103
JUNE 2009
ARCHITECTURAL
STEEL INNOVATION
WITH BLUESCOPE STEEL

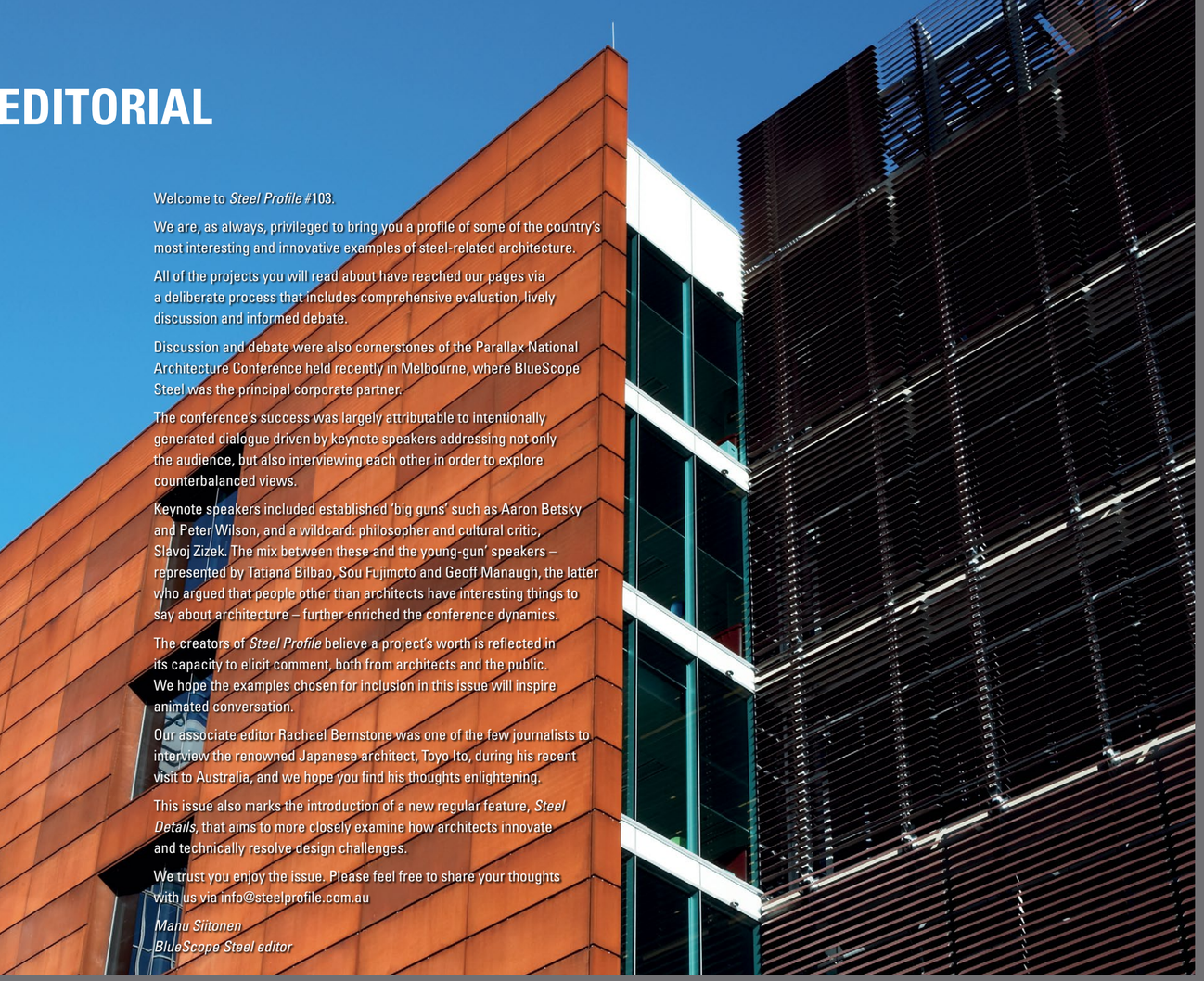
STEEL PROFILE



COX ARCHITECTS
NATIONAL INSTITUTE
OF CIRCUS ARTS

TOYO ITO
BEYOND MODERNISM

IREDALE PEDERSEN HOOK ARCHITECTS
GIDGEGANNUP HOUSE



EDITORIAL

Welcome to *Steel Profile* #103.

We are, as always, privileged to bring you a profile of some of the country's most interesting and innovative examples of steel-related architecture.

All of the projects you will read about have reached our pages via a deliberate process that includes comprehensive evaluation, lively discussion and informed debate.

Discussion and debate were also cornerstones of the Parallax National Architecture Conference held recently in Melbourne, where BlueScope Steel was the principal corporate partner.

The conference's success was largely attributable to intentionally generated dialogue driven by keynote speakers addressing not only the audience, but also interviewing each other in order to explore counterbalanced views.

Keynote speakers included established 'big guns' such as Aaron Betsky and Peter Wilson, and a wildcard: philosopher and cultural critic, Slavoj Zizek. The mix between these and the young-gun' speakers – represented by Tatiana Bilbao, Sou Fujimoto and Geoff Manaugh, the latter who argued that people other than architects have interesting things to say about architecture – further enriched the conference dynamics.

The creators of *Steel Profile* believe a project's worth is reflected in its capacity to elicit comment, both from architects and the public. We hope the examples chosen for inclusion in this issue will inspire animated conversation.

Our associate editor Rachael Bernstone was one of the few journalists to interview the renowned Japanese architect, Toyo Ito, during his recent visit to Australia, and we hope you find his thoughts enlightening.

This issue also marks the introduction of a new regular feature, *Steel Details*, that aims to more closely examine how architects innovate and technically resolve design challenges.

