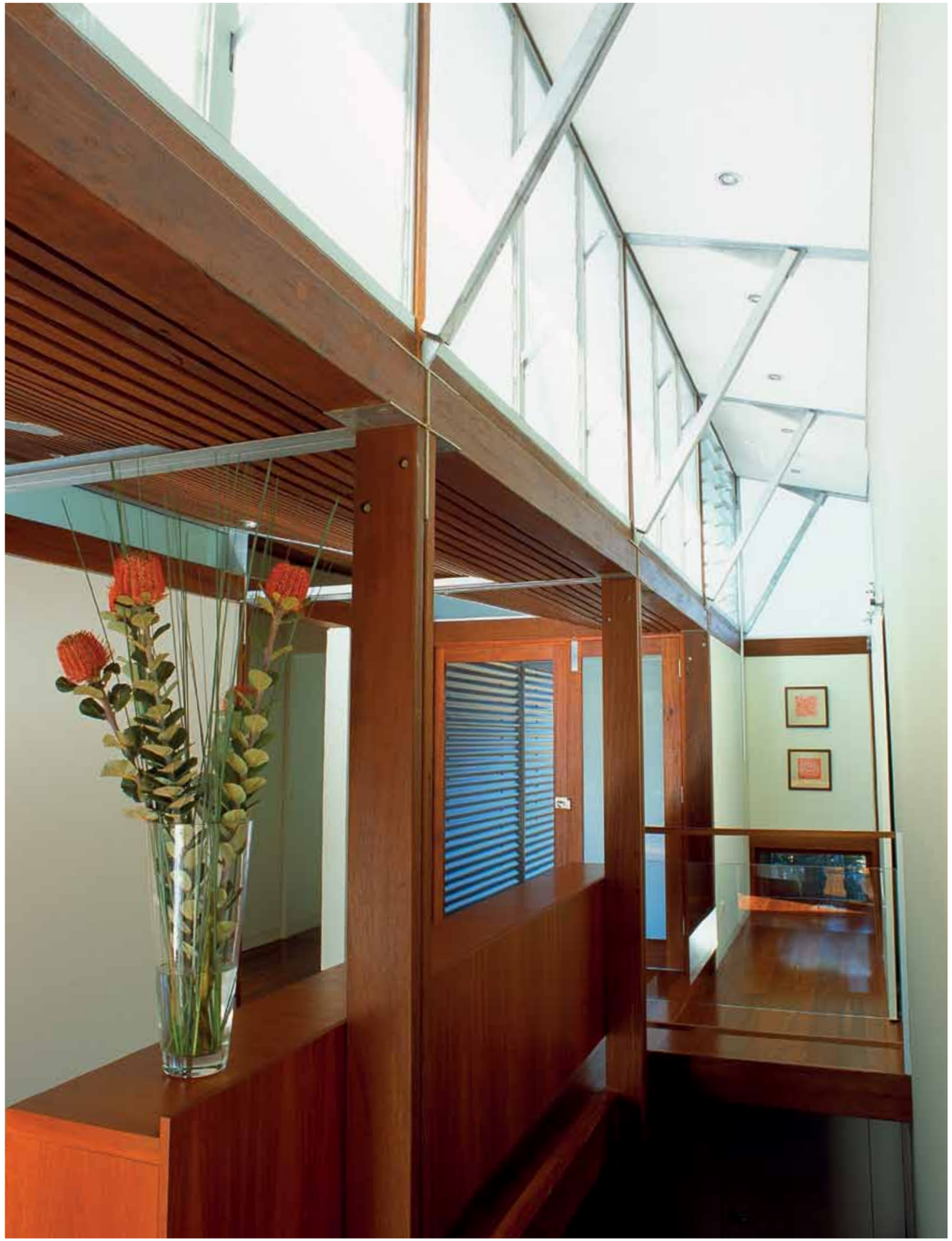
honesty. The structure is there for everyone to see.

Expressed recycled timber posts and horizontal beams bolted together with galvanised steel connection plates provide the physical structure for the building. From these beams, thin steel struts splay out both internally and externally to expressed steel rafters.

"The whole idea of constructability was important to me – to make the house as simple as possible. It's not a conventional house, but once you explain to people how it goes together they understand what you are talking about."

From the outset, Andrew specifically selected materials that were either recycled or could be easily recycled in the future. **The jarrah frame was prefabricated from timber recycled from a demolished woolstore. The decking, window and door frames are also recycled jarrah, and the timber flooring is recycled ironbark. The hardwood roof and floor beams from the previous house were also reused for wall and floor framing.**

The timber components were prefabricated offsite, which saved a significant amount of construction time and minimised wastage. The uniform nature of the structural system meant all



> “It’s not a conventional house, but once you explain to people how it goes together they understand what you are talking about”

The pavilions are kept one room wide, to maximise light penetration and cross-ventilation

timber components could be pre-ordered to exact lengths, resulting in minimal wastage of material.

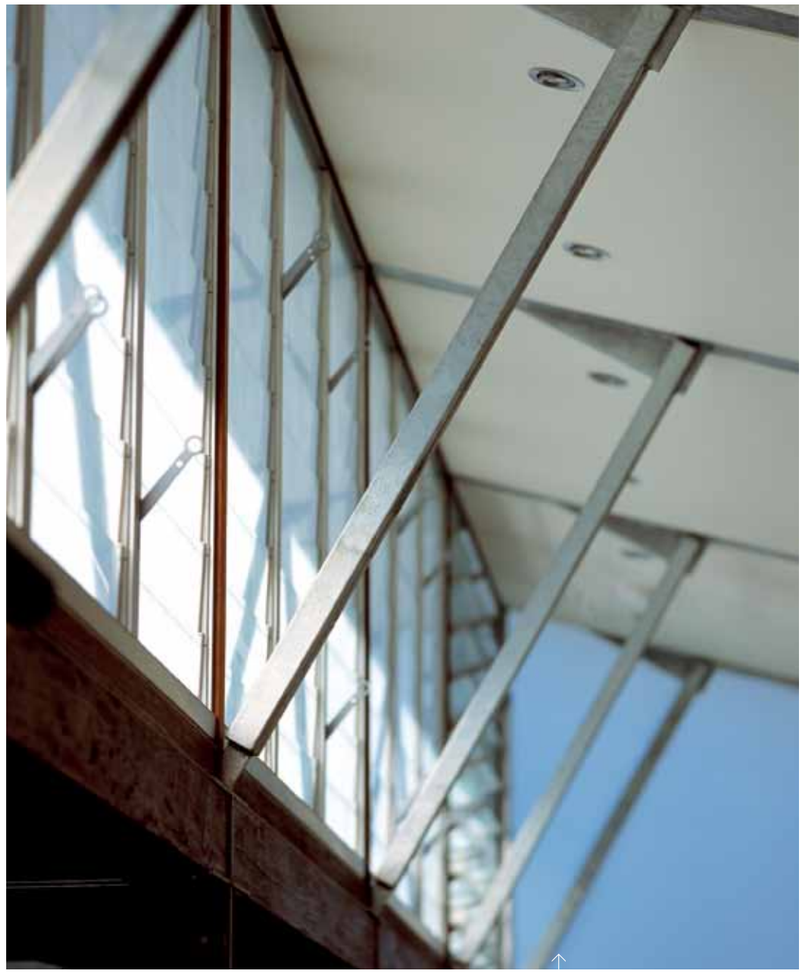
To maximise utilisation of the block, Andrew designed a house with two offset pavilions with skillion roofs tilted upward to the north. The northern pavilion is designed smaller to minimise shadowing of the southern pavilion.

The two-pavilion arrangement owes a debt to tropical architecture. Andrew explains, **“I wanted to keep the cross sections of the house as thin as possible. A thin house allows cross ventilation and light to penetrate, and two pavilions allows you to go thin.”** The tropical effect is visually reinforced by the pavilions’ reliance on Colorbond Metallic steel cladding on the northern and eastern walls.

The entrance to the house is in between the pavilions through a breezeway. Doors at either end of the breezeway and a translucent corrugated polycarbonate roof sheet bring light and breezes into the middle of the house. At the end of the breezeway, a long jetty-like deck comprising recycled jarrah visually connects the front of the site with the eucalypt woodland at the rear.

The building uses its orientation, skillion roofs, eaves, louvres and doors to deflect, catch, and block appropriate breezes, sun angles and views. The roofs capture the northeast summer breezes while deflecting and providing shelter from winter southerlies and westerlies.

The northern pavilion comprises two bedrooms and a bathroom. The southern and much longer pavilion contains another bedroom and the open-plan living spaces. In both pavilions the primary environmental control system is a north-facing roof overhang over a translucent louvred wall.



Steel struts splay out from horizontal beams to the rafters

To capture more light and bring the outside in, the southern pavilion living area also has large sliding glass doors opening onto the deck.

The south-facing wall of the southern pavilion is constructed from double-insulated concrete blocks finished with stuccoed render. This adds thermal mass and monumentality to an otherwise lightweight structure, blending troppo and temperate-climate design.

Below floor level, recycled dry packed sandstone walls anchor the house to the site.

The floor is recycled ironbark, the structural frame, door and window frames are recycled jarrah

The *pièce de résistance* of the house is its future-proofing. As well as minimising waste, the uniformity of the structural sections means that by simply removing a few bolts, structure can be added or subtracted and coupled with an infinite array of infill panels (wall, window and roof) to respond to the needs of future occupants. "This has been designed for a traditional nuclear family," says Andrew, "but the way it's put together means it can be changed to suit different families."

In fact, this Palm Beach house is already home to family number two. And though we can't imagine why they'd change a thing, it would be a cinch if they did.

Meanwhile, Andrew has moved his practice down the road to Avalon, where the lessons of his first house are being applied to a growing portfolio of inspired designs.

Palm Beach residence

Designer **Andrew Coomer & Associates** www.coomer.com.au
Builder A Anderson Builders Pty Ltd
Location Palm Beach, NSW
Project type New building
Cost $700,000

Photography Paul Bradshaw, courtesy of BlueScope Steel Limited

Sustainable features

HOT WATER

- Rinnai Infinity 5.5-star instantaneous gas hot water

WATER SAVING

- Purpose-built 5000L in-ground rainwater tank
- Excess water channelled into dispersion drain to natural reserve
- Caroma 3/6L dual-flush toilets
- Tap and shower fixtures modified to WELS 4-star rating

PASSIVE HEATING & COOLING

- Insulco R1 reflective roof blanket plus R2.5 bulk insulation to ceilings
- Insulco R3 bulk insulation to light-weight walls
- Double-insulated concrete block walls (50mm Styrofoam board to cavity between blockwork skins) to south for interior thermal mass
- Reinforced concrete ground slab for thermal mass
- House divided into four zones for retention of winter and summer comfort
- North-facing roof overhang over a translucent louvred wall

ACTIVE HEATING & COOLING

- Hunter Pacific Typhoon 81cm reversible fans
- Rinnai gas space heating

BUILDING MATERIALS

- COLORBOND CUSTOM ORB wall panels
- Double-insulated concrete block walls to south
- Recycled dry-packed sandstone below floor level
- Recycled tile and concrete backfill from demolition of previous house
- Recycled jarrah structural framing
- Recycled ironbark flooring
- Recycled jarrah decking
- Recycled jarrah door and window frames

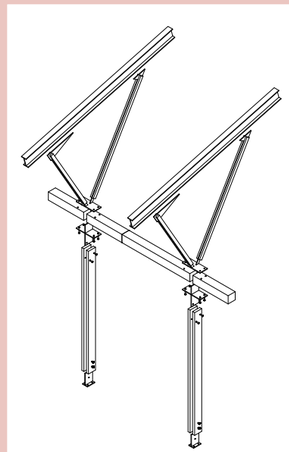
All recycled timber from Australian Architectural Hardwoods (www.aahardwoods.com.au)

PAINTS, FINISHES & FLOOR COVERINGS

- Dulux low-VOC paint finishes

OTHER ESD FEATURES

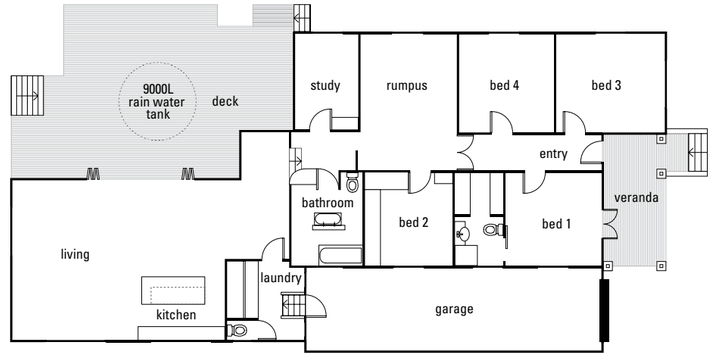
- Pre-fabricated structural frame and wall panel system minimises waste and allows for future deconstruction and reuse
- Endemic native plantings to garden



Weatherboard plus

Reverse brick veneer brings this bungalow back to life

By Judy Friedlander



When this home in Collaroy on Sydney's northern beaches wore a "For Sale" sign three years ago, most potential buyers saw the PVC cladding and nondescript facade and opted to move on. But Richard Luke, a builder by profession, saw its potential.

