MODERN GREEN HOMES

Sanctuary

SPECIAL

GREENER KITCHENS & BATHROOMS

WIN

A home battery storage system from Enphase

Offer open to Australian and New Zealand residents, details p87

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PLUS

Optimise your solar system
Ways to avoid eco-design pitfalls
Cairns home adapted to the tropics

SUSTAINABLE STRATA

Owner actions transform 7 apartment buildings

Lofty ideals

This modest extension showcases not only passive solar design but also well-researched eco-friendly materials, some of them still experimental.

WORDS Anna Cumming
PHOTOGRAPHY Hilary Bradford

WHEN AMANDA MARTIN AND MICHAEL Simon bought their inner-northern Melbourne home 13 years ago, it was with a low-impact lifestyle in mind: "It was a real compromise," says Amanda. "The blocks and houses around here are quite small, but we really wanted to live somewhere where we could easily ride bikes to shops, schools and parks." She describes the original 1929 house as a "depression Californian bungalow – smaller than usual and with no ornate plasterwork." Despite its cramped rooms and typical maze of services – kitchen, laundry, bathroom – tacked on at the back, the couple and their young daughter Georgie lived happily in the house for a decade before deciding to take on the renovation they had always planned.

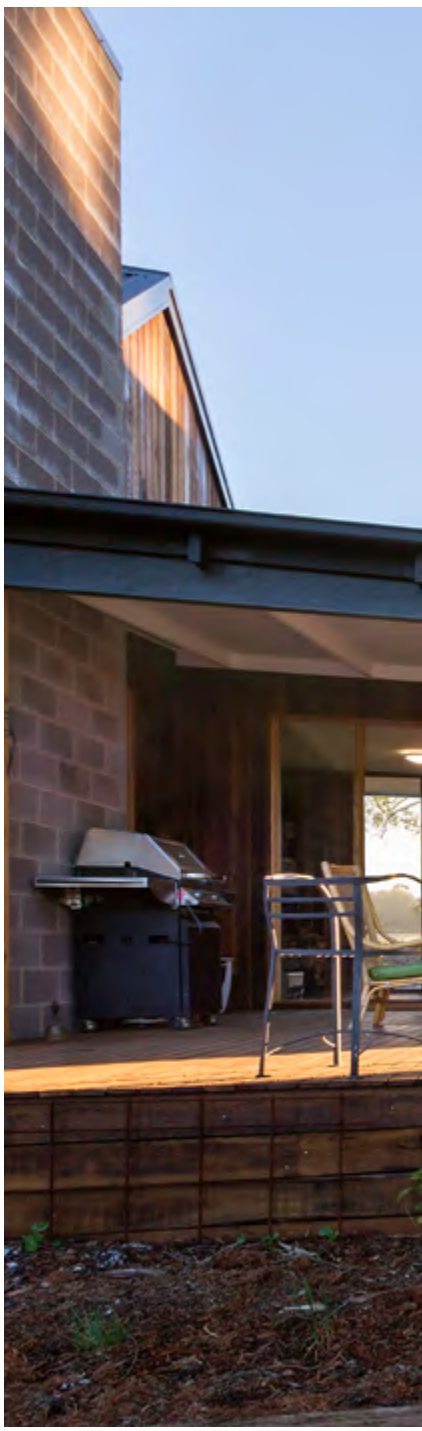
Their brief to Sarah and Paul of Baker Drofenik Architects was to provide a light-filled new living space that would be comfortable with minimal active heating and cooling, to improve the connection with the family's beloved garden, and to create a breakaway space for their growing daughter. "It's a small site, and Amanda and Michael also wanted to fit a garage in, so there were space constraints," explains Sarah. "But the great thing about the block is that it's a 'peninsula': it's got streets on three sides, so it feels surrounded by trees and sky, not buildings."

Their design involved removing the small back rooms and building a new kitchen/dining/living room to the south, close to the western boundary to maximise back garden space. Clerestory windows to the north have eaves designed to block summer sun but admit winter sun deep into the room, where a concrete slab floor acts as thermal mass to help regulate the internal temperature. The windows are all double-glazed, and the large eastern windows are fitted with both external awnings to keep

Amanda and Michael's extension is clad in sustainably sourced white cypress shiplap board. Since this photo was taken, the east windows and glazed doors have been fitted with external awnings for shade and a pergola has been added over the deck. The lizard handle on the alternative entry door is from the Flying Anvil.

Tranquillity base

The owners of the Culvert House, on a rural block in country Victoria, didn't just want a sustainable and peaceful home for their retirement; they wanted to enjoy the journey.



