

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



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Ready for anything

LOCATION Ashgrove, QLD • WORDS Emma Scragg • PHOTOGRAPHY Christopher Frederick Jones



At a glance

- Raised, renovated and extended family house designed to weather flood and fire and for sustainable living
- Energy rating improved from zero to 8.4 Stars
- Different garden zones for privacy, food production and connection with community
- Grid-independent solar PV system with batteries
- Reticulated gas connection removed

On a Brisbane creek, this postwar house was reinvented to encourage resilience through sustainability, community engagement and design for flood and bushfire threat.

When the waters of this year's floods lapped just over one metre up the ground floor walls of Anna and Leighton's home in Ashgrove, Brisbane, they were confident they could ride out the flood with minimal damage. Their recent renovation had raised and updated the existing postwar-era home to make it resilient to both flood and bushfire.

Even though their creekside area hadn't flooded since 1974, they were required to build to the one per cent Annual Exceedance Probability (AEP) flood level, updated in the Brisbane City Plan after the 2011 floods. They're glad they did, as waters rose to just 20 millimetres below this line. Few other homes in their street were impacted so lightly. With no power connection for five days, Anna and Leighton were able to run their home from their solar array and Tesla battery, intentionally installed clear

of the high-water line. "We felt happy and triumphant in our home," says Anna.

One 25-square-metre enclosed room was allowed in the flood zone, serving as the entry and a work or recreation space. When the waters receded, this free-draining lower floor – designed to survive inundation with its robust finishes of concrete slab, exposed core-filled blockwork, and hardwood and marine ply for the stairs – was simply hosed down. Part of this room was lined with painted fibre cement sheet, though; while it is water-resistant, the wall cavity behind it filled with moisture and the lower sheets were removed to allow the timber framing to dry out. "Blockwork would have been a better option here too," reflects Leighton.

As part of the lift of just over half a metre, the house was pushed back nearly two metres to a more central position on the block, providing good-sized gardens to the front and rear. The private backyard is terraced with food trees, a saltwater pool, chicken coop and beehive. In contrast, "our front garden is a theatre of family activity and engagement with the community, via regular over-the-fence chats with families on bike rides and friends jogging past," says Leighton.

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Raised, renovated and extended, Leighton and Anna's family home is surrounded by gardens and space for chickens and native bees. There is also a pool that doubles as water storage for firefighting.





The home now incorporates living spaces on three levels, including a roof terrace with a productive garden.



The undercroft features a shady outdoor area for activities, plus the entry lobby and a flexible-use room; designed for flood resilience, it employs water-resistant materials and was able to be hosed out easily after its recent inundation.



The neighbourhood community is what attracted the couple to their block in the first place. Anna, who grew up 800 metres away, laughs “My brother says we got the sweet spot of my childhood”, midway between her family home and where she swam as a girl.

“We loved the weatherboards and timber elements of the original home. It was such a great, solid structure,” Anna goes on. Despite significant alterations and additions, elements of the original home are still subtly visible – casement windows along the sides, weatherboards and the narrow hardwood floorboards. “We retained the hardwood wall and floor framing, which was very square and true,” says Leighton. Materials and items that could be reused were integrated into the renovation or sold on the secondhand market.

The redesign of the house had passive solar performance at the forefront, and the NatHERS energy rating was improved from zero to an impressive 8.4 Stars. The house steps back and up the hill to

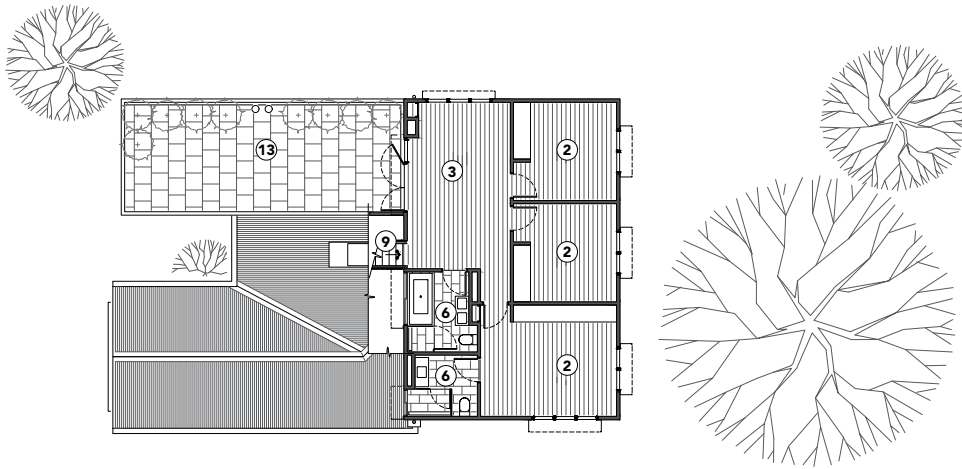
capture northern winter sun from across the street as it peeps above the tall figs by the creek. In summer the central stairwell creates a heat stack, drawing cooled air from the thermal mass of the entry and the well-ventilated main level up to the sunny terrace with its highly productive garden. This green hideaway escapes many predatory bugs and is perfect on winter days and summer nights. The terrace also provides safe access to the solar array on the roof behind, the slope of which was designed specifically with photovoltaics in mind.

