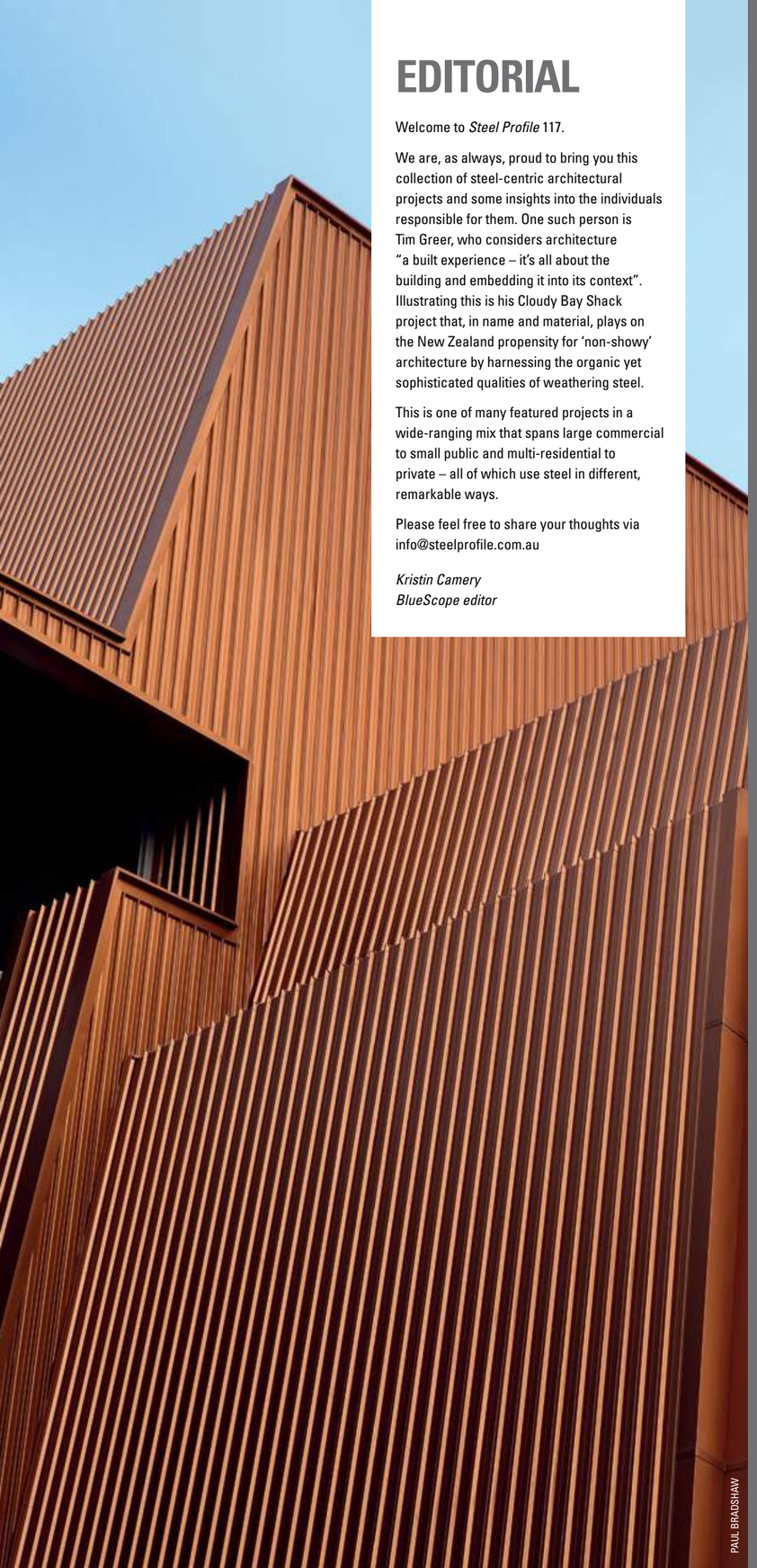
117
MAY 2014
ARCHITECTURAL STEEL INNOVATION
WITH BLUESCOPE

STEEL PROFILE

JAMES STOCKWELL
HUNTER VALLEY HOUSE

WILSON ARCHITECTS AND DONOVAN HILL IN ASSOCIATION
TRANSLATIONAL RESEARCH INSTITUTE

IN PROFILE:
TIM GREER



PAUL BRADSHAW

EDITORIAL

Welcome to *Steel Profile* 117.

We are, as always, proud to bring you this collection of steel-centric architectural projects and some insights into the individuals responsible for them. One such person is Tim Greer, who considers architecture "a built experience – it's all about the building and embedding it into its context". Illustrating this is his Cloudy Bay Shack project that, in name and material, plays on the New Zealand propensity for 'non-showy' architecture by harnessing the organic yet sophisticated qualities of weathering steel.

This is one of many featured projects in a wide-ranging mix that spans large commercial to small public and multi-residential to private – all of which use steel in different, remarkable ways.

Please feel free to share your thoughts via info@steelprofile.com.au

Kristin Camery
BlueScope editor

EDITORIAL ADVISORY PANEL

Steel Profile has established an Editorial Advisory Panel to ensure that only projects of the highest calibre are selected for publication. The panellists are:

ADAM HADDOW

Adam is a director of SJB Architects NSW. He was awarded the 40th Anniversary Churchill Fellowship in 2006 to study alternatives to conventional models of urban design. SJB Architects recently won two Australian Institute of Architects NSW Awards for Multiple Housing.

More than anything, he loves to design buildings

FRANK STANISIC

Stanisic Associates founder Frank Stanisic is a Sydney-based architect and urbanist.

His work is fuelled by an evolving interest in the diagram and frame as a basis for architectural invention, and the aesthetics of permeability.

Frank's projects have won numerous awards including Australian Institute of Architects' Special Jury, Wilkinson, Aaron Bolot and Frederick Romberg

SAM BRESNEHAN

Sam Bresnehan is a graduate architect with Melbourne-based architectural and urban design practice, McGauran Giannini Soon Architects (MGS).

Graduating from the University of Tasmania with a Master of Architecture (First Class Honours) in 2010, Sam was awarded the 2011 BlueScope Steel Glenn Murcutt Student Prize

ISSUE 117 CONTENTS

COVER PROJECT
Hunter Valley House

PHOTOGRAPHER
Paul Bradshaw

NUMBER 117, MAY 2014
BLUESCOPE EDITOR Kristin Camery **MANAGING EDITOR** Rob Gillam **ASSOCIATE EDITOR** Rachael Bernstone
CONTRIBUTING WRITERS Rachael Bernstone, Margie Fraser, Peter Hyatt, Rob Gillam, Micky Pinkerton, Alex Taylor
CONTRIBUTING PHOTOGRAPHERS Duncan Barnes, Peter Bennetts, Patrick Bingham-Hall, Douglas Mark Black, Brett Boardman, Paul Bradshaw, John Gollings, Greg Hocking, Christopher Frederick Jones, Michael Nicholson, Bob Seary, Shantanu Starick, Mike Rolfe
ART DIRECTOR Natasha Krncevic **CORRESPONDENCE** *Steel Profile*, PO Box 961, Crows Nest, NSW 1585, AUSTRALIA
EMAIL rob.gillam@steelprofile.com.au; rachael.bernstone@steelprofile.com.au
SUBSCRIPTIONS For all subscription enquiries please contact us via steeldirect@bluescopesteel.com

SINE LANGUAGE

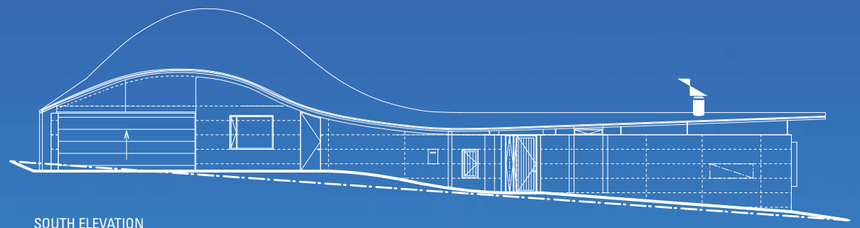
With a form inspired by nature, this Hunter Valley home's dramatic roofline soars above its earthy base.

Words **Micky Pinkerton** Photography **Patrick Bingham-Hall; Paul Bradshaw**

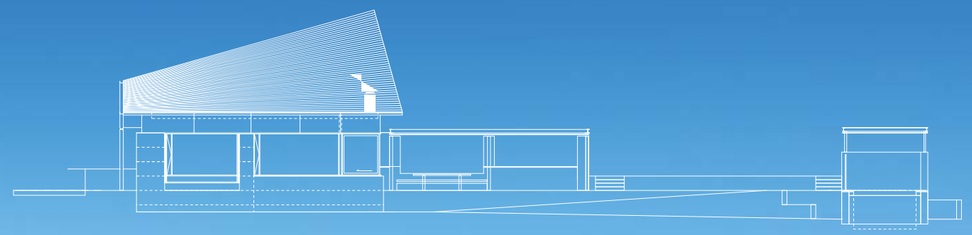
ARCHITECT
James Stockwell

PROJECT
Hunter Valley House

LOCATION
Hunter Valley, New South Wales



SOUTH ELEVATION



EAST ELEVATION

James Stockwell grew up on a farm near Albany, four hours from Perth, in a remoteness that breeds self-reliance. As a result he's been welding, sawing and hammering away since he was 10 years old and has an innate ability – and interest – in solving problems as they are encountered.

"Things would break on the farm; a feeder would snap in half and you'd reinforce it with something else," says Stockwell. "You learned that this much weight on that much steel was going to break it. So that kind of practical knowledge about materials has been invaluable as an architect, because ultimately buildings are made out of stuff, and in choosing materials you have to know what that stuff is and what it can do."

Stockwell's modest, almost simple way of describing this selection process belies a thoughtful approach and a gift for materiality and form which have seen this young architect win a swag of residential awards in recent years. In the Snowy Mountains House (*Steel Profile* 104), perhaps his best-known current work, Stockwell's appreciation of just how far you can push metal is seen in the dramatic parabolic curve of the vaulted roof made from galvanised steel in the profile LYSAGHT CUSTOM BLUE ORB®.

However, it was another house and a different material which originally drew the clients of this project to Stockwell. They loved the zen-like calmness of his Leura House and were keen to have a similar rammed-earth building in order to tackle the summer heat of the Hunter Valley. Spending half their week working from home, the couple also wanted a view of the Barrington Tops mountains from the proposed office above the garage. The coda to the brief was a request for 'an interesting roof'. It was these latter two stipulations that posed the main design question of the project.

"For an architectural answer to that," says Stockwell, "the idea of a box-on-a-box was not really exciting because a small space up high gets cooked in summer. So that led to the stretching of the roof over that form… If you did a box-on-a-box then you'd have a wall, a roof, a wall and then another roof – and instead of all those joints and trickiness we decided to just wrap it in one form."

In considering how to resolve the issue he thought back to a drawing of an owl by Picasso which the artist completed in a single line, never taking his pen off the paper, and sought to replicate that efficiency in the roofline. That inspired memory results in a form which is more a beautiful gesture than a roof; like the sweep of a conductor's baton to a languid piece of music.

Stockwell specified roofing made from COLORBOND® Metallic steel in the colour Axis®, in Stramit Longspan® profile, and reports that it was relatively easy to install. Indeed, the gentle sine curve of the roof allowed the project to be constructed using straight materials in short lengths, which reduced the complexity of the build and dispensed with having to get items purposefully bent. This meant expenses could be kept down and the project ultimately came in under budget.

The top and bottom of the roof were plotted as a series of points in space and the steel structure, made from prefabricated 100 UC and 200 UB steel members, was bolted together. The builder then placed the rafters and timber battens on top. ↗

"The steel does the hard work of creating the shape. It's strong and stiff enough to make the roof quite low-profile – to make it slender and just floating through"

"The steel does the hard work of creating the shape and it does the cantilevering and the spanning. It's strong and stiff enough to make the roof quite low-profile – to make it slender and just floating through. It was also very good for the assembly because the installers could get the beams and columns here and bolt them together, and there was enough skill and technology in the shop drawings and the fabrication to pretty much take the hard work out of the assembly. On a project like this you couldn't do it with anything else except steel beams."

Stockwell wanted to avoid cross-bracing the steel structure and so looked to his other material choice for support. The slender 100 UC steel columns were encased in rammed earth to stabilise them, with just their tops poking out of the thick walls. This sets up a beautiful juxtaposition between the fineness of the structural steel members and the solidity of the rammed earth, and further enhances the visual impression that the roof is about to take flight, as if held on by only a few threads of metal.

The rammed earth walls consist of sandstone road base sourced locally and mixed with a small amount of cement and water. Steel shutters are used as formwork and the mix is shovelled into the forms and finally pressed down with a ramming pad. Once that layer is dry the process is repeated, going up in 200mm increments.

The construction method is more common in Stockwell's native Western Australia, where he first used it. However, the WA road base has a muddier, duller complexion, while in New South Wales there's more quartz in the base which the architect says gives the walls a beautiful glow.

"The form of the sine curve, being a direct expression of material ductility, is brought to life by the properties of the steel"

Stockwell likes the way rammed earth makes a building unique to its place, giving it a direct reference to the geology of the site.

Despite the extremes of the climate, the running costs of the house are low thanks to the passive solar design which uses the excellent thermal mass of the rammed earth walls. The clients also report that it's a very quiet house: the walls absorb sound as well as heat.

Stockwell made a 1:5 scale model of the project, reproducing the sine curve of the roof by simply bending a sheet of thin cardboard. It's a curve that he finds fascinating, encouraged by engineering professor Max Irvine, with whom he has worked on a number of projects.

"It's a harmonious curve… it's what gravity does to everything," says the architect. "Instinctively the sine curve is something you know. You don't see it literally as sound waves or ocean waves. But if you observe a palm tree leaning over, it's a sine curve. There are all sorts of curves – elliptical curves, parabolic curves – but they're all geometric construction by humans, whereas the sine curve is a geometric construction by nature."

