

Sanctuary

MODERN GREEN HOMES

ISSUE
60

FLOOD RESILIENCE
SPECIAL

Retrofit tips for fast flood recovery; sustainable tapware;
mid-century gem restored; slow the flow in your garden

WATER WISE

Flood-resilient design in action



5.

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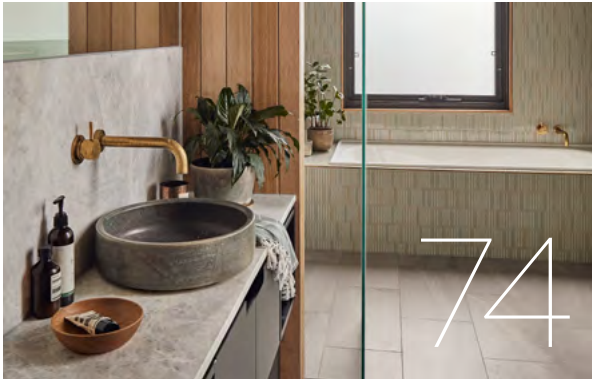
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PRODUCTS

These products are independently selected by our editorial team. If you have recommendations for products you think would be of interest we'd love to hear from you. Email: sanctuary@renew.org.au



Turbo-charged indoor plants

Plants don't just beautify our spaces, they're also great for keeping the indoor air clean. Great for workplaces, the Junglefy Breathing Stand is a self-contained unit with a bio-filtration system that removes pollutants such as bushfire smoke particles, chemicals and VOCs, effectively boosting the plants' effectiveness. Small efficient fans are used to move large volumes of air through the plants' root system, resulting in a substantial reduction in VOCs and particulate matter, according to Junglefy's testing. The stands range in size from 72 to 240 plants and require a 10-amp power point, with a built-in smart controller to manage the pump, lights and fans. The ecosystem is low maintenance, with a water reservoir large enough to last two weeks; an upkeep team makes regular visits. The system can be purchased or hired, so chat to your workplace about boosting the indoor plants.

www.junglefy.com.au

Low-silica marble-look benchtops

For those keen on a stone look for their kitchen benchtops but concerned about the nasty effect of silica dust on the lungs when stone is cut and finished, this low-silica alternative may be attractive. The new Ibrido range from Smartstone comprises mostly recycled glass, which helps to reduce the silica content to around 28 per cent, compared to up to 90 per cent in other engineered stones. Ibrido uses a hybrid print technology to recreate seven natural stone types on the 3,200mm x 1,600mm slabs, offering the look of stone without the price tag. For example, the Calacatta Oro is similar to veined Italian marble, and the Onyx Verde is a reinterpretation of an Iranian marble with green tones and a white polished finish. Prices start at \$3,350 per slab, although shop around for specials.

www.smartstone.com.au



Paint with eco style

Volatile organic compounds (VOCs) can off-gas from a range of household furnishings such as carpets and couches, as well as cleaning products and interior paints, with possible adverse health effects for residents. Thankfully, the quality of low-VOC paints has improved over the years, with more acrylic paints in this category becoming available, including the EcoStyle range by Rockcote. Made in Australia, the paints have very low VOC content and are free of dangerous chemicals and solvents including formaldehyde, glycol ethers, phthalates and crystalline quartz silica. Acrylic paint is durable, so you can scrub the walls with less fear of removing the paint, and it is also fast-drying. The paints have Good Environmental Choice Australia (GECA) certification and come in a range of sheen levels. Prices start at \$23 per litre.

www.rockcote.com.au

REVIEWS

If you have recommendations for films, books, smartphone apps, podcasts, websites or anything else, email: sanctuary@renew.org.au

PODCAST



Passive House Podcast

passivehouseaccelerator.com/podcast

Kickstart your journey or deepen your understanding of the Passive House standard for high-performing buildings with the Passive House Accelerator (PHA) podcast. Founded in the US in 2019, the PHA is a collaborative platform where leaders in the sector share knowledge and resources. The associated podcast aims to empower everyone to build better, offering practical support to guide you through the process of creating a healthy, sustainable and comfortable home.

