

MODERN GREEN HOMES Sanctuary

INSIDE ISSUE 21 110+ green products & design tips; Greener building blocks; Kevin McCloud; Phase change materials; Design Workshop: free advice on your home plans

INSIDE OUT, OUTSIDE IN CONNECTED HOMES, ENRICHING GARDENS

Green your roof

Bushfire resilient design

Energy ratings explained

Design Word with
Kevin McCloud

ISSUE 21 • AU\$11.95 • NZ\$10.95
SANCTUARYMAGAZINE.ORG.AU

ISSN 1833-3416



9 771833 141000

WIN
A washing machine
from V-Zug

*Australian residents only. Entries close 30 Nov 2012.

MODERN GREEN HOMES Sanctuary

Contents —Issue 21



HOUSE PROFILES

14 Present to the past

A light-filled extension connects a Melbourne family to their history, environment and the character of the home they've loved since they first walked through the door.

22 Well connected

An interactive beachside Sydney home blends cutting edge technology with innovative design and committed owners to place it in the green zone.

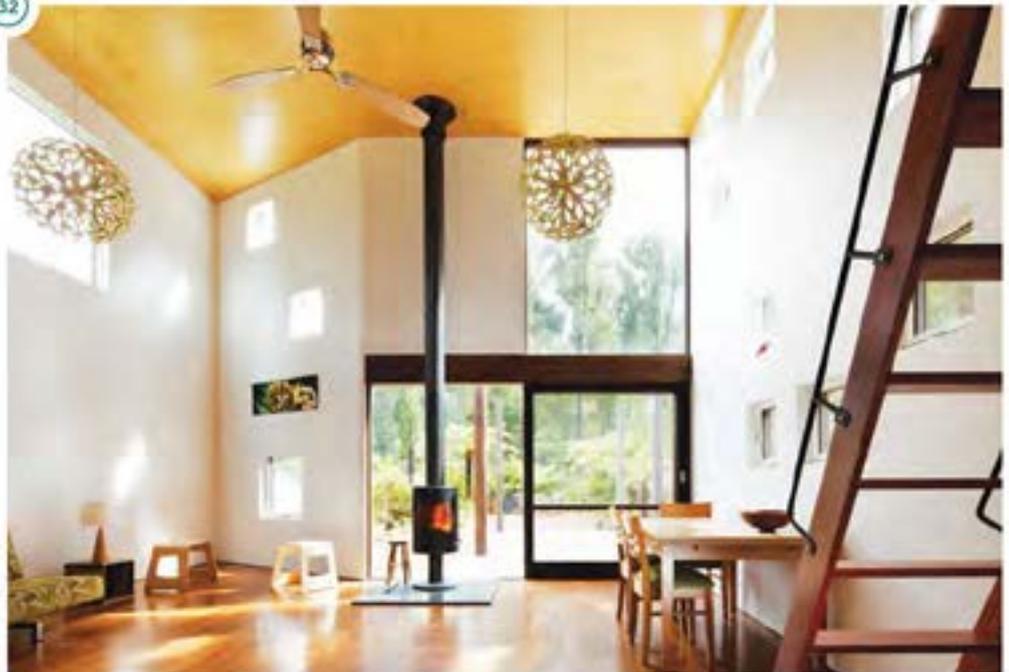
32 Resilient rebuild

A committed team rebuilds a weekender destroyed in the 2009 Victorian bushfires. The result is an energy efficient home away from home with a small footprint, increased fire resistance and strong connections to the bush.

50 Modern infill

This Perth extension is a light, open and thoughtful response to the need for space in our ever-sprawling cities.

32



14



50



22





DESIGN WORD

48

Greener grand designs

Grand Designs host Kevin McCloud speaks to Sarah Robertson about valuing the energy invested in every well-designed thing.



FOCUS

58

Creative sanctuary

A studio and gallery space sits lightly next to a secluded lagoon in the Northern Territory.



PRODUCT PROFILE

72

Greener building blocks

Jo Isaac looks at some of the materials, bricks and blocks available for your new build.



DESIGN WORKSHOP

42

Coastal tree change

A growing family is moving from the city to the bush and beachside town of Otford, New South Wales. Architect Graham Hunt takes a look at their plans to see how they can make the most of the sun and site.



OUTDOORS

64

Earthy enrichment

Brisbane architect Emma Scragg sets to work learning about organic gardening. She shares some of what she learnt along the way.

68

Green roofs

Beyond simple aesthetics, green roofs and vertical gardens reduce household energy demand, cool cities and provide habitats for native species.



DESIGN MATTERS

78

Energy ratings

How sustainable is a star-rated home? Sid Thoo puts green building rating systems currently used in Australia under the microscope.

84

Phase change materials

Our regular columnist, Dick Clarke, looks at the latest in thermal building products – phase change materials.

REGULARS

10

Reviews

12

In the post

77

The ATA

83

Subscribe

86

Products

90

Marketplace

95

Ask our experts

48



58



68



Reviews

—Books, apps, websites and other interesting stuff

BOOKS

If you have recommendations for books, smart phone apps, blogs, websites or anything else you think would be of interest we'd love to hear from you. Email us at sanctuary@ata.org.au



AUSTRALIAN PLANTING DESIGN

Paul Thompson
CSIRO April 2012
\$39.95

Australian native plants are celebrated for their ability to create beautifully-designed garden spaces in Paul Thompson's new book. Thompson outlines how native plants affect the space, light, texture and style of a garden and gives site-specific solutions and example designs. Plants are chosen for their growing characteristics, good looks and for the roles they play in the surrounding ecosystem – drawing connections to natural elements such as soils, habitat and fire. Handy plant lists and personal anecdotes make this a good practical manual on how to grow and look after Australian plants in home gardens.



TOWARDS ZERO ENERGY ARCHITECTURE

Mary Guzowski
Laurence King 2012
\$39.95

Building design informed by the environment allows inhabitants to interact with the changing qualities of the day at the same time as reducing the energy use of the building. This book raises the bar for zero energy architecture, showing you how to rise to the challenge and why. International case studies include detailed design and architectural notes (with building specifications), seasonal wind maps, sun path diagrams and climate data. Written for architecture and design professionals, the book is also accessible to the amateur thanks to its clearly written content and accessible design.

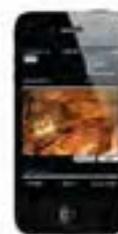
APPS



ENERGY SAVER (IPHONE & ANDROID)

www.products.rajorganization.com/apps/energy/energysaver; \$2.99

This simple app breaks down where you use electricity in your home. Enter the wattage of your appliances, along with details from your energy bills, and the app will tell you where your money is going.