"It appeared enchanting but in need of some TLC," says Richard. "The add-ons were all badly done but I could see that the original building was sound."

The house had been with one family for over 50 years and the owners were reassured when the Lukes – Richard, wife Sarah, and three young boys – said their aim was to restore the home to its former glory.

Fortunately the termites which had plagued the neighbourhood had hit a brick wall – or rather Cypress pine floorboards – a few decades ago. They had had considerable success in neighbouring houses, systematically consuming more palatable timbers, but these boards were not to their liking.

While the original floorboards from the late 1930s have survived, the home's proud stature and heritage values can be largely attributed to the care and attention to detail the owners have bestowed on it. The house now merges an authentic bungalow

Sustainable House Day

This year *Sanctuary* is the official magazine for 'Sustainable House Day' (SHD), held on Sunday 13th September at selected homes right across the country. In its eighth year, SHD is an initiative of the Australia and New Zealand Solar Energy Society (ANZSES) and supported by the Australian Government.

A fantastic selection of sustainable houses will throw open their doors for you to have a look through, for free. You'll be able to ask questions of the homeowners about what they have done and discuss with builders and architects about applying the great ideas to your own home.

Richard and Sarah Luke's home is one of the houses open at this year's Sustainable House Day. Visit www.sustainablehouseday.com to find out where the open houses are in your local area.

Sustainable House Day 2009 is proudly presented by Solar Shop Australia.

SUSTAINABLEHOUSEDAY
www.sustainablehouseday.com

The hand-crafted dining table was made from a slab of mango tree, destroyed near Mossman, Queensland, by Cyclone Larry in 2006

backbone with a complementary contemporary body. The low-pitched roof of terracotta tiles, the open veranda, masonry veranda piers and pared-back symmetry hark from the pre-War period.

"The original cedar and jarrah weatherboards were unfortunately ruined through amateur building work and neglect," Sarah says. "Lead paint had also been applied which automatically rendered them hazardous."

However, there was a definite benefit – a silver lining, you could say – in removing the original weatherboards and replacing them with a reconstituted wood weatherboard. "Original weatherboards would not have provided an access for insulation," says Richard. "By replacing the boards, we were able to introduce insulation and reflective foil."

Hebel PowerPanels, which have relatively low embodied energy, have been used for internal walls on the extension as part of a reverse brick veneer construction system. By placing masonry on the inside, thermal mass is optimised and internal temperatures are more effectively regulated. External walls are then insulated to protect the thermal mass from exterior changes in temperature.

> "The house merges an authentic bungalow backbone with a complementary contemporary body"

A custom-made shade sail extends over the deck in summer; deck timber is recycled jarrah

A new deck and living area added at the rear provide a north-west orientation and the afternoon sun is plentiful, warming up the concrete slab in the family room in winter. "At night we can walk with bare feet it's so warm," says Sarah.

Both Sarah, who is studying interior design, and Richard share a passion for timber and love the fact they can trace the provenance of certain pieces. Kitchen and laundry benches and a study desk, for example, are made from recycled jarrah that was originally used as floorboards in the Bank of NSW in Martin Place, Sydney.

A magnificent hand-crafted table was made by Richard from a slab of mango tree, destroyed near Mossman, Queensland, by Cyclone Larry in 2006. The slab is so heavy Richard had to mount the table on casters to move it.

The timber floorboards, skirting boards, window and door trims and cabinetry complement the contemporary finishes such as the concrete kitchen bench. A mirrored splashback behind the stainless steel sink reflects the sun and trees in the garden. "I can see the kids outside even when I'm washing up!" laughs Sarah.

The original patterned ceilings in the existing part of the house were painstakingly restored and

have been painted off-white, a light colour scheme which infuses the house.

Passive heating and cooling are assisted by a shade sail over the deck which is taken down in cooler months to allow the sun to penetrate deep into the living area. Two deciduous trees have been planted which will eventually provide a "greener" solution.

Large eaves on the western side of the extension help considerably in summer and careful placement of windows (which are also double glazed with weather seals) encourages cross-ventilation.

Sarah and Richard attempt to minimise power consumption where possible and a Smart Switch, installed by the electrician during the framework stage, enables the manual switching off of all standby circuits in the house "before going to bed".

A 9000 litre rainwater tank supplies water for toilets, the garden, laundry and outside shower. Sarah is currently undertaking workshops in permaculture and the three chickens in the enclosure at the back of the garden supply the family with approximately 18 eggs a week.

"The chickens eat the scraps and give us eggs, we pick vegetables on a daily basis and the kids love picking the bananas, olives, apricots, peaches, apples and oranges," she says.

"Permaculture for me is about having a conscience and making a determined effort to take care of my family and the future environment. It's about growing your own organic vegetables so you know what you're eating and the impact you are having on the environment. It's about doing the right thing."

The Lukes' philosophy certainly embraces the best of the old and the new.

Collaroy residence

Designer **Luke Constructions** www.lukeconstructions.com.au
Builder Luke Constructions Pty Ltd
Location Collaroy, NSW
Project type Renovation
Cost $320,000

Photography Helen Ward

Sustainable features

HOT WATER

- Endless Solar hot water evacuated tube split system with 315L stainless steel tank

RENEWABLE ENERGY

- 100% Tru Energy GreenPower

WATER SAVING

- Team Poly 9000L poly-squat rainwater tank under the deck with Rainbank fitted for mains backup when required – supplies internal toilets, laundry, garden, outdoor shower and water feature
- Nylex Greywater Diverta – manual gravity fed diversion system from laundry to garden
- Excess storm water channelled into an "absorption pit" in rear garden

Small and shallow washbasins are a good design solution to discourage excessive water usage

PASSIVE HEATING & COOLING

- Roof Insulation – Autex Greenstuff R3.5 polyester bulk batts within ceiling plus concertina foil batts between rafters (directly under terracotta tiles)
- Wall insulation – Autex Greenstuff R1.5 polyester bulk batts plus sisalation. Concertina foil batts used on all west facing walls plus sisalation
- Floor Insulation – 15mm foil board under suspended concrete slab
- Shade sail over deck – custom made in sand colour. Taken down over cooler months to allow sun to penetrate deep into living area
- Large eaves – up to 900mm on extension and double eaves on existing house
- Cross ventilation – careful placement of windows/ openings capture cooling sea breezes

ACTIVE HEATING & COOLING

- Slow combustion Jindara Kimberley wood heater using salvaged hardwood
- Ceiling fans – Hunter Pacific Concept 2 reversible fans in all rooms
- Comfort Heat Warmtouch in-slab heating – installed during building but not used by owners

BUILDING MATERIALS

- Forest Stewardship Council (FSC) timber and recycled jarrah for joinery and decking
- Boral concrete slab flooring with 25% recycled component

- Hebel PowerPanels used for internal walls on extension as part of a "reverse brick veneer" (RBV) construction system

How it works: RBV is brick veneer construction turned inside out, with the bricks on the inside of the house (in this case Hebel Powerpanels were used instead of bricks in order to lower embodied energy). RBV is one of the most thermally effective construction techniques available. It places the masonry on the inside where its thermal mass is of most benefit in regulating internal temperatures. External walls are then insulated to protect the thermal mass from exterior changes in temperature.

WINDOWS & GLAZING

- Cedar framed, double-glazed casement units with low-e internal pane and Raven weather seals all round. Supplied by Northern Beaches Joinery

LIGHTING

- Solatube skylights installed in bathrooms

PAINTS, FINISHES & FLOOR COVERINGS

- Wattyl ID Green Lid low-VOC paints
- Wattyl tung oil to timber floors
- IBS Premier waterbased sealer to concrete
- Intergrain natural timber oil on deck

OTHER ESD FEATURES

- Smart switch installed by electrician

How it works: The "smart switch" consists of a manual switch in the hallway which shuts down all standby circuits in the house before going to bed. The electrician wired electronic equipment including computers, printers, televisions, DVD and entertainment units onto the one circuit to enable the one switch to simultaneously shut down all standby consumption.

Shutting down standby to some equipment can cause clock and program settings to be lost, so you either have to accept this or look to buy appliances and equipment that don't need to be kept on standby.

Treetop vantage

> **“When we were building it, I sometimes thought: I could be living there already if I’d just plopped a McMansion in the paddock. But then I’d remind myself that it’s a special spot and it deserves a special house”**

A novel solution for a challenging site

by Rachael Bernstone

The steep banks of a winter creek and billabong, dotted with massive river red gums and kangaroo wattle, provided the inspiration for a South Australian couple’s new home, but they got more than they bargained for when they approached architect Max Pritchard.

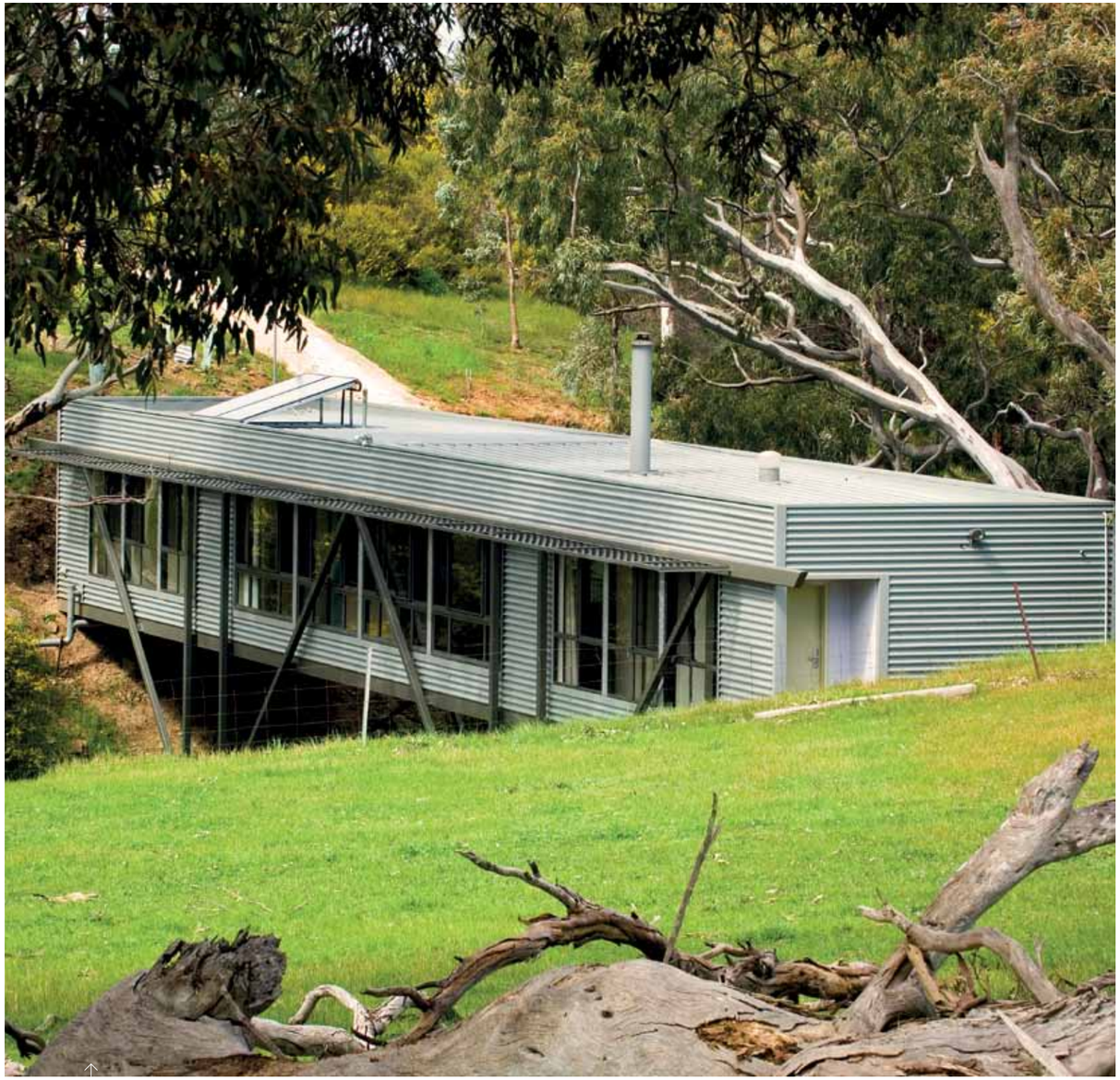
When they decided to move out of the city to a 20 hectare hobby farm, this Adelaide-based couple had modest ambitions. Their property had one shed, some grazing sheep to reduce the fire hazard and no mains power or water. They’d selected a site that overlooked a picturesque waterhole and intended to build a small house and home office, which would minimise their impact on the land while capitalising on its natural beauty.