Presenters Matthew Cutler-Welsh (based in Auckland) and Zack Semke (in Seattle) interview practitioners and changemakers in the Passive House movement from across the globe. Episode 82 is an excellent place to start: Adam Souter, director of Souter Built in Sydney, discusses his commitment to building long-lasting sustainable homes and his passion for working with clients who share his ethos. In episode 81, we hear from Perth-based architect and Passive House specialist Ben Caine, whose projects have featured in *Sanctuary* issues 52 and 58. Founder of Leanhaus, Ben outlines his mission to make Passive Houses practical, affordable, and appropriate for every climate in the country.

Easy-listening and educational, the Passive House Podcast keeps listeners in the loop about the technical challenges, current legislation and latest innovations for building a house to this rigorous standard. Whether you're a beginner or in the middle of planning your sustainable home, each episode provides useful insights straight from the experts. Furthermore, it reminds listeners that they're not alone in their Passive House journey; there's a large community to be part of and learn from.

Review by Gabriela Fannia

BOOKS



Australian Architecture: A History

Davina Jackson

Allen & Unwin, 2022

\$40

As the son of an architect, I've leafed through my fair share of solemn tomes about Australian building design. Every single one of those books assumed that the subject started with the arrival of the First Fleet, so it's very welcome indeed that this new history of Australian architecture begins with an immediate acknowledgement that, yes, there were both people *and* buildings on this continent before 1788.

Sadly, an apparent lack of primary source material means that the 50,000 years that precede invasion are addressed over the course of just five pages, leaving the remaining 307 pages for the colonisers – something of an imbalance, to put it lightly. Hopefully one day a book will provide an in-depth examination of pre-invasion approaches to the construction of shelters; this is not that book.

In fairness, Jackson's expertise is clearly architecture, not anthropology, and once she settles into discussing the subject matter with which she's comfortable, this book really hits its stride. It's organised as a straight chronological history, with each chapter addressing roughly a generation's worth of design, and Jackson's analysis is both well-sourced and well-argued. With that said, most of these eras could probably fill a book on their own: the subject of how early settlers oscillated between attempting to and refusing to adapt their designs to an entirely different climate, for example, is a fascinating one in and of itself.

As such, a book of this size is always going to be an overview, rather than an exhaustive and definitive history. But for what it is – an overview of, and introduction to, a rich topic – it's largely excellent. If you only have space for one history of Australian architecture on your bookshelf, this is as good a choice as any to fill that slot.

Review by Tom Hawking



Familiar ground

LOCATION Balnarring, VIC • WORDS Rebecca Krispin • PHOTOGRAPHY Tess Kelly

This couple enjoyed camping holidays on their coastal Victorian block for decades before building their light-filled and comfortable reverse brick veneer home and making a permanent move.

Ken and Joan have a long history with Balnarring, a quiet town on the Mornington Peninsula south-east of Melbourne. In 1977 they bought two adjacent blocks, using one of them to build a home where they lived while their children were young. They later sold this house and moved away, but kept the second block for family camping trips, using a shipping container to store their gear.

Their recent move back to Balnarring was not exactly downsizing, because as Joan explains, “we’ve always lived in fairly small houses.” But their new empty nester home is certainly a continuation of their ethos of sustainable living, which they integrated as best as they could into their first home build as well as their later Melbourne renovation.

Architect Aaron Neighbour is an old family friend who went to school with their daughter, and his firm was a natural choice for this project. “I’m a surfer – I love working on coastal homes, and I have a really good understanding of coastal house typologies,” he explains. He is also passionate about sustainable design.

As Joan explains, their brief was fairly simple. They wanted an energy-efficient home with lots of light, that was easy to move around in and low maintenance. It had to be single-level for ageing in place, and as small as possible while still meeting their functional needs. “I’ve always had a bit of a thing about courtyards, and the other thing I wanted was for every room to have a decent window – preferably north-facing,” she says.