BELOW: Stockwell responded to the owner's desire for an 'interesting roof' with a sweeping sine curve made from COLORBOND® Metallic steel in the colour Axis®, in Stramit Longspan® profile

PB·H

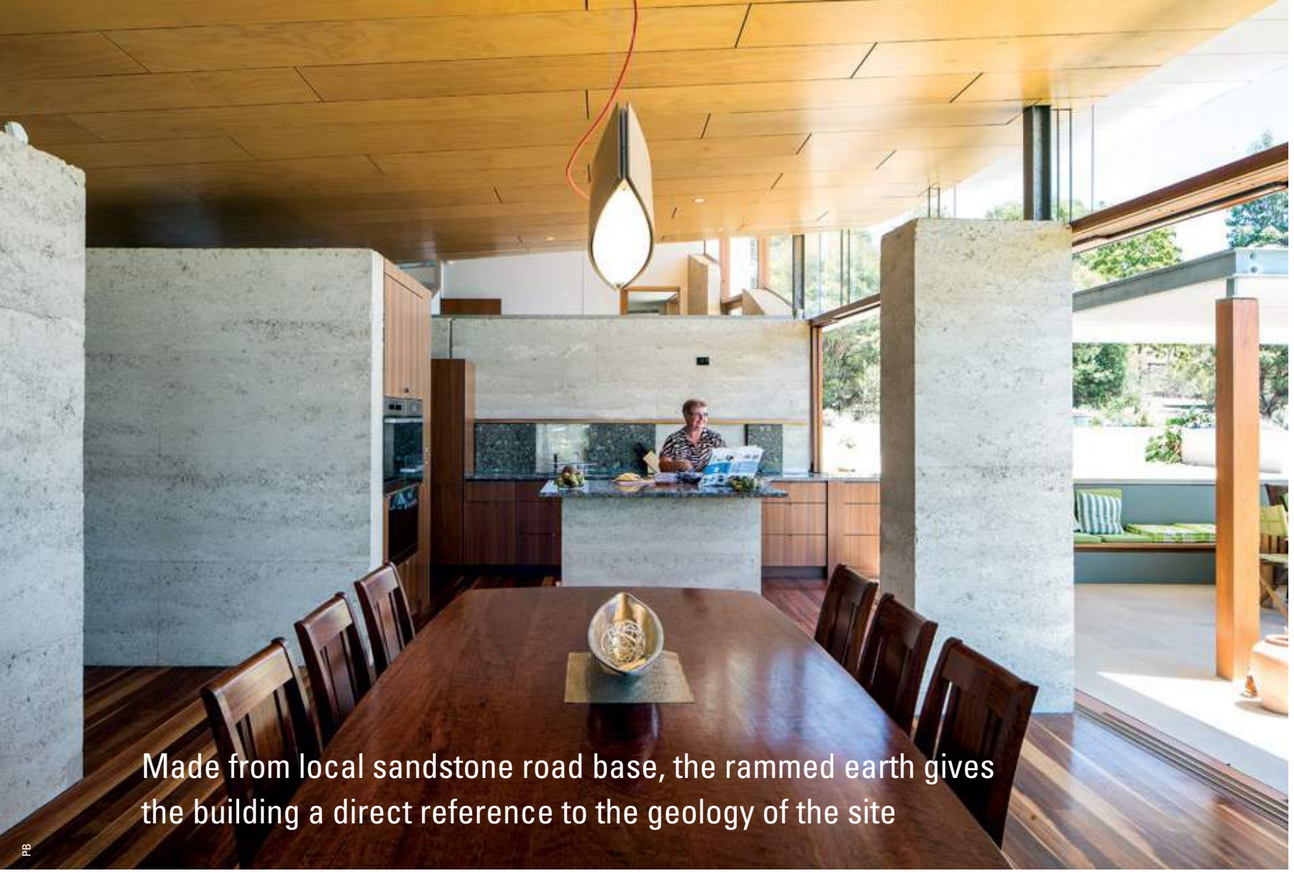
PB·H

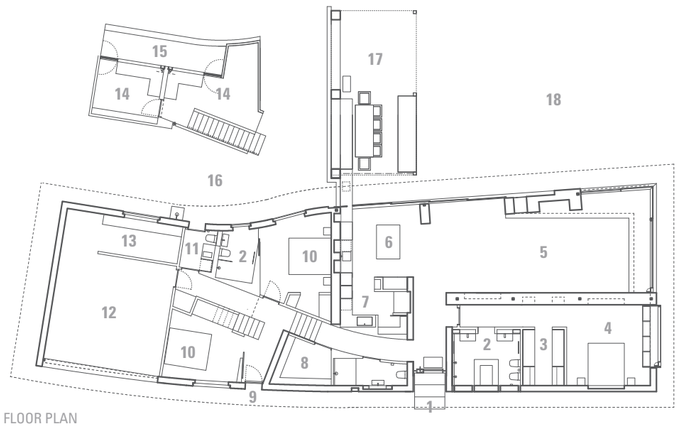
PB

PB

TOP: The slender low profile roof is supported by a structure made from prefabricated 100UC and 200UB steel members which were bolted together on site

ABOVE AND RIGHT: The roof's curves were entirely constructed from straight materials in short lengths, from the guttering to the soffits. This reduced the complexity of the build and enabled the project to come in under budget





FLOOR PLAN

LEGEND

1. Entry
2. Ensuite
3. Wardrobe
4. Master bedroom
5. Dining / Living
6. Kitchen
7. Pantry scullery
8. Cellar
9. Guest entry
10. Bedrooms
11. Laundry
12. Garage
13. Store room
14. Office
15. Balcony
16. Courtyard
17. Outdoor room / Entertaining
18. Terrace lawn

PANEL SAYS

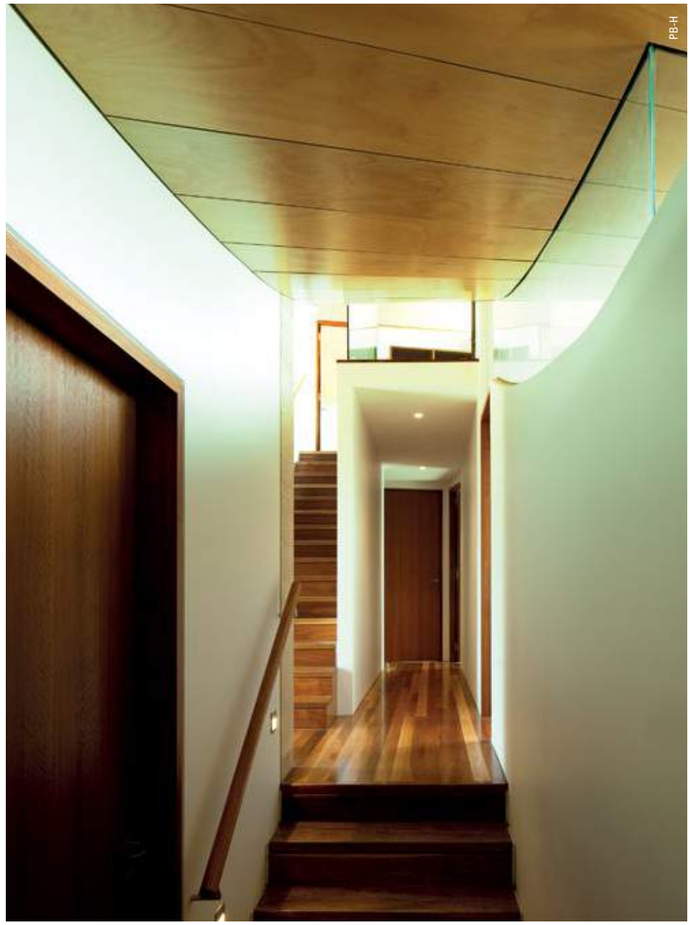
This extremely inventive house marries a beautiful soaring roof that lifts up to the north and the view, with a heavy and grounded base that almost emerges from the landscape on which it sits. The juxtaposition of a few simple materials – thin steel roof sheeting lined with ply, floating atop the rammed earth walls that encase steel columns – deliberately emphasises the disparity between lightness and weightiness. Despite the complex geometry that underpins it, this ingenious roof – which is carefully integrated with the plan to maximise function – was built with off-the-shelf materials and standard construction techniques.

ABOVE: Encasing the slender UC steel columns in rammed earth walls gave the structure enough strength to avoid using cross bracing

OPPOSITE TOP: Tension rods made from 6mm galvanised steel hold up window and door heads

OPPOSITE BOTTOM: Despite the extremes of the climate, the house's running costs are low thanks to passive solar design which harnesses the rammed earth walls' thermal mass


PB


PB-H

That simple curve is, paradoxically, a mathematical complexity – sine curves are in fact quite difficult to draw – so Stockwell found it easier to use a physical model, hand plotting the points off that before sending them to the shop drawer to import into the steel drawings. Stockwell is adamant that to produce the building in any other material would have been an expensive and time-consuming process.

"Steel is brilliant in tension and that is where it really comes into its own," he says. "It's quite clear when you look at the building that it's an object in tension, in other words that the creation of the flat plane into the vault sets up this magnificent tension and the decoupling of that from the rammed earth blocks – you've got the anchor to the earth, and the roof wanting to take off. The form of the sine curve, being a direct expression of material ductility, is brought to life by the properties of the steel."

The main challenge of the build was getting the timber battens in the roof to go smoothly into one another to make the curves perfect for the roof sheeting on top and the ply ceiling panels below. As the ceiling and the roof are the same structure the steel dictates both forms, with the ceiling being mounted on the underside of the rafters that support the roof sheeting.

"The rafters just bolt to the steel frame," explains Stockwell. "So the steel provides a bolting point for the infill lightweight stuff. The ceiling battens do exactly what the roof battens do; they curve around the form, are sprung-bent, cut in half and stuck together again to follow the curve of the roof. The trick was to make sure that the battens could go smoothly around those curves and not make it too tight a radius."

Subtle details on this project include the steel tension rods made from 6mm galvanised steel which hold up the window and door heads. Unless you know to look for them they are easily missed, adding to the impression that the ceiling is levitating above the corner windows which open out onto the lawn, and the clerestory along the southern wall of the building. In terms of palette, Stockwell left the exposed structural columns raw as galvanised steel in keeping with the unpolished feel of the other materials in the building, from the gum-veined timber to the pitted earthen walls. Even the outdoor shower taps and head are raw brass (Stockwell got the manufacturer to pull them off the production line before they were chromed).

The clients understandably love their new home and are full of praise for the architect and the builder. For Stockwell, his favourite aspect of the project is how one part of the building, the roof, can do multiple things.

"Obviously it provides shelter. But it also lifts up to the north, and shuts down to the south and the west protecting it from storms. It provides a look-out, and is an inspirational space inside. Having a very simple form in a single gesture was the virtue of this roof." SP

A video of James Stockwell discussing this project is available at steel.com.au/showcase

PROJECT Hunter Valley House **CLIENT** Helen Routh & Graham Rawlins **ARCHITECT** James Stockwell Architect **PROJECT TEAM** James Stockwell **STRUCTURAL & CIVIL ENGINEER** Izatt Engineers **BUILDER** Richard Fox Builder **STEEL FABRICATOR** Reoworld Newhampshire **SHOP DRAWING CONTRACTOR** Wayne Scudds **CLADDING CONTRACTOR** Richard Fox Builder **LANDSCAPE ARCHITECTS** Craig Burton **PRINCIPAL STEEL COMPONENTS** Roofing made from COLORBOND® Metallic steel in the colour Axis®, in Stramit Longspan® profile; prefabricated fully welded base structure from 100 UC and 200 UB members; 150mm galvanised steel pipe downpipes; 6mm galvanised steel hanging rods for door heads and window heads; half pipe guttering made from COLORBOND® Metallic steel in the colour Axis® **PROJECT TIMEFRAME** June 2009 – Dec 2011 **BUILDING SIZE** 340m² **TOTAL PROJECT COST** $1.3 million

CENTRE OF ATTENTION

ARM's reputation as designers of iconoclastic form grows with every project. The firm's new Perth Arena – delivered with joint venture partners Cameron Chisholm Nicol – may have been inspired by a puzzle, but it works like a dream.

Words **Peter Hyatt** Photography **John Gollings; Peter Bennetts; Greg Hocking; Duncan Barnes**

GREG HOCKING

ARCHITECT
ARM Architecture &
Cameron Chisholm Nicol
– Joint Venture Architects

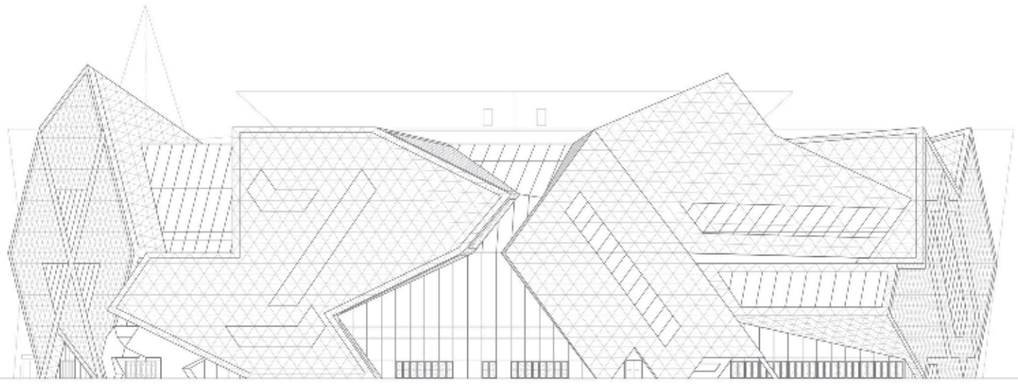
PROJECT
Perth Arena

LOCATION
Perth, Western Australia


PETER BENNETTS

A project with a Bilbao-like complexity to the external skin


JOHN GOLLINGS



SOUTH ELEVATION

Howard Raggatt spools off statistics like a man driven. Design aficionados might expect his preoccupation to be dazzling geometric sketches but, for the moment, this architect floats on a cloud of figures.