“We chose a site with a view of the magnificent gum tree near the billabong and thought Max would perch us on top of the bank,” the owner says. “But that site is south-facing, so Max swung us right around and across the creek, to get a north-facing aspect.

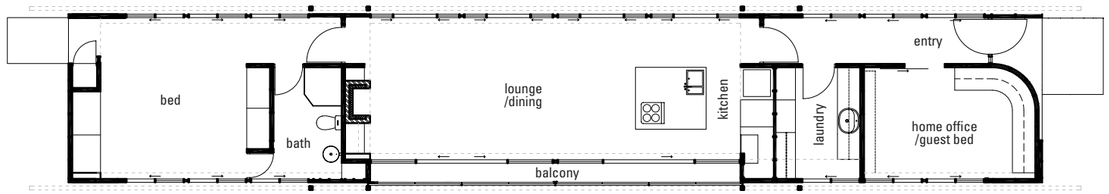
“We were both taken aback initially, because it was hard to imagine being that high: we couldn’t string ourselves out there to get an idea of what it would be like,” she adds. “We never thought we would be out over the creek! We are somewhat boring and old fashioned people and we would never consider something so ‘out there’.”

Having settled on the best site, Pritchard designed an economic and efficient house to comply with the couple’s tight budget. At only 110m^2, the house comprises one bedroom, an open plan living area and kitchen and a home office that doubles as a guest bedroom. A second shed acts as the “spare room” for storage of golf clubs, fishing gear and other useful equipment.

The long narrow plan boasts large double-glazed windows on the northern and southern facades that make the most of the stunning views and



Not only has this home been designed with careful selection of environmentally sensitive materials and passive solar design, it's also a showcase for its modest size. At just 110m², it's half the size of an average new home in Australia



The dark colour rendering of the concrete slab encourages heat absorption during winter

enhance thermal performance. In summer, the glass on the northern side is protected by angled and perforated screens that keep the sun out, while cross ventilation and ceiling fans assist with cooling. **During winter, the perforated screens allow the lower-angled sun to enter the house to warm the insulated concrete slab, which re-radiates warmth at night.** It is supplemented by a small combustion heater that burns wood collected from the property.

The owners had initially considered installing a stand-alone solar system for electricity, but the prohibitive cost – $40,000 for panels, batteries and a backup generator, compared to $20,000 for a grid-connected solar system – convinced them otherwise.

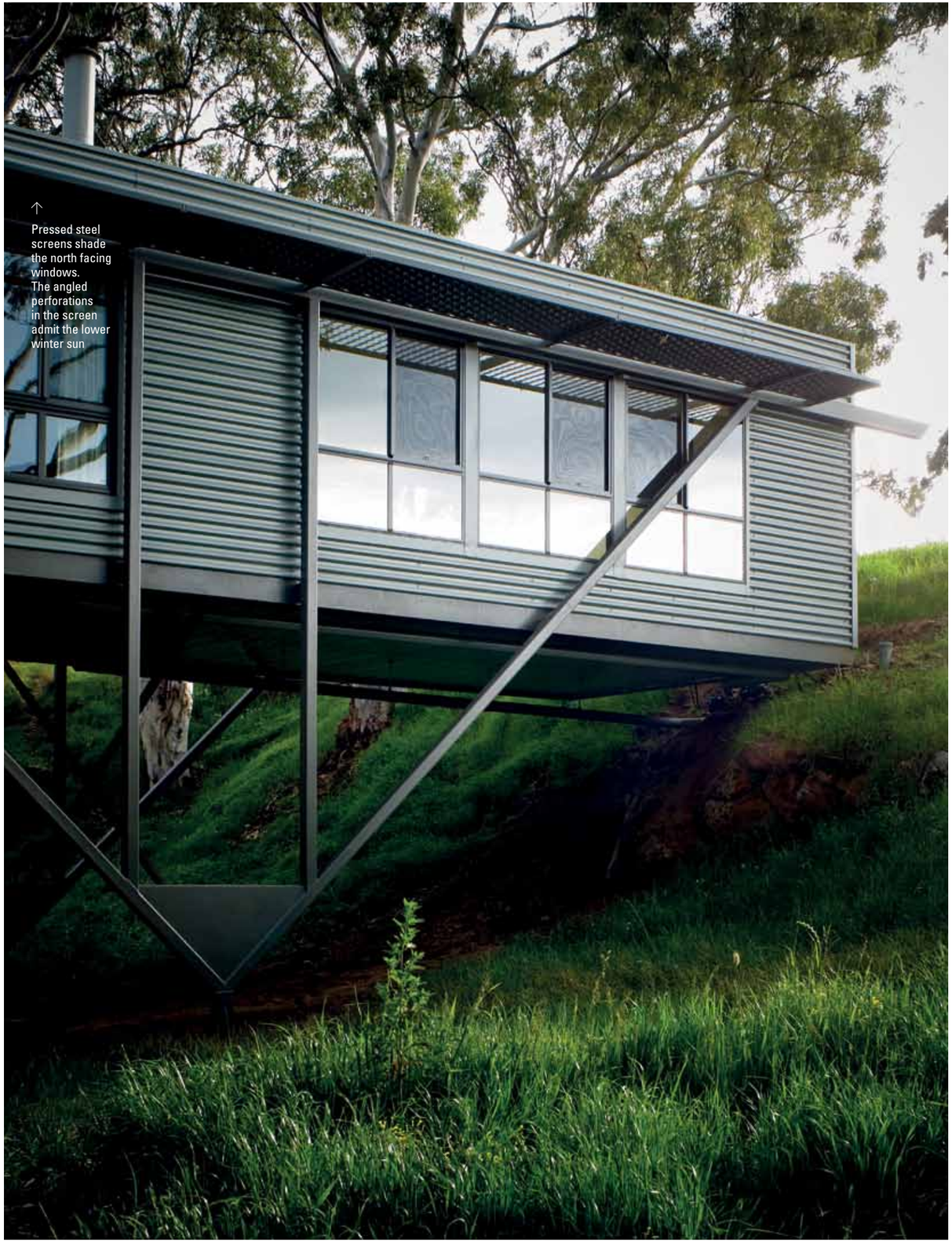
"We wanted to reduce our energy consumption but we have power tools, computers and a TV. Like most people we still wanted to use the latest high tech stuff, and it needs power," the owner says. "We compromised by installing a photovoltaic system that is connected to the grid to offset our consumption.

"We draw energy from our own panels first, and send power back to the grid when we make more than we can use, so we use mains power as a last resort," she continues. "We also have solar hot water backed up by an electric system. We've already achieved significant savings: our second bill (in summer) was paid for entirely by the grid connection and our most recent one (in autumn) was $165 for the quarter."

The house is not connected to mains water so three tanks collect rainwater from the roof and the roofs of the two sheds, while a sewerage system treats waste water before it is dispersed into the landscape, away from the creek.

By far the most innovative aspect of the design is the lightweight structure that touches the ground at just four anchor points, minimising disruption to the creek bed while hovering above the watercourse. While Pritchard had every confidence his remarkable design could be built, he wasn't sure the local council would approve the unusual dwelling.

"Council approval is a concern with any project you do, but we knew from the start that this would be a long process," he says. "We thought it was worth a go, and in fact, the council said that it likes to encourage innovative design." It took the couple about one year to satisfy all of the local and state government approval requirements – including



↑ Pressed steel screens shade the north facing windows. The angled perforations in the screen admit the lower winter sun

> “The site is south-facing, so Max swung us right around and across the creek, to get a north-facing aspect… We never thought we would be out over the creek!”

The simple, slender design facilitates cross ventilation, essential for South Australia’s hot summer nights

demonstrating that the house was above the 100-year flood zone and wouldn’t impede water flow in the creek bed – but the final result was more than worth the effort.”

“We’ve been here 18 months now and we are living in a magical spot,” the owner says. “When we were building it, I sometimes thought: I could be living there already if I’d just plopped a McMansion in the paddock!” she laughs. “But then I’d remind myself that it’s a special spot and it deserves a special house.

“We love the birds and we feel like we’re in our own little nest watching them in their nests,” she adds. “We watch them tending to their young in boxes we made for them and it’s like living in our own bit of nature. While this is a very narrow house – and I was worried about that before it was finished – it feels so open because of the bush all around us.

“As well, we love that people still say ‘wow’ when they come here for the first time. We hope that we never lose that sense of wonder ourselves.” ←

Ashbourne residence

Designer **Max Pritchard** www.maxpritchardarchitect.com.au
Builder Owner-builder
Location Ashbourne, SA
Cost $350,000
Project type New building

Photography Sam Noonan

Sustainable features

HOT WATER
- 270L Rheem solar hot water system with off-peak electric booster

RENEWABLE ENERGY
- 1 kW grid-connected photovoltaic power system (16 x Kaneka thin film 60 watt solar panels, with provision to add additional panels) by The Solar Shop

WATER SAVING
- 3 x 31,700L rainwater tanks by Polymaster for household use
- 1 x 45,000L Aquamate tank for fire protection

PASSIVE HEATING & COOLING
- Suspended concrete slab with 50mm rigid polystyrene insulation installed beneath
- House sited for maximum solar gain
- Designed for maximum cross ventilation
- Dark coloured concrete floor (black oxide, steel trowel finish) slab absorbs heat during day in winter months

ACTIVE HEATING & COOLING
- Heating by Saxon slow combustion heater. Wood from renewable wood lot on property

- Fans by Sycamore. These fans are not only aesthetically pleasing, the aerodynamic blades are designed to provide high airflow at low operating speeds, saving energy and operating costs. They are reversible too, which means in winter you can use the fan to "push" the warm air which has risen to the ceiling back towards the floor. $650

BUILDING MATERIALS
- Roof – Colorbond Klip-lok (sarking under +R4 insulation)
- Walls – Colorbond Spandek (sarking behind +R2 insulation)

WINDOWS & GLAZING
- Double glazing in living area by Rylock
- Louvres to north facing windows by Winterlite

LIGHTING
- Megaman compact fluorescent reflector R80 (15,000 hour) downlights

PAINTS, FINISHES & FLOOR COVERINGS
- Throw rugs in living areas and bedrooms on concrete floor

- How does this building work structurally? "It's relatively simple," says Max. "Two steel trusses, which form the primary structure, were erected by two men and a crane in two days. They were anchored by four small concrete piers, poured each side of the creek. Spanning between the trusses is a concrete floor slab on steel decking with a layer of rigid insulation. The secondary framing for walls and roofing is plantation-grown pine. External wall cladding and roofing is precoloured corrugated steel sheeting." Max designed this home as a "structural system and design, which could be viewed as a prototype for sustainable prefabricated housing".

Free home health checks

Reduce your home's environmental footprint with the Green Loans program

By Jenny Brown

Many people will have heard of building sustainability assessors, who measure the thermal efficiency of new homes. But for people who want to improve an *existing* home's environmental performance there has been precious little help. Until now.

The Australian Government's Green Loans program, launched on July 1 2009, aims to help homeowners improve their existing home. As part of the program, more than 1000 people will undertake Home Sustainability Assessor training to become accredited Green Loans assessors.

A free home sustainability assessment, coupled with access to a four-year interest-free loan of up to $10,000, will enable homeowners to make immediate energy and water-saving changes, from draft-sealing to installing solar panels and greywater systems.

To find out what was involved in a home sustainability assessment, *Sanctuary* followed two assessors as they did their rounds in southeast suburban Melbourne.

Why should I do a green reno?

Apart from reducing your carbon footprint, making your home more environmentally friendly is a timely investment. The next 10 years will see the housing market shift towards environmentally friendly homes in response to pricing shifts for water and energy, smarter building regulations and consumer demand.

Home Health Check no. 1: Balaclava

Kids come along and change everything.

