

128

AUGUST 2018
ARCHITECTURAL
STEEL INNOVATION
WITH BLUESCOPE

STEEL PROFILE

WATSONARCHITECTURE+DESIGN
DEAKIN UNIVERSITY PEDESTRIAN BRIDGE
– MORGAN'S WALK

COX ARCHITECTURE
ANNA MEARES VELODROME

IN PROFILE:
NIGHTINGALE'S JEREMY MCLEOD

EDITORIAL

Welcome to *Steel Profile* 128.

BlueScope is proud to celebrate another year as the Principal Corporate Partner of the Australian Institute of Architects and relished the opportunity to be a part of the 2018 National Architecture Conference – Edge. The profession's largest annual gathering focused on architecture's ability to improve experiences at the 'edges' of our cities and environment.

A presentation was made at Edge: Emeritus Professor Alec Tzannes was awarded with the Australian Institute of Architects' Gold Medal, its highest honour. Congratulations to Alec for his contributions to the industry, as he embarks on the 2018 Gold Medal Tour.

The Conference was also a valuable opportunity for us to engage with architects and showcase COLORBOND® Coolmax® steel which, in this climate of increasing need for energy-efficient buildings, was well received. We had some great feedback from many of you after explaining that COLORBOND® Coolmax® steel is scientifically designed to provide high solar reflectance and thermal emittance, and has the highest Solar Reflectance Index (SRI) of any BlueScope roofing product – leading to a truly cool roof.

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Tanya Tankoska
BlueScope editor

EDITORIAL ADVISORY PANEL

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



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 prizes.



PENNY FULLER

Penny is a partner at Silvester Fuller, established in 2008. Silvester Fuller's first built projects have been awarded for their creativity and design sensibility. Penny's work draws on experience gained across a broad range of international projects. She is a previous recipient of the Australian Institute of Architects' Emerging Architect Prize.



MATTHEW HYLAND

Matthew Hyland works with Woods Bagot. He obtained a Master of Architecture from the University of Tasmania and was awarded the 2015 BlueScope Glenn Murcutt Student Prize.

Having a preoccupation with enriching the ordinary, Matthew is continuing to develop and refine design processes through observation, research and experimentation.

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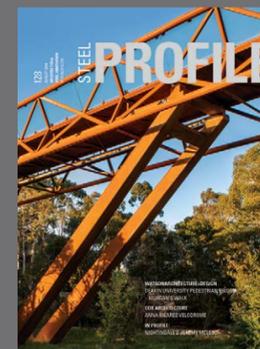


David Barr Architects' unusual Perth apartment design results in a handsome building with cladding made from COLORBOND® steel that offers a new way of living for young people.



Brian Hooper Architect and m3architecture's adaptive reuse of a former outback Queensland pub demonstrates that steel can be used to efficiently transform a building by overlaying a new signature character.

Principal Corporate Partner



COVER PROJECT

Deakin University Pedestrian Bridge – Morgan's Walk

PHOTOGRAPHER

Lisbeth Grosmann



Cox Architecture's design for Queensland's first enclosed cycling track employs 1200 tonnes of steel in an efficient engineering solution for its vast and graceful, saddle-shaped roof structure.



Bearing Six Degrees' trademark attention-to-detail, this highly resolved row of guest rooms features playful incisions into the walls made from ZINCALUME® steel to create sheltered portals which are a nod to archetypal verandahs.

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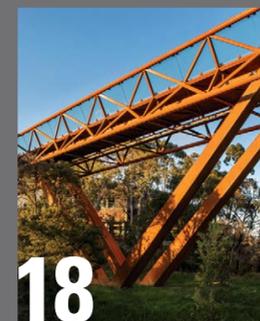
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watsonarchitecture+design's inclusion of BlueScope REDCOR® weathering steel to enhance pedestrian access to Deakin University has resulted in a bridge boasting rich, red tones and the unusual ability to both blend in and stand out.



Showcasing steel's slenderness and refinement, Jackson Clement Burrows Architects employed modular prefabrication to drive a rapid program for a temporary building that demonstrates atypical flair.



A small group of architects led by Breathe Architecture's Jeremy McLeod have created a replicable blueprint for socially conscious developers to support affordable multi-residential housing.



These unusual apartments in Perth offer a new way of living for young people, in a handsome building with cladding made from COLORBOND® steel that references the suburb's history.

Words **Alex Taylor** Photography **Robert Frith**

PUZZLE PIECE

ARCHITECT
David Barr Architects

PROJECT
Gen Y Demonstration House

LOCATION
White Gum Valley, Western Australia



Diversity in housing stock is a hot topic. Several recent design competitions have asked architects to invent ways to address the need for different types of housing, whether it's in-fill in middle-ring suburbs in Sydney and Brisbane, or housing for Gen Y residents in Perth.

The state's land and development agency ran the latter competition under its Innovation through Demonstration program in 2014, when it asked young architects to submit "An idea which encapsulated the Gen Y lifestyle and living requirements". Participants were asked to describe a flexible, cost-effective and sustainable dwelling for the next generation of home owners.

From 21 submissions, and six semi-finalists, David Barr Architects won the competition, with a scheme that tackled the brief as "a series of pieces of a puzzle". Barr's winning design is a hybrid apartment building and freestanding house that contains three 50m², single-bedroom apartments in a compact two-storey footprint on a 250m² block. The apartments prioritise liveability for inhabitants and neighbours with access to private and communal external areas, clever storage, generous ceiling heights, and high thermal efficiency. Although small, the apartments are spatially efficient and reflect the change in Australian demographics whereby single-person households are the fastest growing household type.

The Gen Y apartments are wrapped around a central courtyard, with two apartments at ground (one over two levels) and a third at the upper level. Each has its own independent entry, with the upper-level apartment accessed from a private external staircase. Despite the tight site constraints, the dwellings have private external areas (in the form of garden, deck or balcony). Only two have carports, reflecting changing patterns of car ownership among younger generations, but each has dedicated bike storage areas.

The winning design was built at White Gum Valley, a former light industrial area near Fremantle that is undergoing redevelopment as a residential neighbourhood.

For David Barr, the project provided an opportunity to explore the needs and requirements of a younger generation of potential home buyers. "The parameters we were working with defined a need to house between four and six adults on the site, and there was a lot of flexibility in the proposal," he says. "We were trying to understand what it means to be a first home buyer in Gen Y, and we took a few cues from research we did which showed that they'd like to be well located, they don't need a big home, or a large garden; they'd like it to be maintenance free so they can leave and come back easily."

"Most of the other submissions put forward a share-house type arrangement but part of our strategy in entering competitions and in our practice is to deepen and broaden our understanding, so in this case we investigated what a strata entails, how it might offer flexibility, what the planning requirements were, and how far we could push the envelope," he explains.

Having discovered the site was subject to R40 density and could therefore support multi-residential development, Barr proposed a "mini-apartment block", initially with four units, but he found that scheme didn't provide sufficient liveability. A revised plan that features three interlocking apartments gave each one access to natural light, outdoor spaces and connectivity to the street.

Barr explored ideas around strata ownership and how design might incorporate flexibility for apartment owners to make changes in future, without having to seek unanimous approval from the body corporate. "One of the limits of a large apartment block compared to a single residential home is that it's much harder to grow and augment an apartment over time," Barr says. "One of the things we set out to do – which is not fully implemented in this project but could be in future examples – was to pre-determine additional components such as pergolas and storage options that residents could add later, if they wanted to." ↗

ABOVE: The award-winning design for three interlocking apartments ensures that each has access to northern light, cross-flow breezes and a private outdoor space.

RIGHT: The cladding made from COLORBOND® steel in Stramit® Corrugated profile, in the colour Surfmist®, reflects the new suburb's history as a former industrial area, and addresses the corner with its striking curves.



"...we investigated what a strata entails, how it might offer flexibility, what the planning requirements were, and how far we could push the envelope."





TOP: The open-plan kitchen and living area of the front apartment opens to the central private courtyard, and the bedroom is upstairs.

ABOVE: The interstitial courtyard features a private ground-floor garden and a common dining area that residents share.

His scheme uses the same principle as Alejandro Aravena's Elemental Half-A-House – the project in Chile that develops “half houses” for families, which can then be easily customised and subsequently added to by their owners, as circumstances and access to finance change.

“Those principles are good, and they are one way to tackle affordability,” Barr says, “because they make it easier to add to apartments which means that the stigma attached to strata schemes can be slowly diminished. From the outset, there is an understanding of what other residents can do, and when it's time to ‘push the button’ the works can go ahead in a straightforward way.”

For the Gen Y house, Barr initially proposed to deliver empty-shell apartments that residents could then customise with joinery as it suited them, but LandCorp opted to fully fit out the apartments for demonstration purposes. The project did however set a new benchmark as one of the first multi-residential buildings in Australia with a strata agreement governing the usage of a shared PV and battery system, which is being monitored on an ongoing basis by the Curtin University Sustainability Policy (CUSP) Institute team, which also mentors the owners regarding their energy usage.

During the year the apartment was on show, about 1200 people – members of the property, design and construction industry, school groups and public – toured the building. The new owners took possession in December 2017 so no post-occupancy evaluations have yet been undertaken, but Barr intends to conduct those in future.

Designed to be read as a single home, the building was constructed using a combination of materials, most notably cladding made from COLORBOND® steel in Stramit® Corrugated profile, in the colour Surfemist®, which references the nearby legacy buildings of the Knutsford industrial and commercial precinct. The building's steel cladding also combines with brick and timber to tie in with nearby houses.

Barr says a decision was taken early on to minimise the range of materials externally and internally, because the project can be viewed from all four sides and he wanted to present a cohesive appearance. Steel played an important role in that regard.



GROUND FLOOR PLAN



FIRST FLOOR PLAN

LEGEND

- | | |
|------------|---------------------|
| 1. Entry | 8. Courtyard |
| 2. Living | 9. Carport |
| 3. Kitchen | 10. Common garden |
| 4. Storage | 11. Common dining |
| 5. Laundry | 12. Battery storage |
| 6. Bath | 13. Waste storage |
| 7. Bedroom | |

“Our practice has a history of small alts and adds, and we've used COLORBOND® steel products in those projects extensively,” Barr says. “We knew that it offers good warranties” and it's affordable, and requires only low maintenance, which for us was an important consideration that addressed the fact that the Gen Y residents won't have to re-paint.

“It's also a beautiful product that is perfectly suited to this post-industrial area, and the metal roofs on nearby homes,” he says. “Steel, along with the recycled brick walls that became the defining aspect of the gardens, ties back into those precedents; that was a deliberate decision from the beginning of the design process.”

Sustainability was an integral part of the project, Barr says: it achieved a ‘gold medal’ eTool life cycle assessment, recognising a 104 per cent carbon reduction over the life of the project (against a benchmark residential project). Several factors contributed towards this outcome including the combination of a 9kW PV cell and battery system and high-performance insulation in the form of 150mm Bondor® SolarSpan® roofing insulated

“... the use of prefabricated roofing made from Bondor® SolarSpan® panels and the wall cladding made from COLORBOND® steel in Stramit® Corrugated profile helped to achieve that short time-frame.”

panels made from COLORBOND® steel in the colour Surfemist®, which have a thermal rating of R3.5. The apartments also feature passive sustainability design principles: the interlocking nature of the design means that each dwelling is orientated and arranged to maximise sun shading, natural light and cross-ventilation.

“The use of 150mm Bondor® SolarSpan® insulated panels made from COLORBOND® steel on the roof made it very quick to erect,” Barr says. “We had to make sure the sub-contractors were careful with the panels in order to preserve the internal finish. With this outcome, it meant we didn't have to dry-line the ceilings with another layer of materials because they came pre-finished with COLORBOND® steel in the colour Surfemist®.