We trust you enjoy the issue. Please feel free to share your thoughts with us via info@steelprofile.com.au

Manu Siitonen
BlueScope Steel 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 an elected Councillor of the NSW chapter of the Australian Institute of Architects and a director of SJB Architects in inner-city Sydney.

He was awarded the 40th Anniversary Churchill Fellowship in 2006, to study alternatives to conventional models of urban design.

More than anything, he loves to design and construct 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



DANIEL GRIFFIN

Joint winner of the 2008 COLORBOND® Steel Biennale Prize, Daniel works for McBride Charles Ryan Architects and is currently teaching architecture at the University of Melbourne.

His Award-winning architectural thesis at RMIT – where he is establishing a Humanitarian department – examined the urbanisation of Palestinian refugee camps

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Iredale Pedersen Hook Architects have imbued this home in Gidgegannup, Western Australia, with the same qualities so admired by the clients after visiting Perth Zoo's Orang-utan Enclosure

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The 'steel trees' of Perth Zoo's Orang-utan Enclosure provide its residents with robust and stimulating climbing structures that have earned the admiration of international primatologists and architects alike

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Modern architectural master Toyo Ito discusses his quest to find a 'new real' in architecture – one that gave him a greater appreciation for the materiality of steel

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The tentlike thinness of the new National Institute of Circus Arts (NICA) building at Swinburne University of Technology is a contemporary take on a 'Big Top Arena'

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Australian Institute of Architects



NUMBER 103, JUNE 2009
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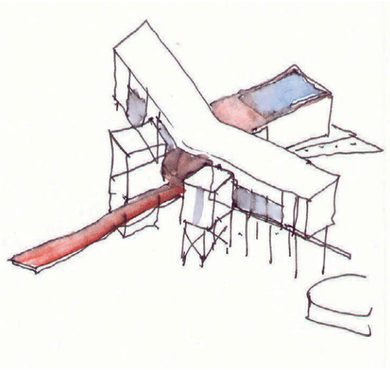
TREE-CHANGE

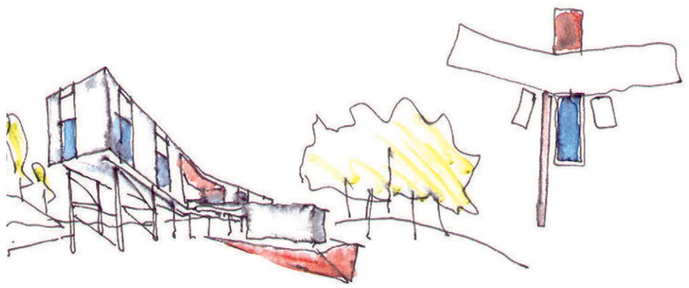
When a family of four approached Perth's Iredale Pedersen Hook Architects and expressed their desire to live like orang-utans, the architects didn't flinch. Having undertaken the successful redevelopment of Perth Zoo's Orang-utan Enclosure, Adrian Iredale was confident that he could imbue their new house with similar qualities.

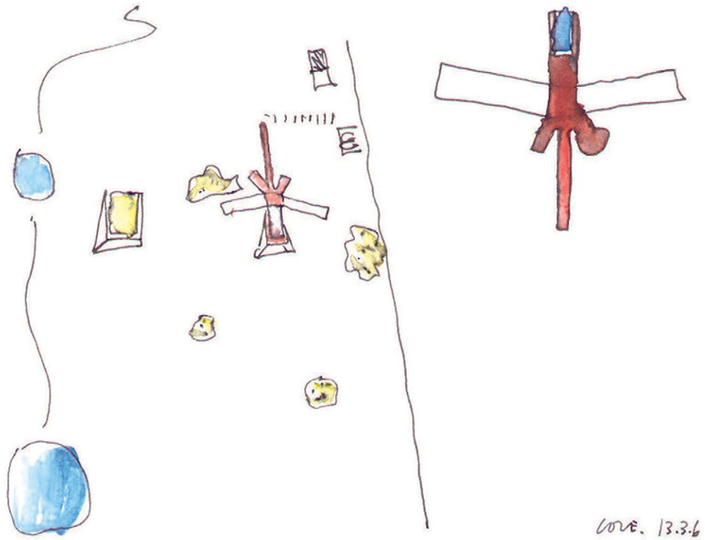
Words **Rachael Bernstone** Photography **Patrick Bingham-Hall; Andrew Pritchard**

ARCHITECT Iredale Pedersen Hook Architects
PROJECT Gidgegannup House
LOCATION Gidgegannup, Western Australia

PBH







The Cole family first noticed Adrian Iredale's work in a magazine: a house that he designed for his parents at Dawesville in Western Australia caught their attention. "It's all COLORBOND® steel, and is elevated four metres at the front and two metres at the back, built on a bed of limestone," Iredale says. When the family's search for an architect revealed that Iredale had collaborated in the design of the Perth Zoo Orang-utan Enclosure, which they had admired during a visit to the zoo, they decided to follow their instincts and appoint him as their architect.

"Sue Cole said, 'I love the Perth Zoo Orang-utan Enclosure and would love a house that enables us to live like that'," Iredale recalls. "They wanted to hover above the ground and assimilate with the trees."

The clients owned a farm at Gidgegannup, 40 kilometres north-east of Perth, and had selected a potential site for their new house beside a picturesque lake on the property. "If we'd built on that site, we would have had to remove existing landscape elements and interrupt the migration paths of native species, so we suggested they shift the house further back into an area that was already fatigued by farming activities," Iredale says. "We wanted to string the house between a big bunch of trees and two isolated trees, like a line in the landscape.