WORDS Anna Cumming
PHOTOGRAPHY Chris Neylon

IAN AND PAM CORNTHWAITE ARE NOT new to house building, nor to sustainable homes: they designed and managed the build of a mud brick holiday house in Apollo Bay, and also spent five years living in the eco-friendly community development of Westwyck in Melbourne. So when it came to planning their retirement home, they had plenty of ideas. "We didn't just want a house; it was a project for us," says Pam. Ian agrees: "We had a lot of pretty strong opinions on what we wanted and didn't want. Mike Hill [co-founder of Westwyck] was an inspirational man, and living at Westwyck was a wonderful experience. We couldn't leave there and not try to build something as sustainable as possible."

Wanting to move out of the city but still be within easy reach to encourage visits from family and friends, the couple "drew a circle about an hour from Melbourne" and looked for a long time before finding the ideal block. They found it on the corner of a farmland subdivision just out of the small town of Trentham, 75km north-west of the city. With views to the north and west through mature gum trees and over the dam and paddocks of the remaining farm, it was possible to design a passive solar house that turns its back on the rest of the subdivision and feels remarkably 'off in the bush'. A disused railway line runs past the corner of the block, and a beautifully crafted old brick culvert was the inspiration for the house's name.

Ian and Pam found sustainable architects Maxa Design through *Sanctuary*. "We wanted to enjoy the journey, and part of that was working with like-minded, nice people," says Ian. "The team at Maxa were genuine, personable and enthusiastic, and we liked their work – we didn't even go to meet anyone else." Sven Maxa recalls that the couple had a very clear idea of the style they wanted: "They weren't prescriptive about anything aesthetic, but they knew how they wanted it to feel. We came out of the initial design meeting pretty much knowing exactly how the floor plan had to be, based on how the house needed to function and feel."

Maxa's design features two buildings with an entryway in between that Sven describes as "a hinge or a knuckle – a connecting joint between the two

A large grey ironbark deck tucked in the angle between pavilions provides a peaceful shady spot to lounge, without blocking winter sun to any of the living spaces. The house is clad with rough-sawn spotted gum, which will fade to grey as it weathers.

Greener kitchens & bathrooms

In this *Sanctuary* special, we feature over 20 inspiring kitchens and bathrooms that use beautiful, sustainable materials and showcase new ways to conserve energy and water.

Shades of green

DESIGN:
David Saunders,
S2 design

PROJECT TYPE:
Renovation

LOCATION:
St Kilda, Victoria

PHOTOGRAPHER:
Melanie Faith Dove

THE WATER, ENERGY, MATERIALS AND LANDSCAPING concepts used in this extensive restoration and addition to a heritage dwelling in St Kilda demonstrate a new approach to sustainable inner city living. Many common architectural elements are intentionally missing, including secondary finishes (such as paint) which have been minimised or eliminated completely by leaving durable construction materials in their natural 'as built' state. You won't find white porcelain, plasterboard or chrome either; instead, toilets, basins and tapware are stainless steel.

Home to sustainable architect David Saunders and his family, the house is thermally efficient and all materials are either salvaged from the original house, recycled, plantation-grown, zero-VOC or naturally occurring. Their home is largely self-reliant with 43,400 litres of rainwater stored in 4 tanks, and energy use is minimal due to the incorporation of solar PV, energy efficient appliances and lighting and sensible lifestyle practices. They also grow fruit and vegetables in the courtyards and 'roof farm'. Very little waste leaves the site due to careful recycling and extensive composting; grey water is diverted for reuse on gardens.

Images: (top left) Kitchen joinery is green-stained plantation plywood; (bottom left) the bathroom walls feature locally produced recycled plastic, a green wall planter and old-school cast iron bath; (top) David Saunders enjoys a cuppa in his naturally lit kitchen. Glazing is a combination of custom-fabricated, steel-framed double-glazed doors and windows and double-glazed, double-hung, sashless windows from Dayview Windows.

SUSTAINABLE FEATURES

APPLIANCES
- KWC Eve kitchen tap; Zip Sparkling Hydrotap
- Miele and Qasair kitchen appliances
- Liebherr refrigerator and freezer
- Stainless steel toilets from Britex, cisterns from GWA Bathrooms & Kitchens
- Linkware 'Elle' stainless steel bathroom fittings and fixtures
- Fantech bathroom / air-transfer fans.

MATERIALS
- Internal walls, ceilings and joinery are plantation plywood with Intergrain clear satin finish or recycled lining boards
- Benchtops stainless steel, granite and repurposed marble
- Shower walls, splashbacks and some external wall cladding made from locally produced Replas recycled plastic
- Elmich Versiwall 'green wall' planters
- Vintage, fully restored cast iron bath.

LIGHTING
- LED and compact fluorescent lamps
- Velux skylights plus windows, glass walls and glass floors allow natural light to flood the entire house. Additional daylighting via internal garden and courtyards.