Barr says material choice also helped meet the building program. “The construction time was nine months, and the use of prefabricated roofing made from Bondor® SolarSpan® panels and the wall cladding made from COLORBOND® steel in Stramit® Corrugated profile helped to achieve that short time-frame,” Barr adds. “It meant the scaffold was reduced, the roof was craned into place, and it made the whole process quicker.”

PANEL SAYS

Affordable housing is currently an issue in Australia and this mixed-occupant dwelling project proposes a great design-led solution that offers several lessons which can be replicated elsewhere. It promotes discussion about shared built and outdoor spaces and the exploration of these ideas and opportunities may help to ease affordability challenges. With its unifying wall cladding made from COLORBOND® steel in Stramit® Corrugated profile, in the colour Surfemist®, and roofing panels made from COLORBOND® steel in a 150mm Bondor® SolarSpan® in the colour Surfemist®, the building asserts a strong presence on its corner site, and ties in easily with the surrounding weatherboard houses and former industrial buildings. This project demonstrates that it's possible to use steel inventively to create flexible outcomes.

Thanks to its level of innovation and pushing new frontiers, the Gen Y project won several awards last year, including a Residential Architecture Award for Multiple Housing and a Sustainable Architecture Award at Western Australia's Australian Institute of Architects Awards. It also picked up a National Commendation for Sustainable Architecture at the National Awards ceremony in Canberra last November.

The state jury called Gen Y House an inventive scheme that uses an “intriguing 3D puzzle of interlocking solids and voids” to create a micro apartment building “that is a clever, convincing and affordable alternative to the detached family home”.

As Australia tackles an unprecedented housing affordability problem, we need more smart thinking, varied options, innovation and new alternatives in housing, and this project represents a valuable piece of the affordable housing puzzle. **SP**

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PROJECT Gen Y Demonstration House **CLIENT** LandCorp **ARCHITECT** David Barr Architects **PROJECT TEAM** David Barr, Stephen Hicks and Tom Smith **PRINCIPAL STEEL COMPONENTS** Wall Cladding: made from COLORBOND® steel in Stramit® Corrugated profile, in the colour Surfemist®. Roofing: 150mm Bondor® SolarSpan® roofing insulated panels made from COLORBOND® steel in the colour Surfemist®. Flashings: made from COLORBOND® steel in the colour Night Sky®. Rainwater pipes and gutters: made from COLORBOND® steel in the colour Surfemist® **STRUCTURAL ENGINEER** Instruct Consulting Engineers **BUILDER** Perth Builders **LANDSCAPE ARCHITECTS** Josh Byrne and Associates **PROJECT TIMEFRAME** Competition Winner Announced: March 2015; Construction Commencement: January 2016; Construction Completed: November 2016 **AWARDS** 2017 Australian Institute of Architects Western Australia Chapter Awards: Residential Architecture Award for Multiple Housing; Sustainable Architecture Award – Multiple Housing; Sustainable Architecture Award – Best of the Best. 2017 Australian Institute of Architects National Awards: Commendation for Sustainable Architecture **BUILDING SIZE** 150m² (total internal area – all three apartments) **TOTAL PROJECT COST** \$590,000 + GST (construction cost).



CIRCLE WORK

ARCHITECT
Cox Architecture

PROJECT
Anna Meares Velodrome

LOCATION
Chandler, Queensland

Tasked with creating Queensland's first enclosed cycling track, Cox Architecture has responded with a vast, geometrically intricate steel roof frame that honours the craftsmanship of the track below, adding theatre for racing athletes and fans alike.

Words **Rob Gillam** Photography **Christopher Frederick Jones**

The latest addition to the Sleeman Sports Complex in the Brisbane outer-suburb of Chandler, the Anna Meares Velodrome – named after Australia’s most successful track cyclist and the most decorated female track cyclist of all time – was purpose-built by Stadiums Queensland to host the Gold Coast 2018 Commonwealth Games (GC2018) track cycling, and then to provide a lasting legacy facility.

Its predecessor in the Complex – a 333-metre outdoor velodrome made of concrete – staged the 1982 Commonwealth Games track cycling events, from which Australia bagged seven gold medals (only to be eclipsed by the 2018 gold medal tally of 10).

Cox Architecture project director Richard Coulson says the client brief for the new velodrome stemmed simply from the track needing to be enclosed. “They of course already had an outdoor track so wanted this one covered,” he says. “A premium track was the centrepiece of the new velodrome so protection of that from the elements, and also to

control the wind and temperature conditions that can affect cycling performance, was paramount.”

The architects’ accomplished history of sporting facilities which includes the Gold Coast Aquatic Centre (also-built-for GC2018) didn’t hurt its chances in the velodrome’s design competition, which it won in 2014.

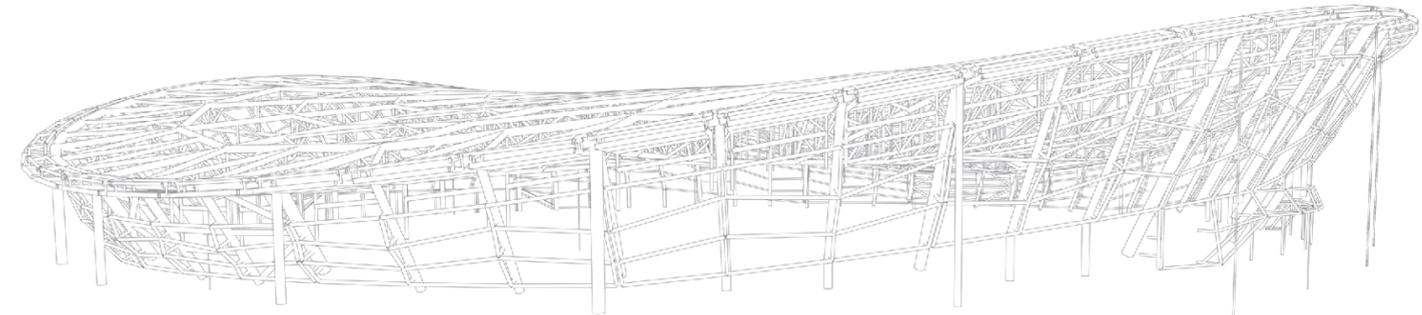
The velodrome is the latest in a long line of Cox Architecture sporting projects including the emblematic AAMI Park (*Steel Profile 108*) and Coulson acknowledges the practice has a signature, of sorts. “We have national expertise in sporting projects stretching back 40 years to Bruce Stadium in Canberra all the way to our current work on the 25,000-seat North Queensland Stadium in Townsville, which will be home to the North Queensland Cowboys, but our local studios bring their own nuances to projects. There is a history of white buildings, but that’s not necessarily a Cox starting point. With the velodrome we set out to make a building with multiple individual

strengths. We knew that over time there would be value in all parts of the building and in making the space really powerful.”

Tucked into the side of a sloping site to reduce its visual impact on the eucalypt-laden surrounding landscape, the building projects outwards from the hill on its lower side to create an external amphitheatre and bold entry point.

Being set amongst bushland, consideration was given to the flammability of external building materials. Internally, wall cladding made from COLORBOND® steel in perforated LYSAGHT MINI ORB® profile, in the colour Shale Grey™ features throughout. The perforated panel is backed by acoustic damping material in order to enhance speech intelligibility in response to the reverberant qualities of the velodrome’s fabric membrane roof and walls.

Whilst cladding and roofing is typically the darling of most steel buildings, opting for a fabric membrane

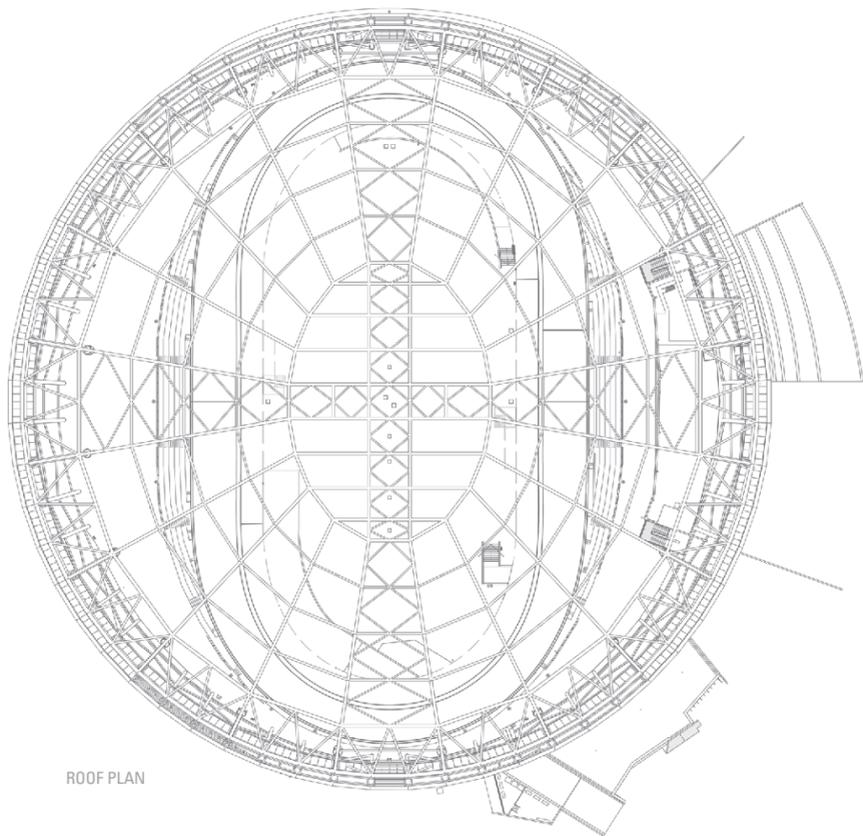


ROOF STRUCTURE

Opting for a membrane roof – primarily to allow diffuse daylight in – left the way open for structural steel to star in the show.



A fabric membrane roof providing diffused daylight allows structural steel to star in the show. The design – deliberately informed by the dynamics of the cycling below it – sought to create the most efficient and compact structural steel system possible.



ROOF PLAN



ABOVE: Nine-hundred tonnes of circular hollow sections and 300 tonnes of steel plate, including custom-welded tapering pin joints made from XLERPLATE® steel, were fundamental in achieving the twisting shapes of the saddle-like roof.

OPPOSITE: The track, described by the architect as akin to an enormous piece of furniture, deserved a steel roof that reflected its expressive handmade artisanship. Protecting the track from the elements and controlling internal conditions that can affect cycling performance, was paramount.

Coulson says the design was also deliberately informed by the dynamics of the primary sport played out under it. “The roof was very much influenced by the act of cycling and influenced by the shape of the track. You can see in the plan view that it has a circular sensibility and, in the sectional and elevation views it shows a fluidity in the space. We describe the velodrome as quite kinetic – it has those inclined walls on the perimeter which spring-out above to allow for stage-able seating.”

Once the building’s footprint was established, Cox and its partners – engineers Arup and building contractor Watpac – sought to create the most efficient, economical and compact structural system possible and steel was always going to be the material to deliver it.

“It would be possible to use some types of laminated timber instead, but we had a number of internal footprint and envelope considerations that required the relative fineness of steel, so we discounted other materials,” Coulson explained.

A planar radial truss system was settled on, for its efficiency and buildability. “We contemplated a variety of different span solutions including portals and non-radial members but to reduce it as an element in the landscape and for the sake of economy we were trying to make the smallest building possible,” he says. “Other construction techniques would have left a much bigger footprint and volume than we required. Modular steel trusses or portal-style solutions can appear quite light, but those roofs are much higher than we have achieved.

“It’s a very efficient building, given the scale and complexity of the roof. The roof benchmarks very well with a primary steel weight of less than 50 kilograms per square metre.”

Watpac Construction design manager Anthony Leonardi agreed that early consultation was

“The roof was very much influenced by the act of cycling and influenced by the shape of the track.”

roof in the case of the velodrome – primarily to allow diffuse daylight in – left the way open for structural steel to star in the show.