He pulls apart his fists in an elastic motion and coos how the 15-metre-deep roof beams span a mighty 170 metres. It's just one of many components in a structural steel and cladding system that would surely have had Gustave Eiffel nodding in wonder.

As one of the design stars behind Perth's new sports and entertainment arena, Raggatt is passionate about a building that is bound to add immeasurably to the city's way of life.

Apart from its radical shape, the arena is a remarkably seamless marriage of connections, intersections, joints and junctions. In all, the project took 7,216 tonnes of steel, 225,000 fully modelled members, 34,000 metres of purlins and 220,000 bolts.

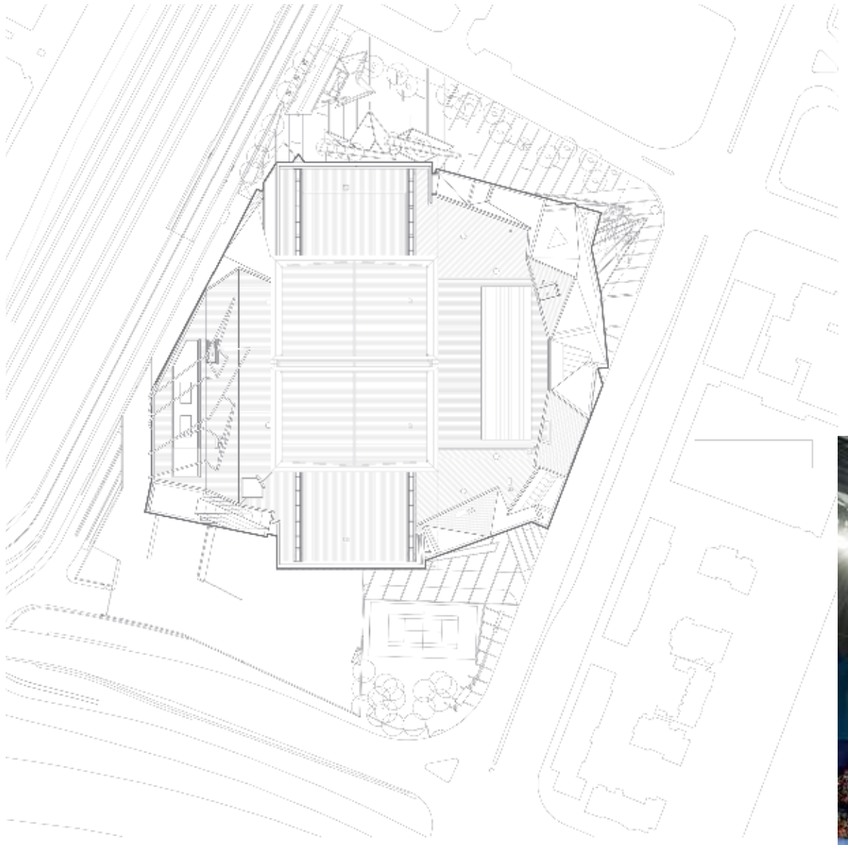
"And it goes on…" Raggatt says. "There was also a staggering 22,675 architectural drawings and a separate 29,266 drawings from the shop-fitter."

While the figures speak of quantity, they don't explain the quality. Raggatt thanks 3D modelling for transforming the way architecture, engineers and fabricators work. "The shop-fitters can fully model every junction of every piece of steel. We integrate their model straight into ours to coordinate the structure and facade. It's a shortcut that's efficient, precise and economical," he explains.

"The problem with conventional structure in such projects isn't the primary steelwork; it's the secondary and tertiary structure that are so wastefully inefficient.

"We've certainly embraced technology, but that doesn't mean that it takes charge of us. It just translates into these extraordinary shapes and forms that, until quite recently, were never possible."

The collaboration between Ashton Raggatt McDougall (ARM) and Perth-based Cameron Chisholm Nicol (CCN) delivered a venue befitting Australia's current boomtown state.



SITE PLAN

"We've certainly embraced technology, but that doesn't mean that it takes charge of us. It just translates into these extraordinary shapes and forms that, until quite recently, were never possible"

"It brings the city into line with the world's best," Raggatt says of the $550 million project.

The Arena is the focal point in Perth's 13.5-hectare urban renewal project that connects the CBD with Northbridge.

WA Premier Colin Barnett described the Arena as a potential rival for Sydney's Opera House. "This is an iconic venue for Perth for many years to come. The Arena is a work of art in itself," he said.

Such comparisons unnerve architects: they invariably come off second-best. "It's impossible to compare your work with something of such renown, but we're exceptionally pleased with the result in a structure where so much could have gone awry," says Raggatt.

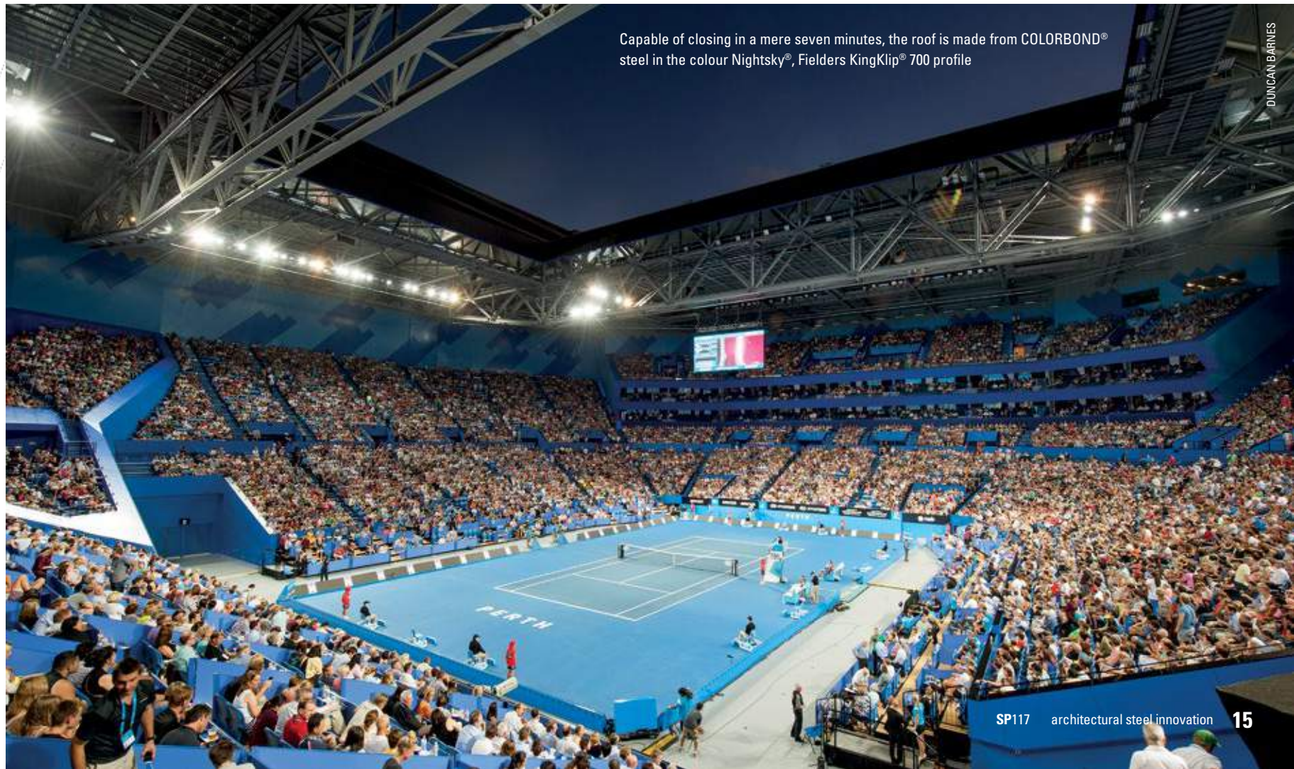
When he arrived in Perth to begin the project in 2006, Raggatt found the entertainment venues to be rudimentary. "Hose-out jobs is how I would describe them," he says. "We wanted this project to set a benchmark and not be just another rude shed. Yes it's a tennis stadium, but it can be easily re-configured and it has finely tuned acoustics making it ideal for concerts."

Apart from delivering an iconographic, postcard view of the city, the arena's flexibility permits multiple spectator configurations. And, in the event of inclement weather, the retractable roof – made from COLORBOND® steel in the colour Nightsky®, in Fielders KingKlip® 700 profile – will open or close in a mere seven minutes, three times faster than that covering Melbourne's Rod Laver Arena.

Raggatt says that a project of such complexity might be expected to open the door to a world of disturbing defects. Almost paradoxically, he says, that didn't happen. "One thing architects love to do is complain about the parts that didn't really work out as they had hoped – and I'm like that – but this building is virtually perfect.

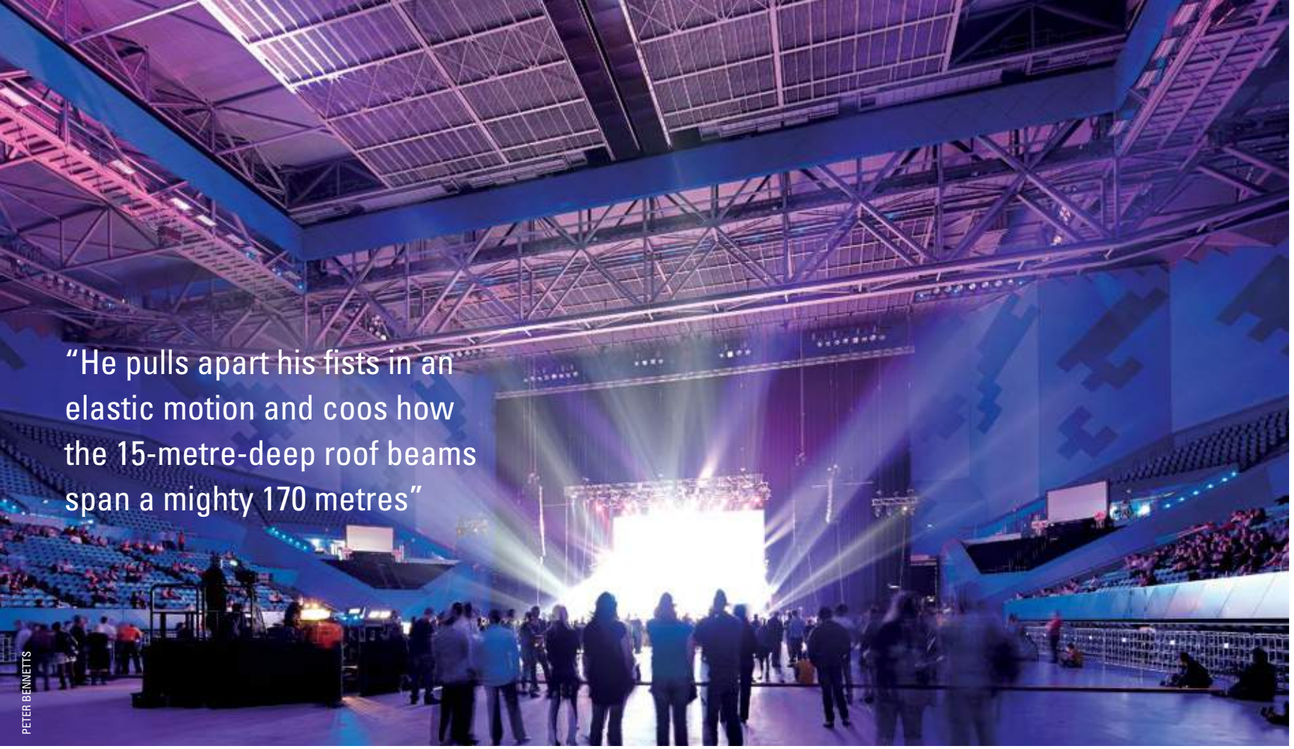
"What you see is exactly as we designed it. The workmanship is just fantastic."

Design inspiration included WA's oldest public building, the 12-sided Round House in Fremantle, and British journalist Christopher Monckton's Eternity Puzzle, a mathematics enigma comprising 209 irregularly shaped parts.



DUNCAN BARNES

Capable of closing in a mere seven minutes, the roof is made from COLORBOND® steel in the colour Nightsky®, Fielders KingKlip® 700 profile



"He pulls apart his fists in an elastic motion and coos how the 15-metre-deep roof beams span a mighty 170 metres"

ABOVE: Some 7000 tonnes of BlueScope steel underpin this marvel of modern fabrication and efficiency

LEFT AND BELOW: The architects' colour palette is predominantly International Klein Blue, based on the work of French artist Yves Klein and referencing the 'blue screen' technology of film and television

While such sources might appear abstract and slightly remote for the average punter, it is Raggatt's more colloquial reading that resonates.

"The design always reminded us of an avocado," he explains. "There's that hard-core function and the delicious flesh. That quite thin ribbon around the 10-metre edge of the building is a major part of what people consider very surprising. The bulk of the building is a hard operational core enveloped by this beautiful 'fruit'."

Raggatt believes the project's fine grain and DNA at molecular level are every bit as important as the major superstructure. "All of the steelwork is highly resolved and that elegance is very function-driven," he says. "You can't have columns or walls obstructing views or beams hanging up there, extraneously wasting space and budget."

He points to the versatile sliding roof as an example of steel's resolved performance. "Every square metre of roof structure is capable of supporting a tonne of load and that is almost unheard of," he says. "Very few stadiums anywhere in the world can offer that. There are far more expensive versions of this type. It's not the cheapest venue, but it's far from the most expensive."