OTHER FEATURES
- No air-conditioning required, natural cooling systems include cool humidified air naturally drawn up through the house via two internal 'rainforests' and air transfer system which draws cool air to the top level from the basement
- Solar PV and Apricus solar hot water system.

Opening to light

INTERIOR DESIGN:
Megan Norgate of Brave New Eco

BUILDER:
Macasar Builders

PROJECT TYPE:
Renovation

PHOTOGRAPHY:
Emma Byrnes

HOW DO YOU RENOVATE A CALIFORNIAN bungalow to improve its thermal efficiency and make it brighter, more open and family-friendly?

Designer Megan Norgate of Brave New Eco went to work, revising the layout of the house, opening it up internally through the centre and adding a small extension. A central, dark bedroom was turned into a study/play area, which leads into the 32-square-metre extension containing a new kitchen, walk-in pantry, bathroom and dining room. The space opens to a large outdoor deck and pergola and feels wider and more expansive thanks to a high-pitched ceiling and deep window seat running along the north side.

A new living room was created and a space heater installed to zone the heating into the highly insulated extension. Recycled deco double doors were used in the lounge room so it could be closed when watching TV and a new sliding door with fluted glass put in to separate the extension from the original house.

The main bathroom was also renovated, made larger by extending into the hall space. The existing bathtub was reused and a soft pewter finish chosen for the tapware to avoid the use of chrome. Handmade fish-scale tiles were chosen for over the bath and an art deco drinks trolley was repurposed as a bathroom vanity.

SUSTAINABLE FEATURES

APPLIANCES & FITTINGS

- Induction cooktop
- Quality high-efficiency appliances
- Low-flow tapware and toilets.

MATERIALS

- Post-industrial waste composite benchtops by Create Stone
- Custom recycled messmate joinery and timber-battened island return
- Locally made hardwood kitchen handles
- Handmade ceramic tiles from Middle Earth Tiles
- Pewter finish Astra Walker tapware
- Recycled art deco drinks trolley repurposed for bathroom vanity
- Re-used an existing bathtub in new location.

LIGHTING

- LED strip lighting
- Locally made lighting fitting by Volkerhaug
- Refurbished mid-century copper and perspex pendant lights.

OTHER FEATURES

- 'Cool room' walk-in pantry for dry bulk food storage. A floor vent in the pantry runs through the concrete slab under the house to draw a continuous supply of air cooled by the slab
- Curved bench edge to soften and ease 'choke point' where kitchen entry meets door to north-facing decking
- Kitchen flows straight to decking and herb/salad gardens.

OTHER FEATURES

- Open shower to bath wet zone design to maximise usefulness of long narrow space
- Filled an existing doorway alcove with recycled timber shelving.

Green roofs

GETTING PAST FIRST BASE

Many green roofs don't get past being a 'good idea', but with some knowledge and planning you can follow through on your desire to green up high, writes Dick Clarke.

WORDS Dick Clarke

GREEN ROOFS ARE PLACES WHERE nature can thrive in spaces we don't usually use for any other purpose. And they are rightfully catching on around the world as more people recognise the benefits of bringing living greenery into what would otherwise be hard environments. But too few residential green roof projects get further than the drawing board, and often because of avoidable obstacles encountered in the design and planning process.

Before we get into the 'hows' of green roofs, it's important to first consider the many good reasons to include one at home.

WE NEED MORE URBAN GREENERY

Traditionally, increasing density has come at the expense of nature but this need not be the case. There is space to recreate natural systems between, on the sides of, and on top of our buildings. There can be many drivers for this, including government policy.

In Singapore, the government set a target of 50 per cent tree cover in what many people think of as a small island covered in high-rise. Their 2003 master plan *A City in a Garden* set the framework that is evident today, where the population has nearly doubled since the 1980s, yet the total green cover grew from 36 to 47 per cent. With over 90 per cent of Australians now living in towns and cities (and New Zealand isn't far behind that percentage), we're starting to think along these lines with the 202020 Vision that aims for 20 per cent more urban green space by the end of this decade.

Improved building performance

It is intensely interesting when buildings engage with plant life externally and internally. And green exteriors help to cool buildings too, so it's an obvious strategy to wrap as much of the exterior as we can in suitable plant life.

This works by reducing the direct solar gain, by both the shading from foliage and the presence of the soil or planting medium. The shading provided by the foliage reduces the direct solar gain to the materials below, and it stands to reason that the more foliage, the greater the effect. So turf will have less of a shading effect than shrubs and trees. The extra insulation provided by soil or planting medium will also vary according to depth. Earth-covered houses, where the soil is a metre or more deep, are legend for their year-round stable temperatures, yet even a non-soil, lightweight planting medium will have a beneficial effect.