Coulson says roof and wall steel structures and temporary works supplied by BlueScope Distribution – 900 tonnes of circular hollow sections and 300 tonnes of steel plate including custom-welded tapering pin joints made from XLERPLATE® steel – were fundamental in achieving the twisting shapes of the velodrome’s saddle-like roof which has been more flippantly likened to that of a Pringles® crisp.

Beenleigh Steel Fabricators director Mark Finney says that, additionally, over one kilometre in total of lighting support beams were made from LYSAGHT SupaCee® SC400 purlins. “We boxed those sections up into the support beams which carry the LED track lighting and speaker boxes,” says Finney.

vital when coordinating so many major parties. “We get involved with the architect and engineer on the detailing as early as possible and pride ourselves on rapid engagement of the shop detailer – we engage the drafter even before we get a steel fabricator on board!”

The construction sequence for the structural steel roof frame was geometrically and logistically challenging, Leonardi explains: “The first thing erected was the main ‘donut’ in the centre that we call the oculus, which is a fully framed truss structure that sits about 7 to 8 metres deep, with tension rods between CHS chords. It was self-supported on nine Favco 750 crane towers that allowed us to do the sub-structure at the same time. We then proceeded to temporary support for the external columns and started dropping in the 16 main radial trusses that link the external columns to the oculus’s frame.”



"We chose to use fillet-welded saddle plates on site rather than bolted splices. This meant that major elements of the roof structure could be lifted in, positioned on welded saddle connections and fillet-welded, providing flexibility in terms of tolerances.

"Even transporting some of the structural steel elements to site was a major task, with some of the truss sections being 10 or 11 metres wide. Beenleigh Steel, the steel fabricators, even had to remove some sections of their front gate and fence to get the trucks out with the large steel sections on them and had to be transported with a police escort in the middle of the night, given the oversized loads."

Arup principal Ian Ainsworth says the structure's success hinged on early collaboration. "The form of the building, the basics of the roof structure

because it had a very tight budget, yet do it in a way that still provided the flexibility to accommodate additional temporary seating in event mode, and a range of indoor sports and community uses.

"The roof shape was driven by the plan and the volume. We ended up with an elliptical roof plan with a hyperbolic paraboloid form that is concave in one direction and convex in another – a saddle shape – albeit a very large-radius one.

"The inclination of the walls, which effectively taper back in, was once again a response to keep the overall volume of the building as small as possible. From a structural point of view, the inclined perimeter wall allowed us to match up inclined columns with vertical tie-downs.

"This bi-pod-type arrangement around the outside allowed us to deal with and take advantage of the

delivered reliably and quickly by local Queensland subcontractors. "So we designed the roof in a way that it could be readily fabricated from available straight steel members, rather than having lots of curved members or three-dimensional trusses that would have been more complicated to weld and transport," he says.

"The roof structure is mainly made from planar trusses because they are a regular two-dimensional truss. You just lay flat, weld it, tilt it up and it's ready to transport and erect. The roof was also configured so that the temporary central supports could be located in the infield area away from the track and the complex concrete bowl, and substructure works. This allowed roof erection to start early and to be carried out in parallel with the concrete works below. Through the use of parametric design and models shared by engineer, architect and shop detailer, the apparently complex geometry was also rationalised and controlled."

The completed minimalistic structure allowed Cox to achieve its goal of delivering an architecturally striking and functional project for a modest outlay. "We had a comparatively tight budget – about \$60 million for a track under a roof which represents extremely good value considering the London Velodrome, which has a similar span, was a \$300 million project," Coulson says. "We were able to produce a solution that maintained great design quality and everyone is delighted by it. The client has achieved popular engagement through its multi-functionality and it is producing great race times.

"There are plenty of ways to span 120 metres in steel but we wanted to do it in a way that was an impressive response to the space because the timber track is such an amazing thing. It's like an enormous piece of furniture and we wanted the roof to reflect that expressive quality and have that kind of craftsmanship, in steel.

"We wanted to make a valuable contribution to the space that honours the riders' performance and provides drama for the spectators. I think we have achieved that and it's a result that I don't think will diminish over time." **SP**

roof having a bit of shape to it, which it does in this case, arching in one direction and acting like a catenary cable in the other. Those shell-type actions in the roof give some large thrusts around the outside that are resisted by these pairs of inclined columns and vertical tie-downs.

"Because we were sinking the cycle track into the side of a hill and we were on quite good ground, we were able to take those thrusts that were coming from the roof shape down into the ground relatively simply and economically. That then meant we could take advantage of the roof shape and design it with some shell action and still do it in an economical way.

Ainsworth says another big driver for Arup was the client preference for the venue being

"We had a number of internal footprint and envelope considerations that required the relative fineness of steel. The roof benchmarks with a primary steel weight of less than 50 kilograms per square metre."

and how it would be built, were developed in the first two weeks of the job during the design competition," says Ainsworth. "We had a series of workshops and debated which ones worked and didn't from everyone's view point before settling on the one that was built.

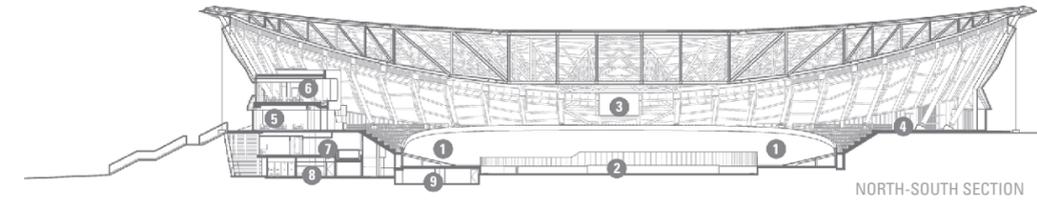
"We take the same approach on most jobs, which is to get in early and work with the architects not only to deliver their vision but also to help shape the preferred form so that we don't end up in a situation where someone comes up with a shape in the absence of any engineering input and hands it to us saying 'just make it work'.

"We worked with Cox to develop the building's form which was all about trying to minimise the volume

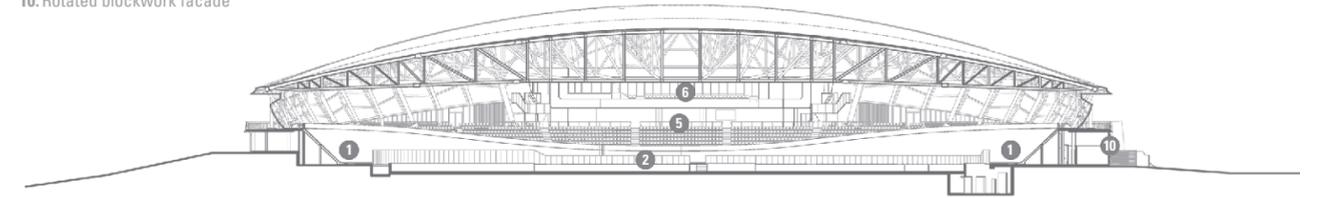


LEGEND

1. 250m track
2. Infield with Futsal courts
3. Video scoreboard
4. Concourse overlay seating zone
5. Café
6. Function room
7. High performance centre
8. Athletes change rooms
9. Bicycle storage
10. Rotated blockwork facade



NORTH-SOUTH SECTION



EAST-WEST SECTION

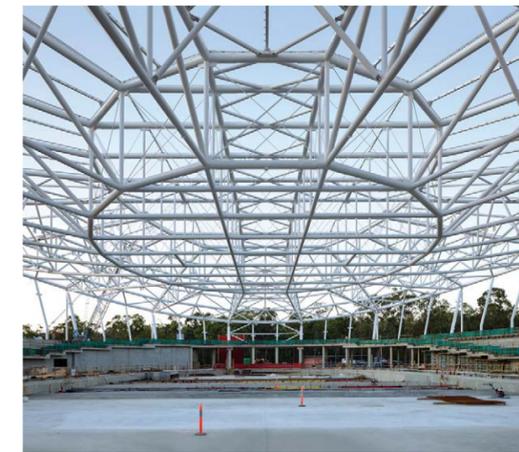


ABOVE AND OPPOSITE: The inclination of the walls, which effectively taper back in, was a response to reduce the building's overall volume.

RIGHT: The main 'donut' or 'oculus' in the centre sits eight-metres deep with tension rods between CHS chords. Sixteen main radial trusses link the external columns to the oculus frame.

PANEL SAYS

This new covered velodrome in Queensland – built for the Commonwealth Games – displays a sophisticated engineering solution in its saddle-shaped roof structure made from steel, which imparts a graceful elegance to the building. The finely crafted structure made from 1200 tonnes of steel plate and CHS that supports the fabric roof is carefully resolved to tread the fine line between efficiency and aesthetics. Internally, COLORBOND® steel in perforated LYSAGHT MINI ORB® profile, in the colour Shale Grey™ is used in combination with acoustic walling treatments to dampen the noise from crowds and high-speed bikes. The structure provides a quiet backdrop for the high-intensity theatrical action of the sport.



PROJECT Anna Meares Velodrome **CLIENT** Stadiums Queensland **ARCHITECT** Cox Architecture **PROJECT TEAM** Richard Coulson, Alastair Richardson, Alex Leese, Robert Callanan, Steve Hunter, Brett Miles, Kim Huat Tan, Marko Trifunagic, Leon McBride, Lauren Hickling, Shane Horswill, Julian Farrell, Michelle Mitchell, Jayson Blight **PRINCIPAL STEEL COMPONENTS** Roof and wall steel structures and temporary works supplied by BlueScope Distribution – 900 tonnes of circular hollow sections and 300 tonnes of steel plate including custom-welded tapering pin joints made from XLERPLATE® steel; One kilometre of lighting support beams made from LYSAGHT SupaCee® SC400 purlins; Interior wall cladding: made from COLORBOND® steel in perforated LYSAGHT MINI ORB® profile, in the colour Shale Grey™ **PROJECT CONTRACTOR/BUILDER** Watpac Construction **STRUCTURAL & CIVIL ENGINEER** Arup **STEEL FABRICATOR** Beenleigh Steel Fabrications **PROJECT TIMEFRAME AND COMPLETION DATE** 2013 - 2016 **AWARDS** 2016 Australian Steel Institute National Steel Excellence Award in Engineering Projects, 2017 Consult Australia Awards for Excellence – Gold Award for Design Innovation. 2016 Australian Steel Institute National Steel Excellence Award in Engineering Projects **BUILDING SIZE** 10,916m² (roof area) **TOTAL PROJECT COST** \$57.8 million.

ABOVE & BEYOND

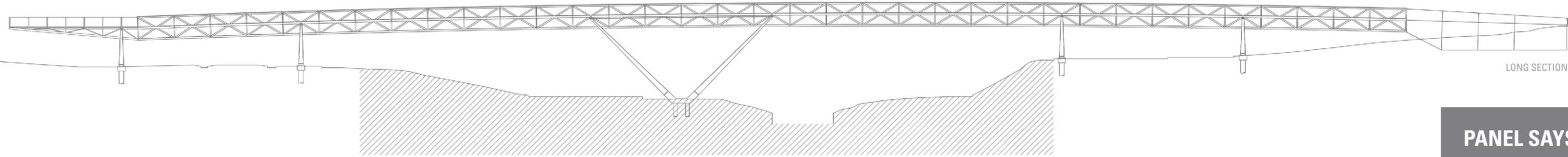
The use of BlueScope REDCOR® weathering steel to construct a pedestrian bridge at Deakin University's Burwood campus has helped overcome a contentious and protracted community debate, to provide an accessible crossing over Gardiners Creek.