The design is much more than a spectacle of twisting geometries and sublime steel-work finessed to bare economy in the delivery of jaw-dropping spaces. Curiously enough the real show occurs just inside, around the entrance and the great public concourses.

"We hate the idea of a building that looks fabulous but doesn't work," Raggatt says. "We don't see architecture as that kind of art. It needs to handle function so well that you don't even think about it. The last thing we wanted was signage everywhere to help people find their way. You need clarity."

ARM is known for its bold use of colour in design, and Raggatt says this brief demanded such an approach. The architects adopted post-war French artist Yves Klein's dictum: "Blue is the new epoch". The artist created his own shade – International Klein Blue (IKB) – to signify a space awaiting an 'event', so Raggatt adopted the same shade (also used in 'blue screen' technology in film and television) for the building's exterior, marking this as a place where major performances and events occur.

And after handover how does Raggatt feel? Isn't there some regret about handing over such a large part of your life? "Funnily enough, as you walk around the project and hear the public's response you have this strange feeling that it's not yours any more," he says. "It happens over time and this project took place over seven years. If architecture is purely an ego on display, I would say that it's small. You have to view this sort of work as part of a greater cultural adventure and human condition."

ABOVE: A fine lattice of steel truss-work as filigree contributes to a remarkably lightweight structure and daylight-filled circulation zones

He laments that civic architecture is too often hijacked. "It can be such an investment. How often do we genuinely invest in it?," he asks. He talks of "lost opportunities" adding: "The budgetary difference between an ordinary facility and a terrific one isn't all that much. To take the most outrageous example, the Sydney Opera House could have been done for half the price. But at what real cost? That money would have been entirely wasted. Look at what it has brought to Australia. It is this eternal money-maker and put Sydney on the road to become a world-class city."

Raggatt explains that the bolder architecture becomes, the greater the risk and the potential for client reward.

"We live in dread at the risk of failure, but it's important to the result. If you think that you know everything and just do another version of the project before, then it's bound to be a disappointment. No, we never work like that."

With ARM at the helm, Perth's new arena was never going to be another rudimentary box. The design team has delivered to Western Australia a cultural icon fully in step with the boom economy that is seemingly without end. **SP**

PANEL SAYS

This important new building in Perth makes a bold statement about the city's place in the world and recent economic prosperity, and uses structural steel to great effect to achieve its incredible geometries. While the extraordinary shapes and angles rightly capture the attention of passersby and visitors, the interiors – foyers and circulation spaces, back-of-house services and the arena itself – are not neglected by the design team. Reports suggest that the building works exceedingly well as a venue for major events. We look forward to seeing it in the flesh when we visit Perth for the Australian Institute of Architects' National Conference in May 2014.

PROJECT Perth Arena, Wellington Street, Perth **CLIENT** Government of Western Australia, Office of Strategic Projects **ARCHITECTS** ARM Architecture & Cameron Chisholm Nicol – Joint Venture Architects **PROJECT TEAM** Project directors: Howard Raggatt (Design), Steve Ashton (Project), Domenic Snellgrove (JV). Project architects: Stephen Davies (Melbourne), Peter Keleman (Perth). Project team leader: Steve Christie. Team: Andrew Lilleyman, Jeremy Stewart, Jonathon Cowle, Luke Davey, Jonathon Davis, Beata Szulc, Greg Stretch, Doug Dickson, Debra Binet, Michael Edmonds, Ian Surtees. Interiors: Andrea Wilson, Jacqueline Cunningham **MAIN CONTRACTOR** BGC Construction **MECHANICAL, ELECTRICAL, SPECIALIST LIGHTING AND SUSTAINABILITY CONSULTANTS** WSP GROUP **STRUCTURAL ENGINEER** Aurecon **MEGA COLUMNS AND TRUSSES** Parks Engineering **ROOF STEEL** Cays Engineering **FACADE CLADDING** Scenna Construction **FACADE STRUCTURAL SYSTEM** BGC Construction / Alcom **ROOF CLADDING** Nationwide Roofing **STEEL FRAME ERECTOR** Perth Rigging **STEEL SHOP DRAWINGS** Steelplan **PRINCIPAL STEEL COMPONENTS** Roof cladding: 16,700m of COLORBOND® steel in the colour Nightsky®, in the profile Fielders KingKlip® 700. Structural Steel: 7,216 tonnes of structural steel including cold rolled steel sections from BlueScope: 58,433 main members and 167,216 fittings; 220,458 bolts; 34,185m total length of purlins and girts. The robotic sculpture Totem, by Geoffrey Drake-Brockman, features a structural frame of hot-dipped galvanised steel, sheet aluminium cladding, neoprene isolators and stainless steel fittings **AWARDS** Australian Institute of Architects National Awards 2013: Sir Zelman Cowen Award for Public Architecture, Emil Sodersten Award for Interior Architecture. WA Australian Institute of Architects Awards 2013: George Temple Poole Award for Best Building, The Jeffrey Howlett Award for Public Architecture, Interior Architecture – Architecture Award, COLORBOND® Award for Steel Architecture. World Architecture Festival 2013: Shortlist – Sports Stadium Category **GROSS FLOOR AREA** 28,000m² **COST** $550 million

TIM GREER

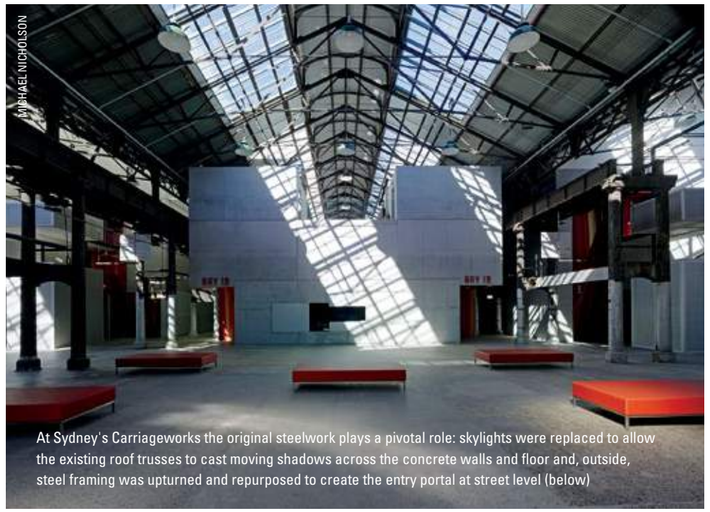
Architect Tim Greer is best known for his adaptive reuse projects, but his latest work was inspired by the buildings that first led him into architecture.

Words **Rachael Bernstone** Photography **Bob Seary (portrait)**

As a teenager in New Zealand, Tim Greer was fascinated by the very public discourse of Christchurch's most famous and prolific architects – Miles Warren and Peter Beaven. "I was lucky when I was growing up that there were two modernist architects who I call 'Petit Brutalist' architects, because of the colonial scale of the city they were working in," Greer says. "They would debate in the newspaper, and were constantly positioning against each other: vying for the small pool of resources for new projects. I was aware of architecture as a creative process early on, and thought it was interesting. I could see these conversations between architectural creatives and the buildings themselves as a connection."

Greer chose to study architecture at the University of Auckland – as Warren and Beaven had done – and travelled around the world for two years before completing his degree. In his absence, a change took place at the architectural school. "It was like having two universities," Greer laughs. "In those two years I was away, the hippies were thrown out and the post-structuralists came in. It was the emergence of the post-modern, with a group of lecturers who introduced new ideas.

"We started debating the meaning of architecture under post-structuralists: Charles Moore was a transitional character who broke down that wall in terms of Auckland Architecture school," he explains.



MICHAEL NICHOLSON

At Sydney's Carriageworks the original steelwork plays a pivotal role: skylights were replaced to allow the existing roof trusses to cast moving shadows across the concrete walls and floor and, outside, steel framing was upturned and repurposed to create the entry portal at street level (below)

"I was exposed to two profoundly different positions on architecture, and the greatest thing you can gain as a student is different positions, so you can align where you sit within all of that."

After graduating, Greer had "an incredible desire to live in a dense urban environment". He adds: "Sydney was fantastic because it was close to New Zealand, it had just celebrated the Bicentenary so there was a tremendous desire to create a fabulous city, and it had a tangible energy."

Looking for work, he met with several firms and felt an immediate rapport with Brian Zulaikha and Peter Tonkin, who had founded their practice in 1987. "I thought they were the most amazing and generous people, and there was a richness that I didn't find in other firms," he says. "I felt a connection with them, and got a sense of them as being interested in architecture in all its capacities."

"For us, architecture is a built experience: it's all about the building"

Despite their differences – the partners (Greer became the third partner in TZG in 1996) are each 10 years apart in age with diverse cultural and educational backgrounds – they share a common philosophy of life. "We are on the same wavelength," Greer says.

Over the 25-plus years they have worked together they have developed a set of four ideas that guide each project: an interest in connecting contemporary and historic culture; expanding the definition of architecture to its broadest reach (including freeway design, landscape and urban design); pursuing collaboration as a way of broadening the architectural thinking of the design team; and, at an architectonic level, an interest in robustness, or clear, simple ideas that can transcend the vagaries of developers and construction.

"For us, architecture is a built experience: it's all about the building," Greer says. "The processes we've set up are all about the end game, and the end game is getting the building and embedding it into its context. The drawings are just a means to that."

Some of Greer's most awarded projects have brought life back into parts of the city that had fallen into neglect. Especially true of this description are Carriageworks at Eveleigh and Paddington Reservoir Gardens, both in Sydney. The first saw the insertion of contemporary art spaces into disused railway carriage building sheds, while the Gardens grew out of a disused reservoir-turned-motor-workshop on Oxford Street, which had been derelict since its partial collapse in 1990.

For both, Greer selected a limited palette of new materials – steel, aluminium and concrete – to avoid competing with the existing fabric. "At Carriageworks, the architecture is deliberately over-scaled to match what's there, but it is also deliberately very light – we didn't want to compete with the sheds," he says.

The Carriageworks' new performance spaces are made from cast concrete boxes, with office spaces suspended above on steel bridges and frames. "In the foyer we replaced the skylights in the roof and inserted fairly plain concrete walls to emphasise the truly stunning existing steel roof trusses, which would have been at the forefront of technology in the 1880s," Greer says. "They cast shadows that move throughout the day: it's a very ethereal effect, but it was intentional."

MICHAEL NICHOLSON

Greer also agitated for the building to have a strong entry portal on the street – to alert patrons to its below-grade presence – repurposing some of the original steel roof trusses to reference contemporary dance which takes place inside the revitalised building.

"We did everything we could to make a connection to the street," he explains. "The building makes a lot of deliberate connections: with the past, with the sense of industry and manufacturing – in that nothing has been cleaned up – and with its new uses."

At Paddington Reservoir Gardens, steel was used as the primary structure for the new roof canopies and stairs, and to "bundle together" all of the small-scale elements such as balustrading, signage and gates. "At the start of this project the existing structure was collapsing – during the design phase, two more vaults fell down – so we chose just one new material so as not to compete with that inheritance," Greer says.

The use of steel in these projects relied on Greer's earlier experience with the material in a project he still describes as one of the most challenging of his career: the transformation of Scot's Church at Sydney's Wynyard into Portico apartments. On top of the Art Deco heritage-listed church, TZG designed a new steel-framed stepped structure containing 176 apartments, with 117 car parking spaces in a 25-metre deep underground car stacker.

The entire building was propped on a temporary steel structural frame prior to the excavation, which took place in a 17-metre-wide envelope dictated by adjacent underground tunnels. "That project would not have been possible without steel," Greer says. "The original building used riveted steel from the late 1920s, and it sits over railway lines and tramways, so it was carefully designed by weight.

"At competition stage, we realised the only way to build was by using a structural steel system, with structural diaphragms underneath the building to spread the load to the side and into the ground for the car stacker"


MICHAEL NICHOLSON


BRETT BOARDMAN


BRETT BOARDMAN

ABOVE: Portico, the apartment building above Scot's Church in Sydney, utilises a lightweight steel frame because it sits above underground railway and tram tracks, and a 25m-deep car stacker

LEFT: At Paddington Reservoir Gardens steel was used structurally to frame new roof canopies and stairs, and to "bundle together" small-scale elements including balustrading, signage and gates


MIKE ROLFE

The Cloudy Bay Shack was inspired by the landscape and the New Zealand propensity for understated buildings. The use of weathering steel speaks to both muses

"At competition stage, we realised the only way to build was by using a structural steel system, with structural diaphragms underneath the building to spread the load to the side and into the ground for the car stacker."

As if the constraints of weight and underground tunnels were not sufficiently challenging at Scot's Church, when construction commenced the builders discovered that the original steel frame did not conform to the drawings. "I suspect that – as the church was being built during the Depression – construction ground to a halt," Greer says. "So the level of accuracy that you would expect, and the reason we love steel – you design it, then shop draw it, so that you know that when it goes in, it is 99 per cent perfect – wasn't there. The existing steel was not where we expected it to be, so we had to redesign the building."

The link between Portico and Greer's latest steel project is fellow New Zealander Paul Rolfe, an architect at TZG who collaborated on Portico before returning to Wellington and establishing his own practice.

A welcome opportunity arose for Greer and Rolfe to work together again on a very different project, the Cloudy Bay Shack, which was a new build on a greenfield site. As the project progressed, Greer realised he was contemplating the inspiration of the Christchurch architects he admired from his youth.

The Shack was built to accommodate visiting sommeliers from the northern hemisphere at Cloudy Bay Winery. "We played on the New Zealand propensity for non-showy architecture by calling it 'Shack', and we took that irony into the material," Greer says. "The weathering steel ties into the context in that it has a very organic appearance, and it's a simple and humble material, but it is detailed and built in a very sophisticated way."

Conceived as a marketing building, the architecture aimed to connect the winery label and the place. "The corridor is on an axis with Cloudy Bay itself, and there are blades on the side of the corridor that conceal and reveal the views in a game," he explains. "From the living room, you can look down the vineyards and up to the Richmond Ranges – the hills on the label – to experience the silhouette of that potent image."