The house reveals the surrounding landscape and the delicate quality that comes out of the use of steel. It is like a line in the landscape that hovers in the junction between earth and sky

"The shift in the slope resulted in a crank in the plan that means the house is both parallel and perpendicular to the contours," he adds. "That allowed us to reorientate the main living area to face north, and finish the master bedroom with a balcony that enables the clients to reach out and touch two trees in the middle of the field."

The brief contained several other challenges, including the provision of a music room where two teenage boys could play piano, saxophone and trombone. "Sue wanted to be able to see the boys playing from the kitchen, but she also wanted the room to be placed near the entry so that music would filter through the house," Iredale says. "They also wanted spaces that would open to the outside and to the pool, which was difficult because the house is so far above the ground. We ended up orienting the house to fully open to the pool and views of the lake beyond."

Having agreed on the site and orientation, Iredale divided the house into distinct zones, which are differentiated by subtle changes in temperature. These become apparent as you traverse the entry bridge and cross the threshold into the main foyer. It can be opened on two sides to allow the pool to act as a cooling sink, in conjunction with prevailing breezes. The 4.2-metre-wide deck and steps that lead down to the pool provide the perfect place to sit and contemplate the valley views.

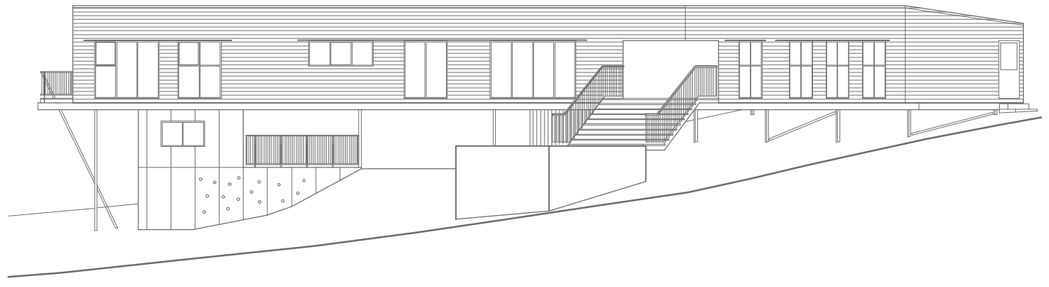
To the left, the children's and guest bedrooms are accessed via a hallway that is lined on one side with two sheets of clear polycarbonate, with heavy insulation in the internal walls. "There is a sense of isolation for the boys because of the perception of increased temperature as you enter their zone," Iredale says. "The hallway provides a sense of leaving the house to reach their bedrooms.

To the right of the entry, the main room combines open-plan kitchen, dining and living spaces, with floor-to-ceiling charcoal-framed aluminium windows. "We wanted to definitely treat the landscape as a piece of art," Iredale says. "We didn't want them to forget to see the view."

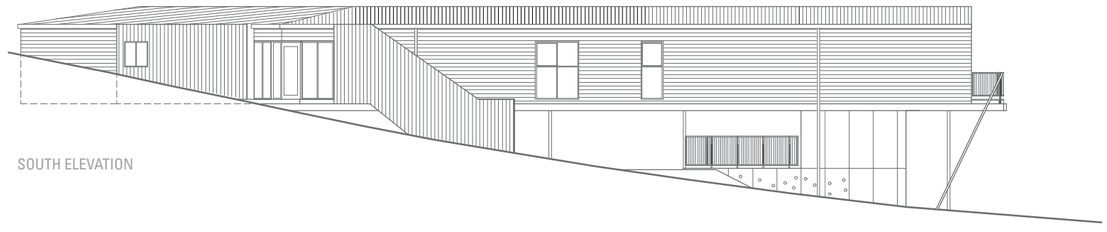


To capture a farming aesthetic, the architects chose LYSAGHT CUSTOM ORB® made from ZINCALUME® steel for the cladding, roofing, and soffits

PB+I



NORTH-EAST ELEVATION



SOUTH ELEVATION

PANEL SAYS

We really like this house: the design is complex but it has a delicate quality that means it is not just a conventional shed in the landscape. The architect's ideas are clearly expressed in the early sketch drawings, and are easily recognisable in the final result. The combination of steel frame and cladding made from ZINCALUME® steel contributes a sense of lightness in the form, and the cladding clearly relates to the floating concept of the building. It's an intelligent house, very well suited to its location, and realised within a tight budget.





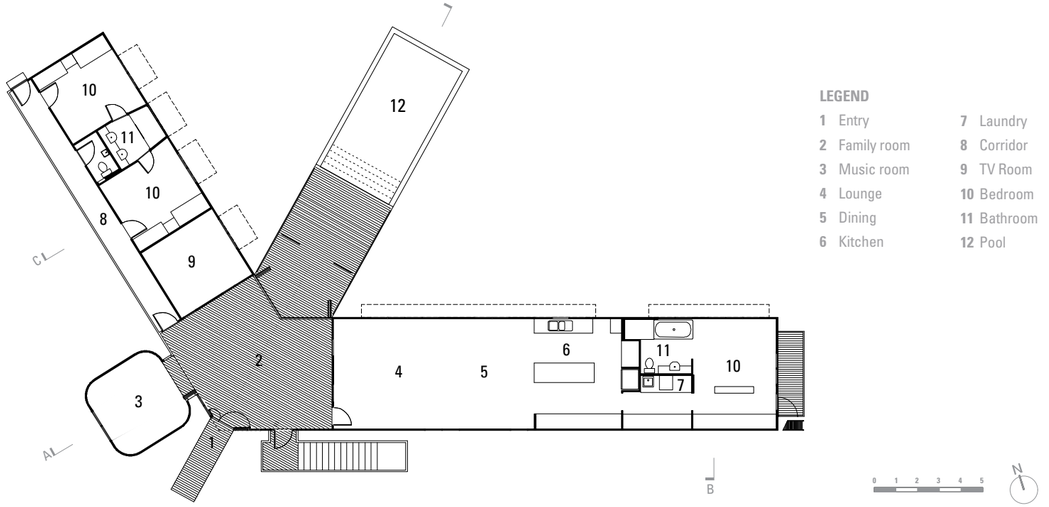


LEFT: The main room – combining open-plan kitchen, dining and living spaces – has floor-to-ceiling windows for taking in the expansive views