Words **Rachael Bernstone** Photography **Lisbeth Grossmann; Peter Hyatt**

ARCHITECT
watsonarchitecture+design

PROJECT
Deakin University Pedestrian Bridge
– Morgan's Walk

LOCATION
Burwood, Victoria



LONG SECTION

Morgan's Walk – the new pedestrian bridge that links Deakin University's Burwood Highway and Elgar Road sites, divided by Gardiners Creek – is a triumph in one more ways than one. The elegant and efficient design – which uses REDCOR® weathering steel to great effect – helped to overcome several major challenges including access for construction, the issue of ongoing maintenance and, perhaps most importantly, public opinion.

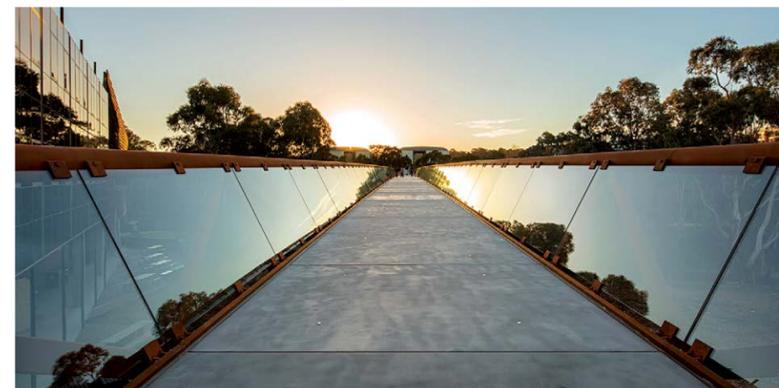
The long and drawn-out story began in 2004, when the University announced plans to build a replacement bridge across the creek corridor. At that time, there was a small bridge at creek-level accessed via walking paths on either side. More than 40,000 people – staff, students and

in honour of former Deakin University Chancellor David Morgan AO – officially opened in August 2017 to much fanfare.

For architect Rob Watson, this was a dream commission. As a young architect working in the London offices of Grimshaw and Foster + Partners, he worked on projects such as the British Pavilion for the 1992 World Expo in Seville and Germany's Reichstag Refurbishment, during which time he was exposed to projects where structural expression and exacting attention to detail were paramount. These characteristics are still of the utmost priority in all of his projects and this bridge represented an ideal opportunity for them to be distilled and even further refined.

"While there are some excellent paint systems available for steel structures, on this project any painting would have been problematic," Watson says. "The bridge has a lifespan of 100-plus years, so it would have needed to be painted perhaps three or four times during its life. Not only did the REDCOR® weathering steel provide an acceptable appearance to the community, that it requires virtually no maintenance was very appealing from a design and whole-life perspective."

The bridge comprises a series of repetitive modular bays – each about four metres-wide by six metres-long – that were connected to form a series of six trusses, ranging in length from 16.5 metres to 47 metres. Each modular bay consists of two concrete



PANEL SAYS

The contribution of REDCOR® weathering steel to create this delicate pedestrian bridge demonstrates an ideal use of this material, which is sometimes specified for its aesthetic properties and rich, red tones. REDCOR® weathering steel is particularly successful in this application because the weathered finish sits confidently and comfortably within the bushland setting, almost hovering amongst the tree tops, and the steel will require low ongoing maintenance over its lifetime. Thanks to its graceful modular form, this new bridge provides a solution to an everyday problem: how to transport pedestrians across the creek in a low impact, uplifting and expressive way.

Weathering steel requires little maintenance over its lifespan and its appearance helps the bridge blend into the native bush surroundings.

locals – used the crossing each day, but as it was accessed by steps on the Elgar Road bank, it was inaccessible to people using wheelchairs and prams, or those with other mobility issues.

A competition was held and a winning scheme selected, however that proposed design failed to achieve planning approval from Whitehorse Council because of community concerns about the weight and visual imposition of the design for the bridge, which meandered across the gully in line with the treetops. That design required four pylons in the sensitive creek corridor and the community feared the significant loss of vegetation that might result from its construction and ongoing maintenance.

The University took the proposed design to the Victorian Civil Administrative Appeals Tribunal (VCAT), which found in its favour. Mindful of community opinion against the scheme, the University allowed that planning application to lapse and focused on other campus building projects for several years. In 2012, the University approached Melbourne architect Rob Watson, director of watsonarchitecture+design, to discuss plans for a lighter, less visually imposing structure, and those plans progressed to become the bridge that graces the crossing today.

The new scheme was not without its challenges though: it was approved following a Planning Scheme Amendment granted by planning minister Richard Wynne in 2015. Construction began in late 2016 and the new bridge – called Morgan's Walk

This project represented a particularly difficult design problem, Watson says, because the new bridge had to address three major obstacles. The first was access: it had to comply with the requirements of the Disability Discrimination Act to provide safe and easy passage for people of all abilities. Secondly, because the creek corridor is titled Crown Land (the University owns the parcels on either side) the flyover section had to be low maintenance and easily accessible, to avoid protracted and costly access permits. Thirdly, the bridge had to blend in with its native bush surroundings, an especially important consideration to ensure community support for this design.

As part of his solution to address these challenges, Watson chose to build the new 250-metre long bridge using weathering steel, including approximately 200 tonnes of REDCOR® weathering steel in grade WR350L0 and HW350. Weathering steel, when used in the correct environment, requires little maintenance over its lifespan compared with traditional structural steel, and its appearance helps the bridge blend into the native bush surroundings.

Watson devised an innovative 3D structural system that includes a 200-metre long bridge section spanning over the 85-metre wide parcel of Crown Land – touching the ground at just one point via two V-shaped steel pylons – that minimised the bridge's impact on the creek corridor, both during initial construction and throughout its projected lifespan.

Glass partitions fold inwards for easy cleaning (top) and their ethereal appearance from the creek corridor below gives the impression that the bridge is entirely made from weathering steel.





ABOVE: The underside of the bridge resembles a seamlessly integrated structure and platform, thanks to the 'baking trays' – made from 3mm-thick REDCOR® steel coil in 1594 HW350 grade – that provide permanent formwork for the concrete deck.



SITE PLAN



The carpark on the Elgar Road campus side hosted the necessary cranes – in various sizes – that lifted the large steel truss sections into place during construction.

decking panels cast into six folded trays of permanent formwork made from REDCOR® weathering steel in grade HW350. These permanent formwork trays give the underside of the bridge the same appearance as the rest of the structure, so that the weathering steel finish is visible from every angle.

Like the entire bridge, the junctions were designed to appear elegant and efficient, particularly because access for future maintenance would be limited, Watson explains. "There was a lot of discussion about the detailing," says Watson. "Even though it's a simple structure – in the way it's modulated as a 3D truss – we wanted to inject some form into it for practical reasons. I'm a big admirer of engineering design where structures have beauty, because with a bit of thought you can make these things look elegant. At Grimshaw's and Foster's offices, we used to slave over the details and we took that approach here.

"We studied every junction carefully, to make them look as elegant as possible and so as not to trap water or dirt," he says. "Originally, Macalloy bars were designed to tie V-pylons together, but in conjunction with Kane we decided to go with 32mm-thick plates of WR350L0 grade REDCOR® weathering steel with a pin joint, using 85mm diameter Duplex steel pins to tie the heads of the two V-pylons."

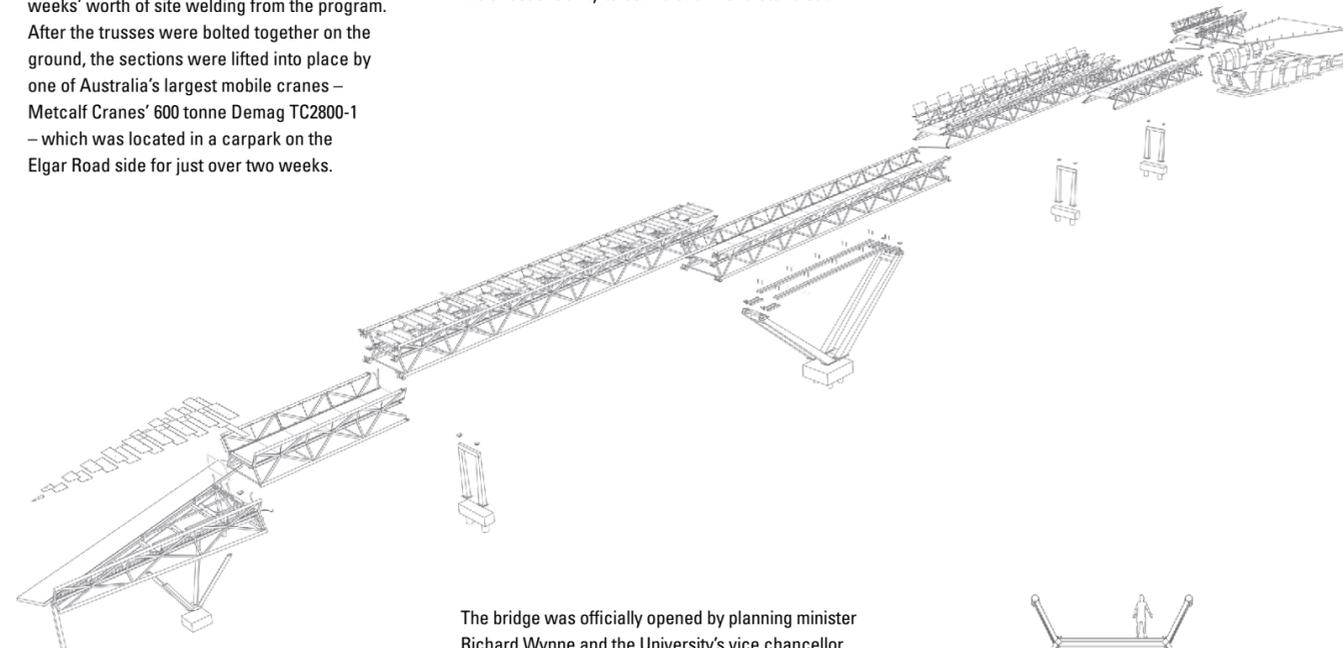
Rob Watson's vision was turned into a buildable reality with structural engineers WSP Structures; modeled and steel-detailed by PlanIT Design Group; fabricated off-site by Sutcliffe Engineering; and erected by Head Contractor Kane Constructions, with Associated Rigging and Metcalf Cranes.

According to Kane project manager, Mark Spolidoro, the unusual and complex geometry of the bridge posed different challenges to Kane's regular projects, which include significant health and education facilities. That complexity was compounded by the fact that access to the creek-side walking paths and the existing crossing had to be maintained throughout construction. "I wouldn't say it was easy, but we planned it all in minute detail and each plan was meticulously peer-reviewed by independent

members of our team. We didn't have any major issues on-site," Spolidoro says. "But I had a few sleepless nights before we started."

As the project moved towards the site erection stage, Kane, along with Associated Rigging and temporary works engineer Andrew Baigent, devised a detailed works sequence and methodology plan that outlined each step in the rigging process, focusing on safety and build-ability. "The tolerances we were working with were minimal," Spolidoro says. "From pin to pin, between the tie member plates – a distance of approximately 28 metres – we had a tolerance of just 1mm."

The bridge supports and walkway truss bays were transported in lengths of about 25 metres and a decision to change from welded truss splice connections to bolted connections shaved two weeks' worth of site welding from the program. After the trusses were bolted together on the ground, the sections were lifted into place by one of Australia's largest mobile cranes – Metcalf Cranes' 600 tonne Demag TC2800-1 – which was located in a carpark on the Elgar Road side for just over two weeks.



"That was a very intense period," Watson recalls. "We had a huge mobile crane on the embankment, not because of the weight of the parts, but to reach 65m into the creek corridor, sometimes with 50 metre-long elements hanging off the jib.

"Once the V-pylons and four middle truss sections were in place, Kane shifted to 350- and 200-tonne cranes for the remaining sections," Watson explains. "The deck trays went on progressively after each truss section was installed, providing a safe working deck. The deck trays are made from 3mm-thick REDCOR® weathering steel in grade HW350, which was fabricated into form like 140mm-deep baking trays, to act as permanent formwork for the concrete deck panels."