A recent report in the *Environment Design Guide* (environmentdesignguide.com.au) showed shallow extensive green roofs could reduce heat transfer and provide a saving for cooling – up to 37 per cent annual heating and cooling energy saving in Perth and 10 per cent savings in Melbourne. The very act of transpiration and photosynthesis uses energy, which is coming from sunlight, so it stands to reason that a living green roof will absorb and use more solar energy than an otherwise identical fake one.

Psychological & emotional benefits

Introducing greenery into our immediate surroundings has a hugely beneficial counter-effect, improving mental and physical health, raising workplace productivity, and leading to a better understanding of our place in the web of life. It is consistent with and complementary to biophilic design – where the very forms and features of the building are designed to mimic or respond to nature. Passive solar design is the most fundamental expression of biophilic design, and green roofs (and walls) fit hand in glove with it. Thankfully planners, architects and developers are getting in on it too.

OVERCOMING OBSTACLES

Despite the benefits, there are any number of reasons why green roofs fail to happen, especially for residential buildings, even when a green roof is the most appropriate design solution. →

Completed last year, these award-winning townhouses in Angel Street, Newtown, NSW, were built by Steele Associates to incorporate native, low maintenance green roofs for thermal and acoustic insulation. Among other energy- and water-saving features, each house has extensive window shading, solar power, energy monitoring and 8000 litres of rainwater for irrigation, flushing and washing.

Natural pools

Natural pools are designed to minimise the environmental impact of backyard bathing, and are aesthetically beautiful too. With hundreds of these systems now installed in Australia, we find out how they work.

WORDS Kulja Coulston

SWIMMING POOLS CAN GET A BAD rap when it comes to sustainability, notwithstanding their benefits for recreation and health. Their ongoing energy and water use can be immense, even for pools that are used sporadically.

But a growing number of households are changing this equation by installing chemical-free natural pools that use filtering systems that mimic nature. Rather than using chlorine to kill everything in the pool (except the swimmers!), a sustainable water quality is achieved by creating a balanced ecosystem.

Frances Cosway has included a natural pool in the garden of her sustainable home in Hampton, Victoria. "I always refer to it as our water feature that you can swim in," says Frances. "It's like swimming in a lake. There are tadpoles in there at the moment and dragonflies everywhere."

The pool is nestled in a thriving native garden and in the natural setting looks like it's always been there. Large boulders are used to form the pool edge, and water lilies and other aquatic plants grow out into the swimming space. The rounded pool shell itself is concrete with a layer of fine, sand-like pebble mix to blend in with the rocks. Rather than artificial blue, the crystal clear water is jewel-green. "The kids love swimming in it. For me, it is aesthetically beautiful all year round," says Frances, but emphasises that it's not for everyone. "A lot of people prefer blue pools that look very structured."

Frances and her partner opened their home for Sustainable House Day 2016 and the pool generated enormous interest. "As soon as you say it has no chlorine, people instantly assume it's salt treated. Most visitors were not aware that you can get a pool with natural water without chlorine or salt."

The term 'natural pool' can describe two different but not mutually exclusive concepts. It generally refers to pools with chemical-free 'living' water. The pool may resemble a pond or look just like a regular pool with a concrete or polypropylene shell, pool tiles and decks; either way, the water is alive and can have a water quality equal to or better than a mountain stream. Less commonly, the term is applied to chemically treated pools that blend in with the surrounding landscape.

Landscape designer Sam Cox, a proponent of naturalistic landscaping, has used both approaches. "What I've always wanted to do is bring the garden right in around the pool. With chemical pools we always had to have a buffer zone. We couldn't bring the plants too close as the splashing would damage the plants," he says. "With natural water, we can bring the plants right into the swimming space."

HOW NATURAL POOLS WORK

The science behind natural pools is well developed. Water is purified using a biological filter and fine filtration in combination with sophisticated hydraulic design, where water is moved constantly and circulated thoroughly. A 'biofilm' of beneficial bacteria lives in the biofilter (and parts of the pool before cleaning), and breaks down any organic matter using nitrification; plants then take up the resultant nitrate in competition with algae.

The constant flow and circulation of water maintains oxygen in the system and appropriate hydraulic design will avoid warm or stagnant patches developing. Good design will also focus heavily on maximising daily water pumping efficiencies: through evaporation these pools will lose a similar amount of water as a conventional pool, but generally use less energy per litre of water pumped.

→

"With natural pools we can bring plants right into the swimming space."

- Landscaper Sam Cox

This natural pool at Frances Cosway's home in Hampton, Victoria, was designed by Sam Cox to look like a natural landscape. The pool itself was built by Natural Swimming Pools Australia: "When we're down there it just feels like we're in a completely different space," says Frances. "We use the pool all year – just not for swimming all year." Photo: Matthew Mallett, image supplied by White Pebble Interiors