ABOVE: The main foyer threshold can be opened to allow the pool to act as a cooling sink

BELOW: Steel was fundamental in solving challenges presented by the house being elevated 30cm at one extremity and five metres above grade at another





FIRST-FLOOR PLAN

At the far end of that wing, the master bedroom contains an ensuite with a bath that takes full advantage of the views, and a cantilevered balcony which juts out into the foliage. "It gives them a sense of living in the trees," Iredale says. "They can lie in bed and look out over landscape."

A carport, home office and spa are located underneath the house. "Because David Cole works from home sometimes, we wanted to provide a sense of leaving home to go to work," Iredale explains. "The black-clad external stair that leads down to his office has open treads and is warmer or cooler than the main house, depending on the weather.

"The spa is separated from the pool so that you can use it at different times, such as when it's raining, or the kids could use the pool while the adults use the spa," Iredale says. "The whole house has different zones that you can use depending on the season or weather, giving it a lot of flexibility.

"They enjoy the flexibility of the design: they've had parties where they can open up the living space and decks and host 80 people, or they can retreat to the under-croft for privacy if the boys are entertaining. It functions equally well as a party place and an intimate retreat."

The main design challenge arose from the fact that the house is elevated only 30cm off the ground at its south-west extremity, and five metres above grade at the eastern end.

"Steel was fundamental to solving that problem, because we wanted to minimise the amount that we touched the ground and minimise disturbance to the landscape," Iredale says. "We only cut the ground in one spot, and that fill was used around the pool.

"Having determined that, we faced the difficulty of building it," he adds. "We used a series of SHS columns and large beams, and then the purlins went on, all of which were pre-made to size using hot-dipped galvanised steel to minimise maintenance. There was no welding on site, because that would have led to painting and then rust, so the framing was delivered in big panels that were fixed on site, meaning that a lot of the house could be reused later."

The steel frame was designed by the builder Richard Tinniswood and Goldfields Steel Framing (GSF), based in Kalgoorlie. It was prefabricated using galvanised steel SHS columns, UB beams and C purlins, and delivered to the site ready for installation. "The major challenge on this project was being able to perfect the welds and presentation of the frames, because the external walkway was clad in clear polycarbonate sheet, thus exposing the raw frame profile," says GSF managing director Craig Patu.

For the cladding, roofing, and soffits, the architects chose LYSAGHT CUSTOM ORB® made from ZINCALUME® steel to create "a sophisticated version of the farming aesthetic of sheds and other buildings," Iredale says.

"We were not trying to create a 'city slickness', we were trying to create something that is appropriate for that place. We wanted to value and emphasise the very things that make that place unique, by making a house that appears like an abstract line in the landscape."

Iredale says he couldn't have realised his vision without steel. "It wouldn't have been as delicate – from a distance it reads as a zinc-clad line sitting on columns," he says. "It would have been a very difficult build in timber because we were able to achieve fantastic precision and tolerances using steel.

"While it appears quite simple, all of the detailing is actually very refined," he adds. "For example, the awnings have a simplicity about them that belies their complexity."

Therein lies the innovation: it's a design solution unique to this landscape and context, so that the house doesn't resemble a "foreigner from the city", Iredale says.

"In terms of how to achieve a house on a sloping site, this is simple and economic, but it manipulates the contours with dramatic effect," he adds. "As you drive along the firebreak you see fragments of the house through the trees, and it appears to be almost launching into space. On arrival, you see the way it relates to the distant horizon, and as you enter, you see the pool and lake and how they are integral to the design.

"I love the manner in which it reveals the surrounding landscape and the delicate quality that comes out of the use of steel," Iredale adds. "It really is like a line in the landscape that hovers in the junction between earth and sky."

Despite the delicacy of its appearance, the house is hardy and functional from the family's perspective, Iredale says. "It looks delicate but is actually very robust. They have a dog, and they sometimes come in from the farm with muddy boots, so the design proves you don't have to have a concrete floor to cope with life in a rural environment."

The Coles are happiest with the way the house affords them the treetop lifestyle they sought, and their guests are equally captivated by their new abode. "People who used to just drop in for coffee now want to stay and won't leave," Iredale laughs. Just like those orang-utans who are so content with their new steel and timber nesting platforms at Perth Zoo. **SP**

PROJECT Gidgegannup House **CLIENT** David and Sue Cole **ARCHITECT** Iredale Pedersen Hook Architects **PROJECT TEAM** Adrian Iredale, Finn Pedersen, Martyn Hook, Oliver Maingard, John Belviso, Chris Cuellar **STRUCTURAL & CIVIL ENGINEER** Bill Butler **BUILDER** Richard Tinniswood **STEEL FRAMING** Craig Patu, Goldfields Steel Framing **STEEL FABRICATOR** Greg Crawford, G and S Fab **PRINCIPAL STEEL COMPONENTS** Wall cladding, roof sheeting and exterior soffit: LYSAGHT CUSTOM ORB® made from ZINCALUME® steel; Structural steel: galvanised ZINCALUME® G450 steel SHS columns, UB beams, C purlins, cold formed wall framing (pre-made). All steel was bolted on site, with no on-site welding **AWARDS** *World Architecture News* (WAN) 2008 House of the Year top 30 **BUILDING SIZE** 365m² including pool

Primate Paradise

The Orang-utan Enclosure at Perth Zoo has generated plenty of positive feedback – from the animals and keepers who use the facility, visitors who can see the endangered species close up, and the international architectural community – despite the structure still being a work in progress.