As a result of Watson's fully integrated and symmetrical structure, the bridge appears to

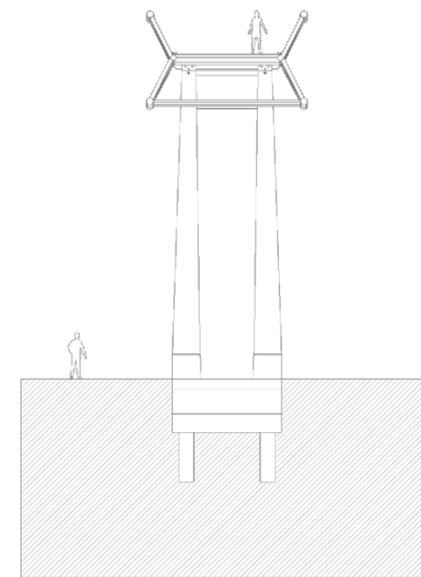
extend effortlessly across the creek corridor. From a distance, and from certain vantage points along the creek-side walking paths, it can be seen protruding delicately above the tree canopy. The hovering effect is amplified by the integrated hand-rail and safety enclosure system, which features 'barely there' frameless 17mm-thick clear glass panels mounted on hinges at the base so the glass can pivot inwards for cleaning. "From a distance, all you can see is the structure and the people walking across it," he says. "It looks deceptively simple, but it took a bit of work."

So after a false start and initial community backlash, Deakin University's Burwood campus and local residents finally have a bridge across Gardiners Creek that is accessible to everyone. And, according to local news reports, the community is pleased with its striking weathering steel structure that boasts the unusual ability to both blend in and stand out.

"I'm a big admirer of engineering design where structures have beauty, because with a bit of thought you can make these things look elegant."

The bridge was officially opened by planning minister Richard Wynne and the University's vice chancellor, professor Jane den Hollander AO, in August 2017. Minister Wynne explained that the government had intervened at the planning stage because the project was too important to the University and surrounding community to be held up by bureaucracy. "This is a great advancement for one of Melbourne's flagship universities," he says. "For too long, people living with a disability, the elderly or people with prams have been without a suitable crossing over the Gardiner's Creek Reserve."

Professor den Hollander says that the bridge has strengthened ties between the university and local residents by removing the bottlenecks caused by peak traffic over the creek from the local walking paths that run alongside it. "With the development of the pedestrian crossing, the traffic jams of students – upwards of 40,000 pedestrians a week in peak time – will be taken off the ground and out of the way of community members walking dogs, exercising and enjoying their beautiful reserve." SP



MAIN "V" PYLON

PROJECT Deakin University Pedestrian Bridge – Morgan's Walk ARCHITECT watsonarchitecture+design PRINCIPAL STEEL COMPONENTS Weathering steel, including approximately 200 tonnes of BlueScope REDCOR® weathering steel in grade WR350L0 and HW350 BUILDER Kane Construction with Associated Rigging and Metcalf Cranes STRUCTURAL ENGINEER WSP Structures TEMPORARY WORKS ENGINEER Andrew Baigent STEEL DETAILING PlanIT Design STEEL FABRICATOR Sutcliffe Engineering STEEL DISTRIBUTOR Surdex Steel CLIENT Deakin University PROJECT COST \$9.7 million.

PROFILE PROFILES...

In a bid to support affordable housing, a small group of architects led by Breathe Architecture's Jeremy McLeod in Melbourne has developed a replicable model that is gaining momentum across the country.

Words **Rachael Bernstone** Photography **Paul Bradshaw**

NIGHTINGALE'S JEREMY MCLEOD



At last count, the Nightingale Housing model for more affordable, community-focused and sustainable housing had notched up one completed project, another nearly finished, one about to commence construction on site, and 15 more teams looking for suitable locations in cities from Hobart to Brisbane, to Fremantle.

The altruistic venture is the brainchild of self-confessed left-wing do-gooder Jeremy McLeod, who as a child marched with his parents in Melbourne on social justice and environmental issues. As an architect, he was sure there had to be a way of helping middle- and low-income earners onto the home ownership ladder, so he came up with a plan that he hoped would lead him towards affordable housing's 'Holy Grail'.

It started with The Commons, a housing development in Melbourne's Brunswick, that McLeod used as the prototype for the Nightingale model, without realising at the time that he was founding a new movement.

"The idea of The Commons was that it would be a project for triple-bottom line housing," McLeod says. "We wanted to show the market that you could do triple-bottom line – affordable, social and sustainable – and we wanted to share our knowledge. We saw The Commons as a standalone project that we hoped would encourage market change.

"Lots of people toured the completed project and it won a few awards, and was widely published, but even then it was seen as a blip on the radar, an anomaly, not the future or the new status quo," he adds.

McLeod says that Nightingale was never intended as a permanent solution, even though it now has 20 licensed architects on board, who can access the dossier of information in case study format that covers project financing, ownership structures, legal frameworks, planning controls and marketing strategies. In essence, it provides a blueprint for socially conscious developers who want to subvert the traditional method of delivery for multi-residential projects.

"The decision to 'super-charge' The Commons by creating the Nightingale model came later," McLeod says. "That decision to make a replicable model that exists so that other architects can deliver the same affordable housing outcomes, that was an afterthought.

"The weird thing about Nightingale is that when we started this, we thought 'This can't be the solution, there must be a better model out there somewhere, why can't we find it?'," he laughs. "When we built Nightingale we thought we'd run it until we found the professionals who were already plugging this gap. We never anticipated for a moment that we would start a movement." ↗

ABOVE AND RIGHT: Building on the success of Brunswick's The Commons project (depicted far right), Nightingale 1.0 by Breathe Architecture contains 20 apartments, 57 bike parking spaces and zero on-site carparking. It's the first in a series of affordable apartment developments taking place across Australia.

"When we built Nightingale we thought we'd run it until we found the professionals who were already plugging this gap. We never anticipated for a moment that we would start a movement."



These architects have tapped into a ravenous appetite for sustainable and affordable housing in cities around Australia, where housing affordability is at an all-time low.

Federal Governments have discussed introducing several structural measures to address housing affordability. For example, Ken Henry's review of the tax system in 2009 devoted two sections to Housing Affordability and Housing Assistance.

Encouragingly, state and local governments have made some progress in the area of affordable housing: the City of Sydney introduced targets for 2030 around the provision of social and affordable housing, and has incorporated both categories in the development of two of its own sites in Ultimo and Pyrmont. Elsewhere, affordability remains a growing problem, especially for so-called key workers – including nurses, teachers and police – who in parts of Australia can no longer afford to live near where they work.

Nightingale is not the only answer to Australia's affordable housing dilemma crises, but it's a useful part of the puzzle, thanks to its reduced up-front apartment costs, re-sale prices that are pegged to average growth levels in the suburb, that apartments are quickly resold off-market to those on a purchaser's list, and the in-built sense of community that results from common rooftop laundries and vegetable gardens.

In Victoria, where the model was born, Nightingale recently received a \$100,000 grant from the Victorian Government to replicate and extend its sustainability achievements across the state, with funds earmarked for research on existing sites and for the development of the next major project, the Nightingale Village at Brunswick, currently being designed by seven architect-led teams.

"The new grant targets two things: sustainability and community," McLeod explains. "On one side, we will work with Melbourne University to monitor

internal temperatures, air quality and daylight quality, to benchmark that data against energy usage and carbon emissions from The Commons and Nightingale 1.0. That will help us determine whether those projects are achieving their objectives and how we might improve on future performance.

"The second part of the grant looks at how we might build meaningful communities," he adds. "We want to engage with potential residents and work out how to build deliberative housing, so the second part of the grant is a loan to fund a piece of technology that we are having built that will provide real time info from resident groups about their preferences and price points, so we can drill down into the needs of the 3500 people currently on our waiting lists."

The number of people who are keen to invest in the Nightingale Model product has surprised McLeod, although he concedes there is nothing he'd rather do than solve the problem of affordable housing. "We never approached this as a gap in the market, we looked at it from the point of view of that our city needs this," he says, "For us at Breathe, if we can't build triple-bottom line houses, we'll wash dishes instead. If you talk to almost anyone aged 35 in our city, they all care deeply about sustainability and the future in our city, and about building meaningful communities."

"BlueScope is one of the last fundamental Australian steel manufacturers so we met with their sustainability team to understand how products such as roofing made from COLORBOND® Coolmax® steel in the colour Whitehaven® can provide high cooling performance."

OPPOSITE: The rooftop features common laundries, a lush garden and places for residents to socialise and entertain, all of which foster the building's strong sense of community.

RIGHT: Tanks made from COLORBOND® steel in the colour Monument® collect and store water from the roof.

BOTTOM RIGHT: The roof itself is made from COLORBOND® COOLMAX® steel in the colour Whitehaven®, with COLORBOND® steel flashings in the colour Night Sky®.

In another big win for the model, Nightingale announced that it is working with financial institutions including SEFA, Christian Super, Brightlight and NAB, to enable institutional investors to invest in the development of future Nightingale projects.

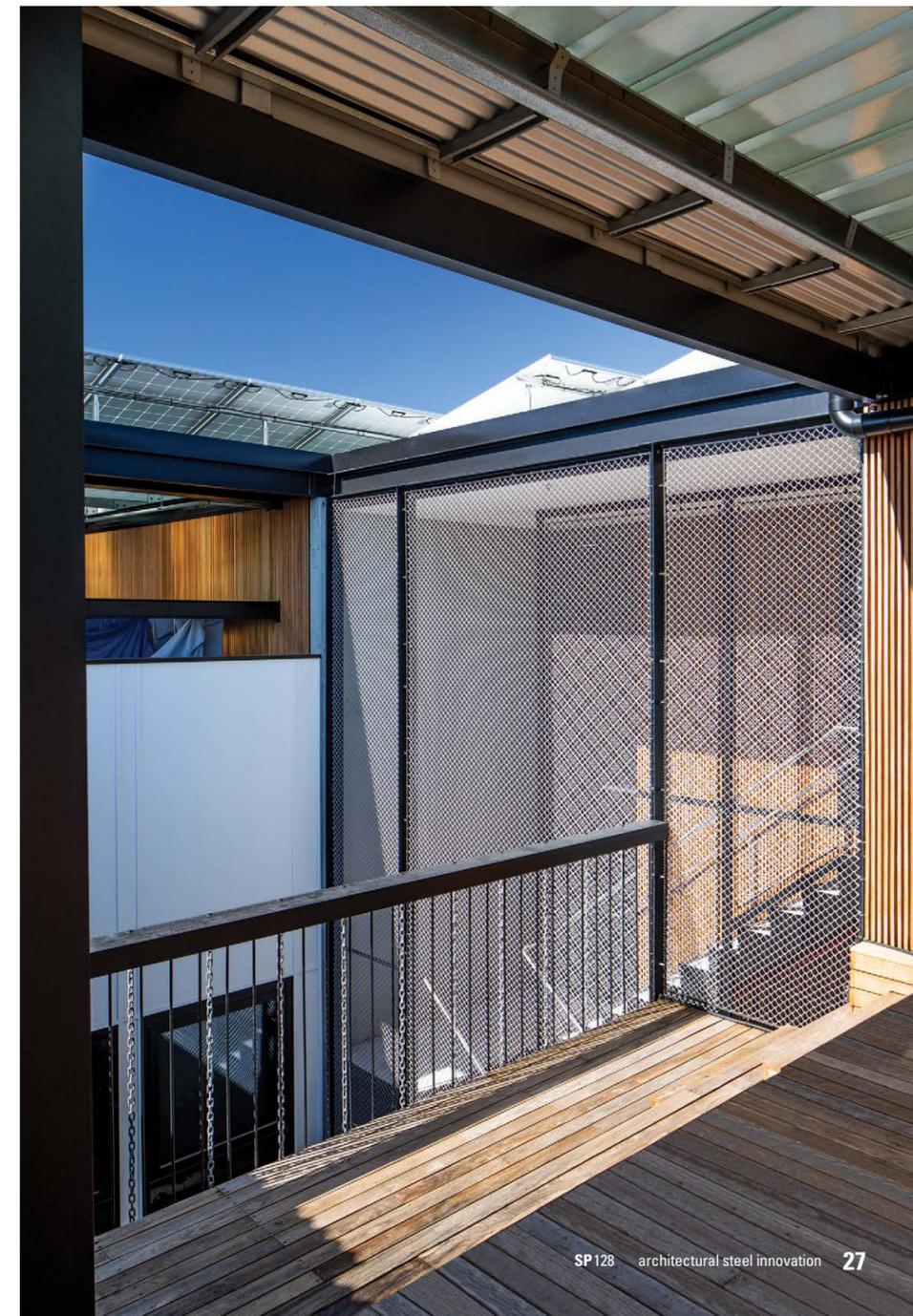
As well as being at the forefront of a social movement, Nightingale aims to be a leader in the design and construction industry and is supported in this endeavour by its partnership with BlueScope, having met with BlueScope's Innovation team to discuss trends and provide feedback on some of the initiatives they are working on.