So it was for Melbourne couple Richard Foxworthy and Philippa Sawyer, when the commencement of their family saw them outgrow their Deco flat in Melbourne's St Kilda and start looking for family-scale accommodation within cooee of their preferred bayside lifestyle zone.

A 1940s double-brick duplex they found in neighbouring Balaclava was affordable and, with four bedrooms and two living rooms, was large enough for a growing family. But along with "lots of plusses", in the 18 months they've been in residence a few minuses have shown up.

They quickly fixed the unworkable bathroom but know that soon they'll need to address the limitations of an upstairs attic bedroom – shared by their two sons, aged four and two. Even kneeling, Richard's head nearly scrapes the ceiling and the children will soon outgrow its cubby-like charms.

The downstairs kitchen/living room is also an issue. Due to its westerly orientation and shading from the back porch, for most of the year it's in semi-twilight. "So cave-like that even on a beautiful day we have the lights on," says Richard.

They need to do a renovation but, says Richard, "we haven't got a clear vision what to do. We have some objectives – lifting the roof is one."

It was timely, therefore, that in the pre-planning phase the couple were among the first in Australia to benefit from a visit by a Green Loans home sustainability assessor.

Fancy a $10,000 interest-free loan?

Getting a free home sustainability assessment is the first step to qualifying for a Green Loan of up to $10,000. To find out if you are eligible for a Green Loan and/or register for a home sustainability assessment, go to **www.environment.gov.au/greenloans** or phone 1800 895 076.

Richard says that although he's "interested in the philosophy and politics of sustainability, I'm no expert and haven't done a great deal of research. I understand the basic principals but this was a chance to get some real expertise in assessing the house and some real clues on what we need to do."

In a 90-minute consultation, Nina Bailey ran her informed eye over things that could introduce energy efficiencies and elevate comfort levels in Richard and Philippa's home.

As the consultation progressed through each room, Richard was asked very detailed questions about his home's performance, including heating – the 20-year-old gas heater groans "and doesn't sound that healthy" – and cooling – "the front living room can get very cold in winter but the sun belts into the back living space in summer and it gets very hot. The old airconditioner is just not worth it."

What sort of hot water service is there? How does the fridge perform and at what temperature? Where are the drafts coming from? What expanse and type of glass did each room have? What about insulation: under floors, in walls and in the roof? And how much of that equipment belonging to Richard – a self-confessed gadget enthusiast – is on constant standby?

The household utility bills are brought out. Nina explains that "we start with the big ticket items and think about the things that use the largest amounts of energy because as much as 60 per cent of energy use can go on the heating and cooling."

Whether the couple will elect to apply for a Green Loan or not, the rigorous assessment process was, says Richard, invaluable and highly stimulating. "It gave us a real game plan for the future, because we are intent on raising the children here."

It also put the horse before the renovation cart and helped the couple prioritise changes – some of which may be relatively invisible, but which will make a tangible difference to their lives and to the planet.

Nina Bailey

Nina Bailey, a Melbourne based environmentalist, has spent her working life promoting behavioural change. In Green Loans she feels she's found the perfect platform. Working "one-on-one, household-by-household is a fabulous opportunity," she enthuses.

With a double degree, including a masters in environmental social science, Nina's career direction was set in 2006, a year in which public interest in sustainability gained impetus "with Al Gore's campaign and with the continuing drought". Looking to make a difference, she joined the Australian Conservation Foundation's GreenHome program, which concentrates on household sustainability.

More recently Nina has been working part-time on Environment Victoria's GreenTown initiative, which works with culturally diverse communities: "people who don't always get the government's mainstream environmental messaging". Nina chanced across the Green Loans program while researching sustainability rebates and "thought it was a fantastic idea".

With Green Loans she has an opportunity to reach the wider community. "What is great about Green Loans is that you can work directly with so many people. I'm hoping it will make a huge impact."

Home Health Check no. 2: Ripponlea

Adam Maxey

A temporary relocation to the coast a decade ago galvanized the environmental concerns of a bricklayer-surfie. Adam Maxey says he got involved in ocean outfall issues “and returned to Melbourne with the decision that I wanted a degree in environmental science.”

With a degree under his belt, Adam swapped his tools for a desk advisory position with the Alternative Technology Association, where he became a policy advisor.

In this role, he says, “I was constantly giving advice to people about where they could start with energy-efficiency initiatives”. Having given them the information, he says, the callers invariably requested Adam to make it happen “at their house”.

Recognising that an opportunity existed for a follow-up sustainability service, Adam and a mate set up a consultancy called Green Hammers (www.greenhammers.com.au) “which combines consultancy with project managing people’s sustainability plans”.

Hearing about the Green Loans, Adam realised he was looking at a natural segue, “an add-on to what I was already doing”.

“It’s a huge grass-roots action, is funded by the Federal Government and it’s starting at neighbourhood level.” He sees great potential for flow-on benefits: “One conversation might lead to a follow-through conversation between neighbours”.

And Adam is always happy to start the conversation. “I like giving lots of information!” he laughs.

The sunny back garden has possibly the best lemon tree on the block. To Russell Baricevic and his partner economist Julie Toth, the free-standing, early 1900s villa sold to them in 2007 as an “economy Edwardian” had plenty of scope for a family that had just spawned a set of twins.

It put Russell back in the “fantastic, familiar and child-friendly” southeastern Melbourne neighbourhood of his childhood, which was a happy synergy because he opted to become the home parent while his partner pulled in the wages.

The house, with its two bedrooms, living rooms and 1960s sunroom addition at the rear, has enough current accommodation, but it also has “the right bones” to cope with a planned upstairs bedroom addition.

While Russell is insistent that the kitchen remain a separate room “because I don’t like the idea of living in a kitchen, I’m more formal than that,” the modifications will give them the chance to claim back the house’s best and most cheerful direct natural light from the toilet and laundry. As Russell says, “architects tell me that it is so characteristic of period houses that the best light is always taken up by a wet area”.

With assessor Adam Maxey conducting a forensic-level examination of every aspect of the house, Russell is seizing on the opportunity to expand his knowledge of sustainable building principals.

“It’s a really great thing to be involved in,” Russell decides, as Adam drip-feeds him a constant stream of information about practical, simple, low-cost and almost instant changes that can be made to upgrade his home’s performance.

Draft-proofing, for instance, and turning down a heater thermostat by two degrees will save a lot of money. “So will putting on a warmer jumper”, quips Adam.

While the assessment will underpin ideas for the major renovation, this informal conversation,

says Adam, is “a great way of planting the seeds of behavioural change”.

Russell doesn’t need convincing when it comes to the benefits of living more sustainably. “I’m very aware of the need to use our earth’s finite resources in a more economical way and that we need to respect the planet and proceed more gently”.

And, he admits, the financial pay-off is also attractive. “The idea of saving money and living more comfortably…Call me boringly practical but I’m very interested in the best way to improve the energy efficiency of a house that is currently a warren of rooms”.

To get the free advice via the initial consultation is the up-front bonus of the Green Loans household sustainability assessment. To qualify for the $10,000, four-year interest-free loan would be one better. “It will allow us to take it to the next level and will be a great help, especially if we fall short.”

Meantime, “I’m listening to what the assessor is telling me. It’ll help us to focus and direct us to where we should start. I’ve already gotten some terrific ideas.”

ecoMaster

In putting together this article we were hugely assisted by Lyn Beinat and Glenn Bermingham at ecoMaster. ecoMaster (www.ecomaster.com.au) is a one-stop-shop sustainability assessment and retrofit company that has been participating in the Green Loans program since before its pilot phase. Nina Bailey was trained by ecoMaster, while Glenn assisted both Adam and Nina in their maiden assessments.

ecoMaster was founded in 2004 by Victorian couple Lyn and Maurice Beinat. It came about after they volunteered to build their children’s environmentally sustainable school while simultaneously retrofitting their own, very cold home. Jobs done, they saw there was an opportunity to deploy the knowledge and technology they’d applied in those projects more widely.

ecoMaster manufacture and install a range of retrofit treatments, such as add-on double glazing and draft-sealers. Their hard work and initiative was rewarded this year when they won the HIA GreenSmart Professional of the Year.

Lyn and Maurice are passionate advocates for home sustainability. They welcome Green Loans as a timely step in the right direction but insist that it shouldn’t stop there. Says Lyn, “Retrofitting is an effective way to deal with existing buildings, but it is time for *all* new buildings to be zero emission. We have the technology and the need, so what’s missing?!”

High on the hill

This eco-house harmonises with its bush setting

By Rachael Bernstone

The house offers a variety of views of its surrounds, from expansive, to localised and abstracted

When the owners of this two-bedroom house in the Perth suburb of Gooseberry Hill approached Adrian Iredale of Iredale Pedersen Hook Architects to renovate their home, they were keen to capitalise on the beauty of their site. The house, on the city's northeastern fringe, turns its back on Perth's suburbs and embraces the bushland beyond.

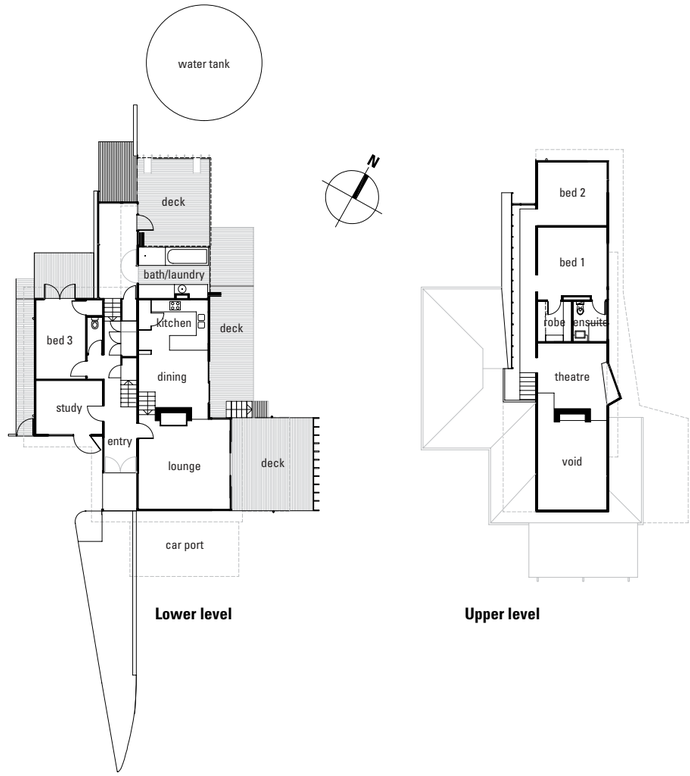
"The house was architect-designed in the 1980s but it didn't make the most of the site's attributes. For example, the living room windows were 1.2 metres off the floor," Iredale explains, "and I was keen to capture the quality of moving through a hilly bush site.

"The renovation aimed to provide the opportunity to move through the house and experience the landscape in a variety of ways, rather than just offering a passive wall of glass to take in the views, which can become mundane," he adds. **"Now the house offers intimate views and vast views, abstracted views and focussed views of the bush."**

Iredale's first task was to emphasise the importance of the central spine, which provides access to all of the internal rooms. **"As we extended the building we stretched the spine: at the front there is a long straight concrete wall to**

> We hope the wall over time will grow lichen and moss and become a microclimate for bugs and plants

Frayed edges. Is it an indoor plunge pool or an outdoor bath?



Lower level

Upper level

guide you into the house," he says. "It's smooth and sleek on the entry side, while the reverse side was poured against industrial bubble wrap to give it a 'hairy' quality. We hope the wall over time will grow lichen and moss and become a microclimate for bugs and plants. The spine reappears at the far end of the house and plugs into the new deck."

Iredale inserted a wall of green, translucent polycarbonate and louvres to provide abstracted views of the eucalypts outside and assist with cross ventilation. He then reconfigured the plan by turning two original bedrooms into the theatre and study and adding two new bedrooms upstairs.

Downstairs, a new bathroom-laundry, which can be fully opened to the elements, sits alongside the combined kitchen, living and dining spaces.

The original house had only one outdoor space, so Iredale was keen to 'fray' the edges of the building and create new vantage points and opportunities to engage with the surroundings. These include the extruded window seat in the theatre and a series of decks that encircle the house on both levels.

"This part of Perth doesn't have the cooling winds that coastal properties have, so it's important to create as much shade as possible," Iredale says. The upper-level decks shade the spaces below and the house is also protected from the harsh summer sun by a structure that encircles the house like a "necklace". It's made of bent galvanised hollow-section poles and recycled jarrah timber, which formed the decking on the original house.

