Collective wisdom

Subdividing her backyard to build a small-footprint house for herself has allowed Vicky Grosser to show how appropriate development can improve the sustainability and affordability of our cities.

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PHOTOGRAPHY Ferne Millen

VICKY GROSSER HAS LET OUT ROOMS in her three-bedroom Geelong West house for years. Along the way she's forged enduring friendships and saved on resources by sharing her space. But as she neared her 60th birthday she began to think about how she could downsize into something smaller and more efficient, and free up the house for other people to share the double lot in a sustainable way.

"I originally thought about building a Tiny House or granny flat in the backyard," she says. "After chatting with a cousin who is a town planner I decided it was best to build something more permanent." This decision had pros and cons. Vicky was forced to subdivide, adding cost, as Victoria's restrictive secondary dwelling laws still require a dependency relationship between granny flat residents and the main house. But by setting her 'tiny' house on foundations (rather than wheels) the project could be useful to demonstrate how to increase density without sacrificing greenspace.

"I wanted to share the experience of doing things differently – with this project we had the chance to build small and high quality and use local suppliers and materials," says Vicky, who is a potter and a carbon manager, working with individuals and businesses to reduce their energy use. "Most of us live in large homes to store stuff we hardly use, and really it's just extra space that has to be heated and cooled."

Fortunately, the 650-square-metre block was ideal for subdivision. The backyard faces north, and the rear right of way made it easy to divide the land to keep Vicky's large pottery shed (in which she'll park her car and store items she uses occasionally) and the magnificent eucalypt tree on her side of the fence. Architecture graduate Dan Prochazka – her friend and a former tenant who has experience building tiny houses on wheels – became the designer.

"The brief was very detailed. The main part was to make the small space feel big and liveable. Vicky also gave me a list with the dimensions of her existing furniture she wanted to keep," says Dan. "I've taken a few tricks from the tiny house movement, like not segmenting the space into rooms and instead leaving the bedroom and living spaces partially open." The resulting split-level design is as charming as it is efficient. Extensive glazing to the north and east 'borrows' space from outside; the double-height ceiling and open mezzanine make the interior feel spacious, and the second-hand materials and furniture are welcoming and attractive.

Building something low-carbon was also important to the brief and materials

The project was a genuine collaboration between owner Vicky Grosser, designer Dan Prochazka, local builder Mark Lane and carpenters Duff Swanson and Pete Baird.

A roof-mounted SolarVenti air heater allows warm solar heated air to enter the house causing stale air and humidity to be expelled.

The structure is highly insulated and oriented to the north to optimise solar gain in winter; custom-built timber shading devices exclude direct sunlight from the north and west in summer.

"The shape would have been just a square cube, but it's been shaved off by the planning code and trimmed back because of the tree," explains designer Dan Prochazka. Cladding materials were chosen depending on the orientation of the walls: green corrugated Colorbond faces south to blend into the trees, reflective white Colorbond Coolmax is used on the west (and roof) to reflect heat and timber is used on the north and east.

were chosen for their low embodied energy; to the extent where even the double-glazed units were made without argon gas: "I wanted to avoid greenhouse gases wherever possible," says Vicky, who commissioned local company Pickering Joinery to instead supply DGUs with a wider-than-standard 12mm air gap.

The house is ideally oriented for passive solar design and sealed tight to avoid air leakage. Hand-crafted timber louvres are angled to shade the northern glazing fully in summer but allow maximum solar penetration in winter to warm the recycled red brick floor. The glazing has been well thought through: cute, reclaimed stained-glass windows prevent overlooking and are triple glazed for thermal performance, openable windows are located to capture breezes and there is no glazing to the west.

For the design of the building envelope they involved energy assessors Ecogenie and ecoMaster insulation expertise to help refine the all-electric home so it would be energy efficient enough to utilise just a 1.08KW solar PV system, perhaps with a battery addition after energy use has been monitored. Their modelling shows that with the extensive insulation, Vicky will need to use her reverse-cycle air conditioner only sparingly.

Vicky has been hands-on throughout the build, supervising trades, painting, cleaning bricks and installing insulation. "I am the trainee apprentice," she laughs. The close bond between Vicky and Dan now extends to local builder Mark Lane and carpenters Duff Swanson and Pete Baird. Each of them contributed ideas above and beyond their 'official' role, drawing on years of outside the box expertise and, in the process, developing new skills in environmentally sustainable design.