"BlueScope is one of the last fundamental Australian steel manufacturers so we met with their sustainability team to understand how products such as roofing made from COLORBOND® Coolmax® steel in the colour Whitehaven® – which we've used on Nightingale 1.0 – can provide high cooling performance," McLeod says.

Having developed a model then shared it with his peers – an unusual step in a profession that tends to keep its intellectual property under wraps – McLeod was honoured with the Australian Institute of Architect's Leadership in Sustainability Prize at the 2016 Australian Achievement in Architecture Awards, where the jury called the development of Nightingale "truly inspiring."

"Both McLeod's built work and advocacy are characterised by a generosity of spirit and overwhelming optimism – qualities that make him a true leader in the field of sustainability," the jury citation read. "That he has made public all of Breathe Architecture's relevant intellectual property – including research, feasibility studies and business strategies – stands as testament to his understanding that real change in the field of sustainability requires the commitment and capabilities of more than one firm and indeed the wider community."

This is welcome acknowledgement that the Nightingale model holds endless potential for revolutionary change, at time it is much-needed. **SP**



NEW CORNER OF THE GLOBE

An old outback pub has undergone a remarkable transformation through the application of contemporary steel.

Words **Micky Pinkerton** Photography **Christopher Frederick Jones**



ARCHITECT
Brian Hooper Architect and m3architecture
PROJECT
The Globe
LOCATION
Barcaldine, Queensland

Barcaldine sits smack-bang in the middle of Queensland, atop two aquifers and at the crossroads of the Capricorn and Landsborough highways. It's a town where you'll find frequent reminders of this fortune of geography and commerce: all the streets bear the names of trees, and road-trains packed with livestock rumble through regularly on their way to market.

Back in the 1890s these layers of Barcaldine's identity famously converged, when striking shearers held their assemblies in the shade of a giant Ghost Gum on Oak Street. Legend has it that beneath its branches the manifesto which led to the formation of the Australian Labor Party was first read out. The rest, as they say, is history and while the Tree of Knowledge, as it became known, is now dead its remains have been preserved and sheathed in a beautiful commemorative structure which went on to receive the Lachlan Macquarie Award for Heritage Architecture and a National Commendation for Public Architecture at the Australian Institute of Architects 2010 National Architecture Awards.

That project, by Brian Hooper Architects and m3architecture, was the first piece of a broader masterplan for Barcaldine's cultural and tourism precinct. The two practices have once again joined forces to deliver the next stage: a new Information Centre which also houses a gallery, function room and history room. It's a project with a less iconic genesis but which delves just as much into the

territory of archetypes and symbolism – and what place they have in our ever-changing present.

Barcaldine Regional Council purchased the Globe Hotel in 2011, a block and a half from the Tree of Knowledge. Its aims were not only to provide a new and larger Information Centre for an improved visitor experience, but also to reduce congestion around the tree and encourage patronage of local businesses through increased foot traffic. The pub was a typical example of an early 20th Century single-skin timber construction, but with unsound perimeter verandahs and the rest of the building in general disrepair,

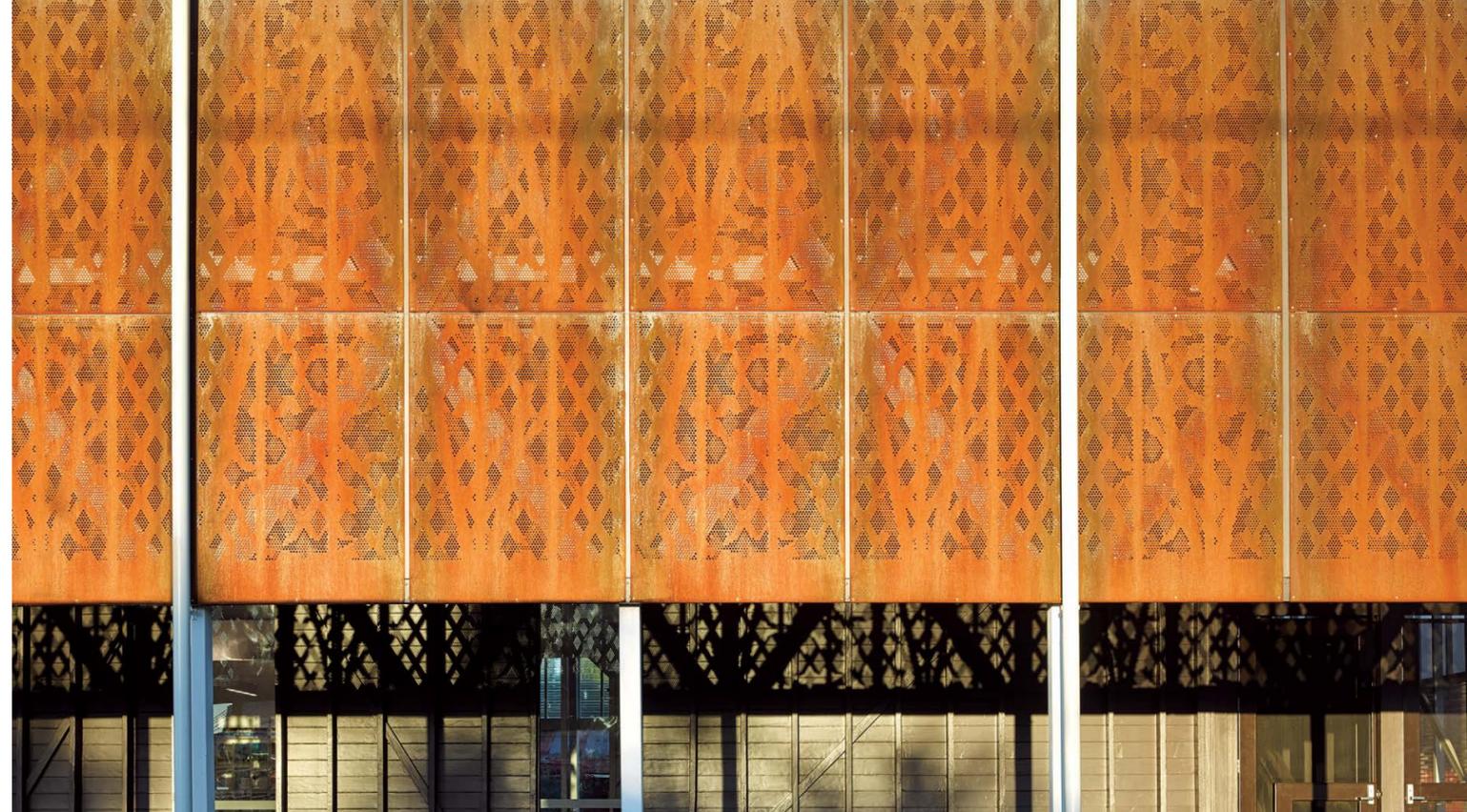
Council's intent was to demolish. The architects thought otherwise, as Brian Hooper explains.

"The character of the town is reflected through its old building stock. We knew it would be a challenge to retain but we felt it was just too valuable to the town's character. In demolishing we would also have lost the opportunity to retain the footpath verandah. In Western Queensland with its harsh environment, those verandahs effectively provide a respite for the public."

The building had no official heritage status; as the project description says it "resides in the shadow"



SECTION



ABOVE: The panels of perforated REDCOR® steel feature a mélange of three patterns that each have a relationship to the site.

BELOW: In opting to adaptively re-use the building the architects were able to retain the verandah which, with its new wrap made from REDCOR® steel, now provides shade on two levels.

"REDCOR® weathering steel was selected for its robustness and the patina of deep, dark red which is reminiscent of those beautiful earthy tones of the Western Queensland Plains."



“For its ability to reflect heat and minimise the amount of energy that surfaces such as a roof absorb in an outback environment, a roof made from COLORBOND® steel in the colour Surfsmist® is a practical and pragmatic choice.”

between the threshold for state listing and the joy of keeping and illustrating the principal characteristics of a typology”. Thanks to the trust developed with Council during the earlier project, the adaptive re-use scheme presented by the architects won the day.

As any designer knows, the past can be a silent, capricious partner in these kinds of projects – at turns obstinate or generous depending on what is uncovered on any given day. The Globe was no exception. Sitting just three inches off the ground, a basement had to be hand-dug to allow ventilation, and joists were strengthened with steel I-beams

in order to achieve the loads required to bring the building up to code. Clever detailing allows the inserted structural steel to do its job without compromising the overall language of the original timber skin.

In contrast, the new verandah does not hold back and uses colour and materiality to celebrate the simple geometry of the proud old hotel. An impressive sash made from perforated BlueScope REDCOR® weathering steel wraps around the northern and western facades, creating a bold juxtaposition. In the change of usage of the building from commercial to civic, the overt written markers of history on the pub made way for a spare white canvas, and this generous steel screen, which provides shade on both levels, created an opportunity for local references to be subtly re-woven into the building’s fabric.

Various motifs are incorporated: the latticework of the old verandah, the zig-zagging metal braces of double-decker triple road trains that roll by and the tulip ornamentation of the fanlight above the doors of the hotel rooms. Having used REDCOR® weathering steel before, Hooper understood the unique properties of the material well.

“REDCOR® weathering steel was selected for its robustness and the patina of deep, dark red which is reminiscent of those beautiful earthy tones of the Western Queensland Plains,” he says. “It’s such a great material to be able to work with, particularly as we were interested in a pattern that pulsates between a number of references to place and landscape. To be honest, I don’t think we would have been able to get that same level of intricate layering with anything but weathering steel.”

Hooper’s collaborator, Michael Lavery of m3architecture, concurs, commending the ability

of REDCOR® weathering steel to create tough yet detailed panels which allow an excellent shade-ventilation combination for Australian environments.

“It’s only 3mm-thick and we are always interested in and excited by taking something that is very thin in construction terms and giving it a surprising dimensionality,” Lavery says. “It’s a very simple technique: there’s just a series of circular perforations in only two sizes. The same pattern runs through all the panels but the circles get bigger when we want to accentuate the tulip and also when we want to emphasise the lattice.

“It’s a trick of the eye, with the slight change in perforation size as you move along it. This is not something you could do in many products, particularly in such a harsh environment, and because REDCOR® weathering steel is self-protecting and its corrosion is controlled, it will be there for a very long time to come.”

