

Family favourite

LOCATION Witchcliffe, WA

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Having experienced life in diverse places and climate zones, Aron and Jodie chose an ecovillage near Margaret River to put down roots and build their small, high-performing family home.

Jodie Passmore and Aron Dyer were born and raised in Perth, and moved around the country before building their home in the Witchcliffe Ecovillage, 10 kilometres south of Margaret River.

“We worked in the film industry and Aron’s projects often had us following the work,” Jodie says. “Even once our son was born we kept moving, between the Gold Coast, Sydney and the Macedon Ranges in Victoria, so we’ve experienced a lot of different climates. That honed our thinking about what we wanted our house to do, and how we wanted to live.”

They gained useful insights living overseas, too. “From the experience of living and working out of a suitcase, we realised that our child was thriving on not having many possessions, and we embedded that knowledge in the design of this house,” Jodie explains.

Once their second child arrived – they are now aged four and eight – Jodie and Aron sought a place to put down roots, exploring ecovillages in several states before becoming just the third family to move into the relatively new Witchcliffe development.

“We knew we wanted enough space to grow some of our own food, but not so much land that we would feel overwhelmed by the management of it,” Jodie says. “And we knew we wanted the support and relationships with others living similarly nearby – growing, harvesting, working together – but we were still keen to have a clear boundary and strata title in place.” They also wanted to be self-sufficient for electricity and water.

Jodie and Aron sketched a rough plan for a small house and showed it to a family friend and architect, Adrian Welke of Troppo Architects. Much to their surprise and delight, he agreed to help them realise the project, and put forward suggestions about how they might adjust their aspirations.

With 40-plus years of experience delivering public and private housing around Australia, Adrian was happy to





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Aron and Jodie's house is part of the developing community at Witchcliffe Ecovillage near Margaret River in Western Australia. Although the house is compact at just 96 square metres, it's well-connected to the backyard and adjacent community garden. The roof form was designed to maximise both solar access to the interior and space for solar panels.

At a glance

- 8.1-Star all-electric family home of just 96m²
- Rammed earth spine wall and concrete slab for thermal mass
- Built to Livable Housing Australia Silver Level guidelines for accessibility



← Clerestory windows flood the living space with natural light, and a concrete slab floor functions as thermal mass. The home's design meets Livable Housing Australia's Silver Level guidelines for accessibility, including step-free access, generous circulation spaces and wide doorways.



share his knowledge, and wasn't deterred by Jodie and Aron's deep green aspirations and modest budget. "Troppo's ethos has always been based on creating more appropriate housing for the climate, and we've worked a lot with people with tough budgets; not the flash end of the market," Adrian says. "In Darwin, we were new to the area, working with small budgets to create small houses that were by-and-large experimental. So the Cubby House is an expression of that core part of what Troppo does."

Although the plan was always for a very small house, conforming to the ecovillage's Sustainable Building Design Guidelines meant some of their aspirations had to be weighed up against cost during the design phase, Jodie says. "We had all sorts of features on our wishlist and Adrian would just say: 'We can do it, but think about the impact this will have on the bottom line.' He quickly got us used to deciding what we really needed and what could be added later, or wasn't suitable for this house."

The resulting home comprises two main sections topped with different rooflines: the north-facing open-plan living room has a skillion roof and clerestory windows, while the southern section contains the main entry, three bedrooms, bathroom and a tiny ensuite,

and is topped with a pitched roof. The laundry is located in the adjacent carport, which has an oversized roof to help meet the ecovillage's requirement for 50 square metres of rainwater catchment per resident: 200 square metres for this family.

As well as the ecovillage's guidelines, the house was required to be designed to Livable Housing Australia's Silver Level guidelines for accessibility. Some of the seven key elements were easy to achieve, such as doorways and corridors wide enough for easy movement of wheelchairs, and others more difficult. "Because it's a smaller home, ensuring there's enough circulation space in the rooms was a bit tricky," says Aron. "One solution was to change the bathroom doors to sliding doors to save space, which we love now. Also, the bathroom had to be wider than we had envisaged, to be fully accessible." Jodie's plans for a bath – which would have added even more area to the bathroom and placed additional demands on the tank water – were shelved, although they may install an outside bath one day.