THE SOUND OF BUILDINGS VOL 2 (IPHONE)

www.o-f-g-d.com; free

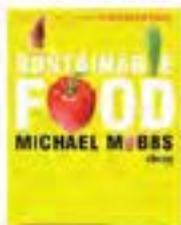
Take an audio tour of architecture in Melbourne courtesy of this app by the Office of Good Design. Listen to stories told by designers, architects, inhabitants and historians as they share insights and knowledge about Melbourne's most interesting buildings. Featured buildings include the Royal Children's Hospital, Flinders Street Station and the Old Treasury Building.



WHY SHRINK-WRAP A CUCUMBER?

Laurel Miller & Stephen Aldridge
Laurence King 2012
\$49.95

Design steps in to reduce our carbon and landfill footprint by tackling packaging. It's a worthy subject; not only does packaging use loads of energy to produce, it can really stick around. Just take the average plastic bag that takes 100 to 800 years to break down. This book presents the whole story of packaging and the reasons for sustainable packaging, including climate science, legislation, materials and the technical aspects of recycling and reuse. It also steers consumers and producers towards better packaging with examples of elegant, stylish and creative solutions.



SUSTAINABLE FOOD

Michael Mobbs
NewSouth Publishing 2012
\$45.00

Live in a city and like food? Well, you can grow your own, and in doing so make the world more delicious, liveable and community focused. This book is very likeable. It's colourful, chatty and comes from someone who's been involved in creating sustainable urban housing and food systems for years. The stories included are practical and focused on what is possible and what has already been achieved on streets just like yours. A very useful guide and one that takes us a little closer toward urban food security.



WEBSITES



CERES PERMACULTURE NURSERY BUSHFOOD CATALOGUE

www.ceres.org.au/nursery/bushfoodcatalogue.html

This website has a great list of Australian native bushfoods, good for anyone wanting to plant an edible native. The list includes species names and what part of the plant is eaten – and while you are there, take a look at the nursery's herb list.

Image: *Acacia pycnantha*, courtesy Tatiana Gerus.



FREecycle

www.freecycle.org/group/au

Freecycle is a grassroots, not-for-profit movement of people giving away unwanted items for free. Building materials do appear on the list, especially bricks and pavers. Sign up to your local list to see what people are putting out there to be taken away. The list does generate a lot of emails, so be warned!



DID YOU KNOW?



Up to 60 per cent of water in an average home is used outside.

Minimising paved areas in your garden will limit heat radiation and water run-off from the site.

Reducing your lawn area is the best way to save water as lawns can account for up to 90 per cent of water used in gardens.

Some Australian native grasses are deep rooted, giving them drought tolerance and resilience compared to introduced lawn species.

Planting native plants will provide a habitat for birds and insects, which can then aid in pest control and pollination.

Sources: Australian Planting Design, Your Home, Greening Australia.
Image: *Glycine clandestina*, courtesy of John Tann.



Homeowners Melissa and Rafael incorporated as many second-hand materials into their Melbourne extension as possible, including the pivot doors pictured above. Red bricks from the partial demolition were reused in the extension and appear as paving outside the back door.



Present to the past

A light-filled extension connects a Melbourne family to their history, environment and the character of the home they've loved since they first walked through the door.

WORDS Sasha Shtargot
PHOTOGRAPHY Erica Lauthier

RENOVATIONS ARE OFTEN ABOUT LEAVING THE OLD behind for a bright, new look. In the process, much of what gives a home its character can be lost. Not so when Melissa Abrahams and Rafael Epstein decided to extend their house in the Melbourne suburb of Balaclava. Reusing materials was central to the couple's plans for their semi-detached Queen Anne-style house – not just for environmental reasons, but as a way to enjoy and connect with history.

They fell in love with the place as soon as they walked through the front door in 2002, says Melissa. An attraction of its feel and architecture was the ornate pressed metal ceilings. However, the couple realised the house needed a makeover to bring more light and space inside and to connect the internal spaces with their backyard.

Typical for the period in which it was built, a corridor acts as the building's spine, with three bedrooms leading off on one side. The corridor ends in a living room. In the original design, the living room connected to a bathroom and lean-to kitchen with a small dining area. This effectively blocked the relationship between the house and the backyard, which could only be accessed through a door on one side of the kitchen.

The renovation involved demolishing the back of the house and adding a large and light-filled kitchen and dining room, as well as a bathroom and laundry area at the side where the old kitchen had been. The couple wanted the extension to be sustainable and functional, to be a true family room for them and sons Jonah, 10, and Ariel, eight. They also wanted the house's history and character to be present in the new area, for "the conversation to continue", as Melissa puts it.

The conversation can indeed be heard in the second-hand 1930s Tasmanian maple double doors with bevelled glass that prominently frame the opening to the yard; in the recycled spotted gum cupboards; in the red bricks from the partial demolition which were retained and reconfigured in the extension and reused as paving outside the back door; in the pressed metal that reappears on walls inside and out; and in the original kitchen hearth which now sits in the new

bathroom. One of the couple's proudest achievements is their reuse of the red and yellow tiles that appear in two vertical strips in the dining area and laundry, saved from the demolition of Melissa's grandmother's house. "The embodied energy in a thing shouldn't go to waste," Melissa says. "Love and energy has gone into making it, and that should be respected."

Living simply and sustainably is a philosophy Melissa and Rafael hold dear. Louvred windows in the extension allow for natural cooling from cross breezes and night purging of hot air. There are ceiling fans throughout the house, and the couple has installed hydronic heating, although they resisted the temptation for air-conditioning. The cement floor in the extension is made of 40 per cent recycled aggregate. In the backyard there is a greywater system and two rainwater tanks that hold 8000 litres of water for the garden. Rafael has added a drying rack for clothes high up in the corridor and a rack on the corridor wall for their bicycles.

Melissa and Rafael decided on their architects, Rexroth Mannasmann Collective, after the architects of their favourite Balaclava cafe referred them on. After Rafael, a journalist with the ABC, was posted to Europe for work, they communicated with Giles, Kirsty and Brenton from Rexroth on the initial plans for two years by email. Work on the extension took eight months and the couple was active in the design and materials choice process. "Rexroth were very attentive to our desires," Melissa says. "I was very involved and they encouraged it."

Overall the extension added a modest 49 square metres to the 85-square-metre home. But it has undoubtedly added to the quality of living in the house – the east-facing dining area, with its jigsaw of windows, brings the morning light deeply in. Streaming through the bevelled glass doors it creates vivid rainbows. And then there's the gentle view of the veggies in the yard growing in their raised beds and the enormous palm tree next to the back fence.

"It feels like being in a jewel box," Melissa says. "I wanted people to notice the space and be present to their environment." ●

"It feels like being in a jewel box," Melissa says. "I wanted people to notice the space and be present to their environment."