In a broader sense, he adds, the Shack negotiates a fine line between the brand (Cloudy Bay is owned by luxury goods company LVMH) and the New Zealand architectural ethos of simplicity and clarity of material. "That notion goes straight back to those 'Petit Brutalist' buildings of Christchurch in my childhood," he says. "I am essentially paying homage to those architects, and this is the first building where I've realised that."

At this mid-career point, those early influences are just starting to become apparent to Greer, who adds that shades of Brutalism are evident at the extremities of earlier buildings, where the details are most easily admired. "As the subject or viewer, a lot of my projects have details you can empathise with," he says. "At Paddington, it's the aluminium screen; at The Glasshouse [Theatre, in Port Macquarie], it's the timber cladding; and at Cloudy Bay, the weathering steel. The realisation that there is a link between Brutalism and my current work is very recent: it has only just popped into my head."

Having said that, Greer is quick to credit his fellow partners and colleagues for the quality of the firm's recent award-winning projects, and the calibre of work it continues to win. "Having the opportunity to build a practice with Brian and Peter, and making a framework for clever architects to come and work here; that's been very rewarding," he says. "Moving up to the point where we are getting some really great projects is also very rewarding: we have created a way of practising architecture where there is a lot of enjoyment." SP

SCIENCE OF TRANSFORMATION

Wilson Architects and Donovan Hill's ground-breaking Translational Research Institute has harnessed steel to enable precision at every point.

Words **Margie Fraser** Photography **Paul Bradshaw; Christopher Frederick Jones**

ARCHITECT
Wilson Architects + Donovan Hill Architects in Association

PROJECT
Translational Research Institute

LOCATION
Woolloongabba, Queensland

It's been a while since scientists were hip. Despite the giant leap into space travel, the heady inroads into molecular biology and nanotechnology (and let's not forget the discovery of penicillin), there's been a perhaps undeserved, nerdy underlay to the common perception of the profession. Back in The Enlightenment, scientists were the equivalent of rock stars. No longer feared for their heretical ideas that supposedly favoured the "natural order", these lateral-thinking rationalists changed the world for the better. The more recent stereotype of deliberate and painstaking research maven exists hand-in-hand with the image of the scientist as a monk: the solitary figure retiring to ponder the mysteries of the universe while seeking a 'light bulb' moment.

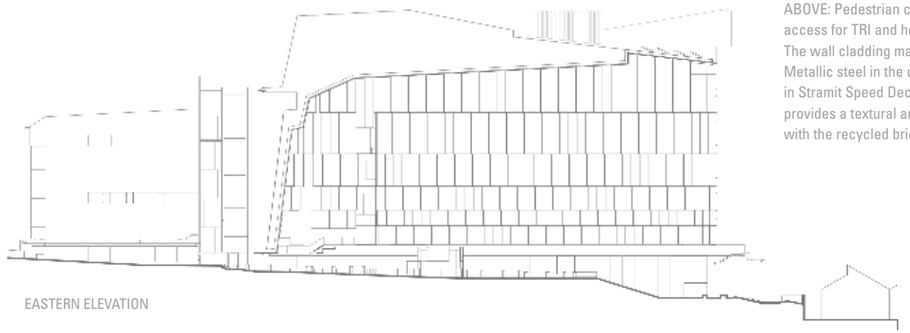
The scientists for whom Wilson Architects and Donovan Hill in Association designed the Translational Research Institute (TRI) at Brisbane's Princess Alexandra Hospital (PAH) are cut from an altogether different cloth. As architect and former DH Principal Timothy Hill suggests, the scientist is "the new leading citizen" who requires accommodation "not as a technician, but as a high-level precious member of society".

Wilson Architects and Donovan Hill in Association won a limited competition to design the building in 2007, and the project was completed in 2012. It is the third major collaboration between the two practices and represents one of a series of significant scientific facilities for both. Funding to the tune of $354 million was provided by partner institutions of the Australian Federal and Queensland Governments, The University of Queensland and Queensland University of Technology.

The TRI touts itself as Australia's most comprehensive medical research and biopharmaceutical facility, housing four major research institutions: the University of Queensland's Diamantina Institute, the Queensland University of Technology's Institute of Health and Biomedical Innovation, the Mater Medical Research Institute and the Princess Alexandra Hospital's Collaborative Centre for Health Research and Education.

TRI's design reflects a concern with preciousness, in its non-pejorative sense, alongside a rigorous plan that encourages communication and disintegrates compartments and hierarchies. The building enjoys a prominent position and new pivotal entry point at the corner of the hospital campus, and is a reflection of the 'new leading citizen's, or scientist's international standing and abundant creativity.

PBI


EASTERN ELEVATION

ABOVE: Pedestrian connections enhance access for TRI and hospital campus workers. The wall cladding made from COLORBOND® Metallic steel in the colour Copper Penny, in Stramit Speed Deck Ultra® profile, provides a textural and tonal contrast with the recycled bricks and rose glass

CFJ


PB

ABOVE: The eastern facade features a sunscreen of perforated aluminium shades clipped to the exterior with galvanised steel framing

ABOVE AND RIGHT: On the northern elevation, fine steel work supports the rose glass panels that give the building its distinctive presence and protect the outdoor room from the elements

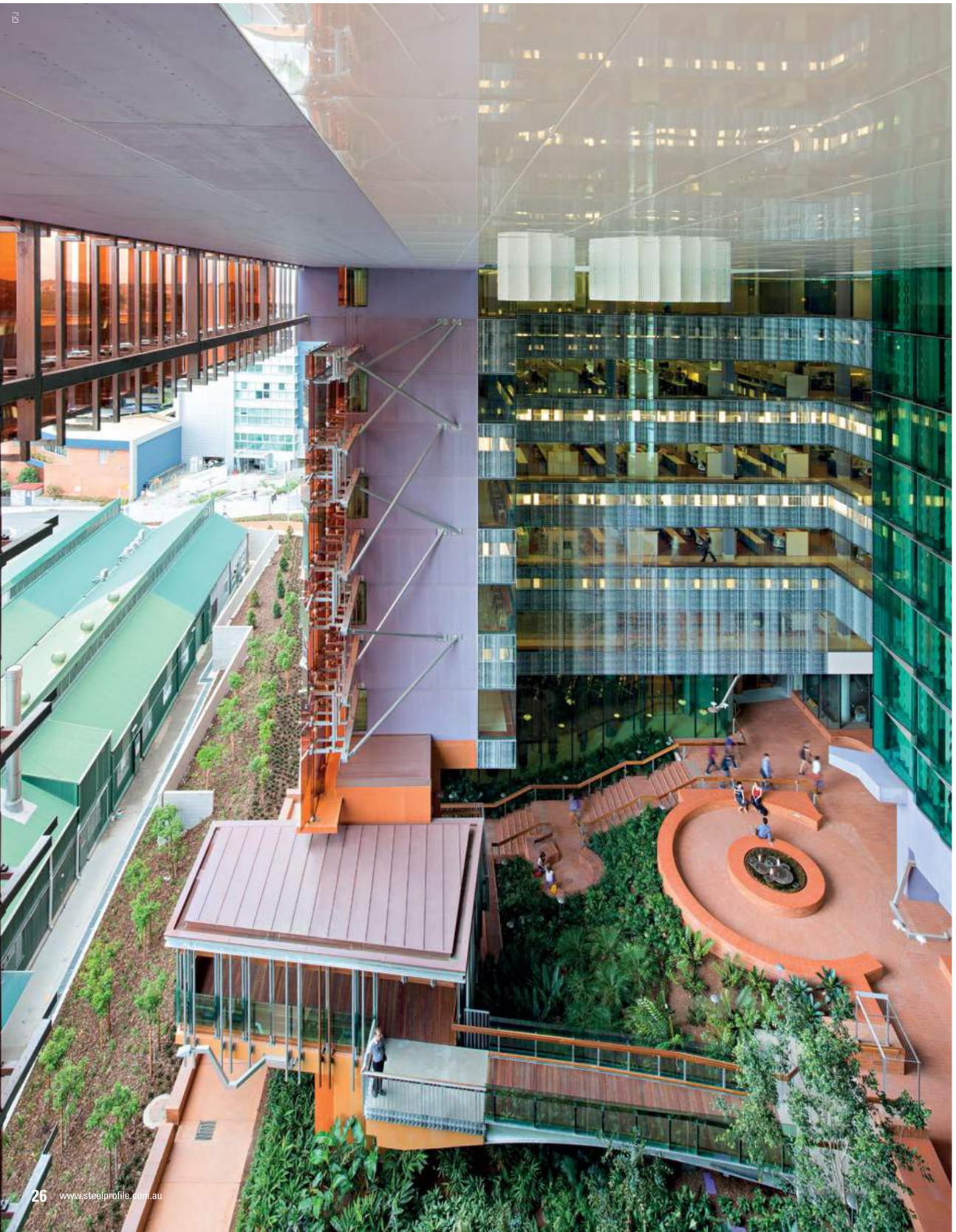
The design of the TRI encourages collaboration and innovation, and places its four partnering institutions, comprising 650 researchers and 300 other staff, at a single address. The idea behind the collaboration is to improve and accelerate medical research and to translate that research into greater palliative care. For the first time in Australia, biopharmaceuticals and treatments can be discovered, produced, clinically tested and manufactured in one location, in a process known as 'bench-to-bedside care'. The aim is to focus on a wide range of health and medical research areas including cancer, inflammation and infection, obesity and diabetes. A biopharmaceutical manufacturing facility is being constructed adjacent to the main TRI building and will house the first major biopharmaceutical production facility in Australia.

"There's a deliberate blurring between workplace and laboratory here," says Hill. "The two are usually so distinct, but here we used steel to do the 'quiet work', and to make everything demonstrably personal, unlike a typical corporate or laboratory space."

Transparency has been a driving concept for the design, allowing the building's inhabitants to have views into multiple sections of the building as well as to the exterior and sky. Walls of glazing wrap around a grand outdoor garden room; the transparent layers and illuminated circulation spaces creating an active village around the central hub. Spandrel panels with no mullions allow for unimpaired diagonal sight lines across the building.

The building's roof – covered with COLORBOND® Metallic steel in the colour Copper Penny, in Stramit Speed Deck Ultra® profile – houses a large array of equipment, and is attached using steel supports. Its shape from a distance takes


SHANTANU STARIK



CFJ

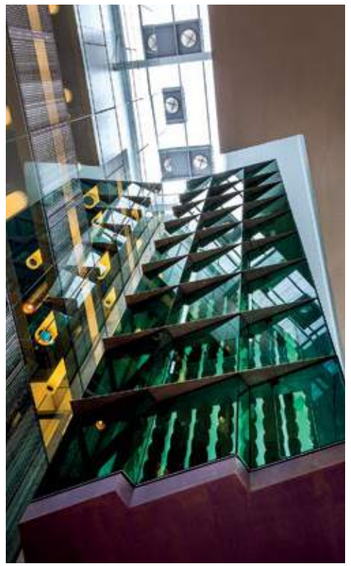
It is the steel which enables the precision of the building. The building is conceived as a shell from which the steelwork is an intermediary to which the outer facade is clipped

PB

on the form of a hilltop, extending the silhouette of the mountains on the edge of the city. “The lifting of the roof was a great moment,” recalls Hamilton Wilson, managing director of Wilson Architects. “There was so much to fit under it, and we could only get such wide spans by using steel.

“At every point, it is the steel which enables the precision of the building,” says Wilson. Steel supports the slab that holds the glass wall and the concrete frame of the building. It is conceived as a shell from which the steelwork is “arrayed as an intermediary around and above it to which the outer facade is clipped”, he notes. An elegantly thin kinked stairwell projects into the outdoor room, its load taken by steel support plates.

A sunscreen of perforated aluminium shades is clipped to the exterior elevations and supported by galvanised steel. The system was pre-tested for wind whistles and optics, establishing the optimum quantity of appropriately scaled and positioned apertures for ultraviolet penetration and vistas. Pinned with precision to the eastern and western elevations, the articulated, blanched screens contrast with the rose-tinted facets of the engineered glass that frame the outdoor room to the north and with the monumental wall cladding that wraps down the building’s southern side.



The wall cladding made from COLORBOND® Metallic steel in the colour Copper Penny*, in Stramit Speed Deck Ultra® profile, picks up on a palette introduced through the vibrant wall of rose glass and the terracotta bricks of the outdoor room. Large expanses of the steel cladding sit somewhere between the earthiness of the historically significant bricks (in part re-used from the original Vision Australia building on the site) and the ethereal quality of the glass, while also connecting to the palette of the older hospital building cluster. The crafted brickwork of the arbours, bridges, folded ledges and welcoming arch in the outdoor room expound the architects’ notion of providing key tactile and pleasurable moments in the most commonly used public spaces.

Anecdotally, researchers are already embracing their new environment as productive, stimulating, time-saving and (through the ability to share equipment), money-saving. While Wilson Architects is embarking on a thorough program of research and data collection into user response, recorded interviews with staff to date show a strong appreciation of the ability to move in and around the building with lab coats on, and of the uplifting beauty of the environment.

Subcontractors and contractors during construction began to “own” the building, according to Wilson. It is also clear that more people are staying in the building for longer periods than in their previous workplaces. Moreover, the public spaces where serendipitous meetings take place are key to new scientific discoveries, according to CEO Professor Ian Frazer, who promoted the collaborative institution. Frazer was Australian of the Year in 2006 and developed the cervical cancer vaccine known as HPV.