"Where we've introduced materials, we tried to used recycled products, such as the jarrah, and where we specified new materials we made sure they were low in embodied energy, like the new treated plantation timber cladding." Iredale says. **"We used screws instead of nails so that materials can be dismantled and reused later if need be, and we were able to recycle 90 per cent of the materials from the original house, such as stone and timber.**

"That took a lot more effort on our part," Iredale explains. "It costs about 10 per cent more to recycle building materials, because timber has to be de-nailed and bricks have to be cleaned before they can be reused."

The renovation also incorporated new water tanks for potable water, an eco-septic system, new insulation in the walls and roof and shades of white paint throughout the interiors to reflect daylight and cut down on the need for artificial lighting.

> “This part of Perth doesn’t have the cooling winds that coastal properties have, so it’s important to create as much shade as possible”

Upper level decks shade the rooms below, and the house is also protected from the harsh summer sun by a structure that encircles the house like a necklace. It’s made of bent galvanised hollow-section poles and recycled jarrah timber, which formed the cladding on the original house

The hands-on nature of this project added to the challenge, Iredale says. “Because we touched every part of the house with the renovation, we visited the construction site once a week and spent four to five hours working with the tradespeople, who were lining up to ask us questions,” he explains.

The effort that went in to creating the home has paid off for the clients, who love their new abode. “It’s like a retreat for them,” Iredale says. “They are a professional couple who work in the city, but escape to the bush every afternoon. It’s a wonderful dream for them.

“In this project we’ve reinterpreted how you might co-exist with the natural landscape,” Iredale concludes. “We didn’t want to create a fishbowl for viewing the bush, we wanted the owners to be able to see, feel and enjoy the landscape; to move up, down and deeply through the house and to richly experience its bushland setting while doing so.”

Gooseberry Hill residence

Designer **Iredale Pedersen Hook Architects**
www.iredalepedersenhook.com
Builder David King Building Services
Location Gooseberry Hill, Perth, WA
Project type New building

Photography Shannon McGrath

Sustainable features

HOT WATER
- 5.6-star Rinnai Infinity Solar 20 instantaneous gas hot water

WATER SAVING
- 100,000L Colorbond rainwater tank

PASSIVE HEATING & COOLING
- Correct placement, sizing and protection of windows to compensate for northeast orientation of house
- R2.5 polyester roof insulation and R3 polyester ceiling insulation
- Aircell Insulbreak sarking and R2.5 polyester wall insulation
- R3 wool underfloor insulation
- Recycled Jarrah sunshade to doors, windows and walls
- Shaded external areas formed by the upper level of the building
- Central spine for cross ventilation
- Louvres and openings to maximise airflow
- High-level windows for purging of hot air
- Use of existing mature trees to shade building

ACTIVE HEATING & COOLING
- Clipsal ceiling fans
- Wood-fire heater

BUILDING MATERIALS
- Plantation pine for structural framing
- Boral Evolution plywood panel cladding
- Recycled pine cladding
- Recycled jarrah decking and floorboards
- Zincalume roof sheeting
- Reuse of fixtures and materials from original house

WINDOWS & GLAZING
- Factory-tinted grey glass

LIGHTING
- Compact fluorescents and T5 linear fluorescent. Installation by Lighting Advisory Services

PAINTS, FINISHES & FLOOR COVERINGS
- Dulux EnvirO2 low-VOC white paint

OTHER ESD FEATURES
- Native garden with local drought-tolerant species
- Minimal disturbance to the site
- Eco-septic system

Lessons learned

A Brisbane couple cut no corners in their sustainable home

by Danielle Dunsmore

> We were cutting down a visually beautiful tree – but then we actually used it for something that would endure

Hot air rises into the void where it can be evacuated

Some people plan their sustainable house for years, researching materials and design. And some, like Brisbane's Keith Armstrong and Julie Dean, just leap into it.

"I've met people who had been planning their eco house for years, but we were very much learning as we went," says Julie.

"We'd just had our son, Kai," adds Keith, "and even though we were exhausted, we really needed to do more pre-planning!"

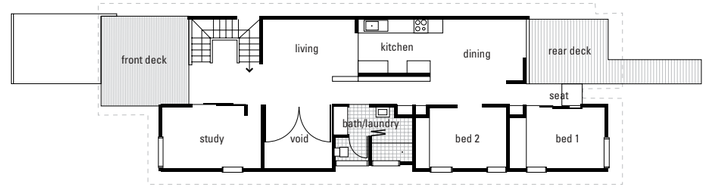
"Keith and I had developed a shared vision for what living sustainably might mean," recalls Julie. "But we were pretty naive about the whole building process!"

Through a mutual friend the couple befriended architect Jim Gall, of Gall & Medek. They found a slim block of land in leafy Bardon in Brisbane's inner west and called on Jim to design their new home.

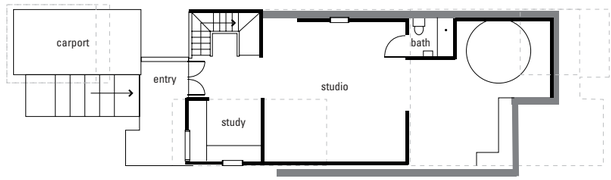
Both Keith and Julie were determined to make the home as environmentally friendly as possible, and one priority was the reduction of PVC piping throughout the house.

"The concern we had with PVC is its chemical leaching since we would be using harvested rainwater for drinking, plus the high environmental impact in its manufacture and disposal," says Julie.

"All building materials have pros and cons," says Julie. "When considering your family home, your health and your ideals about green building practices, it's a matter of trying to keep a balance between emotion and logic."



Upper level



Lower level

"In the end we settled for Zincalume, but because of its lack of strength compared to PVC, we ended up needing six feeds off the roof (to the water tanks), which all had to have first-flush diverters and leaf eaters. Plus the roof needed gutter guards. And because we wanted to drink the water, we also had to install two stages of filters as well!"

"We also had to find a plumber who could, and would, work with Zincalume. So the water system ended up being pretty expensive."

Jim explains the end result, "As the concern was with PVC, we used a polyethylene (recyclable but not biodegradable) product underground - the lesser of two evils. But all the horizontal plumbing, which hangs under the house across to the water tanks, is Zincalume."

The issue of PVC had not occurred to the pair until some of the plumbing was already installed...Hence Julie's advice on research first!

The couple also took on the massive camphor laurel tree – a declared weed – in the backyard. Following the permaculture principle to utilise what's on site, they decided to use the tree's timber in the house construction, including bench-tops and stairs.

Weed trees!

The use of the camphor laurel for timber in this building was an innovative response to an environmental problem, as camphor laurel is an invasive weed. Camphor laurel is a native to Japan, Taiwan and some parts of China, but has spread along the eastern seaboard of Australia from northern Queensland to Victoria.

If you have a plant you're unsure about check the Weeds of National Significance (WONS) website: www.weeds.org.au. Two of the many weed trees listed on the website include white teak and white cedar, which could be worth investigating for milling if you have them on your property.

More info:

www.camphorlaurel.com
www.wwf.org.au/publications/jumping_the_garden_fence/
www.vwa.org.au/des_timbmil.htm

> “Keith and I had developed a shared vision for what living sustainably might mean, but we were pretty naive about the whole building process!”

These bookshelves, made by fine artist and furniture maker Zeljko Markov, are Victorian Ash rescued from a road widening worksite

“It proved quite difficult, as it had to come down in pieces, and then we had to find someone to cut it into slabs,” remembers Keith. “Everyone just said wood-chip it! We did find someone eventually, and then we had to dry it on site for a year. And after all that, we were never really sure how it would turn out!”

“It cost around $4000 to cut down and slab, and we had to think ‘is this really worth it?’ On one hand we were cutting down a visually beautiful tree – but then we actually used it for something that would endure. We love that idea – but if we were acting purely financially it would not have made sense.

“We believe that looking at the big picture beyond simply ‘what will it cost us’ is really critical to sustainable thinking.”

To which Jim Gall adds, “A well-planned, small house can offset these costs.”

The compact garden is now home to a flock of chooks, a frog pond, permaculture plantings and a vegie garden. A back neighbour grows natives to recreate the green screening lost by cutting down the camphor laurel.

During the build, compromises did have to be made – such as truckloads of rock being removed to make room for Keith’s ground floor studio and

It can be a challenge to source a large enough batch of like recycled flooring, but in this home the problem is overcome by the selection of mixed stock recycled hardwood flooring. The results are stunning, making the floor a feature of the home

> “The building design also focussed on not building a larger home than was needed, and utilising low-cost materials”

the workshop. While moving all that rock was a definite negative, the long-term environmental plus of working from home (and not renting a studio) was indisputable.

The building design also focussed on not building a larger home than was needed, and utilising low-cost materials.

“Jim always talks about ‘minimal materials and maximal effect’,” says Keith.

Deceptively simple, Jim Gall’s design is also low tech. He uses simple materials that speak for themselves, a design that means temperatures remain relatively constant, and windows that look out onto sky and trees, not neighbours. Best of all, he has created a sustainable home for Keith, Julie and Kai to live in for decades to come.

Keith and Julie’s home will be open in this year’s Sustainable House Day held on Sunday 13th September at selected homes right across the country.

See the boxed text on p25 for more information.

Bardon residence

Designer Jim Gall, Gall & Medek Architects (collaboration with T Chambers Builders) www.gallandmedek.com.au
Builder Tony Chambers Builders
Location Bardon, Brisbane, QLD
Project type New building
Photography Rix Ryan Photography

Sustainable features

HOT WATER

- Hills evacuated tube solar collectors and Everlast stainless steel tank with electrical booster

RENEWABLE ENERGY

- 1.7kW grid-connected solar voltaic (10 x 170W capacity panels, Solarfun, SF-160-24-1M170), Fronius IG 20 inverter, sized for future expansion. Installation by Solco Choice Electric Co (www.choiceelectric.com.au)
- Origin Green 100% wind on a Green Earth electricity account

WATER SAVING

- Rainwater supply to whole of house, including drinking, with changeover of system as required to town water
- 10000L poly tank by Rotech fed by two linked stainless steel auxiliary tanks - 5100L slim and 3000L round, by Stainless Water Tanks (www.stainlesswatertanks.net.au)

- Australian made Davey (www.davey.com.au) Hs50-06l pump and Torrium controller and Flexcon PWB18V 18L pressure tank to minimise turning on and off of pump
- Rainharvesting (www.rainharvesting.com.au) Blue Mountain gutter mesh guards
- Aqua One (www.aquaoneaust.com.au) Big Blue paper pleated 5 micron whole-of-house filter
- Aqua One twin 1-micron polymicro and carbon super-block undersink filter for kitchen drinking tap
- Small roof gutters diverted to garden and frog pond
- Mechanical hot water divertor for bathroom (by Lloyd Linson-Smith of Enviro Manufacturing www.enviro.net.au)
- Dorf AAAAA rated Vand RX and Mizu 1500 low-flow tapware
- Reece Satinjet Escape 7.5L low-flow showerhead
- 2 x Caroma Profile dual-flush toilets with integrated handbasin
- Kaldewei Saniform Plus 82L small pressed steel, enamelled bath

LIGHTING

- T5 fluorescents and CFL pendants, specified by LAD (www.ladgroup.com.au)

PAINTS, FINISHES & FLOOR COVERINGS

- Organoil natural oil and Wattyl ID low VOC paint finishes
- Natural Tung oils on floorboards and external woodwork
- Sure Seal Ezy-As 1-2-3 low-VOC tile sealant to bathroom and kitchen

PASSIVE HEATING & COOLING

- House sited for maximum solar gain
- Camphor laurel vents over bedroom doors connect to main space ventilation

This home features two doorway-style cross ventilation features to capture cooling breezes

- Use of two full size doors as vents rather than entranceways

How it works: A combination of fans and design for cross ventilation are the most effective design strategies to maximise passive cooling. But to ensure their effectiveness you need to understand the regional climate, as well as any topographic and manmade features which may influence your home's microclimate. For example, if you know from which direction cooling breezes will come you'll know where to position your cross ventilation features (louvres, doorways, vents and windows). See www.bom.gov.au/climate/averages for regional climate information and the Your Home technical manual (www.yourhome.gov.au).