Words **Rachael Bernstone** Photography **Shannon McGrath**



ARCHITECT Iredale Pedersen Hook Architects
PROJECT Perth Zoological Garden Orang-Utan Enclosure Upgrade
LOCATION Perth, Western Australia

As the first job that fledgling Perth-based architects Iredale Pedersen Hook ever won, this 'utopian project' has combined many of the architects' interests and proved to be a challenging and stimulating design task over a 10-year period.

Their brief for the orang-utan enclosure was to provide climbing opportunities similar to those the orang-utans would encounter in their natural environment – using robust materials in place of trees, which would have been destroyed very quickly. Taking their cues from primate keepers and scientists, the architects developed several schemes, eventually settling on a series of steel, pre-cast concrete and timber tree-like structures for the orang-utans, with visitor viewing platforms around the perimeter.

The climbing apparatus resembles a 'tuneable' forest with steel branches and ropes that can be adjusted by the keepers to suit different sized orang-utans.

"Orang-utans brachiate – or, swing by the arms – from tree to tree, but the enclosure is a circular space which made that difficult, so we aimed to provide a complexity and variety of spiralling movements, rather than linear ones," Adrian Iredale says.

"Initially we tested our designs in drawings, working out the circles of reach, because we wanted to place the viewers as close to the orang-utans as we could without them touching, as there is no physical barrier between them," Iredale continues. "There is very little documented research on orang-utans – so we held weekly meetings and workshops with keepers, where more and more information was revealed and we kept refining our design."

The main structural elements – comprising fixed and adjustable poles and platforms – were constructed from recycled power poles, hot-dipped galvanised steel and recycled jarrah timber. The complementary behavioural enrichment devices – puzzle boxes, water cannons and steel dip tubes – encourage skills orang-utans would use to source food and play in the wild.

Steel was chosen for its long-term durability, resistance to orang-utan play, flexibility, and ease of installation. Much of the structure was prefabricated offsite and erected quickly to minimise disturbance to the animals.

A combination of factors keeps the steel cool to the touch, so that the orang-utans don't burn their hands. These include the elevated position of the platforms, which are subject to prevailing breezes, the galvanised finish that reflects heat, and the thinness of the steel elements that minimises heat retention.

After the installation of the first elevated nesting platforms, the architects and primate keepers carried out scientific post-occupancy evaluation studies to gauge the orang-utans' responses.

"There is scientific evidence that the structures we have introduced have improved the behaviour of the orang-utans," Iredale says. "There is a diabetic male among the group and he has become much more active and consequently his sugar levels have dropped, and his condition has improved. It's evidence that design can have a positive impact on health."

IPH is currently working on the final stage of the project – the viewing areas and landscaping – which aim to emulate the orang-utans' jungle habitat. "There will be a sense of removal from the rest of zoo," Iredale explains, "so that you'll be immersed in a landscape with a rainforest quality, above the ground on a series of ramps."

The final stage will also incorporate new interpretive and educational materials, further enhancing primate keepers' resources for communicating with visitors about their orang-utan projects.

Conservation in the wild is one of the zoo's key aims, and it has achieved considerable success to date. An important milestone was the release of Temara, a Perth Zoo-born orang-utan, into a protected national park in Sumatra, Indonesia, in November 2006.

As well as generating a positive response from its inhabitants and their keepers, the new enclosure drew strong praise from renowned primatologist and conservationist Dr Jane Goodall. She visited last year and described the enclosure as "absolutely wonderful" and "the best I've seen".

"I love it that they're all in their separate family groups and not kept in an artificial way," she added. "I love the structure of it, so that it's resembling the elements of a tree canopy."

The project has also picked up several international architecture accolades, including an honourable mention at the international *Architectural Review* (AR) Awards for Emerging Architects in 2008. SP

PANEL SAYS

Over the course of 10 years, the architects have interrogated their Perth Zoo clients to refine their ideas about how to best accommodate orang-utans in a man-made enclosure. Their efforts to provide a healthy and robust environment – which relies on steel, concrete and timber to imitate the animals' jungle home – are laudable. What makes this project especially interesting is the fact that it became the jumping-off point for a house for new clients, who wanted to incorporate the enclosure's best qualities into their new home. That's a unique brief!

Their brief was to provide climbing opportunities using robust materials in place of trees, which would have been destroyed very quickly



PROJECT Perth Zoological Orang-utan Enclosure Upgrade **CLIENT** Department of Housing and Works, Government of Western Australia **ARCHITECT** Iredale Pedersen Hook Architects **PROJECT TEAM** Finn Pedersen, Adrian Iredale, Martyn Hook, Rebecca Angus, Caroline Di Costa, Jemma van Dongen, Ross Brewin, John Belviso, David Barr, Peter Weiss, Mike Moore **STRUCTURAL & CIVIL ENGINEER** Scott Smalley Partnership **BUILDER** Lakis Construction **STEEL FABRICATOR** Craig Parton Living Iron **PRINCIPAL STEEL COMPONENTS** Hot-dipped galvanised pipe, angle iron and flat bar steel is used through-out as fixed structure, adjustable structure, dipping tubes, water cannons and puzzle boxes **AWARDS** Honourable Mention – *Architectural Review* (AR) Emerging Architects Award 2008, London, England. Citation by Honorary Members – World Community Architecture Awards 2009. Selected by Prof. Leon van Schaik to represent Australia in the Zumtobel Group Awards 2009 Austria, (being judged at time of publication)

BEYOND MODERNISM

The quest to find a 'new real' in architecture gave Japanese architect Toyo Ito a greater appreciation for the materiality of steel. The modern master's much-awaited recent Australian visit was punctuated by very few media opportunities, but one of those was with *Steel Profile*'s **Rachael Bernstone** with whom Ito elucidated his landmark projects.