ABOVE: The atrium is enclosed by walls of glazing and a glass ceiling

OPPOSITE AND BELOW: A deal of optical trickery is used to play with the scale of the building. Transparent layers and illuminated circulation spaces create an active village around the seemingly enormous landscaped outdoor room

PANEL SAYS

This clever building in Brisbane’s Woolloongabba makes a generous and delightful civic space out of what was a banal brief, transforming this from a pedestrian building into a thriving community. We think it resists the urge to appropriate sticks, slats and flying roofs – typical of so many Queensland buildings – to create something that is uniquely rooted in its climate and environment without being predictable or cliched. The expert use of a broad range of materials – brick, steel, glass and aluminium – results in a thoughtful whole that is finely balanced. Structural steel has been used to masterfully achieve the internal canopy and we particularly like the expressed steel framing on the northern elevation, which holds both the aluminium and coloured glass shading in place.

A rhythm is established between the carefully wrought intimate spaces, and the expansive communal areas

Optical trickery is used to play with the scale of the building, and is enabled by the use of structural steel. The "huge, dry inexpressive floor plates", as Hill calls them, are countered by the seemingly huge outdoor atrium. "You understand the size of the building through the size of the outdoor room, which is surprisingly small in plan, rather than the floor plates," says Wilson. "It establishes a sense of comfort in its scale and in the multitude of wrought details," he concludes.

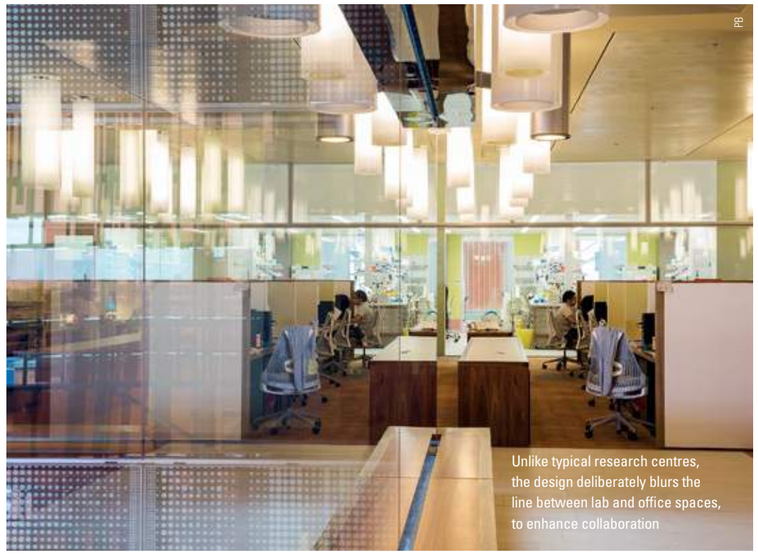
The massive scale of the eight-storey building sitting prominently on a hill is tempered by the intensely human scale at points of encounter through the building. A rhythm is established between the carefully wrought intimate spaces and the expansive communal areas. Perhaps the TRI's function and presence are best summarised by one of its users. In a recent filmed interview**, Professor Maher Gandhi, Laboratory Head of the Centre for Experimental Hematology at the PAH, compares the architecture of the building with the nature of scientific research:

"The difference is – as a clinician scientist – you don't have the picture in the box from the beginning. So you work with the edges, and the corners, and you get some kind of outline, then you work your way with that. You need new ways of solving jigsaw puzzles. I think this building represents that for me." SP

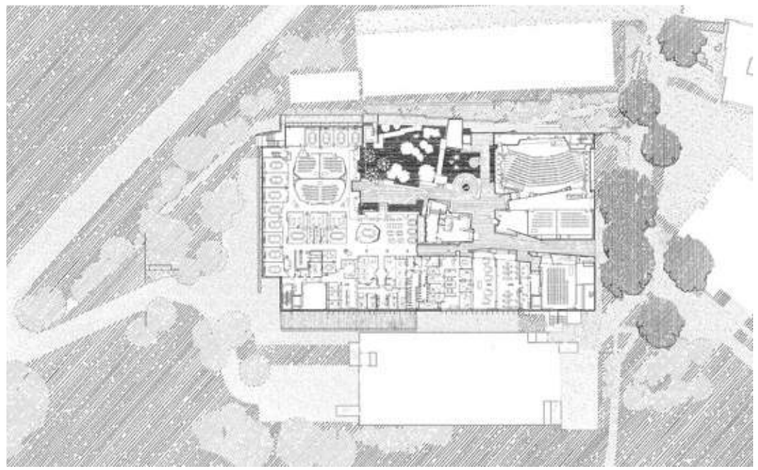
A video of the architects discussing this project is available at steel.com.au/showcase

**Copper Penny is not part of the standard COLORBOND® Metallic steel colour range. Please consult your nearest BlueScope office regarding availability of non-standard colours*

***Alex Chomicz film 2013 alexchomicz.com*



Unlike typical research centres, the design deliberately blurs the line between lab and office spaces, to enhance collaboration



SITE PLAN

PROJECT Translational Research Institute **CLIENT** Translational Research Institute **ARCHITECT** Wilson Architects + Donovan Hill Architects in Association **PROJECT TEAM** Design Architects: Timothy Hill, John Thong, Michael Hartwich, Damian Eckersley, Hamilton Wilson, Brian Donovan; Project Architects: Fuller November, Simon Swain; Project Team: Sophie Atherton, Domenic Mesiti, Melissa Dever, Lucas Leo, Sarah Russell, Chris Hing Fay, Sarah Neale, Tim Jukes, Simon Depczynski, Ash Every, Wei Jien, Lauren Wellington, David Evans, Charlotte Guymer, Robert Myszkowski, Alisha Renton, Jasper Brown, Michael Herse, Roland Fretwell, Greg Lamb, Beth Wilson, John Harrison, Kamil Kuciak, Ilka Salisbury, Paul Jones, Phil Hindmarsh, Hyun Kim, Martin Arroyo, Daniel Tsang, Michael Bailey, Sarah Woodhouse, Andrew D'Occhio, Tomoyuki Takada, Peter Harding, Nick Lorenz, Dana Hutchinson, Phillip Lukin, Michael Hogg, Shaun Purcell, Rebecca Lee, Jessica Riske, Sally Tyrell, Brent Hardcastle, David McRae, Michael Ford, Briohny McKauge, Maddie Zahos, Santanu Starick, Neil Wilson, Kae Martin, Lisa Matray **STRUCTURAL & FACADE ENGINEER** Aurecon **CIVIL ENGINEER** Opus **BUILDER** Watpac **MECHANICAL ENGINEER** Multitech Solutions + Hawkins Jenkins Ross **ELECTRICAL ENGINEER** Aurecon **HYDRAULIC ENGINEER** Opus **LANDSCAPE ARCHITECT** Wilson Landscape Architects + Donovan Hill **ENVIRONMENTAL CONSULTANT** Aecom **FIRE ENGINEER** Exova Warrington Fire **VERTICAL TRANSPORT** Cundall **ACOUSTICAL ENGINEERS** ASK Consulting Engineers **BUILDING CERTIFIER** Certis **STEEL FABRICATOR** All Type Welding **SHOP DRAWING CONTRACTOR** Network Drafting Service **CLADDING CONTRACTOR** Padstar & G James **PRINCIPAL STEEL COMPONENTS** Roofing and cladding made from COLORBOND® Metallic steel in the colour Copper Penny in Stramit Speed Deck Ultra® profile; Structural steel including steel-framed roof structure, steel slab supports, steelwork arrayed around concrete building frame, steel support plates for stairwell into outdoor room, galvanised steel framing supports for perforated aluminium shades **PROJECT TIMEFRAME** Design, documentation: 15 months; Construction: 40 months; Completion: December 2012 **AWARDS** 2013 Australian Institute of Architects (AIA) National Architecture Award Public Architecture; 2013 AIA National Architecture Award Interior Architecture; 2013 AIA FDG Stanley Award for Public Architecture; 2013 AIA GHM Addison Award for Interior Architecture; 2013 AIA QLD State Commendation for Sustainable Architecture; Shortlist for 2013 World Architecture Festival, Higher Education category; 2013 IDEA (Interior Design Excellence Awards), Highly Commended Public Space; 2013 Horbury Hunt Think Brick Award for Urban Design & Landscape; 2013 Australian Interior Design Awards: Best of State QLD Commercial Design; 2013 Australian Interior Design Awards: Highly Commended Pubic Design; 2013 Australian Timber Design Awards, Best Northern Region (QLD & NT); 2013 AIQS Infinite Value Awards - Architectural Excellence Award; 2013 AIQS Infinite Value Awards - Project of the Year Award; 2013 Engineering Excellence Award QLD Winner, Building Services (awarded to Aurecon, Multitech Solutions, Opus, Hawkins Jenkins Ross); 2013 IES Qld Lighting Society Award for Excellence; 2013 AIA John Dalton Award for Building of the Year; 2013 AIA Brisbane Regional Commendation Public Architecture; 2013 AIA Brisbane Regional Commendation Interior Architecture; 2013 AIA Brisbane Regional Commendation Sustainable Architecture **BUILDING SIZE** 39,500m² (GFA) **TOTAL PROJECT COST** $324 million

TOP LEFT AND TOP RIGHT: The placement of the elegantly thin central stairwell alongside the outdoor room means that vertical circulation provides additional opportunities to connect and communicate with colleagues.

The UQ School of Medicine & Nursing student lounge has outdoor visual connection to the Outdoor Room

BOTTOM LEFT AND ABOVE: The auditorium and casual seating in the atrium provide alternative ways to collaborate and share knowledge

COOL ROOMS

The weathering steel cladding of this COLORBOND® Award for Steel Architecture-winning “hotel for students” works on many levels to make it unique and of its place.

Words **Rachael Bernstone** Photography **Bob Seary**

ARCHITECT
Bates Smart

PROJECT
Iglu Central

LOCATION
Chippendale, New South Wales

Drawing on experience from several previously completed multi-unit residential and student accommodation projects, Bates Smart director Guy Lake has honed a design solution to arrive at the most efficient typology possible, without compromising on quality or finish.

On a tight corner block on busy Regent Street, adjacent to the new Central Park development and a stone's throw from Sydney's Central Station and several university campuses, Lake and his client wanted this eight-storey, 100-bed facility to have its own distinctive presence.

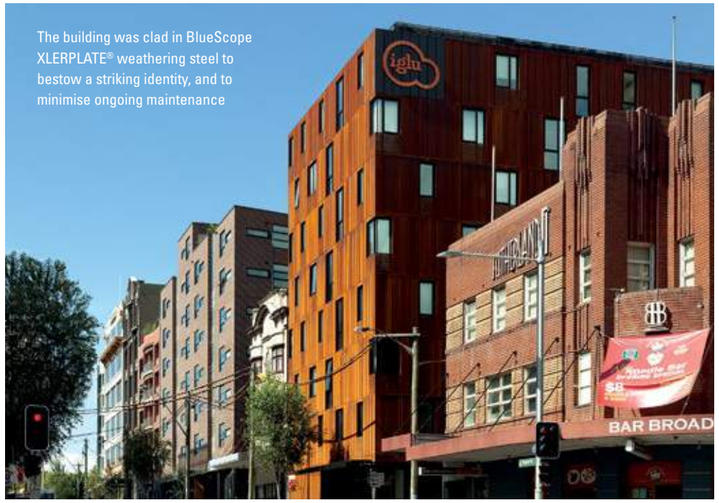
"This is Iglu's first building in Sydney, and they wanted to make it a landmark project," Lake says. "The market for student accommodation is becoming a lot more sophisticated and Iglu was keen to create a brand that appealed to both local and overseas students.

"Our brief was to design a 'hotel for students' and to consider all the details about how the rooms work in exactly the same way we would approach a hotel project," he adds. "But they have tight budgets, so one of the key aspects is to get the planning to be incredibly efficient: that's a critical part of the design process."

Given the small size of the site, the dual street frontages, and the character of the streetscape, Lake opted for an L-shaped plan that abuts the footpath. "It's clearly a block-edge precinct, with a strong context of brick buildings and a history of industrial uses," he says, "so we chose weathering steel for the cladding to pick up the colour of the brick without imitating it, and also to reference the industrial history of this area".

The cladding, made from BlueScope's XLERPLATE® HW350 weathering steel, was also chosen to give the building a striking identity, and for its low maintenance requirements. "One of the differences between this and a strata residential building is that Iglu is the long-term owner, so maintenance is an issue that is taken seriously," Lake says.

EAST ELEVATION



The building was clad in BlueScope XLERPLATE® weathering steel to bestow a striking identity, and to minimise ongoing maintenance

Having made the decision early on to clad the building in weathering steel, the custom-sized panels dictated the dimensions of the repetitive modules that impart a rational appearance. "Once we knew we were using this material, the whole building was set out on the 450mm module," Lake says. "It ties in with the rooms – the windows are either 900mm or 1350mm wide – so it all fits together in a modular way."

"That was the most efficient way to use a (1200mm-wide) coil, once you have folded the fixing edges," Lake says. "We minimised the amount of wastage, which was critical to being able to afford this material, so it's a very rational building. In student housing especially, you can't afford frivolous things: this is a business and you need to come up with the most efficient outcome, but also something that provides a strong architectural response."

To counter the risk of the facade appearing too regimented, Bates Smart alternated the placement of bedroom windows from left to right, in what Lake describes as "a very pragmatic response to building codes". "If you have full-height windows on a building under 25-metres tall, which is not sprinklered, you need a 900mm separation vertically between floors," he explains. "So here, the windows are staggered to allow us to have full-height windows without that vertical separation. Also, because the student housing typology is very repetitive, the staggering helps to break down what would otherwise be a very gridded and regular building."