- Concrete slab at lower level studio for thermal mass
- Woolmen poly batts: R1.5 to walls, R3 to roof with R1 reflective foil

ACTIVE HEATING & COOLING

- Hunter Pacific Typhoon 52" reversible fans inside
- Hunter Pacific 316 marine-grade 56" fans on decks

BUILDING MATERIALS

- Boral plywood
- Finlaysons plantation pine
- Recycled Australian mixed hardwood floor from The Big Red Shed (www.thebigredshed.com.au)
- Plantation hoop pine LOSP-treated and painted weatherboards.
- Slabbed and milled camphor laurel from tree felled on property. Dried for one year on property and kiln dried for three weeks for bench tops, stair treads, stringers, and banisters
- Powerscape (www.powerscape.com.au) Touchstone 95% recycled plasterboard (made in USA)
- Zincalume pipes

WINDOWS & GLAZING

- Mix of Finlaysons Envirowood windows and bifold doors and GJ James aluminium windows and doors

OTHER ESD FEATURES

- Drought-tolerant Australian red grass lawn and public verge from www.nativeseeds.com.au
- Wheelchair accessible house

The recycling revolution

Why we love born-again timber

This fence comprises recycled old fence palings and railway sleeper cut offs

Neville Wright

Stairwell comprises recycled brushbox reclaimed from a gymnasium

Rhiannon Slatter

Long before timber certification became widespread, a growing number of people were showing they were prepared to pay a premium for quality, sustainably sourced hardwoods. These were people who bought recycled timber.

Leading the way were environmentally conscious home builders and renovators, architects and house designers. In all the timbered houses *Sanctuary* has profiled since 2003, 60 per cent used recycled timber!

Many will tell you its the story behind the timber they love – an old wool shed here, ship's ballast there. Others say they love its lived-in look.

Because it's so well seasoned, recycled timber is more stable than the kiln-dried product, and it's also possible to find in lengths and thicknesses you can't find anymore.

Of course there will never be enough recycled timber to satisfy the entire market. But in the end what does it matter? The recycling trend shows that there is a huge demand for sustainably sourced timber, and you've got to love that.

The timbers featured here are from a few of the nearly 40 houses we've profiled recently that have used recycled timber.

Resources

Australian Architectural Hardwoods
www.aahardwoods.com.au

Australian Recycled Timber
www.australianrecycledtimber.com

Bowerbird Timber
www.bowerbirdtimber.com

Thor's Hammer
www.thors.com.au

Urban Salvage
www.urbansalvage.com.au

The recycling trend shows that there is a huge demand for sustainably sourced timber

Found object: This recycled timber stairwell features a post from a burnt-down pier

Earl Carter

A room with a view

It's all plain sailing in this passive-solar house

by Fiona Negrin

Shade Sails are removed to take advantage of the warming winter sun

> "The house is wrapped up like a cocoon, there are no gaps anywhere!"

It was pure chance that brought Ian and Sue to the township of Birregurra at the foot of the Otways but their decision to buy land was anything but accidental. The acre-and-a-half block they saw advertised had fantastic north-facing access – Ian and Sue knew this would give them the opportunity to build their dream passive-solar house.

What they hadn't anticipated was the challenge of the site: with its north-south and east-west slope it seemed it would be impossible to lay a concrete foundation without serious excavation. Designer Andreas Sederof of Sunpower Design sums it up. **"We wanted to avoid hacking out of hills, because it adds costs and scars the land. The idea is to be smart, and make architecture work: to fit the land and be functional at the same time."**

A small cut was made in the ground to accommodate the east-west contour and the concrete foundation was split to fit the cut. To follow the north-south contour, the foundation for the garage was laid one metre higher than the house, with stairs leading from the garage to the house. Thanks to smart design and creative thinking, the site's primary challenge was successfully integrated into the finished home.

> “I’m very proud of the feeling of the building and the way it nestles into the land”

Nestling the house into the landscape helps protect it from the chilling winter winds, which pass over the house, rather than through it

“I’m very proud of the feeling of the building and the way it nestles into the land,” says Andreas. **‘Nestling’ the house into its site has had the further advantage of buffering it from the chilling winter winds typical of the region, which now pass over the house rather than through it.**

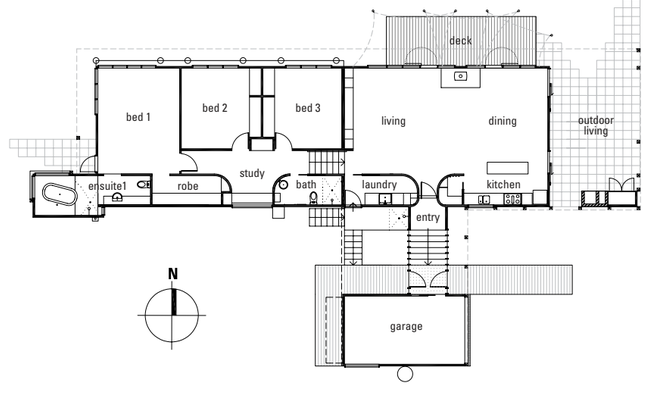
Ian and Sue plan to retire to Birregurra but at present they divide their time between the town and Melbourne. For that reason, they chose a waste management system suitable for intermittent use. It turns their waste water, including blackwater, into greywater suitable for use on the garden.

Sue is very excited about the system and appreciates its low maintenance. “It has a lot of appeal for a holiday house.” She says their greywater is easily sufficient to irrigate the garden which, although in its infancy, is based on permaculture principles. A vegetable plot is planted near the house, with an orchard planned a little further away. Local *Eucalyptus tricarpa* line the driveway, with olive trees, native grasses and shrubs planted on the slopes.

The house is a sterling performer in terms of energy efficiency, rating 43 points on Sustainability Victoria’s First Rate house rating scale. (A Five Star house is equivalent to 19 points.) “The house is wrapped up like a cocoon, there are no gaps anywhere!” remarks Sue. All doors and windows are double glazed and walls and ceilings are insulated. External blinds over north- and west-facing windows can be lowered during summer and **Ian notes that during last summer’s notorious heatwave, “it was 29 degrees inside when it was 47 degrees outside”.** Twelve solar panels generate electricity and hot water is provided via an evacuated tube solar collector with a gas booster.

All materials, fittings and appliances were sourced with sustainability in mind: internal and external timbers were either recycled or from

External blinds keep the summer heat from this north-facing room with a view



Plantation plywood lines the cupboards and the benchtop is made from reconstituted stone

plantations; the furniture is second-hand; and light fittings and appliances are energy and water efficient with at least AAA or 4.5 star ratings. "We consciously chose a small dishwasher," Sue offers by way of example. "We've had 12 people over for dinner and it's big enough."

Aside from the prudent choice of materials, fittings and appliances, it's the layout of the house itself that is conserving energy. "This house is so liveable, and it's partly down to the simple design," says Sue. **All the utility rooms (the laundry, kitchen and bathrooms) are down the south side and all the living areas face north.** The north-facing rooms receive the benefit of light and sun year-round, the heat of which is stored in the concrete foundation and released slowly over the course of the day. A slow combustion wood stove and gas heater offer heating options in winter, but the couple don't anticipate they'll need to use very much of either.

"On a really cold night you don't need the heater on," says Ian. "The slab and double glazing combination means the house is lovely and warm in winter and cool in summer. The house actually works, it's not just theory."

The windows in this house open onto panoramic views over the Birregurra township and surrounding rural landscape which includes Mt Gellibrand in the distance. **Andreas says that windows are the soul of a building.** "The windows are one of the highlights of this home, and what you want, inevitably, is to sit there." He pauses, searching for the right words. "They create an incredible sense of space and ambience. It speaks to that part of our spirit that gets neglected in our fast, modern lifestyle." Sue and Ian echo this sentiment in their own words. "It is so relaxing here," says Sue. "You could just sit here and look at the view forever."

Birregurra residence

Designers Ryan Strating, Andreas & Judy Sederof of Sunpower Design
www.sunpowerdesign.com.au
Builder Henry Bongers
Location Birregurra, VIC
Project type New building

Photography Rhiannon Slatter Photography

Sustainable features

HOT WATER
- Apricus evacuated tube solar hot water system
- Readyhot recirculation system to minimise water usage

RENEWABLE ENERGY
- Grid interactive 12 x 165 W BP Solar panels (1.98 kW)

WATER SAVING
- Water efficient fixtures and appliances throughout
- Water tanks with 47,000L capacity
- Biolytix waste water system (www.biolytix.com)

  How it works: The Australian-designed Biolytix treatment plant is an underground tank that turns waste water from the kitchen, toilet, bathroom and laundry into greywater using a combination of charcoal filters, netting, microbes and worms. The greywater feeds into the garden through a network of underground pipes. Systems cost between $6,920 and $7,439, not including installation or freight costs.

PASSIVE HEATING & COOLING
- Concrete slab throughout house
- Aircell insulation batts with DuPont's Tyvek HomeWrap and R4 polyester in ceiling
- Adjustable external blinds on west and north windows.

ACTIVE HEATING & COOLING
- Ceiling fans to circulate air on hot summer days
- Kemlan slow combustion wood heater (Tempo Stack model)
- Rinnai gas heater used for short boosts in winter

BUILDING MATERIALS
- Smorgon ARC steel with a recycled component
- Ecoblend cement containing a minimum of 30% flyash or ground slag
- Silvertop cladding and decking boards from Radial Timber Sales (www.radialtimbers.com.au). The timber is milled by a radial sawing process which maximises the recovery of sawn timber
- Austral Plywood (www.australply.com.au) hoop pine from plantation sources

WINDOWS & GLAZING
- Double glazed windows and doors.

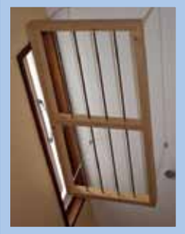
  Large windows impact negatively on the insulation value of walls, so if you're thinking of using big windows in a newbuild or renovation you should consider double glazing in order to achieve a high house energy rating

LIGHTING
- Energy efficient lighting by Cosmoluce

PAINTS, FINISHES & FLOOR COVERINGS
- Recycled karri internal architraves and spotted gum floors
- Wattyl I.D. environmental paint

Sunpower Design

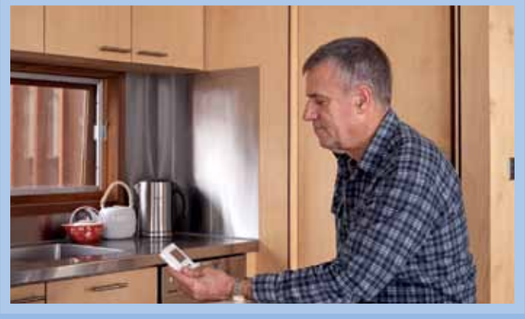
OTHER ESD FEATURES



Sunpower Design

- Clothes drying rack which can be elevated to take advantage of the warm air near the ceiling
- Seals on all windows and doors
- Velux skylights (2 x 550 x 980mm) with high performance double glazing and photochromatic glass www.velux.com.au
- Ace leaf diverters to all downpipes www.acegutters.com.au
- Exhaust fans with backdraft inhibitors
- Franke Australia sorter kitchen recycling bin
- Caesar Stone reconstituted stone bench top

Franke Australia



Rhiannon Slatter

Ian uses a BP Solar Sight remote monitor, a gadget that measures the house's energy output

Green Renovators Bathroom Guide

Part 2: Taking care of business

Neville Wright

For this second instalment of our Bathroom Renovators Guide we take you behind the scenes to the business end of the bathroom.

Conventional systems

Toilets are big water guzzlers, using up to 20 per cent of household water, so a water-efficient dual-flush model is an obvious choice. But how do you wade through the many options on the market? The government's WELS (Water Efficiency Labelling and Standards Scheme; www.waterrating.gov.au) compares and rates a range of products for water efficiency, including toilets.

"Best practice" toilets with the lowest water consumption achieve a five-star rating, which means they average three litres or less per flush. Caroma's integrated hand basin model is one of the few models on the market that achieve this rating.

There are more options in the four-star range, with water consumption averaging between 3.1 litres and 3.5 litres per flush. Most 4.5/3 litre toilets are in this range.

Non-conventional systems

Waterless urinals are worth considering if your household has a few males in it. Most of the models on the market work by the use of biodegradable, deodorising cubes which contain microbes that neutralise the bacteria growth that causes odours. Models include the Caroma H2Zero (RRP $1512) and the Desert Eco System (www.desert.com.au).

If you want to treat and reuse blackwater onsite your choices are basically a blackwater treatment system or a composting toilet.

There are a number of blackwater treatment systems on the market. Some operate by an aerobic system, employing biological filters and pumps to aerate the wastewater. Others employ disinfection processes like chlorine or UV. Others just use worms. All these systems have the advantage that the water can be reused onsite after treatment, though in most states and territories the water can only be used for garden irrigation.