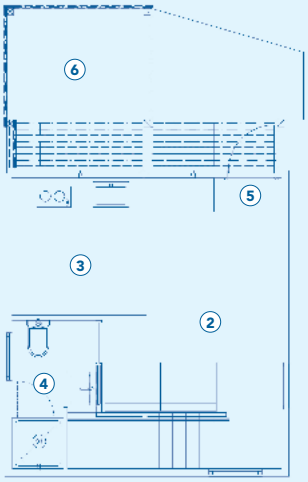
"Everyone has been so supportive, it's been a really empowering experience," says Vicky. "I was big on the small details like insulation and filling gaps, and the team have told me that this project is the first time they've been given the time to really do some aspects properly. I've chosen to spend money on labour and reclaimed wood, rather than new materials."

"There's not many projects around like this one," says Dan. "It's been pleasant to have a lot of cross-dialogue with the builders, with Vicky, with the building surveyor and the engineers. Normally the architect is the only one who talks to all of them whereas in this project everyone is talking to everyone." S

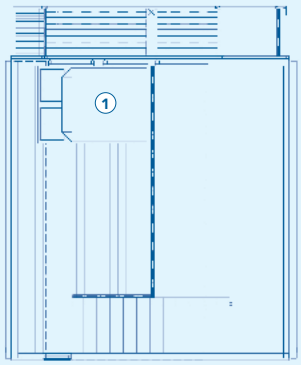
The project achieved a 7.2 Star energy rating, but the expect 'as built' will perform even better, which will be confirmed with 12 months of energy monitoring. Heating, cooling, energy and mains water use are kept to a minimum due to the home's compact size, high energy rating and choice of efficient electric appliances, and on-site rainwater storage.

Although built for Vicky to enjoy in her older years, the small footprint required stairs: "Ideally we wouldn't have made it two storeys, but the nature of the subdivision made that necessary. There is space for a daybed downstairs; we'll see how her knees hold up," laughs designer and friend Dan Prochazka.

GROUND FLOOR PLAN



FIRST FLOOR PLAN



LEGEND

① Bedroom
② Living
③ Kitchen/dining
④ Bathroom/laundry
⑤ Entry
⑥ Deck

Tree hugged small house

—Specifications

Credits

DESIGNER/BUILDER
Dan Prochazka Designs

TRADES
Mark Lane Quality Builders; Restoration Carpentry; Oasis Permaculture; Manage Carbon; Green Earth Electrical; Southend Plumbing Solutions

PROJECT LOCATION
Geelong, Wadawurrung Country

PROJECT TYPE
New build

COST
$250,000

SIZE
House 40 m² (includes 13 m² mezzanine)
Land 244 m²

BUILDING STAR RATING
7.2 Star

Sustainable Features

HOT WATER
– Sanden heat pump 160L.

RENEWABLE ENERGY
– 1.08kW Tindo Solar PV system (installed on adjacent shed).

PASSIVE DESIGN
– Optimised northern glazing with louvres for shading
– Insulated reclaimed brick lounge area flooring, for thermal mass
– Natural cross ventilation paths designed for effective night purging of heat in summer.

ACTIVE HEATING & COOLING
– Solar Venti SV14Air: two fans to draw to living area & bathroom solarventi.com.au
– Mitsubishi 2.5kW split system
– Three Futura Eco ceiling fans for thermal comfort control.

BUILDING MATERIALS
– Timber frame (insulated), with cement sheet for flooring base
– Roof and west wall Colorbond Coolmax (chosen to be heat reflective); south wall Colorbond 'pale eucalypt' (chosen to blend with the garden); east and north walls reclaimed Ash shiplap boards
– Insulation: west wall and west roof Kingspan Air-Cell & ecoMaster supplied 'Greenstuf' R3.5, R4 for roof, R3 east wall, R2.5 other walls/under floor
– Timber (all reclaimed) from Timberzoo, Geelong: Baltic pine boards for mezzanine; Messmate stairs; blackbutt skirts, architraves, door frame
– Recycled furniture and benchtop: Phil The Handyman
– Balustrade: reclaimed Oregon, with recycled steel reo bar.

WINDOWS & GLAZING
– Cedar framed, double glazed: Pickering Joinery
– Two windows are local reclaimed old cottage stained glass, triple glazed
– Doors reclaimed, including double-glazed front door.

FINISHES & FLOOR COVERINGS
– Low-VOC paints and sealants
– Sceneys timber and decking oil, & Haymes Simply Woodcare
– Reclaimed bricks in lounge area for passive heat retention
– Marmoleum for wet areas made from 97% natural raw materials, 43% recycled content.

WATER SAVING
– 5000 litre rainwater tank to toilet, laundry, plus garden use.

OTHER ESD FEATURES
– Miele KM6113 induction cooktop; Bosch CMG633BS1B combination microwave oven 45L; Mini fridge; small chest freezer in shed
– Shaded by large gum tree 1m from east wall
– Food producing garden with indigenous plants including Murnong/Yam daisy.