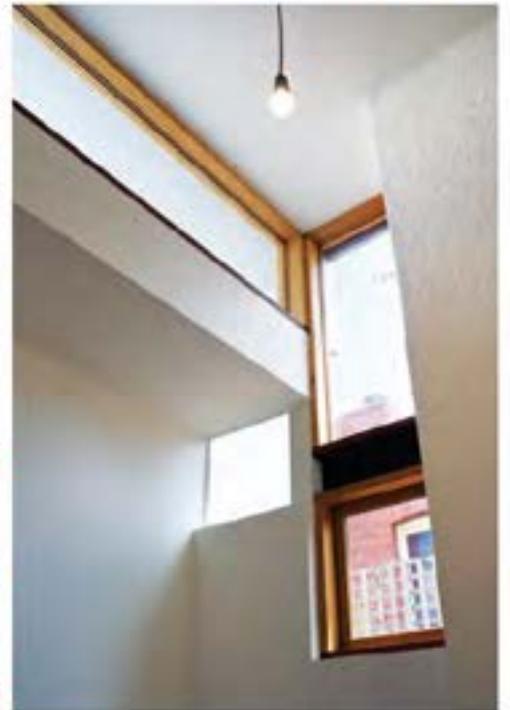
The extension looks out over the backyard, patio and vegetable garden – a key part of Melissa and Rafael's life. The redesign ensured the existing brick structure was recycled and/or retained where possible.



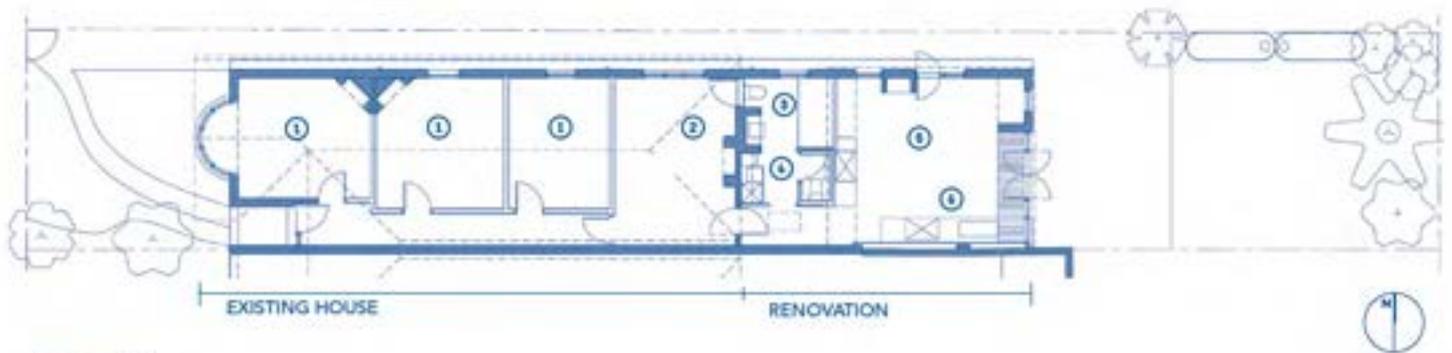
Recycled lining boards were used for this floor to ceiling feature strip. Gas-fired hydronic heating has been installed but homeowners Melissa and Rafael resisted the temptation for air-conditioning. There are ceiling fans throughout the house.



Highlight windows bring light into the extension and aid cross ventilation and night purging. They also facilitate solar gain onto the thermal mass of the concrete slab floor below.



These stylish retro tiles came from Melissa's grandmother's demolished house. They sit in vertical stripes in the dining area and in the laundry.



FLOOR PLAN

LEGEND

- ① Bedroom
- ② Living
- ③ Bathroom
- ④ Laundry
- ⑤ Dining
- ⑥ Kitchen

Resilient rebuild

A committed team rebuilds a weekend home destroyed in the 2009 Victorian bushfires. The result is an energy efficient home away from home with a small footprint, increased fire resistance and strong connections to the bush.

WORDS Beth Askham
PHOTOGRAPHY Brendan Finn

👉 Silvertop ash cladding will change in colour over time, helping the house soften and blend into its surroundings.





SOMETIMES YOU GET A SECOND CHANCE – AND EVEN when you haven't chosen it, all you can do is step up and make the most of the opportunity. Jonathan and Jane's new weekender in Marysville, Victoria, is part of a bold reimagining of the area and a commitment to be part of the new town. The result is an unobtrusive building that appears effortless and uses simple measures to connect the building and its inhabitants to its environment.

Snuggled next to the state forest and shaded in the winter by tall mountain ash, the block is on the north-east ridge of Marysville where it looks down above the town. Jonathan and Jane spend their weekends here with friends and family, enjoying the bush.

The destructive force of the Black Saturday fire was shocking and sobering. "[The original double-brick house] was destroyed along with the extensive mature garden," says one of the project's architects, Damien Thackray. "Timber balconies were reduced to a faint ash outline on the ground. Glazing had melted and congealed into eerily beautiful pools and teardrops. Double brick cavity walls had failed, the inner and outer leafs peeling away from one another. Tin roofing sheet had been blasted into the sky, twisted and warped and planted in the ground as mimetic sculpture."

It was not long after the fires that Jonathan and Jane made the decision to rebuild their weekend home. They felt it was important to stick by the community that was struggling to rebuild itself. New bushfire building regulations, however, meant this project was going to be more difficult than they expected. The challenge soon became how to meet the new regulations without the rebuild looking like a bunker, a building hunched up in defence against the natural environment.

What Jonathan and Jane wanted from their new house was a space that merged the inside and outside, embracing the full nature of the forest and the views of Marysville to the west and the Yarra Ranges to the south. They wanted the house to embody living in the bush in a resilient, durable and meaningful way. "We also wanted something that could be used year round – winters are cold and summers can be hot in Marysville. So the use of light and insulation were important," says Jane. The task of matching these desires to new bushfire regulations came down to a collaborative effort between them, the building design team and the builder.

Initially, a large double-storey house was on the

cards, but after an assessment of the cost and a realistic appraisal of how much space was actually required, the plans were downsized to a studio-style dwelling. One communal room, including a kitchen and bathroom, now sits underneath a sleeping-platform mezzanine. A separate laundry and storage area are incorporated externally to the house.

Meeting Bushfire Attack Level (BAL) 29 standards added approximately 12 per cent to the total cost of the house, says Damien. He adds that as there were no Forest Stewardship Council (FSC) certified timbers that could satisfy these requirements, they settled for radially sawn silvertop ash for the timber-framed walls due to its fire resistant properties, its durability in the area's climate and the way its colours would blend over time with the environment. As opposed to sawing across the log, radial sawn timber generates a higher yield and lower wastage. The home's doors and windows are all timber-framed and double-glazed.

"All external timbers were required to comply with the requirements of the BAL-29 rating, which has additional benefits in terms of considerably enhancing the expected durability and life cycle of the timber given its increased density," explains project architect Steffen Welsch. "For example, the deck frame timbers are F27, a grade which is rarely used."

The deck is indeed an impressive feature, complete with an outdoor bath. Stretching out to be almost as big as the small house, it extends the living space outside and connects to a series of smaller decks linking the living room, storage spaces and car park. Living areas are oriented to the north, with the bathroom and kitchen to the south, to make the most of solar thermal energy.