Ken, a retired civil engineer, had plenty of technical specifications for the sustainability aspects, including thermal mass, high levels of insulation, passive solar design, solar panels and energy-efficient appliances, as well as a good-sized garage and workshop.

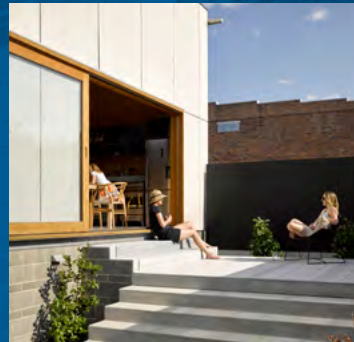
Aaron worked with his business partner Ton Vu to develop a design response: “a modern expression of the skillion shed”, as Aaron describes it.



At a glance

- Empty nester small-scale home with flexibility for visiting family
- 7.2-Star gas-free house
- Courtyard design for passive solar performance and privacy
- Reverse brick veneer using recycled bricks

Facing flood



ROAD CLOSED
BY FLOOD

While major bushfires tend to get names – Ash Wednesday, Black Saturday, Black Summer – big floods are remembered by their dates. 1974, 2011 and 2017 have resonance for Brisbane residents, 2016 for Tasmanians and 2021 for Sydneysiders, to pick just a few dates that provide a (literal) high water mark for comparison for every big rain event that comes after. For many communities in New South Wales and south-east Queensland, the floods of 2022 will top them all, with 22 people losing their lives, tens of thousands of homes and businesses inundated, and a massive cleanup effort still underway.

With such heavy rain events and flooding predicted to become more frequent in our warming climate, the importance of designing and retrofitting our homes to cope better with floods is clear. As architect Libby Ba-Pe puts it, “Flood-resilient design is about being able to prepare for and live through a flood event and to recover quickly, with as little waste as possible.” In this special, we visit five homes from Tasmania to Queensland that incorporate strategies to stay dry or to recover quickly after flooding.



↑
A small undercroft houses garage, laundry and rainwater tank, and is built with one blockwork wall for bracing and other walls of hardwood timber slats to allow floodwater to flow through and air to circulate.



↑
The house is modest in size at just 94 square metres, and has been designed without a hallway to avoid wasted space.

The steel-rib cladding is low maintenance and long lasting, designed to withstand the coastal conditions and blend into the surrounding landscape.

External stairs help optimise the upstairs layout – a compact 117 square metres including the deck. Refresh designed the open-plan lounge, dining and kitchen to serve as the circulation space giving access to the three bedrooms and two bathrooms, eliminating the need for a hallway. “Any square metres we can

avoid building is the most sustainable intervention,” says Monika. East- and north-facing windows and glazed doors bring natural light and winter sun into the living area and adjacent main bedroom, while awnings help modulate the summer sun. Windows to the south and west are kept small for thermal comfort and privacy, while allowing for airflow and cross ventilation.

Downstairs, the garage, laundry and rainwater tank are in the undercroft,

and it’s the design of this space that made flood recovery so easy. It has one blockwork wall for bracing, and is otherwise enclosed with hardwood timber slats that are durable and resistant to water damage, and are spaced to allow floodwater to flow through and air to circulate to dry out the space quickly.

The garage has had a couple of small floods in the past, but Camille and Chris were able to raise everything off the floor to avoid any loss. They were in Brisbane

High and dry

LOCATION Newcastle, NSW • WORDS Sasha Shtargot • PHOTOGRAPHY Christopher Frederick Jones

With raised living spaces and a services level designed to keep floodwaters out, this diminutive Newcastle secondary dwelling built on a budget delivers easy, breezy living.

Designing for resilience in the face of natural disasters is something that increasingly occupies the time of Newcastle-based architect Mark Spence. He's challenged to respond to local planning controls for floods and bushfires in many of the homes he and his firm Anthrosite design.