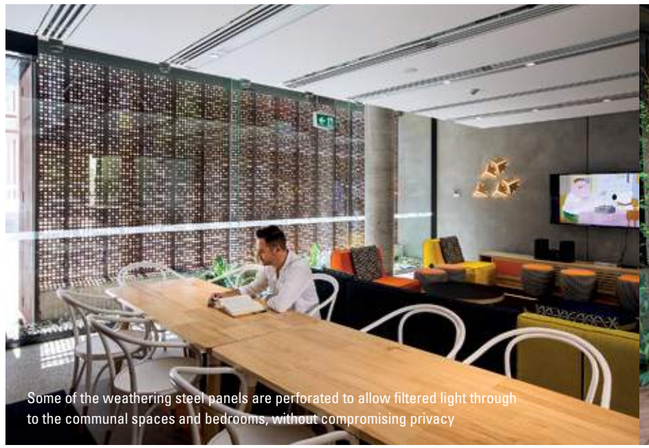
Contradicting misconceptions that weathering steel might be an expensive or difficult material to build with, Lake says the simplicity of the modular construction method allowed it to be completed on time and within budget. "From a cost perspective, this project had to be delivered at the same cost as other student accommodation projects. It was very easy to scaffold this building and achieve economies with the steel facade system."

Lake says the waterproof sarking layer, which encloses internal plasterboard and insulation, was completed early in the build, allowing the internal fitout to be carried out before the facade was added. "The facade was one of the last elements to be finished on the project, and the screws used to affix the weathering steel were somewhat contentious," he laughs. "Ideally we would have liked them to also have been weathering steel, or black, but that wasn't practical. So, they are visible, but they are an honest expression of how the system works."

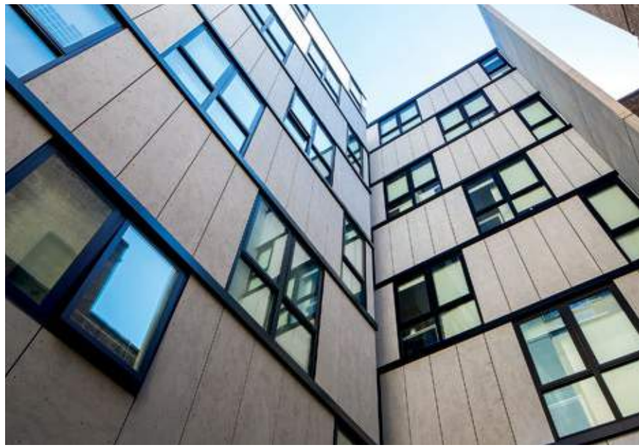
"We chose weathering steel for the cladding to pick up the colour of the brick without imitating it, and also to reference the industrial history of this area"

The use of perforations in some of the steel panels adds a degree of privacy while maximising natural light internally within the communal spaces at ground level and the bedrooms on the upper floors.

"A lot of the neighbouring buildings have fully glazed bases that try to be inviting from the street but don't respond well to this block-edge street condition, or to what's effectively a harsh urban environment," Lake says. "The challenge for us was to design living spaces behind the facade at ground level that were not disconnected from the street, but that offered a screen or protecting device. We also wanted to make the building feel grounded, and so bringing the weathering steel to the ground and cutting perforations in the panels allowed us to do that."



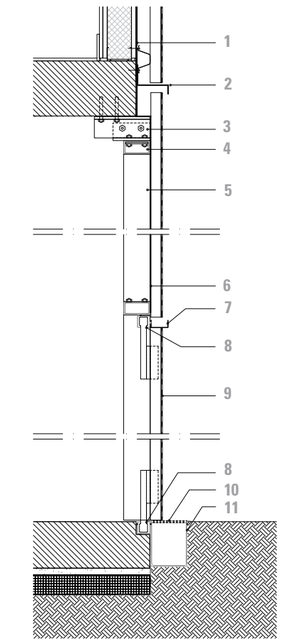
Some of the weathering steel panels are perforated to allow filtered light through to the communal spaces and bedrooms, without compromising privacy



ABOVE: The ground floor communal living area opens to an outdoor room where students can socialise

ABOVE RIGHT: The building is L-shaped around an internal courtyard that provides a quiet escape from the traffic and noise of the street

"What we really love about this material is that it changes all the time... With age, this colour will probably sit more and more comfortably with the surrounding brick"



LEGEND

1. Waterproofing membrane
2. Weathering steel
3. Fixing plate
4. RHS
5. SHS post
6. Vermin mesh
7. Water stop
8. Door track
9. Perforated weathering steel door
10. Weathering steel cover plate to gutter
11. Gutter

On the Regent Street frontage, the perforated steel screen conceals the lounge and dining areas in the foyer, while on Dwyer Street the perforated steel doors provide natural light and ventilation to the rubbish and recycling room and bicycle storage facilities at ground level.

The 'L'-shaped building encloses the internal courtyard on the ground floor where students can eat and socialise in a retreat away from the traffic and noise.

Standing in the leafy southern courtyard, overlooked by bedrooms above, Lake admits it's not the obvious location for an indoor-outdoor room. "But it does provide a sanctuary from the street, and throughout the year sun does penetrate this space, and we clad it with lighter-coloured materials to maximise the light," he says. "I'm told this space is incredibly well used. Our client is very interested in creating opportunities for students to engage and collaborate with each other, so we have created different seating options within a relatively small footprint, here and inside, to foster community among residents."

Upstairs, there are three bedroom types: single rooms with ensuites and single rooms that share a 'Jack and Jill' bathroom, which are clustered into six-bed apartments with their own kitchen/living/dining space, and self-contained studio apartments that occupy the north-east corner of each floor.

The perforated weathering steel cladding was key to balancing the need for light, space and privacy. "Upstairs, the rooms are relatively small so full-height windows make a huge difference to one's sense of space, but there are privacy issues that go along with them, so we've introduced a 'modesty' panel of perforated steel, which gives a sense of openness for the occupants," he explains.

ABOVE A simple gutter made of folded weathering steel directs water away from the doorways to bicycle storage and garbage rooms off Dwyer Street

"Combined with internal blinds, it allows them to control privacy, light and views in their own living environments."

Always conscious of maximising the lettable area, Bates Smart minimised circulation and service zones: all of the 'apartments' are accessed via one lift or stair, and one short hallway on each floor, and the bathrooms and kitchens are stacked vertically. "One of the biggest issues in designing multi-residential buildings is getting those bathroom and kitchen exhaust services out," Lake says. "They often end up being very badly integrated onto the facade, so we've used full-height perforated steel panels to conceal the service cores rather than using internal riser space, which we didn't have room for in our overall floor plan."

The same minute approach to detail is evident in the bedrooms, which are designed by the Bates Smart Interiors team, also responsible for the firm's hotel projects. "We are trying to get the most rooms possible on the site but to still provide good amenities," Lake says. "While this has a student-type feel, the interiors are more resolved than typical student projects."

One of the most intriguing details can be found on the ground floor facade fronting Dwyer Street, where a unique gutter made from folded weathering steel works in conjunction with grates in the footpath edge to minimise run-off.

"These gutters, which we've never used before, are having some impact on the way the building weathers, which is interesting," Lake says. "What we really love about this material is that it changes all the time. So does the (Bates Smart-designed) Queanbeyan NSW Government Services Centre building, which I've revisited many times and looks quite different each time. With age, this colour will probably sit more and more comfortably with the surrounding brick.

"When it first went on, the client said to me that it looked like Uluru, which they loved," he says. "From a branding and identity perspective, it's a building that gets people's attention, so while I think it's very contextual, it also has a presence and identity. As a result, it's generated a huge amount of interest and has really helped to position the Iglu brand."

These factors were all noted by the New South Wales Australian Institute of Architects Awards jurors last year, when they gave the building the COLORBOND® Award for Steel Architecture and an Architecture Award in the Residential Architecture – Multiple Housing category. In the words of the jury: "It is exciting and delightful to see steel extended in such a creative and expressive manner to deliver a remarkable addition to the fabric of the city. Fundamentally this material use gives the building personality and expression while allowing it to age and weather, delivering a richer building over time." SP

PANEL SAYS

In response to what is arguably a very harsh street environment, Bates Smart did something unusual on this student housing project: it located the courtyard on the south-western corner. In doing so, the architects have created a generous outdoor space that can offer quiet repose or noisy interaction, depending on the students who frequent it. Also unusually on a multi-res' project, they chose a weathering steel cladding system which embeds the building into its red brick milieu. The custom perforated panels provide interest while allowing the architects to integrate subtle service doors at ground level and to conceal building services on the upper floors, without interfering with the rigorous commitment to the steel module.
There is a design clarity apparent in the attention to detail that can be clearly observed throughout this highly resolved building.

PROJECT Iglu Central **CLIENT** Iglu Student Accommodation **ARCHITECT** Bates Smart **PROJECT TEAM** Guy Lake, Natalie Lane-Rose, Sylvia Vasak, Bianca Heinemann, Tonie Maclennan **CONSTRUCTION MANAGER** Grindley Construction **STRUCTURAL & CIVIL ENGINEER** TTW **MECHANICAL** EMF Griffiths **PLANNING CONSULTANT** JBA Planning **PROJECT MANAGEMENT** Pyramid Pacific **BCA** Steve Watson and Partners **QUANTITY SURVEYOR** WT Partnership **ACOUSTICS** Acoustic Logic **LANDSCAPE ARCHITECT** Aspect Studios **STEEL CONTRACTOR AND SHOP DRAWING CONTRACTOR** Dunsteel **LIGHTING DESIGNERS** Point of View **PRINCIPAL STEEL COMPONENTS** Cladding: BlueScope XLERPLATE® HW350 weathering steel panels, approximately 450mm wide by 2700mm high, with custom perforation 3mm to 5mm-thick depending on location and size **PROJECT TIMEFRAME** 12 months **AWARDS** New South Wales Australian Institute of Architecture Awards 2013: COLORBOND® Award for Steel Architecture, Architecture Award for Residential Architecture – Multiple Housing **BUILDING SIZE** 2,600m²

CONTINUING EDUCATION

With a design strategy inspired by the pods of the locally indigenous Kapok tree, this new school by HASSELL honours local history while offering a warm welcome to students and the broader community.

Words **Alex Taylor** Photography **Douglas Mark Black**

ARCHITECT
HASSELL

PROJECT
MacKillop Catholic College

LOCATION
Johnston, Northern Territory

NORTH-WEST ELEVATION

NORTH ELEVATION

TOP AND BOTTOM: One of the main challenges in the design was to create a 'whole' school that could be constructed in stages. The first stage included the school's front door and northern wing, which accommodated years seven, eight and nine in the first year of operation

The roof of the library, at the western end, extends beyond the building in a gesture that is visible throughout the surrounding suburb: a deliberate attempt to make the school a beacon in the landscape

Distinguished by a steel-tough outer 'shell' and a softer, open courtyard interior, this new Catholic secondary college at Palmerston – a satellite city about 25 kilometres south-east of Darwin – has been a long time in the making. First mooted in 2001, Perth-based architect David Gulland of HASSELL was part of the team that won the original design competition for the project in 2002. It was then shelved for several years, but when the Catholic Education Office (CEO) re-started the scheme in 2009, Gulland was approached again.

The original design competition was for a standalone middle school, but in the interim the remit had expanded to encompass a complete high school on the same site. "At that point, we went right back to first principles, and it was good for the clients to see where we were coming from, talking about the site and a conceptual layout," Gulland says.

Concurrently, HASSELL was working on several other education projects that were at various stages of design and construction, including Dalyellup College in Perth (see *Steel Profile* 104). What made this one stand out was the unique attributes of the site.

"The site was a clear inspiration, partly because of the topography but also because CEO places a strong emphasis on spiritual and pastoral care, and the site was adjacent to indigenous heritage and natural heritage areas," Gulland says. "This wasn't a typical school in a sub-division surrounded by roads, so the challenge for us was to make linkages to those places – gestures beyond the boundaries of the school – and also to capture views across Palmerston. The site conditions provided us with design opportunities for the community to see the school and vice versa: for the school to become a beacon in the landscape."

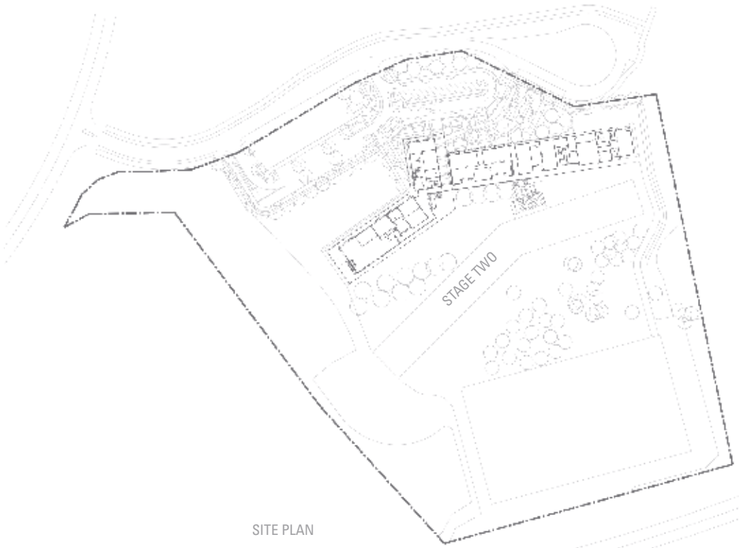
The nearby heritage site known as 17½ Mile Camp was a major defence point in World War II, when Darwin was under attack from Japanese bombers. Home to Australian and US troops in 1942, it now comprises preserved fox holes and interpretative signage that describes the site's history, and is part of a heritage trail that was completed while the school was under construction. The boundary between the two sites is deliberately low-key, to foster a sense of connection with the past for students.

On the other side of the school, an indigenous sacred site holds special significance for local Aboriginal people. "The school is keen to build relationships with the Larrakia nation, so the idea that there is a potential visual connection adjacent to the school became key to our orientation of the buildings at concept sketch stage," Gulland says. "We were keen to pay reference both to the sacred site and the heritage site – which occupies a topographical high point – and this influenced the orientation of the new buildings and the master plan approach to the site."