Thermal mass is provided by a double block wall sitting on the south and west aspects of the house. To maximise solar gain, the floor-to-glass ratio is four-to-one, with most of the windows facing north. Smaller windows face west, south and east for natural light and to allow for cross ventilation. A pergola to the north shades the windows in the summer.

"The house feels lovely to live in – the light works very well, particularly in winter. The double height gives a real sense of space in the living area, while the kitchen is functional and beautiful too, with a view out to the southern hills," reflects Jane. ⑤



⑤ The weekender for a family of four was originally envisaged as a large double storey residence. However, as planning proceeded, the owners and design team pared back the design to an enlarged studio more suited for short and medium-term holiday accommodation. The house essentially consists of one communal room, bathroom, kitchen and a mezzanine as a sleeping platform.



④ The house's floor-area-to-glass ratio is about 4 to 1, with the majority of glass facing north for solar gain and smaller window openings facing west, south and east for natural light and ventilation. Operable windows capture different wind directions, allowing cross ventilation. Ceiling fans also assist with ventilation.



"We love going up to Marysville and sharing the house with friends. It's a beautiful place," says Jane.



Design Workshop: Coastal tree change

GILES AND ADRIANA'S PROPOSED DESIGN



• A sketch of the proposed house design.

A growing family is moving from the city to the more affordable bush and beachside town of Otford, near New South Wales' Royal National Park. Architect Graham Hunt takes a look at their plans to see how they can make the most of the sun and site.

Currently living in Bondi, Sydney, Giles, Adriana and their 20-month-old daughter Luana are growing out of their two bedroom unit and are looking to stay close to the beach but get closer to the bush. They would also like some more space for Adriana's family to stay when they visit from Brazil.

Otford – a town south of Sydney on the escarpment that separates the beach from the Royal National Park – provided the couple with an affordable, forested block. The area also offers the young family community, the beach and a backyard.

The block is steep and surrounded by trees. It is close to the Royal National Park and the risk of fire is high – as Giles describes it, the site is a "bushfire prone ski slope". Their house will need to meet a Bushfire Attack Level (BAL) of 40.

Giles and Adriana would like their new house to be energy efficient, open and light. Giles says of their lifestyle, "I work at a sustainability strategy and communications company called Republic of Everyone ... so I hope we aspire to a sustainable lifestyle. We hope to have a garden and composting system. We both are very interested in eastern traditions, including meditation and yoga."

They are aiming to use the site's solar access to maximum benefit and give living areas a spacious feel with light and cross ventilation. They also hope to take advantage of the sloping block rather than see it as a hurdle in the design and build process.

Choosing fire resistant materials is crucial

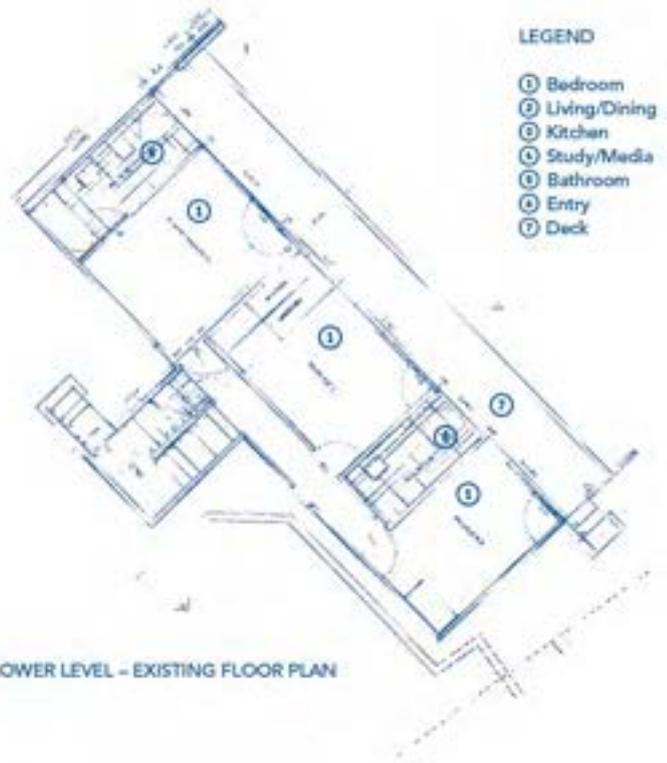
to meeting the BAL 40 standard. The current house design incorporates a steel frame and Stegbar cedar windows. At this planning stage, the house is to have corrugated steel cladding, although they are also considering Shadowclad Ecoply. As yet, they are undecided about insulation and are looking at their options.

Giles and Adriana have some specific questions for Graham:

- How can we soften the design and make it as sustainable as possible? It seems quite brutal due to the fire restrictions.
- The roof is now sloping toward the sun to mitigate solar gain – does this make sense?
- How best do we heat and cool?
- What materials are available to use for the interior floors, cabinets, wall cladding, kitchen cabinets, decking?



UPPER LEVEL - EXISTING FLOOR PLAN



LOWER LEVEL - EXISTING FLOOR PLAN

LEGEND

- ① Bedroom
- ② Living/Dining
- ③ Kitchen
- ④ Study/Media
- ⑤ Bathroom
- ⑥ Entry
- ⑦ Deck

Details

PROJECT
New build

LOCATION
Oxford, NSW

DESIGNER
Peter Fuller

LAND SIZE
2000 sqm

PROPOSED HOUSE SIZE
150 sqm

BUDGET
\$300,000-\$350,000

The Brief

Create living spaces that are light, open and have good cross ventilation.

Use the solar resources of the site to maximum benefit.

Treat the steepness of the slope as an advantage, not a disadvantage.