Such was the task when given the brief for a small secondary dwelling at the back of a property in Waratah, a suburb on Newcastle's flood plain. "The project is about having resilience as the base," Mark says. "If water gets through, the surfaces and finishes needed to be resilient enough to cope."

Accessed from a quiet rear street, the secondary dwelling has a cuboid, modern look that is in contrast with the workers' cottages and backyard sheds of the area, but its understated colour palette ensures it blends in. For the purposes of flood

mitigation, all habitable rooms are higher than the flood hazard level of 1.2 metres above natural ground. Below this level are the laundry, bathroom and entry from the carport, together occupying a footprint of just 17.5 square metres. In this area, materials like concrete, masonry and tiles were chosen for durability and ease of post-flood cleaning: there's a concrete slab floor, interior and exterior concrete stairs and core-filled blockwork walls. There is only one opening below the 1.2-metre flood level – the entry door – with the idea that if a flood threatened, the door could be sandbagged and floodwaters prevented from entering.

The small footprint of this enclosed area also contributes to the design for flood management. "As the site is located within a flood storage area, local controls required that not more than 20 per cent of the site be what's called 'closed storage,'" explains Mark. "We achieved a total of eight per cent, even with the two houses on the block." This ensures the property does not exacerbate water levels in its neighbourhood during a flood event, and floodwaters can flow through and away relatively unimpeded.

The owner of the property, Sydney-



At a glance

- 58m² secondary dwelling demonstrates considered urban infill
- Flood management strategies and water-resistant ground-level materials for flood resilience
- SIPs construction for speed, simplicity and environmental performance
- Designed for indoor-outdoor connection despite raised floor level



↑

This compact secondary dwelling features flood-resilient materials below the 1.2-metre flood hazard level, with wide concrete steps, terraces and decks at front and rear to promote a connection between inside and out.

based developer David Pidcock, bought the original house as an investment and wanted a secondary dwelling on the site that would be inexpensive and quick to construct – the build took just three months on site – but sustainable, avoiding the inefficiency and waste that’s typical of construction. “The plan was to keep everything simple – that was the main thing,” he says. “I’ve always been disturbed by all the time, energy and materials that go into the construction process, and it all adds to the cost. I wanted to see what cost-effective housing in Australia could look like.”

At just 58 square metres in total, the new dwelling is small and simple but conveys a warmth that is palpable. The main entrance is reached from street level via wide external stairs and a terrace, and opens directly into the east-facing living

area. Half a level further up is a mezzanine bedroom built over the bathroom and laundry. There’s a generous sense of space thanks to the high ceiling and the visual connection between the main living space and the mezzanine, and the golden colour of the oriented strand board (OSB) ceilings and wall linings adds to the warmth. This OSB is the interior face of the structural insulated panels (SIPs) used for the build, a natural choice not only for speed of construction and efficiency – doing away with the need for plastering, painting and internal trims as well as minimising steelwork – but also for their highly insulative qualities. The OSB lining and prefinished fibre cement sheet external cladding sandwich a core of rigid polyisocyanurate foam insulation over a timber frame.

Passive solar design was also

important to David, with the aim of low energy use and comfortable living for his tenants. A wide bank of north-facing double-glazed windows to the sleeping mezzanine and sliding glazed doors to the east and west sides of the living space admit plenty of sunlight to the whole dwelling, and openings are positioned for cross ventilation. Wire mesh external screening to the east and north supports deciduous vines that provide summer shading and in winter allow the sun deep inside the main living area. There are ceiling fans, but no air conditioning is needed.