Toyo Ito experienced an epiphany during the course of his Sendai Mediatheque project in Sendai City, Japan. Completed in 2001, this set him on a new direction in design. Prior to winning the design competition in 1995 for a complex to house a library, art gallery and audio visual centre, Ito had sought to incorporate technology explicitly in his buildings, creating structures that "nobody could touch", that were "impossible to grasp and hold". His Tower of Winds (1986) in Yokohama and Tokyo's Egg of Winds (1991) were described by Tokyo-based architect Andrew Barrie as "interactive landmarks, whose design seeks to represent the invisible electronic world as a parallel to our physical environment".

Following Ito's experiments with materiality during the Sendai project, he now aims for "an architecture that you can touch and feel". The ground-breaking Sendai project marked the start of Ito's search for the new 'real' in architecture, in which he hoped to overcome some of the perceived limitations of Modernism.

Speaking about The New 'Real' in Architecture exhibition in Tokyo in 2006, Ito explained his shift: "Twentieth-century cities sought economic performance, so the same kind of buildings were constructed everywhere all over the world," he said. "More and more, however, such architecture strikes me as no environment for vibrant human life, so I've turned my attention to other possibilities in architecture. I feel there's a need to reassess the relationship between materials and people in order to reclaim a more fully human sense experience."


TOYO ITO & ASSOCIATES

In his competition entry for the Sendai Mediatheque, Ito described the steel structures as seaweed floating in a tank of water

"I found myself attracted to the strength of steel and its sense of substance"


MATTHIAS ENGESSER

13

TOYO ITO


ISHIGURO PHOTOGRAPHIC INSTITUTE


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TOYO ITO & ASSOCIATES


TOYO ITO & ASSOCIATES

ABOVE LEFT AND RIGHT: Tokyo's Tama Art University Library owes the fine appearance of its variously-sized arches to steel

LEFT: Tama Art University under construction

BOTTOM LEFT: Tod's Japanese flagship store exemplifies Ito's desire to create surface using structure

BELOW CENTRE: Sendai Mediatheque in construction

BELOW RIGHT: The Meiso no Mori Municipal Funeral Hall in Gifu's steel formwork was Ito's favourite part of the building

BOTTOM RIGHT: Meiso no Mori Municipal Funeral Hall's finished form

Ito imbues his buildings with a sense of being in nature. In the Sendai Mediatheque, the natural world is evoked by the 13 steel 'tubes' that punctuate and support the seven steel-and-concrete slab floors. "The strong contrast between organic shaped 'tubes' and thin, highly abstract 'plates' almost seems to plant a grove of trees across an otherwise man-made expanse," Ito says. "Or rather, it suddenly brings pure geometries into nature and sets them up in striking counterpoint."

The steel 'tubes' are vertical circulation routes that convey natural light to the ground floor (thanks to mirrors that line several of the shafts), fresh and conditioned air, and people moving on stairs or elevators between floors. The precision welding that connects columns to floor gives the impression that 'tubes' pass through 'plates' without touching, resulting in very flexible spaces that enable users to choose how they use them.

The seamlessness of the result may give an impression of ease, but the project's realisation was far from simple. In fact, the act of watching the site workers connect steel plates to steel tubes changed his "way of talking about architecture".

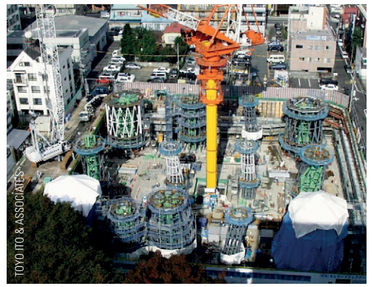
"At the time when I was doing the design, there was regular commentary on the project from local newspapers about the architectural ideas," he says. "I felt like a voodoo doll with lots of needles in me. Initially I had designed a gentle lightweight structure, but because of the negative comments, I decided to create an architecture that would

MASTER ON MASTER

During his recent visit to Australia, Toyo Ito met with Glenn Murcutt, whose work he particularly admires, and who is well known for his experiments with steel. So do the two architects have much in common? "I enjoy the way he works and his attitude," Ito says. "He works only with himself, which means that he has to convince even himself that a design will work.

"I feel in Murcutt's work there is a strong connection between our two countries," Ito adds. "Glenn's wife's mother lived in Japan for 10 years – and he was also educated in Finland, and there are strong links between Finland and Japan. There are some very similar aspects in terms of culture and language. While it is very far from Japan or Finland to Australia, I think there is a close connection between Glenn and Helsinki."


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TOYO ITO & ASSOCIATES


TOYO ITO & ASSOCIATES


MEISO NO MORI MUNICIPAL FUNERAL HALL

Ito's most recent projects feature impossibly thin and light concrete structures that owe their delicacy to the steel within

become much stronger, so I decided to give much more prominence to the steel during construction. I found myself attracted to the strength of steel and its sense of substance.

"It sounds easy but it was difficult," he concedes. "The site welding of steel plates was delicate because if we had too many joins, the steel would bridge and bend. There were constant arguments between the structural engineer and the site workers. That was a very difficult aspect of the job, but I really enjoyed the construction process."

Ito's recent projects have been similarly challenging, and steel has again played a central role. The Serpentine Pavilion in London's Kensington Gardens (2002), for example, boasts a steel frame and white aluminium panels that blur the distinction between inside and outside, and floor, roof and walls. Back in Japan, the flagship store for Tod's in Tokyo's Omotesando (2004) exemplifies Ito's desire to create surface using structure. It uses steel-formed reinforced concrete and glass to produce a facade that mimics the Zelkava trees of the picturesque avenue.