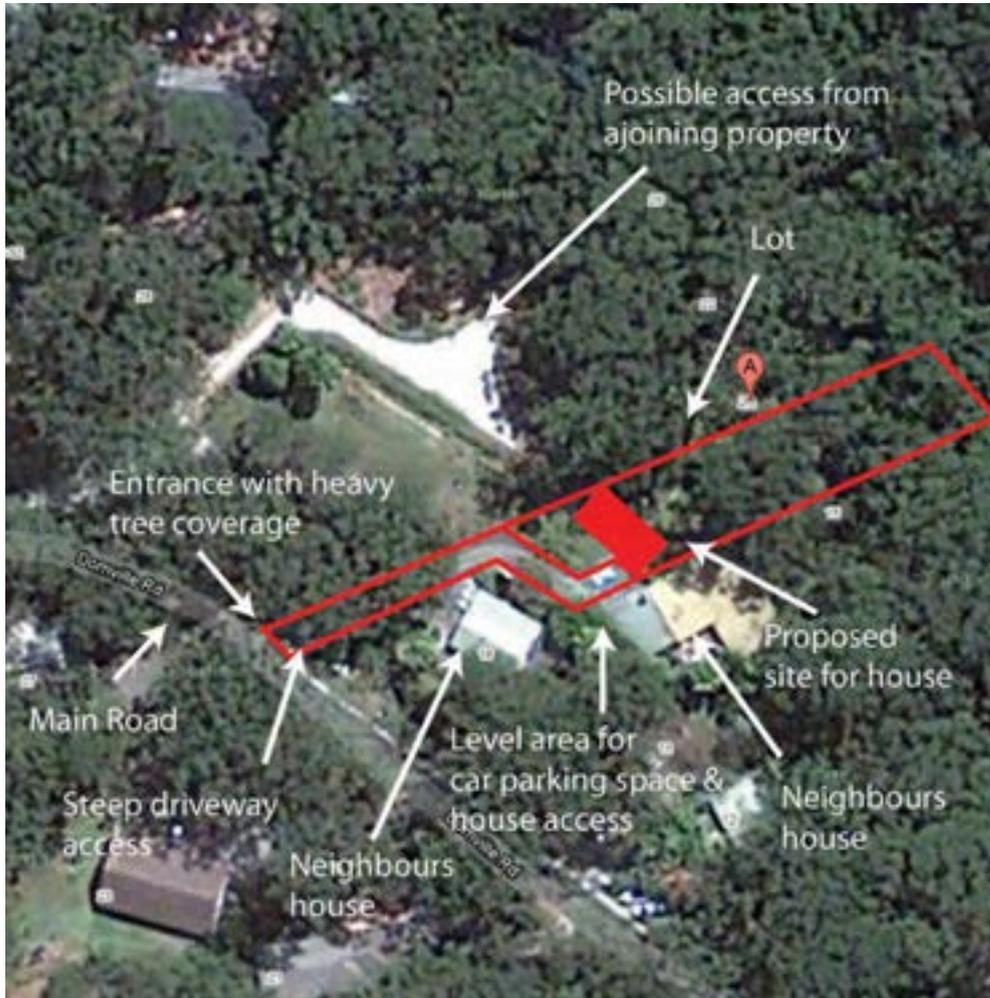
Meet Bushfire Attack Level 40.

Make the most of the block's aspect.



“For optimum solar performance, the building should be rotated to face true north.”

The bush block is described by owner Giles as a ‘bushfire prone ski slope’.



An aerial view of the site and Giles & Adriana's proposed house orientation.

Greener grand designs

Grand Designs host Kevin McCloud speaks to Sarah Robertson about valuing the energy invested in every well-designed thing.

WORDS Sarah Robertson

THERE'S NO DOUBT THAT KEVIN MCCLLOUD, THE HOST OF BRITISH home design TV show *Grand Designs*, has celebrity status in Australia. His programs are repeated here to an enthusiastic audience, and Australia is the one country with its own *Grand Designs* offshoot, hosted by architect Peter Maddison. Not to mention the crowds that flocked to Grand Designs Live events in Melbourne and Sydney this year.

It's generally recognised that part of McCloud's appeal is that he's not an architect. However, with university training in history and architectural theory, he communicates design principles clearly, without condescension and with real enthusiasm. Passion and excitement about design practically ooze from McCloud, whether you meet him in person, watch him on television or hear him speak.

Meeting him a day before the Melbourne Grand Designs Live show, however, I was keen to hear more about his interest in sustainable design – why and how he pushes this agenda forward.

"I've always, since I first owned a home in 1985, I've always gardened organically; always preferred organic veg, home-grown, and local stuff. It's not even a philosophical position ... [living and working sustainably] seems a very obvious thing to want." He attributes this to being a craftsman, a maker of things. "If you make things, you value the resources that you use; you don't waste because it seems to run counter to how you work. Human energy is a really precious resource and you don't waste that if you can possibly help it, so why would you waste the materials?"

It boils down to the fact that a crafted item doesn't have any magical properties, he says; it is just a vessel for and an expression of human

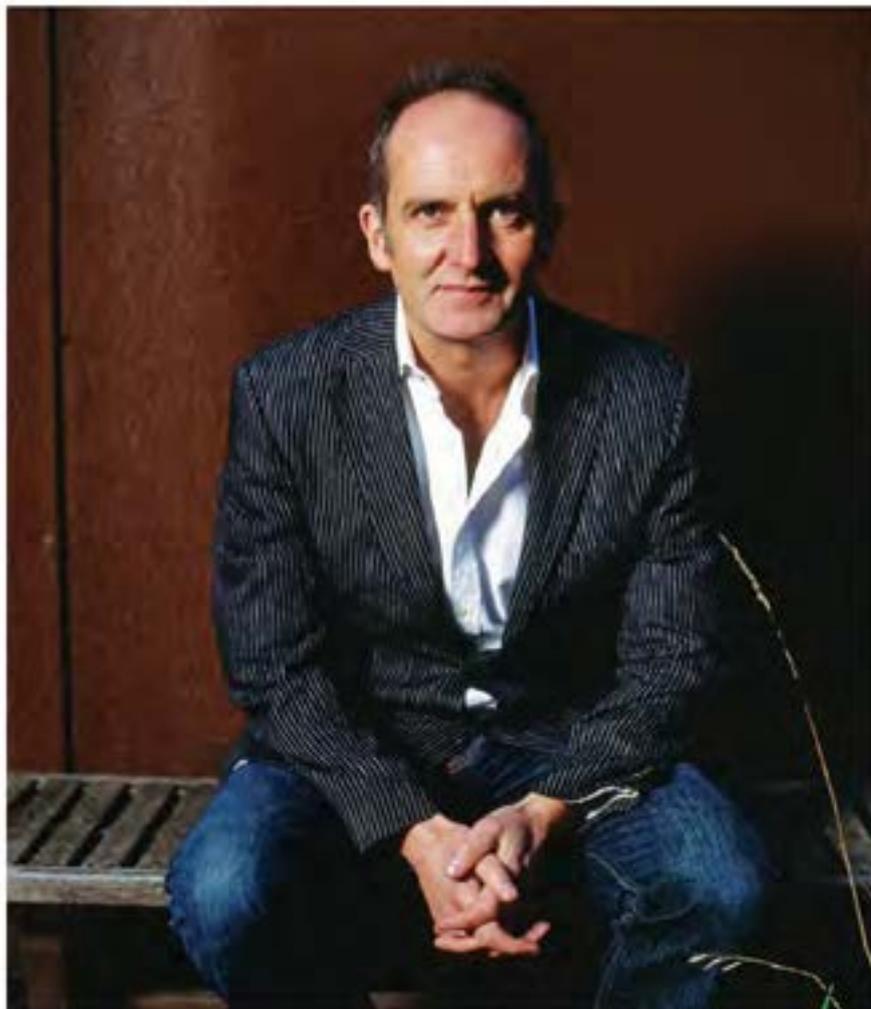
energy. But McCloud understands that many people still don't value this energy or the natural materials that go into every well-designed thing. "We have no idea where stuff comes from ... It's always fascinated me how easy it is to divorce yourself from the made thing, just as it's always fascinated me how things are made."