Having settled on the form of the house, the couple were concerned about how to achieve their desired levels of passive solar performance and thermal mass using simple timber construction. They opted for a rammed earth spine wall and a polished concrete floor. "The



↑ A laundry with a roller door is cleverly tucked in at the end of the carport.

south-west of WA is a hotbed of rammed earth technology and construction; a lot of people work with the material, so you don't need to pay a premium for it," Adrian says. The final design achieved an impressive energy rating of 8.1 Stars.

Adrian also introduced Aron and Jodie to experienced local builders Bill Alexander of Lat 34 Constructions and Doug Simpson of Simpson Builders, who delivered the project together. "They were all just the loveliest guys, so thoughtful and with extreme attention to detail – we were lucky to have them," Jodie says. They were also fortunate to complete their build before the most recent material price rises started to bite, moving into their new home in December 2021.

Since then, they've planted their own fruit trees and gardens shared with their neighbours. And their children have embraced village life, playing with friends on communal play equipment that's visible from the kitchen windows. Jodie says there is a "a flurry of kids" running in and out of the house on weekends.

They are happy with the way the house operates thermally, having experienced the most extreme seasons already. "It performs amazingly in the summer, it's so easy to stay cool, and it is performing well in winter," says Jodie. "We've laid coils for underfloor hydronic heating, so we can install a heat pump down the track if we decide that's necessary, but so far we

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Aron designed and built this wall bed with integrated desk for the third bedroom, allowing for an easy transition from study space to guest room. The ensuite is attached to this room, not the main bedroom: a deliberate choice to reflect the family's lifestyle. "We prefer to all use (and clean) the one main bathroom, and the other one stays nice all the time for visitors," explains Jodie.

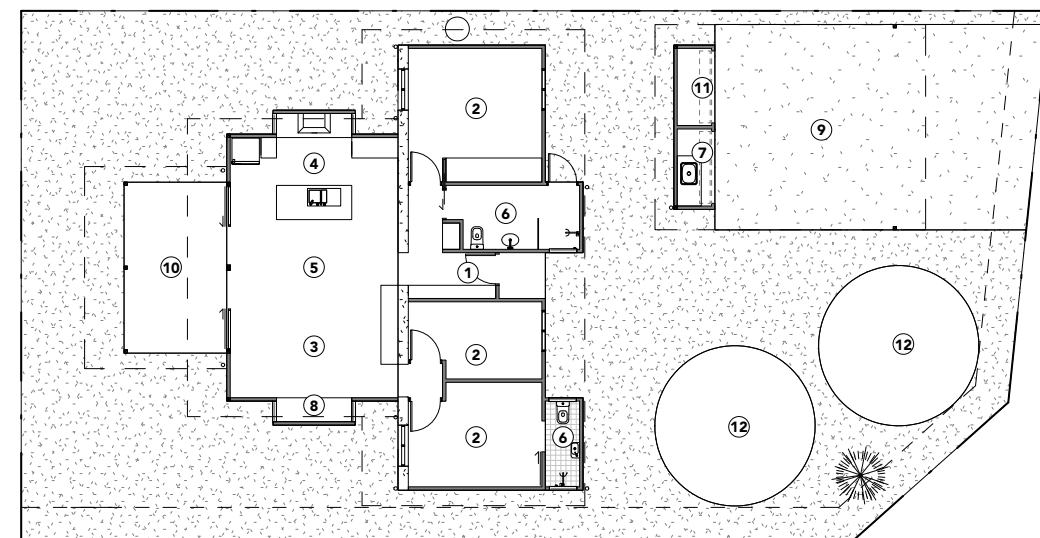
haven't needed it."

Spatially, the small footprint offers plenty of surprise and delight, Aron says. "I love the bathroom and the high windows in the living space – the kids call them the moon windows. It's awesome to watch the moon rising throughout the year, and also to see the passage of the sun moving up and down the rammed earth wall, tracking the seasons."