For the nearby Mikimoto Ginza building (2005), Ito employed a similar method but eschewed concrete in favour of steel skins. All four facades comprise two 56-metre-tall steel sheets that were manufactured in sections before being welded together on-site. These were installed about 20cm apart before concrete was poured between them to support the nine-storey building.

Mikimoto may appear as a gleaming, pristine beacon for retail therapy, but in reality, the process of constructing it and its forerunners was complicated and messy. "The site is filled with steel – countless slabs and pipes are suddenly introduced into the middle of the urban space," Ito says. "Gradually they are being assembled to become one massive steel sculpture. The sound of dozens of welders echoes from morning until night as sparks fly from their torches, and the steel dust dyes the air like smoke belched from a chimney. This work seems too primitive for a construction site in the computer age; bringing things into evidence seems like a violent act.

"Although the skin is built with 12mm steel plate, when you weld it everything tends to bend," Ito continues. "Furthermore, if you don't do it perfectly, at the end you see the weld joints. To achieve a perfectly flat surface we had to work a lot. We, the engineers, the workers, we all had to experiment with a lot of different solutions.

"Working with the Taisei Corporation was fundamental. There is the typical attitude of the Japanese craftsman – they like to do difficult things and they love an impossible task. If the duty is impossible, then the craftsman generates incredible strength and energy. He thinks: 'I am the only one who can do it'."

That same dedication is evident in two of Ito's most recent projects which feature impossibly thin and light concrete structures that owe their delicacy to the steel within. At the Meiso no Mori Municipal Funeral Hall in Gifu (2006), the 20cm-thick white concrete roof floats upon freely dispersed columns, which rise up to 11.5m above a travertine platform, beside a small lake. Presenting a photo of the concrete being poured during construction, Ito said that the steel formwork was his favourite part of the building, adding that it was a terrible shame to cover it over with concrete.

At the Tama Art University Library (Hachioji campus) west of Tokyo (2007), the variously-sized arches also owe their fine appearance to steel. Ito wanted the new library, occupying a gateway position at the edge of the campus, to be easily accessible to the campus population, and to blend with its environment.

"To let the flows and views of these people freely penetrate the building, we began to think of a structure of randomly placed arches which would create the sensation as if the sloping floor and the front garden's scenery were continuing within the building," he says.

"The characteristic arches are made out of steel plates covered with concrete. In the plan, these arches are arranged along curved lines which cross at several points. With these intersections, we were able to keep the arches extremely slender at the bottom and still support the heavy live loads of the floor above. The spans of the arches vary from 1.8m to 16m, but the width is kept uniformly at 200mm."

It is clear that connection is at the crux of this softly spoken man's work and life. In order to determine whether his ambition to create a new 'real' in architecture – to produce buildings that both attract and engage with their public – is realised in his projects, it's instructional to seek the views of others. According to architect Andrew Barrie, the Sendai Mediatheque is a hub of unexpected activity.

"When I visited the Mediatheque it was packed with people: families in the children's library; teenagers in the video booths; students cramming in the library; old men sitting, shoes off, checking betting forms in the quieter corners; black-clad, digicam-wielding architecture students charging up and down the stairs and lifts," Barrie said.

"The structure of the Mediatheque generates chance encounters, unpredictable connections and gatherings. This moves the building beyond being just a metaphor for architecture's connection to the city and the virtual world; it becomes an active agent in that exchange." SP

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STEELING THE SHOW

Celebrating an industrial aesthetic and a newfound public presence, Melbourne's Swinburne University of Technology continues to innovate in lightweight steel architecture with its new National Institute of Circus Arts (NICA) building at the Prahran campus.

Words **Christine Phillips** Photography **Dianna Snape**; **Paul Bradshaw**

ARCHITECT Cox Architects and Planners
PROJECT NICA National Circus Centre
LOCATION Prahran, Victoria



The NICA building's blue-glazed ribbon motif dances through the cladding, which consists of LYSAGHT SPANDEK HI-TEN® made from COLORBOND® Metallic steel in the colour Facade®

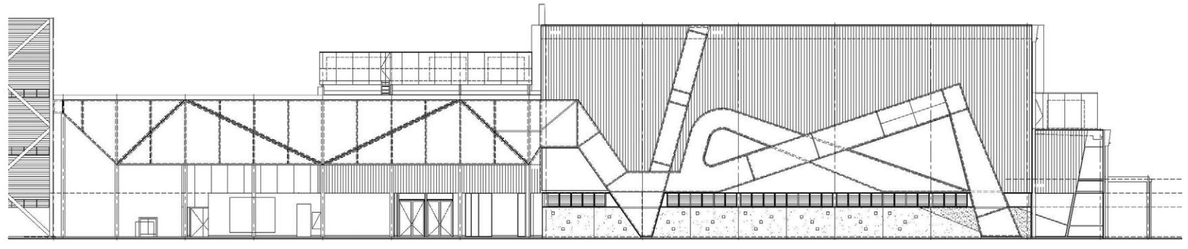
The campus already comes with an impressive collection of steel-clad buildings. The NICA building, however, with a blue-glazed ribbon motif that dances around the facade, stands out as more than just an elegant shed.

The $7.5 million facilities were designed by Cox Architects. The centre expands on NICA's existing facilities to create a suite of lightweight steel structures that add character to the Green Street neighbourhood. In many ways, this project can be seen as a counterpoint to Cox's sports and recreation projects – such as the Rod Laver Arena and Sydney Football Stadium – that have become synonymous with white steel expressions. This building proves Cox's versatility in approach to both program and context.