Given the raised floor level of the dwelling, one of the architectural challenges was the connection between indoor living areas and the garden, Mark says. “Growing up in Brisbane, I was familiar with the experience of living in a

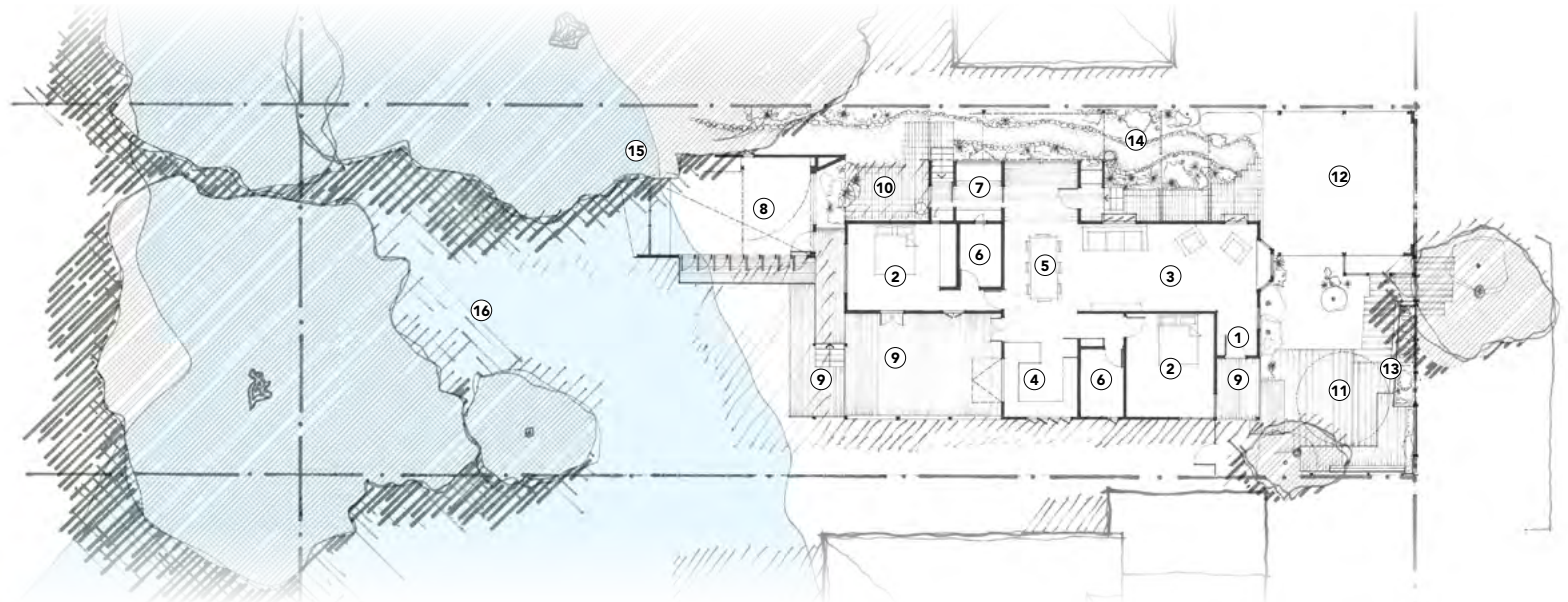


↑
A small addition to the western side of the house extends the living space and accommodates a laundry. Louvred 'vent boxes' to existing windows and adjustable slatted awnings provide shade.



↑
The new pavilion is flooded with light. A fold-down wall bed and purpose-built storage for craft supplies help maximise the usefulness of the modest-sized space.

SITE PLAN



LEGEND

- | | | |
|------------|---------------------------------------|-----------------------------------|
| ① Entry | ⑦ Laundry | ⑬ Vegie beds |
| ② Bedroom | ⑧ Office/studio/guest room | ⑭ Permeable surfaces and planting |
| ③ Living | ⑨ Deck | ⑮ Rain garden |
| ④ Kitchen | ⑩ Courtyard with clothesline | ⑯ Dry creek bed |
| ⑤ Dining | ⑪ Courtyard with rainwater tank under | |
| ⑥ Bathroom | ⑫ Carport | ● Overland flow path |