Even visitors express surprise at the generosity of the internal spaces, Jodie says. "We've had a couple of people come in and say: 'Oh, it's not small at all!'," she laughs. "Everyone has been very positive: they say they love the rammed earth wall and the height of the ceilings. People have a preconceived idea of what the ecovillage might be like, but it's been beyond our expectations living here: a real community is forming. It's been so good for our family." ⑤



FLOOR PLAN



LEGEND

- ① Entry
- ② Bedroom
- ③ Living
- ④ Kitchen
- ⑤ Dining
- ⑥ Bathroom
- ⑦ Laundry
- ⑧ Study nook
- ⑨ Carport
- ⑩ Covered deck
- ⑪ Store
- ⑫ Water tanks

HOUSE SPECIFICATIONS

HOT WATER

- 250L Enviroheat heat pump hot water system

RENEWABLE ENERGY

- 8.6kW solar PV system with Fronius Symo inverter
- Solar system connected to ecovillage strata cluster microgrid, enabling access to shared 232kWh Tesla battery and trading of solar power between neighbours

WATER SAVING

- 2 x 37,000L Pioneer rainwater tanks plumbed to whole house; overflow runs to a swale which leads back to the ecovillage dams
- Water Wally Greyflow greywater system

PASSIVE DESIGN, HEATING & COOLING

- Optimised northern glazing including clerestory windows for maximum winter sun
- Eaves and verandah roof at 34 degrees, designed for summer shading and winter solar gain to thermal mass of rammed earth spine wall and concrete slab
- Cross ventilation paths and louvre windows

ACTIVE HEATING & COOLING

- Aeratron AE+3 ceiling fans to living area and two bedrooms
- Hydronic heating coils installed in slab; could be connected to a heat pump in future

BUILDING MATERIALS

- Timber frame construction with some structural steel
- Rammed earth spine wall using local (10km away) earth from Redgate Lime
- Zinalume roof
- Burnished concrete slab floor
- Cladding: western red cedar (PEFC-certified) and Shadowclad (FSC-certified)
- Austral Ply Formply and plywood kitchen cabinetry
- Insulation: antiglare foil to roof (R1.3); Bradford batts to ceiling (R4); bulk insulation to walls (R2.7)

PAINTS, FINISHES & FLOOR COVERINGS

- Dulux low-VOC interior paints
- Livos Oil finish to plywood joinery
- External cladding finished with Lanotec

WINDOWS & GLAZING

- G.James by Dowell aluminium-framed low-e double-glazed windows and doors
- Breezway Altair low-e glass louvres in bedrooms, bathrooms and living area 'pop-outs'

LIGHTING

- Warm white LED downlights from Unios
- Feature pendant in kitchen made from clay by MUD Australia
- Minimal exterior lighting in keeping with ecovillage's prioritisation of stargazing and nocturnal wildlife

OTHER ESD & UNIVERSAL DESIGN FEATURES

- All-electric house with induction cooking and high star-rated appliances
- House achieved a carbon impact result of -107% GWP using the RapidLCA life cycle assessment tool, making it carbon negative over its lifetime (see article on p82 for more)
- Built to Livable Housing Australia's Silver Level guidelines; accessibility features include:
 - Step-free access from boundary to entrance door (a small ramp can be placed over the door frame edging)
 - Slip-resistant hobless shower with extra wall studs for future grab rails
 - 1,200mm clear circulation space in front of toilet, and sliding doors to bathrooms to prevent falls blocking the door
 - Toilet located in corner and extra wall studs installed for future grab rails
 - Doorways to all rooms have a level transition and clear opening of 820mm
 - Clear circulation space in the living area and kitchen
 - Main bedroom is 15m² with ability to have 1m space on each side of bed
- Space-saving furniture including a shoe bench and a wall bed with desk
- Food-producing gardens plus native front garden and productive verge trees
- Part of a strata group of 19 houses; strata company is a shareholder of Ecovillage Commons, a not-for-profit association owning 40ha conservation area, dams, village-scale community centre, avocado orchard and woodlot irrigated by household wastewater

DESIGNER

Tropo Architects

BUILDER

Simpson Builders and Lat 34 Constructions

PROJECT TYPE

New build

LOCATION

Witchcliffe, WA (Wadandi Country)

COST

\$390,000

SIZE

House 96m²
Land 500m²

ENERGY RATING

8.1 Stars

ENERGY ASSESSOR

Lisa Enoka,
Margaret River
Structural Engineering

BUSHFIRE ATTACK

LEVEL

BAL-Low

INSIGHTS

"The builders gave us the option of a lighter-coloured rammed earth wall using limestone sourced from 100 kilometres away. A redder earth was available just 10 kilometres away, so we went with that. We were always considering the carbon footprint."

Jodie and Aron,
homeowners