



A large grey gum acts as a column to support the loft and roof, while flitches (offcuts from milling) were used to create feature walls of different colours and depths.

Form and function

Balance, harmony, sustainability and self-sufficiency are the principles behind the design of this rammed earth and timber New South Wales coastal home.

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PHOTOGRAPHY Simon Whitbread

YOU WOULDN'T THINK A HOUSE IN IDYLIC CHARLOTTE BAY ON THE New South Wales mid-north coast needed much more to make it balanced and harmonious. Architect Ian Sercombe thought otherwise.

Ian, his wife Kate and their seven-year-old daughter Sage moved into their new three-bedroom rammed earth and timber home last year after 18 months of construction. Located in a tranquil hamlet between Newcastle and Port Macquarie and constructed with the help of a small group of tradespeople, the 256 square metre house and home office on a 2.5 hectare block is cleverly designed to make passive use of the plentiful mid-north coast sunshine and prevailing north-east breezes. The house faces north and is long and narrow, ensuring all the main rooms are well ventilated in summer. Eaves prevent direct summer sun entering the house; external shutters provide shade to windows on the east and west sides; and removable shade sails on a pergola control sunlight to the northern deck, stopping heat bouncing from the deck into the home.

Good ventilation is crucial on humid, hot days. The living area and two of the bedrooms have windows on the north and south sides and there are smaller louver windows along the hallway. When windows and doors are opened, breeze paths carry cool air through the house. Thermal mass is provided by the 400 millimetre thick rammed earth walls and the concrete slab, their performance aided by insulation in the roof and walls. An added feature is the trombe wall in the study, a sun-facing wall separated from the outdoors by glass and an air space which absorbs heat and releases it gradually towards the interior at night. "The house is always cool in summer," Ian says. "We have a ceiling fan, but it's only been used once." A wood-fired heater with an oven and plate on top for cooking is used for about three months of the year when needed. →





④ The loft bedroom looks out over the breezeway to the north. Walls are lined with locally milled Blackbutt and MDF.



① A vegetable garden and small orchard provide a large percentage of the family's fruit and vegetables. "Chickens supply more than enough eggs for the household, as well as fertiliser for the garden," says Ian.

The timber in the house is a mix of local hardwoods like Blackbutt (walls and floorboards) and wood cut and milled from the family's previous property. Red mahogany that had fallen due to termites has been transformed into bathroom benchtops. A large grey gum has become a column in the living area to support the loft and roof. Most impressively, the offcuts from milling, called flitches, were kept and used to create feature walls of different colours and depths in the living room, toilet and garden shed. "Many of the flitches have borer paths visible. Nearly everyone who visits puts their hands on the grey gum post or the flitch wall," Ian says.

Wherever possible, non-toxic or low-toxic materials were used in the interior. The floor and joinery have been finished with natural oils, and there are no floor coverings. The family keeps a meter in the house to measure chemical pollutants in the air and it always registers zero.

The house has a 2.2 kilowatt photovoltaic solar power array and a 315 litre evacuated tube solar hot water system. Household energy use is about 10 kilowatt-hours per day, which is economical for a family of three with Ian running his business from home. "I like that we receive a cheque from the electricity supplier for all

the excess electricity we produce," says Ian.

Rainwater tanks are also central to the family's ethic of sustainability and self-reliance. The entire house is plumbed to tanks with a capacity of 20,000 litres. The pump for the tanks automatically switches to town water if the tanks run dry, but thanks to plentiful rainfall there has been no need to use mains water so far. "There is town water connected, but it tastes awful," Ian says. "The cost is always increasing too." The garden is watered from a small dam on the property, with swales (ditches or land contours) directing water flow efficiently through planted areas. Vegetable gardens and a small orchard provide the bulk of the family's fruit and vegetables, while their coop of 20 chickens is a constant production line of eggs and garden fertiliser.