So how do we encourage people to design, build and live more sustainably? "I don't know, because right now nobody's interested in the UK; the emphasis has shifted to basic economic survival. In Australia, sustainability hasn't become an idea that's fully formed yet, I think, but it will."

He adds that he's an advocate of sustainability by stealth. "I don't like to wag a finger and tell people how to live – I think that's wrong. I think, actually, a sustainable future and sustainable development is something that we have a responsibility to explore together with people around us. So in the housing schemes I do, for example, we try to introduce ideas that people can choose – opt into or opt out of."

Encouraging sharing is one simple way to promote environmental and social sustainability, he says. "We already share library books, we share meals with people, we share jokes and stories, we share our homes with our family. It's actually only a short step away to sharing ownership of a car, or a bike, or a piece of public realm, or a bit of the veggie garden, or an allotment."

Of course, McCloud believes good design is central to environmentally responsible living, whether that involves designing a bicycle rack into house plans, sourcing local and environmentally responsible materials or,



Grand Designs host
Kevin McCloud.

importantly, designing outdoor spaces.

What advice does he have for people planning to build or renovate? Like many Australian professionals promoting sustainable design and living, he reiterates that it is about building homes that are appropriate and that respond to their environment.

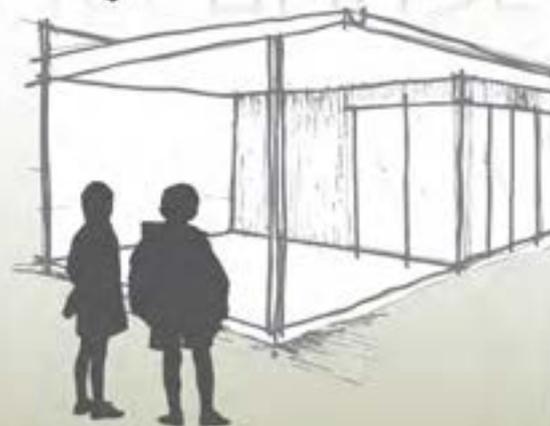
"What matters is to get the bones of the building to work. Thanks to fossil fuels, you can take a glass box and you can put it in the middle of the desert and you can put it in the North Pole and you can still live in it. The trick is to be able to build in the desert and at the North Pole without fossil fuels, without plumbing lots of energy into the building."

First and foremost, good design is considered, he says. It makes the most of using appropriate thermal mass, orientation and natural ventilation. "You do all these things and the building starts to behave organically because it responds to its environment and those rhythms in the environment – the sun, the moon, the wind, the breeze, the rain, it collects water, it keeps you cool, it keeps you warm. It starts to actually harness the environment and look after you in the process by providing the resources you need."

Many people are now passionate about sustainable design and living, McCloud, for his part, has communicated their stories and is working to quash the myth that a greener future involves giving things up or compromising on good design. "Some things you'll give up," he says. "Some things you'll take up, some things you'll discover actually give you more choice and more pleasure and perhaps provide more happiness." 5

Introducing the.....

LIFEHOUSE



an affordable
sustainable
designer home

passive solar - smaller footprint - reduced waste

The LIFEHOUSE is a new concept in sustainable architecture that allows you to personalise the design in a number of ways to suit the orientation of your land, number of rooms required, external finishes, outdoor living spaces, interior joinery preferences, without the design costs normally associated with this process.

Save 80% of
design costs

Save 20% of
building costs

Save on
running costs

Be the first to see the LIFEHOUSE

Visit the
LIFEHOUSES
web page here.
Scan the QR code
with your
smart device.



LIFEHOUSEDESIGN
www.lifehousedesign.com.au



Modern infill

This Perth extension is a light, open
and thoughtful response to the need
for space in our ever-sprawling cities.

WORDS Robin Barton
PHOTOGRAPHY Jody D'Arcy, Ben Price & Justine Monk



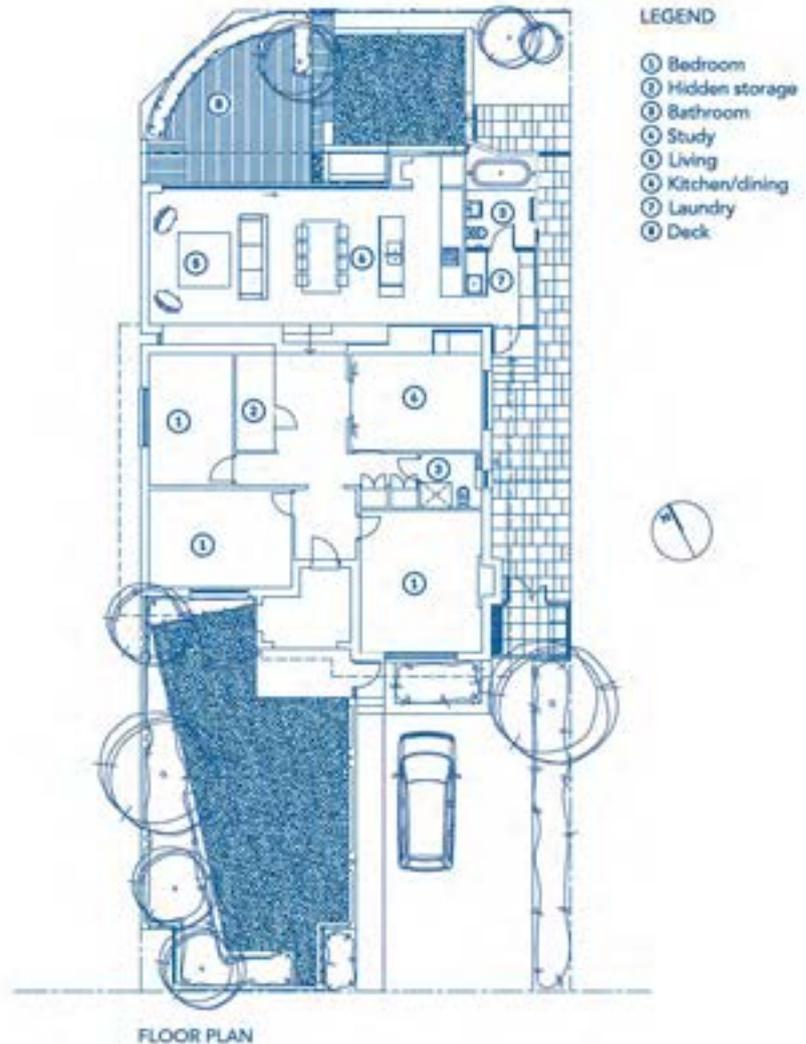


For her Perth home, Justine designed the windows and doors, which were made by a local joiner. Louvre windows, the large sliding door and small openings at the front of the house maximise cross-ventilating breezes. Motorised external blinds are fixed to all north-east facing glazing to minimise summer heat gain. Image Ben Price

watching the sunrise as a family is a special experience and the new spontaneity of social occasions has been a revelation. Our house went from modest to modern."