While the house’s edible gardens provide lush surrounds, large areas of bushland beyond the creek present a bushfire risk. Crimsafe screens and gutter guard aid fire resistance and permit secure natural ventilation, and are low maintenance. With the grid-independent battery bank and a pump connected to the pool and rainwater tank, Leighton and Anna are able to protect their home even if there are grid electricity interruptions or reduced mains water pressure.

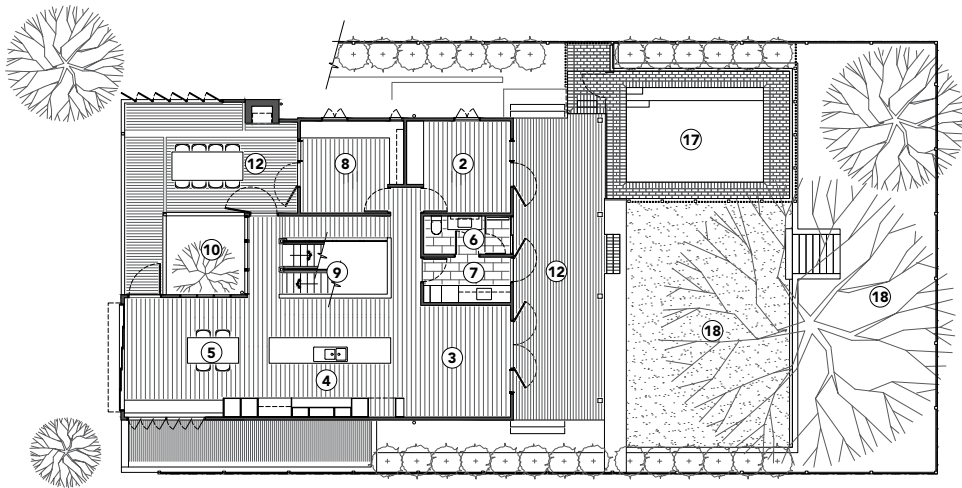
Through Covid, the family enjoyed unexpected benefits of their design for flexible living. There were many options for places to play, retreat and work over the three levels and two gardens. The connection with the street even made quarantining a pleasure: “We had two weeks of hard isolation because of close contacts, but we could catch up with people every day, hanging out at the fence, with the kids playing in the front yard,” they explain.

Anna and Leighton are both architects, and loved working in their home office during Covid so much that they established their own full-time home-based architecture practice, contexture. “It’s a great space, with its abundant natural light and ventilation and direct connection to the main deck,” says Anna. Their home has survived a major flood and a global pandemic, and it’s likely that it would be unscathed in a bushfire too – an excellent result. 🌿