As for the Tree of Knowledge, an important consideration in this project was using local trades wherever possible and the architects took time and care to understand what skills were available in the region when designing and specifying. For The Globe they worked with a Barcaldine-based steel fabricator and plumber to develop neat solutions to integrate flashings with the pub’s polycarbonate screens and the roof. Roofing and guttering made from COLORBOND® steel in LYSAGHT CUSTOM ORB® profile in the colour Surfsmist® was selected for many reasons.

“For its ability to reflect heat and minimise the amount of energy that surfaces such as a roof absorb in an outback environment, a roof made from COLORBOND® steel in the colour Surfsmist® is a practical and pragmatic choice” explains Lavery. ➔



LEFT: Roofing and guttering made from COLORBOND® steel in the colour Surfsmist® was designed and fabricated to integrate neatly with the flashings and polycarbonate screens.

TOP: The Globe is the second collaboration in Barcaldine for m3architecture and Brian Hooper Architects. In 2010 they received a National Commendation for Public Architecture at the Australian Institute of Architects National Architecture Awards for their sensitive treatment of the depicted symbolic Tree of Knowledge site.

ABOVE: The Globe and the Tree of Life (seen in the distance here from the old pub’s upper verandah) bookend the main street of Barcaldine.



OPPOSITE: The panels made from REDCOR® weathering steel create a winning shade-ventilation combination for the harsh outback environment.

RIGHT: Traces of the former layout of the hotel rooms on the upper level are retained in the ceiling detail and uneven door sizes.



SCREEN PERFORATIONS

“It also provides a really beautiful backdrop to the REDCOR® weathering steel itself; it becomes a frame which allows the REDCOR® steel to star.”

The Hooper and m3 partnership is clearly a successful one, despite the 650 kilometres between them. It therefore comes as no surprise that this symbiosis is reflected in each architect’s favourite aspect of the project.

“We’ve retained the spirit and the character of the building but we’ve done it in a contemporary

way and I’m pretty excited about that,” says Lavery. “The layering of framing, materials and space is my favourite aspect of the work, and then what comes with this layering, such as the interest created by shadow and the views into and through the building. Each aspect of the project offers something new, and each aspect undergoes dramatic change throughout a day. These components of the design give buildings such as this a dynamic feel.”

Hooper’s reflection elicits a similar appraisal: “The re-purposing of the building has really



been the joy in terms of being able to retain it, and the layering of all those materials for such a simple single-skinned building gives it that depth right through,” he says. “It’s not a one-dimensional building. Each of those individual elevations are very different and whilst they all do similar things, such as protecting the internal single-skin layering, the combination of all those materials juxtaposed against each other is what really makes it a successful project.”

“It also provides a really beautiful backdrop to the REDCOR® weathering steel itself; it becomes a frame which allows the REDCOR® steel to star.”

The architects convey that the response from the Barcaldine community has been fantastic and the Council’s leap-of-faith to embrace the challenge of adaptive re-use has been further rewarded with a second National Award for Public Architecture. The Globe’s growing audiences clearly appreciate the sensitive interleaving of old and new, allowing a physical space for the narratives of the past to be acknowledged and enjoyed in a contemporary building, in a region looking to the future. SP

PANEL SAYS

This bold adaptive re-use of a former corner pub in Queensland’s outback demonstrates that steel can be used to efficiently transform a building by overlaying a new signature character. The application of perforated screens made from BlueScope REDCOR® weathering steel on the upper floor balconies – combined with the freshly minted roofing and guttering made from COLORBOND® steel in LYSAGHT CUSTOM ORB® profile, in the colour Surfmist® – gives this building a new lease on life. By reframing the building, the architects have also provided a new point of orientation for visitors to the town and added to the legibility of the streetscape. We especially applaud Brian Hooper and Michael Lavery of m3 – who previously collaborated on the town’s award-winning Tree of Knowledge project – for identifying the value of this building and making a case to adapt and retain it, in the face of plans for its demolition. Bravo!

PROJECT The Globe **CLIENT** Barcaldine Regional Council **ARCHITECTS** Brian Hooper Architect and m3architecture **PROJECT TEAM** Brian Hooper, Michael Lavery, Brooke Hayes
PRINCIPAL STEEL COMPONENTS Perforated screen: made from BlueScope REDCOR® weathering steel. Roofing and guttering: made from COLORBOND® steel in LYSAGHT CUSTOM ORB® profile, in the colour Surfmist® **STEEL FABRICATOR** Adnought Sheet Metal Fabrications, Rockhampton (perforated screen), Barcaldine Welding Works (steel framing) **SHOP DRAWING CONTRACTOR** Roberts Engineering and Drafting (steel framing) **CLADDING CONTRACTOR/ROOFING PLUMBER** Capricorn Plumbing **MECHANICAL, ELECTRICAL AND HYDRAULIC** Umow Lai
STRUCTURAL CONSULTANT Optimum Structures **HERITAGE CONSULTANT** Michael Kennedy **BUILDER** LJ and G Fietz Builder **PROJECT TIMEFRAME** September 2013 to September 2015
AWARDS 2017 Australian Institute of Architects National Architecture Awards: Public Architecture Award, 2017 RAI A State Award (Queensland) Heritage Architecture, 2017 RAI A State Award (Queensland) Public Architecture, 2017 J.W. Wilson Building of the Year (Central Queensland) **BUILDING SIZE** 465m² **TOTAL PROJECT COST** \$2.1 million.

Designed by Melbourne-based architects Six Degrees, the firm's 'chill factor' is evident in this 'hot' new accommodation that harnesses steel to blend into its rural setting.

Words **Peter Hyatt** Photography **Trevor Mein; Peter Hyatt**

BRAE'S ADVENTURE

ARCHITECT
Six Degrees

PROJECT
Brae Guest Suites

LOCATION
Birregurra, Victoria

Rural and bush architecture can afford to tone down the visual blast meter. When the landscape is of serenity, season, sunlight and storm, who needs 'look-at-me'? Punters high on Las Vegas or Dubai would do well to avoid Victoria's Birregurra.

Roofing and wall cladding made from ZINCALUME® steel in LYSAGHT CUSTOM ORB ACCENT® 35 profile completes an elegant new pavilion in Birregurra's summer straw paddocks. To match a patch of darkly stained timber roofing and walling at the building's far end, Six Degrees project architect John Hajko elected to post-paint* ZINCALUME® steel in a custom black colour.

Hajko says the profile is a larger version of CUSTOM ORB® with strikingly deep corrugations. "We were really keen to use it, as it has a much larger-scale profile," says Hajko. The LYSAGHT CUSTOM ORB ACCENT® 35 profile size is important in subtly scaling the project to relate to these archetypal buildings."

Rather than cropping or shearing, this property features six guest apartments – lodgings for the high profile Brae restaurant set on a 30-acre organic farm.

With a population of around 830 and being a two-hour drive south-west of Melbourne, this laid-back bush township has a brand new mojo and not-so-quiet fame thanks to Brae as its shooting-star.

Inclusion in the world's top 50 restaurants last year only added to its reputation, and that of chef Dan Hunter, renowned for his culinary sensations.

Based around a modest, converted farmhouse, the restaurant needed suitable on-site guest accommodation. Especially so given the number of international visitors making the pilgrimage to this previously quite unnoticed part of the world.

Seasonal changes are captured by the soft undulations and sheen of the suites' exteriors, made from ZINCALUME® steel in LYSAGHT CUSTOM ORB ACCENT® 35 profile.

Six Degrees' response of a six-part steel pavilion is one of subtle, thoughtful interpretation. Understatement though doesn't mean anonymous or invisible. The firm's work, much like Brae's reputation for culinary innovation, reveals courage and resolve.

With such recognition comes high expectation. The apartments are designed to offer a more complete and immersive experience by adding a further dimension to Brae's celebrity.

For the restaurant's frequent international visitors, it's an opportunity for a specifically regional dining experience – much of it derived from produce grown on the property, the rest sourced locally.

The area's history of shearing sheds, huts and farm-houses all inform the new buildings. These qualities and types absorbed from Australia's great rural vernacular – notably corrugated steel – intersect along an east-west axis some 100 metres south of the restaurant.

Birregurra and Brae might appear to be names strangely at odds – one proudly indigenous Australian and meaning 'kangaroo camp', the other fiercely Scottish and referring to the slope or hillside. It's all an unlikely, but ultimately successful, connection.

Design project director James Legge of Six Degrees provides a contemporary take of a songline in his reading of the land. He sees the project as a modern interpretation of critical regionalism: "Where you also play off and 'riff', if you like, with some of the textures, materials, details and forms of the immediate setting," says Legge.

Legge parallels music and architecture. He extols the idea that the jazz master Herbie Hancock improvised so brilliantly; it's a quality he sees as possible and desirable in architecture.

"You take an idea and riff with it," he says. "You're improvising around that basic idea of a rural Australian shed. Of course we're not the first to do it and we won't be the last, but it can be a very inventive way to work."

"A lot of it was around looking at some of those archetypal rural buildings and sheds, and materials that comprise rural architecture. Our work at Brae is derived from numerous farm buildings. Fragments of recent and early examples prompt memories that we have tried to include in this project."

Meeting guest expectations beyond the unique culinary experience was also part of the architect's brief.

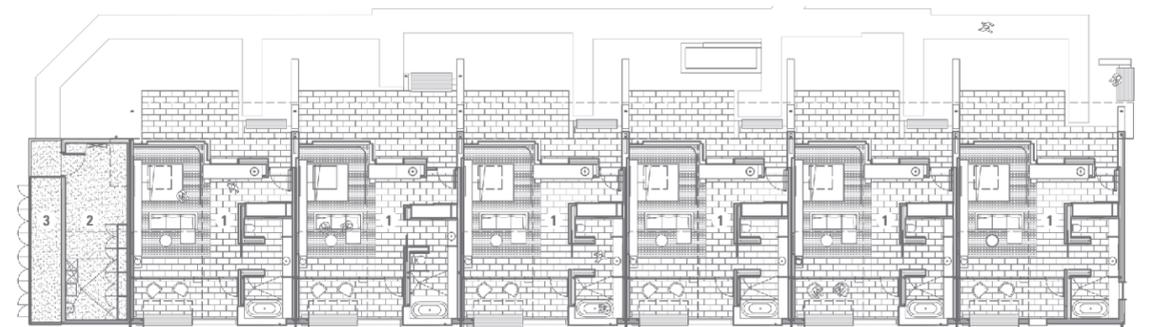
"Brae's clientele," says Legge, "come to experience an Australian rural setting and that's what we have tried to deliver." ➔



ABOVE AND OPPOSITE: Brae's sustainability credentials, from menu to architecture, stem from the local landscape. Viewed through a flock of Ibis, a blend of paddocks and edible gardens are complemented by simple, pavilion-style accommodation with roofing and cladding made from ZINCALUME® steel, drawn from the existing historic homestead.

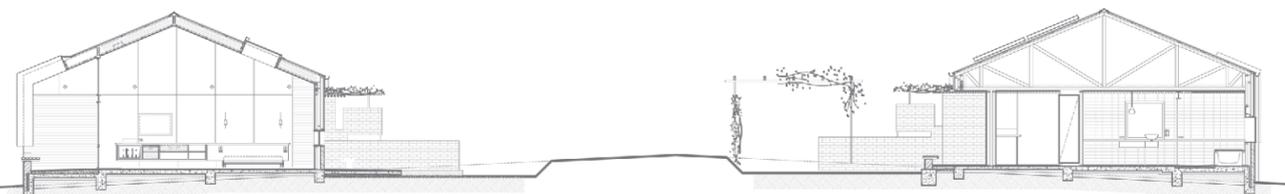


*The overpainting of ZINCALUME® steel or COLORBOND® steel will void any warranties issued by BlueScope. For details on overpainting and restoration of exterior steel products please refer to BlueScope Technical Bulletin TB-2.