HOUSE SPECIFICATIONS

HOT WATER

- Existing electric hot water system set to heat using solar generation

RENEWABLE ENERGY

- 7.75kW solar PV system

WATER SAVING

- Allcast Precast 22,000L concrete water tank under front courtyard collects rainwater from all roofs and is plumbed to laundry and toilets
- Tank overflow directed to raingarden and dry creek landscaping in back garden
- Sponge City overland flow drainage strategy incorporated into stormwater and landscape design; see below for more

PASSIVE DESIGN, HEATING & COOLING

- Large northern window to new pavilion for natural light and solar gain
- Pavilion roof and ceiling rise toward the south to make the most of the views to the back garden and surrounding trees, and to create a chimney effect to exhaust hot air
- Insulation, 'vent boxes' to existing windows and draped slatted awnings added to western side of existing house for shade, ventilation and thermal control
- Some existing internal walls removed for more natural light and ventilation

ACTIVE HEATING & COOLING

- Hunter Pacific Concept 2 ceiling fans to bedrooms, living area and deck
- Existing air conditioning system removed

BUILDING MATERIALS

- New pavilion:
 - Pine weatherboard and unpainted magnesium oxide board cladding
 - Zinalume roof
 - Solid-core doors used for adjustable panels on eastern facade
 - Australian northern beech floorboards
- Insulation: polyester batts to pavilion walls and ceiling (R2.5) and underfloor (R2), and to western wall of existing house (R2.5)
- Spotted gum decking

WINDOWS & GLAZING

- New pavilion: timber-framed fixed and casement windows by Darra Joinery; tall sashless sliding window to south allows venting of hot air; polycarbonate skylight with custom cover for summer
- Solatube skylight to existing house

LIGHTING

- LED lights from Lumen8

OTHER ESD FEATURES

- The design incorporates water sensitive urban design (WSUD) and Sponge City principles, meaning decreased stormwater runoff from the property, reduced mains water use and increased drought and flood resilience. Principles include:
 - Replacement of driveways and paved areas with permeable landscaped surfaces
 - Rainwater harvesting, storage and use for toilet flushing and clothes washing
 - Active engagement of the property's overland flow path.

DESIGNER

Tim Bennetton Architects

BUILDERS

Greg Thornton
Constructions and
Charles Warren
Constructions

PROJECT TYPE

Renovation and extension

LOCATION

Yeronga, QLD (Jagera
and Turrbal Country)

COST

\$490,000

SIZE

House 150m²
(new built area 50m²)
Land 690m²

ENERGY RATING

6 Stars

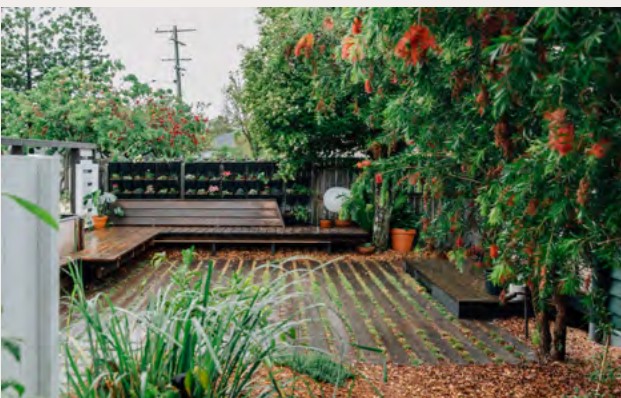
ENERGY ASSESSOR

Energy Rating Consulting

INSIGHTS

"The water management for this property includes a raingarden and a landscaped creek bed, whose plants filter stormwater before it enters the river. They also slow the water velocity, which reduces scouring. If these principles were applied over a whole catchment, stormwater runoff would take longer, reducing peak flood heights."

Tim Bennetton, architect



←

At the front of the property is a courtyard with generous bench seating and planter boxes for vegetables. A 22,000-litre rainwater tank under the courtyard supplies toilets and laundry, and overflows to a raingarden and to the dry creek landscaping in the back garden.