But beyond making the best possible use of a small plot, Philip and Justine's project was intended to reflect an approach that might also serve Perth itself, Australia's fastest-growing city. Projections by Western Australia's government show Perth's population increasing by a third by 2026; growth so far has been in the outer suburbs. But clever design and Bedford's good transport links meant Philip and Justine didn't need to move further from the CBD. "Most of us have to live in cities," says Justine. "For all its intensity, Hong Kong is one of the most sustainable cities in the world due to its dense population and efficient public transport."

Justine's advice for people planning a renovation or new build is to find "that architect and builder who understand what you're trying to achieve". "Look out for similar projects in magazines, ask people who they're working with - word of mouth is important." ⑤



⑤ The extension's burnished concrete slab floor tinted with black oxide requires no other treatment or covering and radiates warmth in winter as it is warmed by sunlight through the north-east-facing glazing. A bathroom and laundry sit neatly behind the kitchen. Image Ben Price



Plywood lines the floor, walls and ceiling of the extension. Floorboards in the hall are recycled jarrah. Image Ben Price

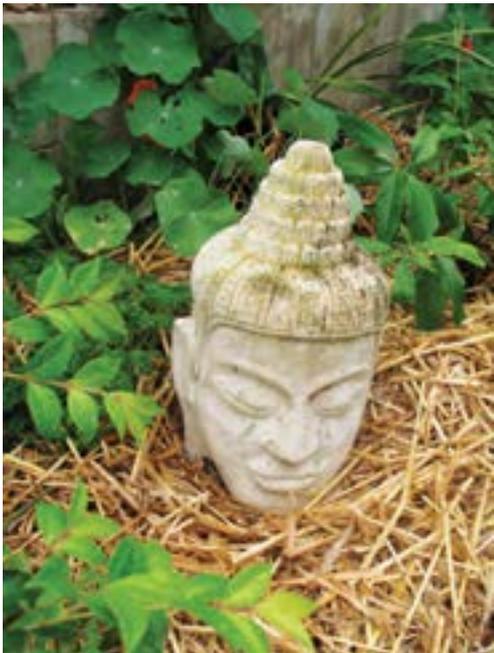


A door in the bookshelves leads to a storage area behind. "It is the full length of the centre room and is invaluable (and invisible) storage space," says Justine. Image Jody D'Arcy

Earthly enrichment

On moving into her own Brisbane home, architect Emma Scragg set to work learning about organic gardening and permaculture before transforming her garden into a rich edible landscape. She shares some of what she learnt along the way.

WORDS & IMAGES Emma Scragg





SO OFTEN HOMES OR RENOVATIONS ARE planned with the most sustainable intentions but through lack of knowledge and time, or a limited budget, the surrounding site becomes an afterthought, or is completely overlooked. However, a garden can greatly enrich a home and its owners. It can improve a home's microclimate, provide food for its residents (and their neighbours), provide a habitat for wildlife and serve as an enticing extension to internal spaces.

PLANNING – DESIGNING GARDENS FOR HOMES AND LIFESTYLES

When planning a garden, consider the impediments and opportunities that exist within the house itself. Are there rooms with window and door openings that suffer from a lack of privacy? Do some rooms tend to overheat due to excessive sun exposure or inadequate ventilation? On the flip side, are there areas where views and access to northern sun and/or natural light need to be preserved. Could these spaces be enhanced? Are there living areas with a strong physical or visual connection to the outside?

All of these issues can be resolved, to some extent, through thoughtful garden design. Deciduous vines and trees, for example, can shade internal spaces in summer but let sunshine through in winter to help improve

the energy efficiency of a home.

Outside, survey your garden space. Identify natural paths around the site and think about dividing it into different zones. Permaculture design tells us that high use spaces or areas requiring the most maintenance are best placed closest to the house. This means that the ideal place for vegetables and herbs is close to the kitchen and on regularly trodden paths.

Outdoor areas, if not roofed decks, are traditionally paved for low maintenance. However, beware of large areas of paving in full sun. These hard surfaces reflect heat and glare, adding discomfort to the garden and the home, particularly in summer. Instead, consider softer, more permeable surfaces with a mix of ground covers. Paving or stepping stones placed only where they're needed let rainwater soak into the soil and the water table but also allow vegetation to grow.

MAXIMISING DIVERSITY, PRODUCTIVITY AND PERFORMANCE

In selecting plants for a sustainable garden, focus on those that will play multiple roles, eg produce food, provide shade and attract wildlife. Ideally, plants should provide food, habitat, be compatible with the local climate and be resilient to pests. They should also be appropriately sized for the site. Native species are often encouraged for their drought tolerance.





However, they can also be high maintenance so consider mixing them with exotics for greater diversity and resilience.

Most food producing plants like well-drained sunny sites. Identifying these areas will give your favoured crops the best chance to bloom. If you graduate the heights of plants, from ground cover herbs up to taller vine trellises or fruit or nut trees in sunny areas, you can create a higher density but avoid overshadowing. A common practice is to plant food-producing plants out the back, leaving the front garden for ornamentals and lawn. A north-facing front garden (as I have) filled with vegetables and herbs, however, is a great conversation starter and an opportunity to share surplus produce with your neighbours.

A HOUSE AND ITS GARDEN

A house and garden design should acknowledge the symbiotic potential between the built environment and its inhabitants. Gardens that go far beyond the obvious mix of lawn, ornamental shrubs and trees are a joy to create. They can be solutions for economic, social and environmental sustainability and not only keep their human inhabitants fitter and healthier but happier too. I write from personal experience! 🍷

Getting started

- Know your climate.
- Get composting as soon as possible.
- Enrich your soils with plenty of compost, manure, garden clippings and introduce plenty of mulch to retain nutrients and moisture while you finalise your plant selection.
- When laying out a planting plan, consider the size of trees and shrubs when fully grown to ensure they don't overcrowd the garden, create too much shade or root competition.
- To establish a garden, choose some fast-growing, shorter lived vines, creepers, flowers (sunflowers are a great motivator) and shrubs to quickly reward your work and provide interim shading while longer-lived vegetation establishes.
- Select vegetation that's appropriate for your local climate, your water supply and your physical ability to maintain it
- Scatter edible plants throughout the garden, interspersed with other vegetation to create a diverse environment and to confuse predators.
- Join your local community garden or organic grower's club, or volunteer on a few PermaBlitz's.
- Have fun!

EMMA'S GARDEN PLAN



Brisbane-based architect and gardening enthusiast Emma Scragg is establishing a diverse microcosm in her yard based on organic and permaculture design principles.