LEGEND
1. Guest suites
2. Storeroom
3. Plant

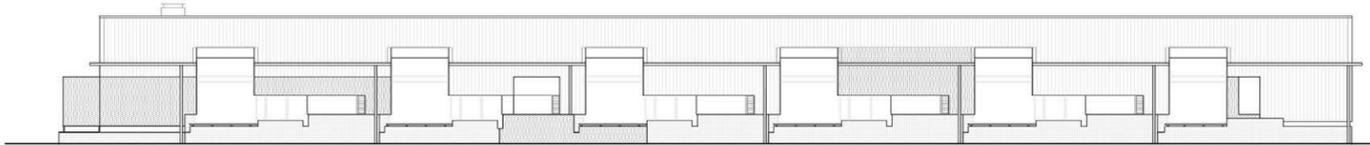
FLOOR PLAN



SECTIONS



NORTH ELEVATION



SOUTH ELEVATION

His enthusiasm for steel as a quintessential Australian building material sees it embedded with specific associations.

"It speaks of its ruggedness, durability and adaptation to the Australian landscape," Legge explains. "Coated steel has become a part of that rich history of bush Australia."

The pattern of the LYSAGHT CUSTOM ORB ACCENT® 35 profile in falling light and shadow reveals time of day and speaks of particular song-lines.

Certain structures and materials celebrate landscape whilst others exhibit denial. Legge says his clients wanted visitors to enjoy the seasons and those changes are captured by the soft undulations and sheen of the suites' exteriors, made from ZINCALUME® steel in LYSAGHT CUSTOM ORB ACCENT® 35 profile. The BlueScope product feels distinctly Australian. "There aren't many materials that have that quality."

He stresses that the product selection for the suites was based around not only practical performance but that they also sought subtlety and suitability for the environment. "It's not about over-powering the land so much as working with this place," he says. "Many of those qualities that appealed to farming pioneers are universal and remain true today."

Legge says the brief for Brae clearly avoided the "...cutesy country kitchen with table doilies everywhere. We all wanted to steer well away from that. Our thoughts were about offering other building

typologies with materials, volumes and light derived from shearing sheds and farm buildings."

This approach provided a fundamentally practical series of answers rather than design as witticism, whimsy or extravagant gesture.

Legge considers waking up and experiencing the southern view across the paddocks a project highlight. "It's amazing: a flock of cockatoos, or Ibis, wheeling past in the soft light," he says. For star-gazers, each room has an operable skylight directly above the bed specifically to view the crystal cave night skies. "And with the steel roof you definitely hear that distinctive patter of rain."

Courtyards to the north and private decks on the southern elevation extend the experience from interior to exterior.

"It's quite lovely," enthuses Legge. "It's tranquil and I like that aspect that you're cocooned within this comfortable, quiet, rural landscape."

"At Six Degrees we always look at how a building is scaled for an experience that responds to people. It's not about one scale only. As a visitor, we ask: 'How do you experience such a place and truly feel its texture? What do you actually touch when you open the door, what does it feel like? Where's the texture of the building on approach and is there a human scale to the building? Those are among the qualities you want to get right'."

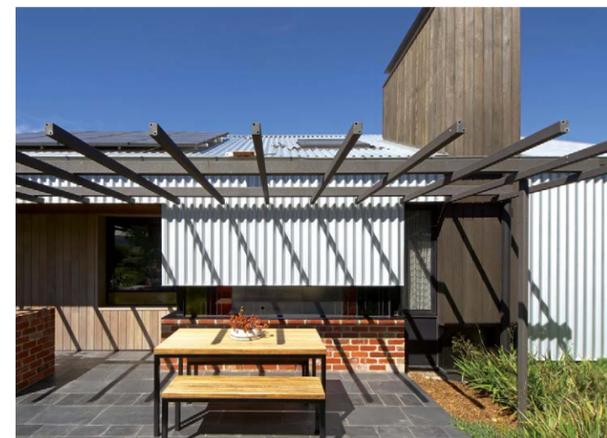
PANEL SAYS

With Six Degrees' trademark attention-to-detail and incorporation of found objects, this row of upscale guest rooms for travellers – visitors to one of the world's Top 50 Restaurants found in south-western Victoria – is a delightful play on quintessential homestead and farm structures, yet it transcends both of those typologies. At first glance, this appears to be a simple building. Further inspection reveals highly resolved detailing and fine execution. The sheltered portals at the rear – which pay homage to the great Australian verandah – offer guests a place to sit outside and relax while taking in the bucolic surroundings. The spaces are characterised by playful incisions into the walls made from ZINCALUME® steel in LYSAGHT CUSTOM ORB ACCENT® 35 profile – which bring views deep into the rooms themselves – where steel folds away to create striking and inventive forms.

BELOW LEFT AND RIGHT: Views south from the suites connect poetically to the landscape.



ABOVE AND BELOW: The northern elevation features cladding made from ZINCALUME® steel in LYSAGHT CUSTOM ORB ACCENT® 35 profile as a mediating screen for individual suites, offering privacy and solar control. A simple pergola will eventually be vine-covered to provide dappled shade. The rippled steel surface produces a sun dial effect of moveable shadow and light.



"It speaks of its ruggedness, durability and adapting to the Australian landscape. Coated steel has become a part of that rich history of bush Australia"

A familiar concern with building out of town can be the quality of builder, but Legge says that with BDH Construction any such anxieties quickly disappeared on this project. "Our experience in that regard was fantastic," he says. "BDH were interested and engaged. They were completely able to step up to what we were trying to do."

He sees the architectural achievement as subordinate and complementary to a broader farm and culinary experience. "Visitors don't arrive for our architecture, yet our job was to make sure the accommodation added to, rather than clashed with, the star attraction.

"We needed to consider the process of arrival and separation between dwellings and restaurant," he adds. "You might come halfway around the world, so the question is 'what is it you will do and how can we make this a fantastic rural experience beyond the meal?'"

Brae's sustainability story includes home-grown and locally sourced produce right through to its new apartments operating at net-zero energy and water usage – as much energy produced as consumed from external utilities – in what Legge refers to as a 'boutique hotel'.

"That's pretty amazing, because while people obviously don't live here, guests are using resources fairly heavily." Solar panels and harvested water storage tanks feature prominently as does a worm farm wastewater system and sympathetic landscaping using recycled materials.

He is a great believer in architecture as a first and lasting impression. "For Brae, we discussed the idea of visiting friends in the country and of being made to feel welcome and 'at home' during our stay. That was definitely the quality we wanted in this project."

In this rhythmic, distinctly Australian landscape, evocative in light and topography, Brae becomes a series of silver licks. As a fusion of jazz riffs, here clever hands and culinary bravado provide an added edge. SP



PATHWAY TO SUCCESS

A modular prefabrication program drove the rapid pop-up of this all-steel education facility, which showcases design flair and refinement rarely associated with temporary buildings.

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



Caught short of classrooms after a sustained student influx, Monash College sought relief in the form of a temporary learning centre it pegged space for in a peripheral car park.

Although required only for a handful of years whilst permanent buildings in construction elsewhere on campus are completed, and others refurbished, the college was committed to a high-level of amenity and refinement for the new facilities.

Jackson Clement Burrows Architects project lead David Burton says that rather than seeking a bare minimum outcome, the client committed to a considered architectural response. "All credit to Monash's Phil Ward," says Burton, "who carefully examined precedents of pop-up buildings and spaces as part of his business study. Phil wanted the building to be a manifestation of the University's vision for learning in a dynamic, flexible environment. He gave us licence to embrace and amplify its temporary nature in our design which draws on elements of temporary structures such as scaffolding, circus tents and gantries."

Practicalities were not lost in the design vision's romance. With just 14 "pretty frantic" weeks for the first of two construction stages, a rigorous program hinging on off-site steel prefabrication was employed.

Prefabrication specialist Modscape was chosen to build completed classroom modules, finished in wall cladding and roofing made from COLORBOND® steel in LYSAGHT SPANDEK® profile, in the colour Surfsmist®. Internally these come pre-wired for lighting, audio-visual and heating/cooling, and feature ceiling panels made from COLORBOND® steel in perforated LYSAGHT CUSTOM ORB® profile, in the colour Surfsmist®, over acoustic-absorptive backing.

Modscape managing director Jan Gyrn says people mistakenly equate their modules with old demountable buildings but that "Other than being transportable, ours are entirely different. They are built from scratch, starting with a fully welded structural frame and 100mm-thick floors," says Gyrn. "So, it's a structural steel building that has a high degree of permanency. It has an obvious rigidity that other temporary buildings do not have. Our structural panel is a high-density panel that spans over only an eighth of what it's designed to withstand, so it's more than adequately engineered for our application."

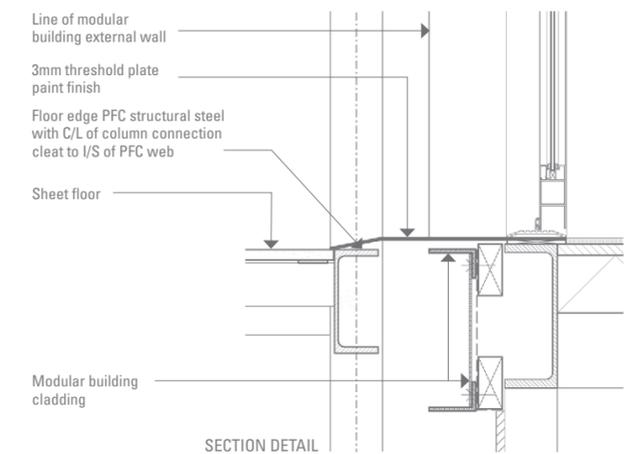
Burton concurs: "We were particularly impressed by the inertia of the floor, which doesn't drum when you walk on it. It was going to be a pop-up but it needed to feel like a proper, solid building. Being factory-made also minimised potential effects of inclement weather on the building program."

The class modules were configured into nine equal-sized double-storey buildings in a village-like cluster, creating central multi-use spaces. These were joined by a series of finely detailed gantry-like elevated walkways and bridges built off-site. Steel fabricator Structural Challenge's operations manager, Nick Mavrikos, says the vividly painted structural modules made predominantly from off-shelf rectangular hollow section were employed to expedite the build.

"Originally it was to be stick-built, but we changed that to modules. That meant we could get a section done in the space of a couple of hours rather than the better part of a day," says Mavrikos. "We were transporting modules 3.8- by 4.8-metres and 11 metres-tall. With just one of those lifted, we instantly had a corner of a walkway installed."

More than a sum of its kit of steel parts, the learning village demonstrates that a sadly low bar for temporary educational buildings can skyrocket without a commensurately high amount of expenditure and effort. "With a bit of clever planning and consideration you can easily get a much more delicate, joyous and interesting space than a dour site shed plonked on the ground," says Burton. "And thanks to its modular nature and all-steel construction it can have other lives as a building and ultimately be recycled." **SP**

"With a bit of clever planning and consideration you can easily get a much more delicate, joyous and interesting space than a dour site shed plonked on the ground."



PROJECT Monash College Learning Village **CLIENT** Monash University **ARCHITECT** Jackson Clements Burrows Architects **PROJECT TEAM** Graham Burrows, Richard Hill, David Burton, Fenina Acance **PRINCIPAL STEEL COMPONENTS** Classroom modules: exterior cladding and roofing made from COLORBOND® steel in LYSAGHT SPANDEK® profile, in the colour Surfsmist®; interior ceilings made from COLORBOND® steel in perforated (10-11% open) LYSAGHT CUSTOM ORB® profile, in the colour Surfsmist®; structural steel including gantry walkways and bridges made from RHS, channel and steel plate **BUILDING** Buildcorp (phase 1), Shape Group (phase 2) **STEEL FABRICATOR** Structural challenge **PROJECT TIMEFRAME** Completed October 2015 **AWARDS** 2016 World Architecture News Awards Education Category – Finalist **BUILDING SIZE** 4,600m² (2872m² learning space) **TOTAL PROJECT COST** \$23 million.



STEEL PROFILE #128



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