SECOND FLOOR PLAN



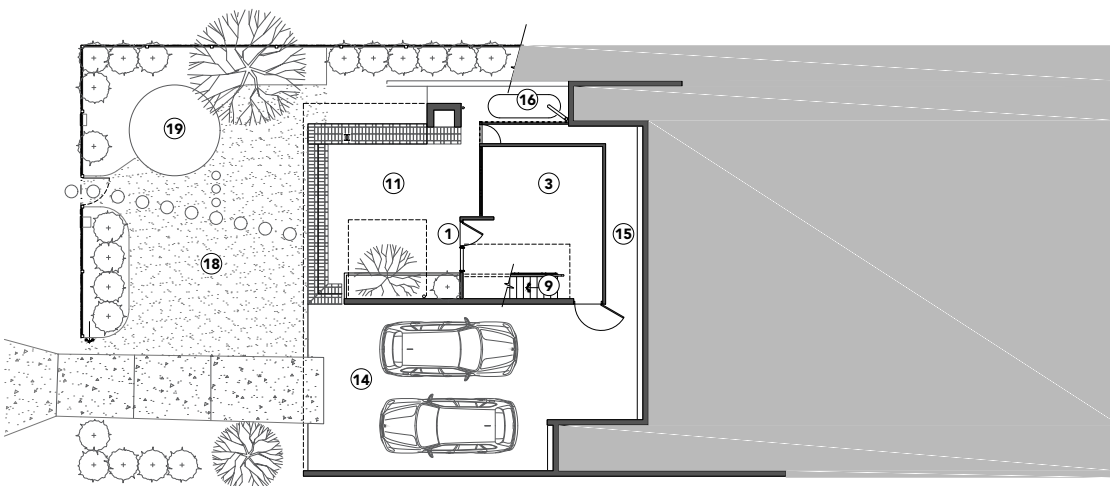
FIRST FLOOR PLAN



LEGEND

- ① Entry
- ② Bedroom
- ③ Living
- ④ Kitchen
- ⑤ Dining
- ⑥ Bathroom
- ⑦ Laundry
- ⑧ Home office
- ⑨ Stairs
- ⑩ Void
- ⑪ Covered outdoor living
- ⑫ Deck
- ⑬ Roof terrace
- ⑭ Garage
- ⑮ Services
- ⑯ Rainwater tank
- ⑰ Pool
- ⑱ Garden
- ⑲ Trampoline

UNDERCROFT PLAN



HOUSE SPECIFICATIONS

HOT WATER

- Envirosun 400L solar thermal hot water system, electric boosted

RENEWABLE ENERGY

- 6.24kW solar PV system: 24 x 260W Tier 1 BYD panels with Fronius inverter
- Tesla Powerwall 2 (13.5kWh) connected to the AGL Virtual Power Plant network

WATER SAVING

- Low-flow fixtures
- 3,000L Kingspan Modline galvanised rainwater tank plumbed to toilets, washing machine and gardens
- 20,000L saltwater pool from Performance Pools with variable speed pump, pool cover and solar electric heat pump

PASSIVE DESIGN, HEATING & COOLING

- Optimised northern glazing with considered shading design
- Exposed blockwork and concrete slab for thermal mass
- Central stairway for stack ventilation
- Extensive louvres and Crimsafe screens for natural ventilation while maintaining security
- Extensive insulation
- Variety of exposed and shaded decks for year-round outdoor living

ACTIVE HEATING & COOLING

- Daikin 7-zone ducted reverse-cycle air conditioning system
- 10 x Big Ass Fans Haiku ceiling fans to decks, living areas and bedrooms

BUILDING MATERIALS

- Timber framed structure of existing house largely retained
- Exposed structural steel to front facade to achieve broad spans and cantilever
- Polished concrete slab and core-filled blockwork walls to undercroft
- Cladding: naturally bushfire- and termite-resistant spotted gum (AFS-certified) and HardieFlex fibre cement sheet, plus reused existing weatherboards
- Lysaght custom orb and Trimdek roofing
- Claypave bricks to fireplace and pool surrounds

- Flooring: existing brush box floorboards retained plus new spotted gum floorboards
- Insulation: Glasswool batts to upper level ceiling and foil-backed board to roof (total R4.6), Bradford SoundScreen batts to internal walls (R2.5) and upper level floor (R3.1), Bradford Gold Hi-performance batts to external walls (R2.7)
- Stairs: spotted gum treads with perforated metal riser infills and marine ply balustrades
- Heka Hoods for window shading

WINDOWS & GLAZING

- Existing windows salvaged and reused
- New windows and glazed doors: aluminium-framed with tinted and low-e glass from G.James, incorporating Breezway louvres and Crimsafe screens
- Velux skylight

LIGHTING

- LED lighting throughout
- Sensors and timers on lighting

PAINTS, FINISHES & FLOOR COVERINGS

- Bona Traffic low-VOC timber sealer to floors
- Sikkens Cetol HLS protective finish to decks

OTHER ESD FEATURES

- Renovation with retention of existing structure and finishes, and minimal waste to landfill; salvageable items sold on secondhand market to enable reuse
- Designed for flood mitigation and management with raised habitable floor level, robust lower floor materials, services above the 1% AEP flood level and free flows to avoid water retention
- Bushfire risk addressed with extensive Crimsafe screening, gutter guard, electricity backup with battery, pumps and pool as a water source
- Home office for homeowners' architecture practice
- Reticulated gas connection removed; bottled gas currently used for cooktop but this will be replaced soon with induction
- Edible gardens using Vegepod beds, chicken coop and native stingless bees
- Roof terrace designed with capability for hydroponics in the future

DESIGNER

contexture

BUILDER

Rynders Constructions

PROJECT TYPE

Renovation and extension

LOCATION

Ashgrove, QLD (Jagera and Turrbal Country)

COST

\$880,000

SIZE

House 224m²
Decks 110m²
Undercroft 136m²
Land 556m²

ENERGY RATING

8.4 Stars

ENERGY ASSESSOR

Accelerate Sustainability Assessments

INSIGHTS

“When talking about flood levels, it’s best to avoid terminology like ‘one in a hundred year flood level’ as it can be misinterpreted easily; it’s not the case that such floods will only happen once every one hundred years. Instead, authorities encourage us to talk about the 1% Annual Exceedance Probability (AEP), as there’s a one per cent chance we’ll see floods that reach this level in any given year.”

Leighton Thomas,
architect and homeowner