Of all the home's sustainable features, Ian is most proud of the rammed earth walls. Chosen for its excellent thermal properties, the mass of crushed sandstone makes the house feel warm and solid. "It radiates an amazing energy as well as being incredibly functional. Having a good team of tradespeople who were understanding of our aims assisted immensely. It made being on-site very enjoyable." ⑤



The building's long narrow footprint and window design take advantage of the prevailing north-east breezes, maximising breeze paths and carrying cool air through the house. The ceiling fan in the loft is the only active cooling but is used rarely, says Ian. Blackbutt floorboards have been used in the loft, studio and entry. Wherever possible, Kate specified non-toxic materials, including wall and timber finishes.



Rammed earth "radiates an amazing energy as well as being incredibly functional".



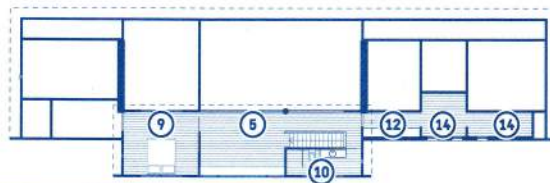
The fitch wall is a prominent feature in the living and kitchen areas, with many borer paths visible in the timber. "Nearly everyone who visits puts their hands on the grey gum post or the fitch wall," says Ian.



A pergola with adjustable shade sails moderates sun to the north façade and decking area, while a roof overhang prevents the ingress of sun in the summer months.



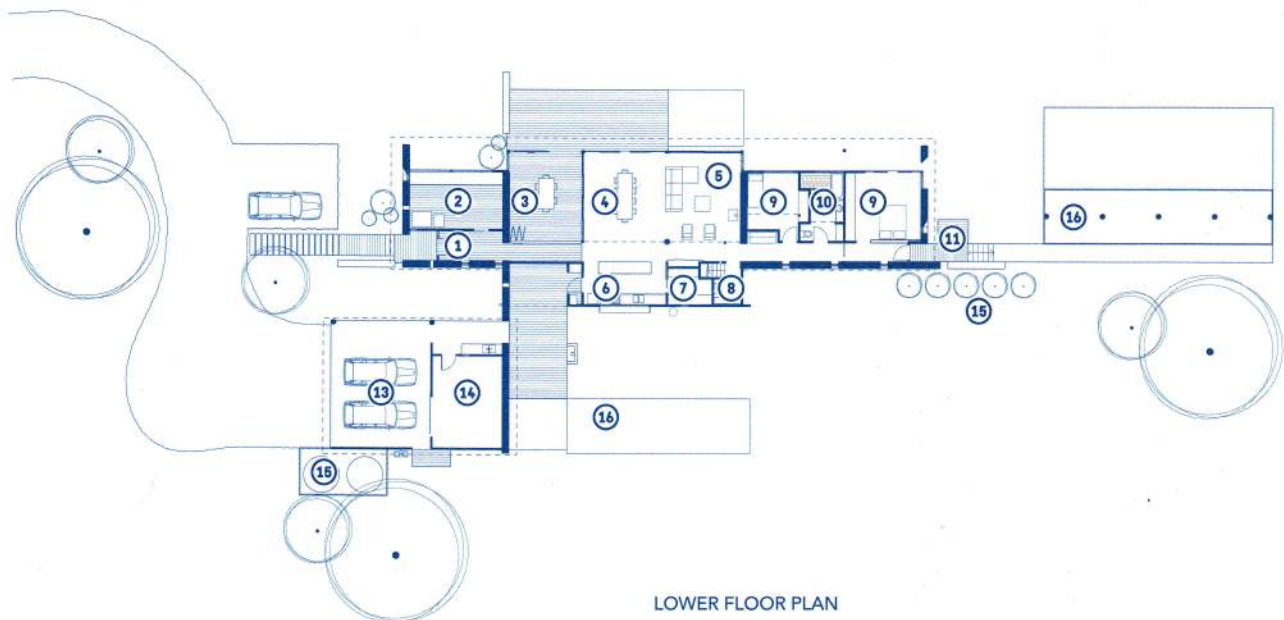
➡ The entire house is connected to two 10,000 litre water tanks with supply backed up by town water. The timber for the Flooded Gum island benchtop was milled from a fallen tree on Ian and Kate's previous property. Five lengths of the 200 x 50 millimetre timber were biscuit joined on-site by local builder Allan Dunn.