The new school was designed in two distinct stages – two long, cranked wings that seem to nestle into the hillside at one end and jut out over the landscape with large cantilevered roofs at the other. "Our Perth team worked with Darwin-based HASSELL team member Reuben Bourke and colleagues at

PANEL SAYS

This new school in Darwin's satellite city of Palmerston has a modest appearance that doesn't try to overwhelm its setting. With its subtle gestures, big roof overhangs and civic scale, it effortlessly achieves many laudable goals. We especially admire the way the building seems to emerge from the hillside: reminding us of the Arthur and Yvonne Boyd Education Centre at Bundanon by Glenn Murcutt in the way it responds to the landscape and follows the contours of the terrain. The fine steel structure combined with the use of steel cladding and expressed shading articulates the facade in a refined and elegant way, lending this project an understated beauty.



SITE PLAN

Jackman Gooden Architects, and we took into account the wind direction, soil conditions and topography as guiding elements driving the design," Gulland says. "Also, the fact that this would be a staged construction program meant that we had to design a whole school and create a front door in stage one, so that it looked reasonably finished from the outset. That was a key driver in our strategy of building the northern wing first: it then felt like a coherent school."

This first wing was completed in early 2012, and initially hosted students in years seven, eight and nine. Accessed via Farrar Boulevard, it occupies the site's highest point, while the second wing will sit alongside it to the south. The southern boundary fronts busy Lambrick Avenue, so playing fields were deliberately located there to provide a buffer against traffic and noise.

The design strategy was inspired by the pods of the locally indigenous Kapok tree, which have a hard outer shell and are full of soft cotton-like material. "We opted for a hard exterior – using steel, concrete blocks and aluminium panels, and an open, courtyard-focused interior that is softer and very well connected," Gulland says.

The base of the buildings was constructed with concrete columns and block-work for fire engineering reasons, topped with a structural steel frame of 150x100RHS, 75SHS and 165CHS sections that support the upper level and roof.

COLORBOND® steel in the colours Windspray® and Jasper® was used to clad the soaring roofs in Steeline Steel Span 700 profile, and the upper walls in LYSAGHT CUSTOM ORB® profile. The upper walls were also clad in aluminium panel.

The two levels are visually separated by a shadow line which helps to break down the scale and the COLORBOND® steel wall cladding is applied in a rhythmic, ordered way. "We developed a strong and direct plan layout, and wanted the cladding to be a modern interpretation of the existing site colours and textures."

The use of two COLORBOND® steel colours in differing profiles for the wall cladding and roofing provides variations in texture and accentuates a different sensibility, Gulland says. "Take the library at the western-most end: the roof floats out beyond the building and is visible to the rest of the suburb," he explains, "and that section of the building also offers amazing views, so we wanted a lightweight or lantern approach for the upper level in contrast to the weightiness of the concrete block work-base".

Construction was not without its problems, mainly because of a wetter-than-usual wet season during the early phase. "Getting out of the ground is always difficult in the tropics – you have changing ground conditions in Darwin in the wet season. But once we had stabilised the groundworks and laid foundations and footings, we got up and away and the build was straightforward," Gulland says.

The plan features several innovations that HASSELL has used previously, but they were enhanced here because of the school's emphasis on pastoral care, he says. "The learning areas have been laid out as clusters of rooms, with four general learning spaces, so that they can form mini-communities by year group, and look out into the broader school through a series of common courtyards," Gulland says. "That approach will become more apparent once stage two is built, and the looping system – whereby the youngest students start on the south side and move around to the north wing as they progress – is put into practice."

Befitting of the tropical climate, where air-conditioning is needed in the 'build-up' period before the wet season, the breakout spaces double as circulation rather than arranging classrooms in a linear plan linked by long corridors. The teaching spaces all feature louvred windows to facilitate cross-ventilation in the dry season. "We've also installed breezeway elements between the learning spaces, to encourage indoor/outdoor connections when the weather is more favourable," Gulland says.

"The verandah loops around the inside of the school with double doors connecting to the outside, and internal/external benches to give a season-dependent range of options."

The selection of lightweight materials – including two COLORBOND® steel profiles for the upper level cladding – adds texture and rhythm to the facade, and provides contrast with the heaviness of the concrete block-work lower level

"We developed a strong and direct plan layout, and wanted the cladding to be a modern interpretation of the existing site colours and textures"

The spaces between the buildings were also carefully considered and arranged – similar to Dalyellup College, Gulland says – and the staged construction program meant that all of the elements, indoors and out, had to work twice as hard in the first phase. "Because of the split construction program we talked with CEO about how to make spaces multi-functional," he says. "For example there is an undercover area at present that will become a full cafeteria in the future.

"We needed to provide specialist facilities such as laboratories in the first stage," he adds, "because it's hard to teach science in a temporary location, so the second stage largely features learning stages and areas that can easily be adapted".

From a design point of view the second stage is fully documented and expected to be delivered in separate packages. The completed school will have the capacity to serve between 650 and 780 students, most of whom are likely to be drawn from the rapidly expanding Palmerston area.

One of the main challenges Gulland recalls arose from the fact that, as a brand-new school, there was no existing school community or principal to liaise with in the design phase.

"We certainly had a lot of interaction with the founding principal after she was appointed, but we also had to find a way to engage with people who would be delivering the teaching, to ask about their preferred ways of doing things," he says. "To that end, we consulted extensively with CEO's learning specialists."

After its long gestation, the school now appears to have a bright future, with enrolments steadily growing thanks to the efforts of founding principal Lauretta Graham, who took the helm after serving in the same position at a Catholic college in Cairns. It won the Northern Territory AIA's Reverend John Flynn Award for Public Architecture in 2013, and the jury was "impressed with the clarity of planning, the simplicity of the building materials used and the generosity of the circulation spaces and verandahs in the buildings".

For Gulland, the most successful aspect of the design is the way the buildings sit in the landscape and are knitted into the community. "It is a spectacular and beautiful site, and the way the building comes out of the hillside is a strong gesture," he says. "Inside, it is a series of learning spaces and learning communities which are all strongly knitted together.

"We didn't want to do something that was going to be driven by fashion rather than context and function," Gulland adds. "We want it to settle into the site and be timeless." SP

TOP AND ABOVE: Circulation spaces range from open verandahs to air-conditioned break-out spaces between classrooms, with a mix of louvres, double doors and indoor-outdoor benches offering different degrees of connectivity, depending on the climate in dry, build-up and wet seasons

PROJECT MacKillop Catholic College **CLIENT** Catholic Education Office, NT **ARCHITECT** HASSELL, with Jackman Gooden Architects in Association **PROJECT TEAM** HASSELL Team: David Gulland – Project Director, Christopher Pratt – Design Architect, Reuben Bourke – Project Architect. Jackman Gooden Architects – Architects in Association: Col Browne **STRUCTURAL ENGINEER** Townes Chappell Mudgway **CIVIL ENGINEER** Byrne Design **BUILDER** John Holland Construction **STEEL FABRICATOR** Ahrens **SHOP DRAWING CONTRACTOR** Steelpencil **CLADDING CONTRACTOR** Halikos Roofing **LANDSCAPE ARCHITECTS** Clouston Associates **PRINCIPAL STEEL COMPONENTS** Roofing and upper wall cladding: Steeline Steel Span 700 profile made from COLORBOND® steel in the colours Windspray® and Jasper®. Wall cladding: LYSAGHT CUSTOM ORB® profile made from COLORBOND® steel in the colours Windspray® and Jasper®. Soffits: Steeline Corrugated made from COLORBOND® steel in the colour Shale Grey™. Flashing: COLORBOND® steel in the colours Windspray® and Jasper®. Structural steel: 150x100RHS, 75SHS and 165CHS sections to upper level and roof frame **PROJECT TIMEFRAME** Design: 2009-10, Construction: April 2011 to July 2012 **AWARDS** Australian Institute of Architects Northern Territory Awards 2013: The Reverend John Flynn Award for Public Architecture **BUILDING SIZE** 6,100m² (GFA), including unenclosed covered area

PREHUMAN PAVILION

Like a leaf falling randomly onto a clutch of sticks, this public shelter's shimmering, thin-edged roof rests lightly on slender steel columns.

Words **Rob Gillam** Photography **John Gollings**

The 'Lilypad', as it's informally named, is one of five shelters BKK Architects was commissioned to create for the Royal Botanic Gardens' Australian Garden site at Cranbourne, 40 kilometres south-east of Melbourne.

Two of the other shelters have already been constructed – a visitor's centre/caf and bus stop – and they both feature extensive cladding made from COLORBOND® steel and XLERPLATE® weathering steel. The final two shelters are in planning.

The garden, which had been planned for decades, was well established when the brief was received, presenting an unusual role-reversal for the architects. "Normally the landscape comes at the completion of a project, but this was very much the opposite," says BKK director in charge Simon Knott (the second "K" in Black Kosloff Knott).

"The landscaping by Taylor Cullity Lethlean was already in when we started and it's very impressive. *The Monthly* magazine described it as 'The Landscape equivalent of the Opera House', so it's quite an honour for us to be involved with it, and we considered its extraordinariness as a challenge."

The garden is segmented into thematic regions, and the 'Lilypad' sits within the Gondwana Garden, which is representative of a landscape prior to human habitation.

"The idea with that garden is to step back to a time where the environment didn't have the mark of humans. There are naturally shaped stone walls there, for example," Knott explains.

"What we were trying to do with that shelter was create the idea that it is a piece of leafage or debris that just landed there, and for the roof to take an organic form."

Indeed, the roof's appearance changes depending on the direction it's viewed from. From the front, it appears love heart-like. From the sides it's a disc and it tapers to a feather-fine point from the rear.

Wooden beams that form a permeable wall follow the traces of the landscape. They suggest they're holding up the roof but in fact slender steel columns alongside them take the load.

"Steel was the most suitable material for the columns because they're so slender," says Knott. "Also, the load-bearing and detailing was complicated by the columns being angled differently."

Rather than running plumb-straight and being spaced uniformly, the columns add to the shelter's organic credentials by appearing to be 'sticks' that have fallen haphazardly.

"We wanted to continue the idea of imperfection so they're intentionally angled differently and in a random pattern," Knott says. "The shelter roof is about eight metres across so there was a fair bit of engineering needed to get it right." The resulting junctions between the roof and columns are highly resolved and particularly impressive.

Steel was likewise the material of choice for the structure's centrepiece. "We found steel was the most appropriate material to give the roof the thinness we wanted because it provides a really fine edge," Knott says.

The roof was extensively modelled in design phase and 3D modelled in the shop drawing phase.

"Once we were in the manufacturing stage, it was relatively straightforward for Melsteel to fabricate it, but getting it onto site presented a challenge," Knott recalls.

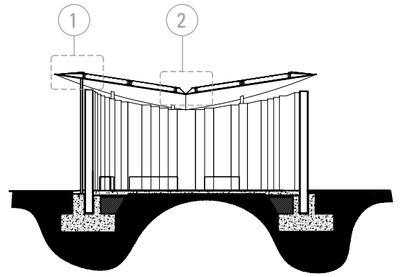
He describes the roof – constructed from BlueScope 3mm hot-rolled sheet and finished with a paint system – as "a highly customised sandwich panel, complete with insulation". Built in two halves, the roof panels meet at an extremely thin middle junction point to make the whole.

"Transporting and erecting the roof as a whole was always going to be difficult so it was craned out there in half and then welded together on site," Knott explains.

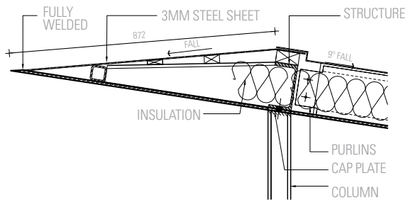
The choice to build the shelter with steel was very much supported by the client, Knott says. "The client had its own design team which was very involved from a technical point of view. With termite issues to consider, they were impressed by the longevity of the material and the highly protective coatings. The structures are going to be there in 100 years' time and that's exactly what the client is after."

The Australian Gardens has also resonated with locals and has had a transformative effect on the suburb. "Cranbourne is a relatively low socio-economic area and free entry to the Gardens has had a really positive effect," Knott says. "A lot of people go there, and children especially are delighted by the experience of the landscape and the shelters. It has really invigorated the area."

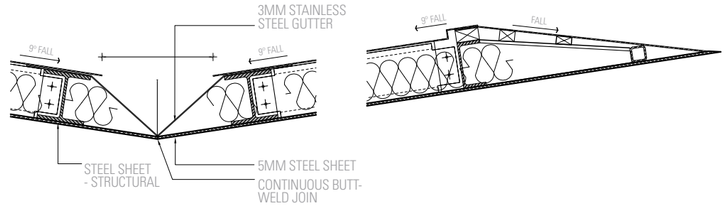
And the architect's favourite feature? "I like the way it sits within the landscape. For us, the chief aim was for it not to necessarily be a structure in its own right, but be part of the larger landscape picture. I think it does that quite well." **SP**



SECTION



1 SECTION DETAIL



2 TYPICAL SECTION DETAIL - STAINLESS STEEL GUTTER

PROJECT Australian Garden Shelters, Lilypad **CLIENT** Royal Botanic Gardens, Melbourne **ARCHITECT** BKK Architects **PROJECT TEAM** Directors: Simon Knott, Tim Black, Julian Kosloff; Project Architect: Adi Atic; Graduate Architect: Madeleine Beech **STRUCTURAL & CIVIL ENGINEER** Perrett Simpson Stantin **BUILDER** Overend Constructions **STEEL FABRICATOR** Melsteel **SHOP DRAWING CONTRACTOR** Melsteel **PRINCIPAL STEEL COMPONENTS** 5mm and 3mm BlueScope hot-rolled sheet, steel CHS columns **PROJECT TIMEFRAME** 12 months **LANDSCAPE ARCHITECTS** Taylor Cullity Lethlean **AWARDS (LANDSCAPE)** 2013 World Architecture Festival, Landscape of the Year Award **BUILDING SIZE** 60m² **TOTAL PROJECT COST** $170,000

BLUESCOPE

STEEL **PROFILE** #117

www.steelprofile.com.au