Elements to incorporate into a sustainable garden

- Edible plants – where possible, choose plants that provide food.
- Composting and mulch areas – allow sufficient space, if you have it, to have a few compost mounds or bins at different stages in the decomposition process. If you don't have much space, consider self-contained composting units.
- Rainwater storage – where possible, install rainwater storage tanks to meet your household and garden use. Mulch gardens to reduce irrigation demands.
- Water features – these are calming and can help mask traffic noise in urban areas, but they can also provide water and habitat for wildlife and are a place to grow more unusual foods like water chestnuts, lotus and water spinach.
- Flowers – these add colour to gardens and can attract valuable insects and wildlife – many are also edible.



Emma Scragg is an architect with Brisbane firm Riddel Architecture. She specialises in environmentally sustainable design, conservation and colour studies. As well as being a budding gardener, she is a member of the Queensland Australian Institute of Architects' Sustainability Committee. She credits friend, horticulturalist and landscape architect Arno King, the ABC's television show 'Gardening Australia', author Annette McFarlane and her mum and sister for motivating her green fingers into action.



Green roofs

Beyond simple aesthetics, green roofs and vertical gardens reduce household energy demand, cool cities and provide habitats for native species.

WORDS Angela Tufvesson



↑
A green roof over a garage in Wellington, New Zealand. Image courtesy Cranko Architects. Facing page image courtesy Fytogreen.

“I LIKE TO TELL PEOPLE IT’S CHEATING BECAUSE WE’RE USING the land twice,” says Simon Fisher of his green roof. He lives in Adelaide’s Christie Walk, an urban village featuring South Australia’s first intensive green roof. “The roof is a delight – I like being able to go up there to read a book or have a cup of tea with a friend or a sundowner, or to go there and watch fireworks,” he adds. “I also pick fruit and vegetables up there.”

Although green roofs can be traced back to Viking dwellings in Scandinavia and the hanging gardens of ancient Babylon, Christie Walk architect and urban ecologist Paul Downton says green roofs aren’t usually found atop modern Australian homes. “They cost more than an average roof because you’re adding another layer of materials,” he says. “Green roofs are rare events and the reason is we’re in the early adoption stage.”

It’s a different story abroad. Downton says green roofs have been popular for decades in Germany and Austria. As many as 30 per cent of the rooftops in Berlin are green, and in Linz, Austria, residential roofs larger than 100 square metres must have a green roof. Green roofs are also increasingly favoured for homes in Denmark, the United Kingdom, Singapore, Japan, Canada and the US.

WHY GROW GREEN ROOFS?

In simple terms, a green roof is a flat or pitched roof surface planted with vegetation and a growing medium over a waterproof membrane. There are extensive and intensive green roofs. The former are lightweight systems up to 200 millimetres deep where vegetation is limited to shallow rooting plants, while the latter require regular maintenance as they are home to a wide range of vegetation at a depth of more than 200 millimetres. “Intensive roof gardens are designed for traffic so people can walk on them – they are traditionally what people think of as roof gardens,” says Downton. Vertical gardens are a less invasive option. Plants may be rooted in a vertical structure attached to the outside of a building or rooted in the ground and trained to grow up a wall.

The benefits of green roofs and vertical gardens are many. One of the most significant is the ability of a green roof, and to a lesser extent a vertical garden, to act as an insulating thermal buffer. “The plants and soil are the first point of contact from the sun’s heat,” says Ben Nicholson, director of Groof. “Plants provide evaporative cooling and it takes a long time for that heat to move through the soil, so generally it maintains a steady temperature underneath – a green roof is like a huge shade sail during summer.”



➔ Brod Street retrofitted a native species green roof onto his Melbourne home a few years ago. The garden is installed on a 28-degree sloping roof. Brod says the under-roof temperature is now at least 10 degrees Celsius cooler on hot sunny days when compared to the ambient air temperature.

Research by the CSIRO found green roofs can reduce the amount of energy used to cool a room by 48 per cent in summer.

Nicholson says a green roof is more effective to help cool a home than heat one. Research by the CSIRO found green roofs can reduce the amount of energy used to heat a room by 13 per cent in winter and reduce the energy used to cool a room by 48 per cent in summer. Similarly, a study by Columbia University in the United States reports that average winter heat loss under a green roof is 34 per cent lower than under a black (conventional) roof, while summer heat gain is reduced by 84 per cent.

Green roofs also help to reduce the heat island effect in cities. “If you put a roof garden on what would’ve been a hard, flat surface, it reduces the amount of heat and light reflecting back into the urban environment,” says Stuart Tyler from Fytogreen. He explains that green roofs also reduce and delay stormwater run-off, which has a dramatic impact on catchment areas and drainage in urban areas. Additional benefits include air purification and enhancement of biodiversity by providing habitat for native species.

GOING GREEN UP TOP – THINGS TO CONSIDER

Green roofs can be retrofitted but care must be taken with the weight added to an existing roof. Nicholson says removing roof tiles before planting a green roof is the best option as it gives you “more weight to play with”. “If you had a tiled roof you would have the tiles removed, then you would have the roof waterproofed,” he says.

Downton says solar panels can be fitted to an extensive or intensive green roof. “The green roof can work with the solar panels to improve their efficiency. One of the benefits is that because the green roof surface is much cooler than a normal roof, it aids the efficiency of the panels.”

For those who want to exercise a green thumb, DIY green roof kits are available. Brod Street, an environmental policy officer for Victoria’s Department of Sustainability and Environment, retrofitted a green roof onto his Melbourne home a few years ago.

“I realised we had this awfully hot part of the house that could be cooled naturally with a green roof,” he says. “I was very interested to show how it could be built on a 28-degree sloping roof and it was a



• An old factory converted into modern three-level town houses in North Fitzroy, Melbourne, includes roof gardens by Fytogreen, including this 35 square metre turfed area. Image courtesy Fytogreen.

challenge for me. More than three years later I know it's successful. The under-roof temperature [the roof cavity temperature] is now at least 10 degrees Celsius cooler on hot sunny days when compared to the ambient air temperature."

A lack of proven plant species suited to Australian conditions is thought to be a deterrent to green roofs here in Australia. Street says he trialled 13 species of native plants to discover which grew best. Recent research suggests species that can withstand high temperatures and winds and that require minimal watering are most suitable and will reduce maintenance costs over the long term.

Depending on how you build your green roof, costs vary. Street says he was able to install his DIY roof for \$90 per square metre. Nicholson says it can cost up to \$300 per square metre to have an extensive green roof installed by a professional, while Tyler says engineering, design and drainage costs can total up to \$500 per square metre. With the ongoing energy savings and the social and environmental benefits of green roofs, it's likely to be money well spent. •



The idea of sanctuary forms the foundation of our design philosophy, and our buildings are designed to enlighten from outside and within. We create homes with soul.

[02] 9909 8844

 **sanctum** design

www.sanctumdesign.com.au