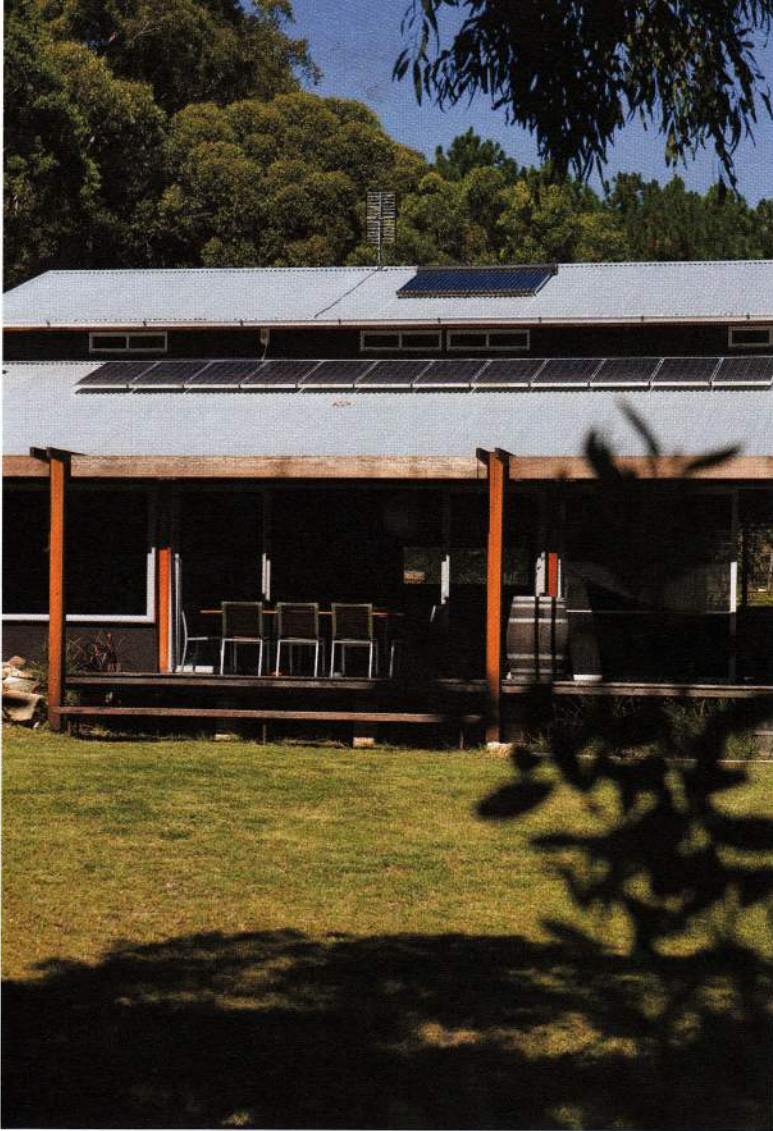
LEGEND

- | | |
|-------------|--------------|
| ① Entry | ⑨ Bedroom |
| ② Study | ⑩ Bathroom |
| ③ Breezeway | ⑪ Shower |
| ④ Dining | ⑫ Robe |
| ⑤ Living | ⑬ Carport |
| ⑥ Kitchen | ⑭ Store |
| ⑦ Utility | ⑮ Watertanks |
| ⑧ WC | ⑯ Garden |

UPPER FLOOR PLAN



LOWER FLOOR PLAN



↑ Ian and his family use about 10 kilowatt-hours of energy per day, supplied by a 2.2 kilowatt photovoltaic solar power array. They also have a 315 litre evacuated tube solar hot water system.



↑ Red mahogany from trees that had fallen due to termites has been transformed into bathroom benchtops. Low flow taps and shower fittings have been used in the bathrooms and kitchen.



↻ Louvre windows help maximise breeze paths through the house.