The great majority of blackwater treatment systems are installed in unsewered areas in rural Australia, however there are an increasing number of people wanting to install them in urban (sewered) areas. In Victoria it is illegal to install a blackwater treatment system in a sewered area, but regulations differ state by state. Michael Mobbs, author of *Sustainable House*, had a system installed in his own innercity house in Sydney in 1996. Since then he has consulted for a number of residential systems, including installations in Turramurra and Concord in Sydney. His website (www.sustainablehouse.com.au) details the processes you need to go through to get a system approved.

Be mindful, though, that regulatory bodies approve blackwater treatment systems only occasionally, and with good reason. All systems need regular maintenance and servicing to run effectively and to minimise the risk of environmental damage by below-standard effluent. If you sell your house the new owners might not be as committed as you were to servicing the system.

Do your homework before you commit to a system. Don't be fooled into choosing a system just because it has the cheapest purchase price: the sting could come during its operation. Note also that costs may vary significantly depending on climate, location, installation requirements and number of persons using the toilet.

A composting toilet works by an aerated "dry" pile system. Some systems have excess moisture removed by forced ventilation, while others will only include a fan to eliminate odours. With composting toilet systems compost can be safely used on the garden after six to 12 months, providing it is buried about 30cm below the surface and not used on any plants that will be consumed by humans.

The design, construction and performance of composting toilets in Australia and New Zealand is governed by an Australian Standard. In NSW, the Department of Health provides health-related guidelines for the various systems, while local councils actually authorise use in residential households through the development approval processes. In Victoria dry composting toilets can be installed in sewered areas.

Caroma's Profile Toilet Suite with integrated hand basin uses the water twice. First you wash your hands in the sink, then the water washes down the plug hole and fills the toilet cistern. It's a five-star system with 4.5/3L water consumption. RRP $712

Caroma's H2Zero waterless urinal

To see which systems can be installed in your state see the following websites

VIC: www.epa.vic.gov.au

NSW: www.health.nsw.gov.au

QLD: www.dip.qld.gov.au

SA: www.health.sa.gov.au

TAS: www.wst.tas.gov.au/industries/plumbing/waste_water

WA: www.public.health.wa.gov.au

NT: www.health.nt.gov.au

Self-contained hidden chamber of a composting toilet system

Nature Loo

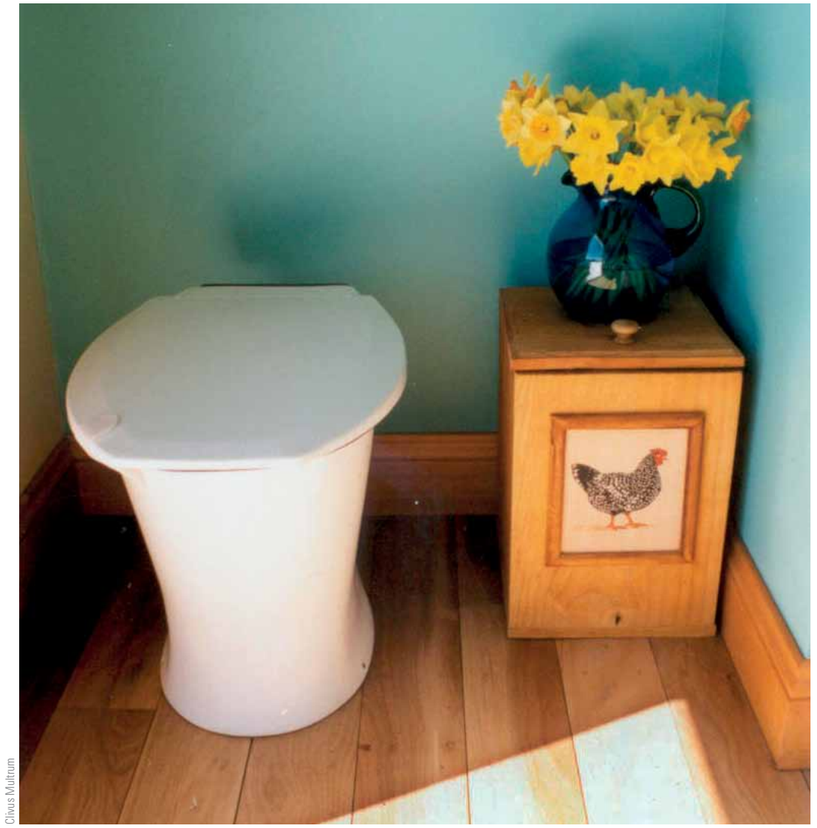
Fans

Any toilet, no matter what the system, will need good ventilation, so efficient fans are a must. Many people forget about exhaust fans when insulating their home, though. An unsealed exhaust fan in your bathroom will cause heat loss and drafts. Make sure you get a self-sealing fan, such as Clipsal's TopHat or one from the Universal Fans range. If you are retrofitting you can buy a product such as the DraftStoppa ($35; www.draftstoppa.com.au), which will stop air from entering the bathroom via the exhaust fan.

A DraftStoppa connects to your existing ceiling exhaust fan. When you turn the fan on the shutters open, when you turn the fan off they close.

You cannot use conventional toilet pans with composting toilets, but there are ceramic and fiberglass models on the market that resemble conventional pans. Composting toilet systems require space under the toilet, either below ground or in a self-contained chamber.

Nature Loo



Clivus Multrum

Popular blackwater and composting toilet systems

Supplier	Type of system	Purchase Price (ex. delivery & installation)	Operational cost	Permitted in urban environments?
Nature Loo (www.nature-loo.com.au)	Composting	From $2090	<$100 p.a.	Yes, depending on the state
Clivus Multrum (www.clivusmultrum.com.au)	Composting	Tank systems from $3700, smaller systems from $1900	<$100 p.a.	Occasionally
Ozzi Kleen (www.ozzikleen.com)	Aerated blackwater treatment	from $5,700	Quarterly servicing required	Generally not
Biolytix (www.biolytix.com)	Aerobic wet composting blackwater treatment	From $8000	Once-yearly servicing (approx. $350)	Generally not

Back to basics

A Melbourne renovation gets the fundamentals right

By Verity Campbell

Rhiannon Slatter

> “We used recycled floorboards for the kitchen cupboards. I love the nail holes and marks of prior life the timber has. It gives the kitchen character”

Shania Shegedyn

An adult violinist and four junior musicians were five very good reasons to improve insulation and keep the peace in the Oleinikov house. The other reasons were less to do with maintaining family harmony, but just as compelling.

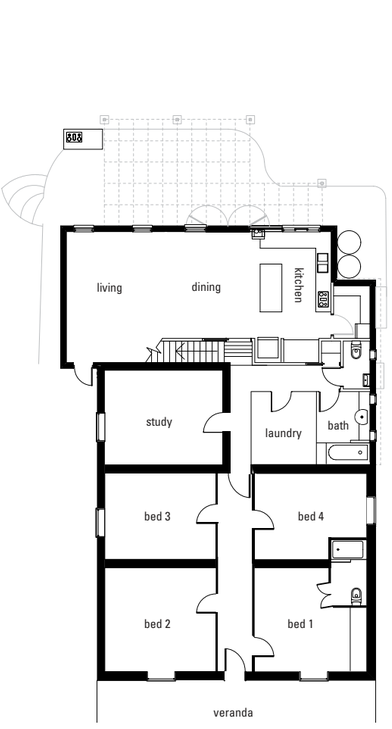
The gorgeous double-fronted bluestone home in Melbourne’s inner-city suburb of Northcote needed expanding. It was also time to introduce the slate-roofed, light-deprived Victorian abode to the 21st century – with the proviso that its heritage character be preserved.

Says Judy Oleinikov, “Like many, we started our sustainability journey small, while finding more information about greywater recycling systems some years ago.

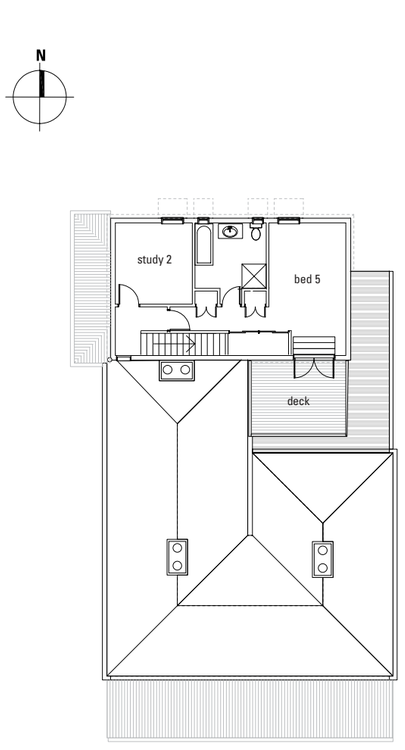
“Over the years our knowledge about sustainability grew with the knowledge that we wanted to try to make a difference to climate change, so by the time we came to renovating our house we knew a sustainable renovation was a certainty.”

The Oleinikovs were attracted to Construction Queen’s no-fuss attitude to sustainable

Shania Shegedyn



Lower level



Upper level

renovating. "There's a movement of Australians wanting to live more sustainably, which is fantastic," says Paula from Construction Queen. "But we've still got a long way to go. We need to be thinking about house size, the embodied energy in manufacture and transportation of materials, and also behavioural patterns in how we live – where we work, how we travel, how we spend our time together.

"A lot of people we talk to say they can't afford to build or renovate sustainably," she adds. "My answer is simple: concentrate on the shell of your home before you look at the big ticket items such as solar power. **Get the shell right first: improve insulation, ventilation, shading and glazing. These are what makes the difference between good and bad design, these are what will make the most difference to your quality of life. And it doesn't cost much more to get these basics right.**"

The Oleinikov's renovation was a classic passive solar affair. **"One of the simplest but**

> A lot of people we talk to say they can't afford to build or renovate sustainably. My answer is simple: concentrate on the shell of your home before you look at the big ticket items such as solar power

Shanna Shegedyn

Carpeting a room with an environmentally friendly carpet such as wool or jute is one of the most efficient insulation strategies you can undertake. If you do choose floorboards, make sure you insulate them to improve their insulative efficiency

Rhiannon Slatter

Reorienting the home so that the living spaces face north was simple yet it made a huge difference to the livability and environmental performance of the home

most important things we did was to reorient our living spaces to the north side of our block," says Judy. "Our laundry and bathroom used to be on the sunny side of the house. Now our living spaces are. Not only do we find we enjoy the living spaces more, but they're warmer and much lighter. No need to turn on lights during the day anymore."

They improved wall and ceiling insulation, installed double glazing and thick curtains, and stopped draughts. They got the basics so right that despite installing wall-mounted heaters they weren't needed at all in their first winter. "It's so warm upstairs that the temperature rarely falls below 19ºC, even in winter!" says Judy.

They also improved cross ventilation, laid a concrete slab for thermal mass in the extension, installed low-wattage lighting, used low-toxic finishes and paints and put in a 5000L rainwater tank for the garden.

"One of the biggest challenges," says Judy, "was sourcing the recycled timber used in the

Rhiannon Slatter

This south-facing terrace features recycled karri for the decking, and recycled oregon for the balustrade. It's also a lovely, quiet space to sit

Rhiannon Slatter

floors, shutters and kitchen cupboards. It took ages to find the amount of timber we needed, and in the end we had to wait a while for the right batch to come in. But it was worth it. We used recycled floorboards for the kitchen cupboards. I love the nail holes and marks of prior life the timber has. It gives the kitchen character."

The six person household produces a large amount of waste water and Judy and Igor were keen to reuse as much of the water as possible. "One of the most important things in this renovation was to install the greywater system we'd wanted all those years ago." They chose a 1000L Nubian Oasis system that treats and stores all their greywater.

So did they get the basics right? Bills are down, despite the floor plan of the house almost doubling, so the answer is yes. In addition they have lively chooks roaming the sunny yard, a gorgeous grapevine-covered trellis, a sun-drenched roof garden on which to enjoy a quiet read...and that all-important sound proofing in the bedrooms.