WATER WORKS: Flood-resilient design in action

WORDS Rebecca Gross



↑

Fairfield Flood House, retrofitted in response to Brisbane's 2011 floods, was the catalyst for architecture practice JDA Co.'s specialisation in flood-resilient design. Image: Mindi Cooke

Based in flood-prone Brisbane, the team at architecture practice JDA Co. are experts in designing and retrofitting homes to better handle increasingly common flood events. Rebecca Gross spoke with the practice's Libby Ba-Pe, who explained the basics of flood-resilient design and shared the great work being done as part of an extensive housing retrofit program in Brisbane.

The record-breaking floodwaters that inundated much of Brisbane in February and March 2022 damaged an estimated 15,000 properties, with many more households losing belongings and requiring extensive cleanups. While it is near impossible to flood-proof a home, making a house more flood-resilient will aid a quick recovery in such situations and minimise loss and damage.

JDA Co. is an architecture firm with expertise in designing, adapting and retrofitting houses to better cope with floods. "Flood-resilient design is about being able to prepare for and live through a flood event and to recover quickly, with as little

TAPPING INTO QUALITY:

Sustainable fixtures for your kitchen and bathroom

WORDS Allison Fogarty



↑

Made in Australia from lead-free brass with 65 per cent recycled content, the WELS 5 star Scala Gooseneck from Sussex Taps in Living Rustic Bronze takes pride of place in the kitchen at this renovated cottage in Sydney designed by Three Birds Renovations. Image: River Bennett

A tap is just a tap, right? Not so. Beyond aesthetics and budget, there are design and material factors to take into account. Choose carefully and you can have environmentally friendly materials and water efficiency without compromising on performance; we explain what to look for.

In the midst of a new build or renovation, faced with a multitude of material and product decisions needing to be made quickly, it can be tempting to head down to your closest hardware shop and choose the first tap that looks appealing. But taking the time to delve a little deeper when selecting tapware can help you reduce your water and energy bills and ensure you install a quality product that will stand the test of time. Here are some of the key features to look for.

DESIGN WORKSHOP:

A mid-century inspired home for a changing climate



PROJECT TYPE

New build

LOCATION

Murwillumbah, NSW

PROPOSED HOUSE SIZE

270m²

LAND SIZE

640m²

BUDGET

\$480,000

THE BRIEF

- An all-electric home using passive solar design principles
- Simple and flexible spaces to accommodate a large family and guests
- Water and moisture management strategies
- Mid-century aesthetic that aligns with the heritage values of the area

Want us to Design Workshop your house?

To apply, email sanctuary@renew.org.au with your plans and a brief outline of your project.



↑

The family's block rises steeply from the street: challenging to design for, but offering beautiful views across Murwillumbah. Image: Emma Healy

Giselle and Scott are planning to build an all-electric home for their large family in Murwillumbah, New South Wales. Located on a steep slope in a region prone to heavy rainfall, effective water management strategies will be critical to the success of the build. Architect Emma Healy from Landings Studio has come on board to help the family navigate the design process.

Married in 2021, Giselle and Scott have five children in their blended brood and would love a home that can accommodate the needs of the family now and into the future. "At any one time, there can be one of many combinations of adults and kids, adult kids and extended family, so accessibility and adaptability of spaces is important," Scott says.

The family are in the final stages of

buying land in a hilltop conservation area that has state significant heritage value. This requires homes to be situated in step with the topography with minimum cut and fill, and to be designed to ensure neighbours maintain their views. "We like the mid-century architectural style that suits the heritage of the area, particularly the traditional flat or butterfly rooflines with box gutters, but because of the heavy



OUTDOORS

Slow the flow

Gardening for flood mitigation

WORDS Allison Fogarty

Climate change is making Australia warmer and wetter, and with heavy rain events and flooding predicted to become more frequent, it's time to do what we can to prepare.

We spoke to the experts to find out what you can do in your garden to reduce the impact of flood and stormwater damage on your property.