Charlotte Bay home

—Specifications

Credits

DESIGNER

Ian Sercombe Architect
www.isarchitect.com.au

PROJECT TYPE

New build

PROJECT LOCATION

Charlotte Bay, NSW

COST

\$400,000

SIZE

House & office studio 256 sqm,
 land 2.5 ha



Sustainable Products

HOT WATER

– Apricus evacuated 30 tube system with 315L tank and separate boost switch so boosting is done only when required www.apricus.com.au

WATER SAVING

– The entire house is connected to 20,000L of water tanks from Cessnock Tank Works. The water is distributed by a Davey water pump and Rainbank controller, purchased from Town Plumbing, Forster

www.cessnocktankworks.com.au,
www.davey.com.au

– Low flow taps and shower fittings
 – Garden watered from a small dam, not with mains water.

“The design incorporates provision for another 10,000 litre tank; however, with the high rainfall in this area it’s not looking like it will be necessary,” says architect and owner Ian.

RENEWABLE ENERGY

– Grid connected 2.2kW photovoltaic system with SMA Sunny Boy inverter from STS Services in Wootton, NSW
www.stsservices.com.au

“The house currently uses about 10 kilowatt-hours a day. This is well under the average use (about 18 kilowatt-hours a day) for a family of three running a business from home,” says Ian.

PASSIVE HEATING & COOLING

– House sited for maximum passive solar performance
 – Thermal mass from concrete slab and 400mm thick rammed earth walls
 – External shutters to control sun to east and west windows
 – Cross ventilation to all habitable rooms attained with long narrow

building footprint

– Pergola with adjustable shade sails to moderate sun to north façade
 – Roof overhang designed to prevent the ingress of sun in the summer months

– Insulation: Framed walls insulated with Autex GreenStuf (R2.0); roof insulated with Kingspan AIR-CELL plus GreenStuf (R3.5 total)

www.autex.com.au,

www.kingspaninsulation.com.au

– Trombe wall to studio.

ACTIVE HEATING & COOLING

– One ceiling fan
 – Metal Dynamic Gourmet wood-fired heater with oven and plate on top to cook. “This gets used for heating and cooking for about three months of the year,” says Ian.
www.metaldynamics.com.au

BUILDING MATERIALS

– Rammed earth walls by East Coast Rammed Earth

www.eastcoastrammedearth.com.au

– Timber lined walls and floorboards throughout in locally milled Blackbutt

– Reclaimed Flooded Gum island benchtop. The timber was milled from a fallen Flooded Gum on a previous property and the five lengths of the 200mm x 50mm timber were biscuit joined on-site by local builder Allan Dunn.

– Concrete slab with burnished finish in the main house

– Alpine Premium E0 low formaldehyde emitting MDF lining to walls and ceiling from Gunnensen

www.gunnersens.com.au

– Timber milled from trees from a previously owned property.

WINDOWS & GLAZING

– Single glazed with Viridian ComfortPlus glass
www.viridianglass.com

LIGHTING

– A variety of compact fluorescent fittings, including downlights, battens, oysters
 – Some handmade shades by architect and owner Kate.

PAINTS, FINISHES & FLOOR COVERINGS

– Bio Products paint supplied by Eco at Home in Willoughby, NSW

www.bioproducts.com.au

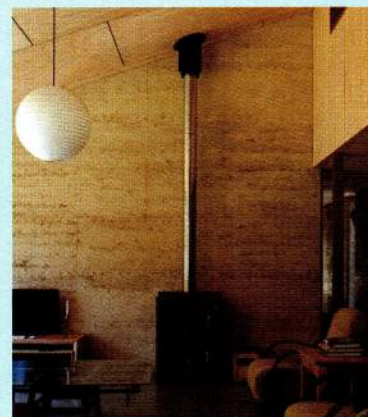
– Kunos Natural Oil by Livos for timber and concrete floors

www.livos.com.au

OTHER ESD FEATURES

Garden and food:

– A vegetable garden and small orchard provide a large percentage of the family’s fruit and veg.



↑ The wood-fired heater with oven and cook plate is used for about three months a year. The burnished concrete slab and 400 millimetre thick rammed earth walls throughout the house provide thermal mass to maintain comfortable indoor temperatures.