Northcote residence

Designer **Construction Queen** www.constructionqueen.com
Builder Nexus Design Homes
Location Northcote, Melbourne, VIC
Project type Addition
Cost $400,000

Photography Rhiannon Slatter and Shania Shegedyn

Shania Shegedyn

Sustainable features

HOT WATER

- Gas-boosted combined solar hot water and hydronic heating system comprising 30 evacuated tubes. Apricus (www.apricus.com.au) system with Ollin heat exchange boiler

Rhiannon Slatter

RENEWABLE ENERGY

- GreenPower

WATER SAVING

- Tankmasta Bagel 5,000L underground rainwater storage for garden
- Nubian (www.nubian.com.au) Oasis greywater treatment system. Treats greywater to class A standard for reuse in toilet flushing and subsurface garden watering
- Low-flow fixtures and fittings: Newport 3/3.5L toilet suites, Grohe showerheads, Blanco sink mixer

Rhiannon Slatter

PASSIVE HEATING & COOLING

- Concrete slab for thermal mass combined with passive solar design
- Pergola with deciduous vine to shade the northern glazed doors and building fabric
- Awnings, eaves and shutters to first-floor windows
- R3.5 Autex Greenstuff polyester batts and Aircell Retroshield to roof, R2 polyester batts and Aircell to walls
- Doors and windows placed for north-south cross ventilation in summer

Rhiannon Slatter

- Openable window at the top of the stairs with ceiling fans to assist in cooling and to purge summer heat at night

ACTIVE HEATING & COOLING

- Hydronic system allows individual control of Biasi wall mounted panels for localised heating. Preheat by solar hot water system
- Airflow ceiling fans

BUILDING MATERIALS

- Hebel PowerPanel insulating AAC (Autoclaved Aerated Concrete) panels to upper floor walls
- Concrete slab incorporates 20% recycled concrete plus flyash
- Secondhand timbers: recycled karri for kitchen and bathroom joinery, balcony decking, inset flooring, stair handrail and capping; recycled Oregon for shutters and balcony balustrade; recycled Tasmanian oak and Baltic pine ground floor floorboards. From Urban Salvage (www.urbansalvage.com.au)
- Cypress macrocarpa timber to pergola and awnings, salvaged from redundant windbreaks. From Bowerbird Timbers (www.bowerbirdtimber.com)

PINE VENEER DOORS

- Structural framing uses minimal hardwood through the use of laminated veneer lumbers (LVL) and Mitek Posi-Struts
- Recycled bricks for ground floor external walls, from demolition of previous house
- Locally sourced stone for rear patio landscaping and retaining walls

WINDOWS & GLAZING

- All windows and external doors double glazed, finger jointed pine construction. By Canterbury Windows (www.canterburywindows.com.au)

LIGHTING

- CFLs throughout: Pendants to living areas and bedrooms; Gentech recessed compact fluorescent downlights in kitchen and bathrooms; Megaman recessed compact fluorescent lighting to hallways, laundry, toilet

PAINTS, FINISHES & FLOOR COVERINGS

- Wattyl ID low VOC paints
- Intergrain (exterior) and Bonatech Traffic (interior) water-based timber sealers

OTHER ESD FEATURES

- All external doors and windows draft sealed
- All exhaust fans self closing

Bay views

The hard work payed off in this green dream home built by owner builders

By Gabi Mocatta

“Mike was the artist who designed what I had to try and paint. My challenge – as a first time builder – was to get things to a standard that would live up to his vision”

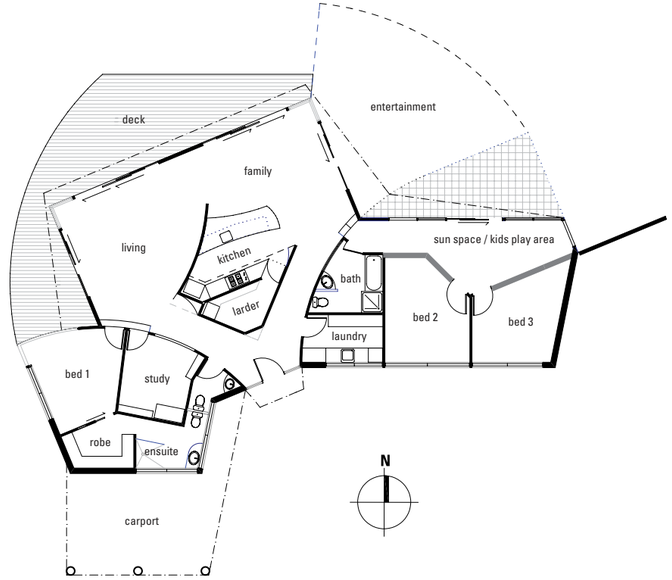
> We lived for the first three years with only a small electric heater… When we had snow on the ground outside, it was 14 degrees in here

Views over to Geilston Bay from the deck are sublime, and the huge double-glazed windows help the winter warmth from the northerly aspect stay in the home

When you build a house with your own hands, it's something you live and breathe for months, or even years, on end. You know every detail – each decision, measurement, inspiration or mistake – and you remember the whole process from design to completion. Such is the experience of owner-builders Steve and Karina Dine, who built their home in the northern reaches of Hobart, overlooking Geilston Bay.

When Steve and Karina first started looking for someone to design their home, they knew exactly what they were after. "We wanted a contemporary passive solar house that would be as environmentally sensitive as it was ageless and timeless," says Steve.

The Dines found Mike Cleaver of Clever Design, and the team soon set to work. The couple arrived at their first meeting with the designer well prepared, with a scrapbook of ideas. "Mike immediately understood the kind of home we wanted," says Steve. The design agreed upon, designer and owner-builder worked in close consultation. "You could say Mike was the artist who designed what I had to try and paint," Steve explains. "My challenge – as a first time builder – was to get things to a standard that would live up to his vision."



The compressed earth bricks on the southern entry side of house are a striking feature

One of the first things Steve and Karina found when building their own home was that the onus is on the owner-builder to source building materials, products and furnishings. And sourcing sustainable building materials, products and furnishings takes extra research. But the ground work paid off as the couple found they had saved thousands of dollars by getting a range of quotes on everything from timber framing to lighting to floor tiles, while fulfilling their brief to build an environmentally friendly home.

Slowly, if sporadically, the house began to take shape in its hilltop forest setting. Steve is a police officer and his shift work allowed him to do plenty of building in his free time, working sometimes with an apprentice builder, but mostly on his own.

The house that emerged is a north facing, two wing design, with three bedrooms and timber framing. The home's bedrooms are arranged around the central living area, so that at bedtime in winter the bedroom doors can be thrown open to let in the heat from the living room.

The home's passive solar design is the greatest reason for its success. The home faces directly north and its eave widths and angles are calculated exactly so that in winter the interior is sun-

Owner builders

Increasing numbers of people are thinking of DIY (do-it-yourself) building. DIY building requires a great deal of determination, time and skills. Although Steve had no formal building training, his experience as a 'high end handyman' had included numerous kitchen renovations and he was the kind of person who enjoys studying the nuts and bolts of how houses are put together. He kitted out his tool supply before setting to work.

According to Karina, "Building is not for the faint hearted. It adds enormous stress to any relationship but the pride and satisfaction in the finished product is much like the pride you have in a child – something you created that has turned out so well." She adds, "I would recommend that anyone contemplating this journey takes photos and writes a journal of the experience. We took pictures of the house throughout the process and have a power point that shows the house springing up from the ground. One of the most rewarding outcomes is to have people admire our house, achieving the wow factor we were after."

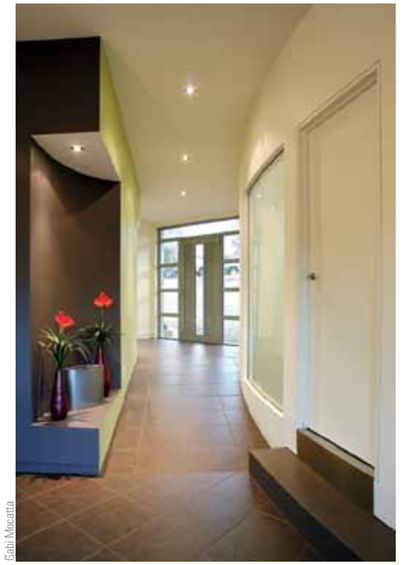
More info:

www.theownerbuilder.com.au
www.ownerbuild.com.au

Entry via one of the curved dual ramps. The concealed larder and kitchen are positioned in the heart of the home

Gabi Mocatta

Gabi Mocatta



Gabi Mocatta

Stainless steel work-top benches can be a good environmental choice for their longevity and recyclability

washed, while being shaded in the hottest hours of a summer day. A substantial concrete slab floor retains the winter heat from the sun, along with the internal thermal storage walls.

The temperature inside the home is also kept constant by extensive insulation. **The timber stud walls are insulated with rendered polystyrene sheeting. There is also double-thickness polystyrene insulation under the suspended section of the slab together with slab perimeter insulation.** Both walls and roof have fibreglass batt insulation and the home is double-glazed throughout, except for the butt joined corner windows and the windows in the master bedroom which are single glazed with high performance Low E glazing.

With such energy efficiency, the home has had little need for heating. "We lived for the first three years with only a small electric heater," says Karina. "When we had snow on the ground outside, it was 14 degrees in here. Eventually we decided we wanted to keep things cosier on the coldest winter days". They installed a reverse cycle floor-mounted airconditioner in the living room, which is an energy efficient choice for winter heating.

To complete the suite of environmental credentials, the home collects its own rainwater, has low-flow water efficient appliances in the kitchen, bathroom and laundry, heats its hot water with solar energy and has an aerobic waste water system that treats kitchen and bathroom waste.

The design was intended to produce a comfortable, liveable family home – and for the owners that's exactly what this house is. "We've had 35 people here for lunch on Christmas day, with people spilling out onto the deck," says Karina. "We also live close to nature here: we have parrots in the trees and wallabies are regular visitors. It's everything you would wish a home to be – as well as being environmentally responsible."

For Steve, building his own home was the dream of a lifetime, and to have been able to make his dream home a sustainable one only enhanced that pleasure. "There's been a great deal of attention to detail over the whole project," says Steve, "and that gives you an end product that you can really be proud of." To know that his home is also being kind to the environment only enhances that sense of satisfaction and achievement.

Geilson Bay residence

Designer **Mike Cleaver** www.cleverdesign.com.au
Builder Steve Dine (owner-builder)
Location Geilston Bay, Hobart, TAS
Project type New building
Cost $495,000

Photography Richard Eastwood and Gabi Mocatta

Sustainable features

HOT WATER

Gabi Mocatta

- Solarhart 300L solar hot water system with electric booster

WATER SAVING

- 2 x Pinecrest poly tanks (42,000L total) rainwater storage
- Small Pinecrest header tank (1000L) under house with Grundfos automated pump system to rainwater storage tanks
- Linea dual flush toilets
- LG front-loading washing machine

  Front loading washing machines are usually the best bet when it comes to water effiency, however one of the downsides can be detergent residue left on clothes. Choice published a study reviewing washing machines and looked into ways to reduce residue. To help with the problem they recommend using quality liquid detergents or reducing the amount of powder detergent and ensuring it is kept in airtight containers. See www.choice.com.au
- Water saving showerheads throughout
- Ozzi Kleen (www.ozzikleen.com) aerated wastewater treatment system for grey and black water

PASSIVE HEATING & COOLING

- 300mm thickened concrete slabs with side insulation throughout of 25mm high density polystyrene. Under suspended section of slab there is 100mm of polystyrene insulation supplied by Prime Industries.

  While an insulated concrete slab built directly on the ground is best practice environmentally, if you're going to suspend a slab, to make the most of the its thermal mass, make sure the suspended part is insulated as well. Side insulation of slabs is critical in cold climates despite it being often overlooked.
- ACI Pinkbatt insulation in roof (R3.7) and wall (R1.5)
- Selected internal walls used as thermal mass (solid bricks by Besser)
- Eave widths and angles tailored to optimise sun according to passive solar principles
- Windows and doors located to maximise flow-through ventilation

ACTIVE HEATING & COOLING

- 6kW reverse cycle Daikin floor-mounted airconditioner installed for occasional use in winter

BUILDING MATERIALS

- Koolwall (manufactured by Active Building Systems, distributed by Access Solutions) polystyrene cladding system
- Bluescope Colorbond roof – Shale Grey with Deep Ocean trim
- Compressed earth blocks on south side of house

WINDOWS & GLAZING

- Double glazed throughout with 10mm air gap except for butt joined corner windows and windows in master bedroom. Manufactured by Architectural Windows using Fairview Aluminium Frames. Low-E glass on butt joins

LIGHTING

- Internal Skylights by Velux (double glazed, argon filled)

PAINTS, FINISHES & FLOOR COVERINGS

- Dulux low emission paint
- Large format tiles throughout for less cleaning (lower use of cleaning solutions required) and reduced grouting

- Wool carpet in bedrooms

OTHER ESD FEATURES

- Independent fire pump (Davey 5hp with 90 metres of canvas hose) and custom built perimeter sprinkler system for bushfire protection