NICA had a humble start in 1995 when its founding students trained in an unrenovated warehouse in Melbourne's Docklands. This space was superseded by the construction of the Sidney Myer Circus Studio, (designed by Bates Smart and completed in 2001), the first of NICA's buildings at Swinburne's Prahran campus. As contemporary circus arts continue to grow in popularity and demand, so too do NICA's needs. The Institute now offers a Bachelor of Circus Arts program for more than 60 students and has outgrown its not-so-old facilities, making expansion crucial.

The brief for the new facilities called for a highly flexible, purpose-built venue to house training and performance spaces for NICA students, as well as the wider circus community. Contemporary circus or *cirque nouveau* is far removed from the image often conjured up by traditional circus art. Lions or tigers form no part of cirque nouveau, which instead focuses on extending the limits of human skill and endurance. It includes a variety of activities such as gymnastics, acrobatics, aerial acts and dance-like adagio performances.

The choice of steel for structure and cladding was a considered one; its tent-like thinness and 'escapist interior' is a contemporary take on a 'Big Top Arena'



GREEN STREET ELEVATION

ABOVE: Structural steel beams and columns are also used to support trusses, catwalks and other circus apparatus

ABOVE RIGHT: Steel framing is strategically contained within. Combined with the thinness of the cladding, it offers a modern interpretation of the circus tent

RIGHT: The large glazed doors of the connecting pavilion open up in warmer months to create an indoor/outdoor space



Cirque nouveau required a large shed that could accommodate various kinds of trapeze and circus apparatus in a number of configurations. NICA's creative director also recognised that the resulting flexible space could be hired out for external functions to generate additional funding that would sustain the facility over the course of its lifetime.

Cox's response to the brief was a playful interpretation of circus themes, combined with a thoughtful response to the site and cultural context. The choice of steel for structure and cladding was a considered one; its tent-like thinness and 'escapist interior' is a contemporary take on a 'Big Top Arena'. The design also draws on local street art culture, providing a tag of its own with its blue-glazed ribbon that sweeps across the facade.

Replacing a redundant ground-level car park, the new facilities occupy two connecting buildings. The larger 30m x 20m structure occupies the corner block and is a portal-framed building clad with LYSAGHT SPANDEK HI-TEN® made from COLORBOND® Metallic steel in the colour Facade®, which juxtaposes against the existing white-clad facility and emphasises the building's industrial aesthetic.

It houses the main 16m performance space with seating for 600, which can be adapted for different seating and stage configurations, and doubles as rehearsal space. The building also incorporates back-of-house facilities and a loading bay.

The entry foyer is located within a lower glazed 'conduit' structure, which connects the existing Sidney Myer Circus Studio to the new facilities. Its brightly coloured blue glazing reads like a gymnast's ribbon, connecting the two new buildings and announcing the entry point. It also encourages passersby to stop and peer in through the facade to catch glimpses of NICA students in rehearsal.

The connecting pavilion is both utilitarian and theatrical. As well as the foyer, it houses a drama room and has capacity for two or three stages. Inside, an over-scaled door connects the old facilities to the new, with a box office and bar to either side. The incandescent-globed 'box office' and 'bar' signs are reminiscent of backstage dressing-room mirror lights. During warmer months, the large glazed doors open up to create a generous indoor/outdoor space.

The design caters for potential future expansion in the form of a steel roof structure that is designed to withstand upward development.

An obvious marriage exists between the scale and architectonics of the new Cox-designed performance building and the original studio. The new facilities neatly complete the block to create a handsome wall comprised of Stramit Longspan made from ZINCALUME® steel along the streetscape.

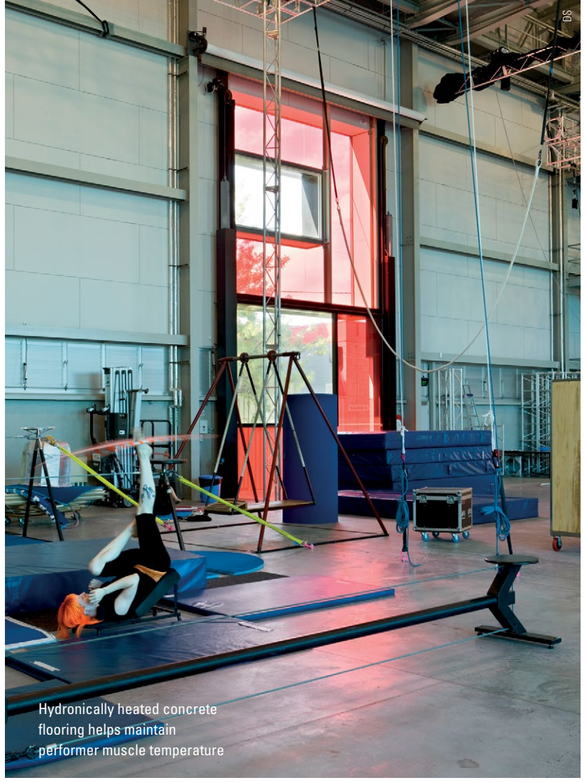
Like the existing building, the new facility adopts a three-tiered facade – a concrete base punctured

PANEL SAYS

The COLORBOND® Metallic steel encasing this big circus rehearsal and performance space looks fantastic in changing light, while the graphics embedded in the facade animate the street frontage. While steel 'sheds' are often associated with rural locations – where they appear as isolated objects in the landscape – we appreciate the fact that steel is used so effectively on this tight urban site in Prahran [Melbourne]. NICA demonstrates that steel is not incompatible with city-based projects.



The older Sidney Myer Performance building (right) and the new facilities are of similar proportion and height, perfectly anchoring the block corners



Hydronically heated concrete flooring helps maintain performer muscle temperature

by an array of glass brick 'peephole' windows and a strip of louvred windows allowing cross-ventilation, topped by the roof and wall cladding made from COLORBOND® Metallic steel. Both buildings are of similar proportion and height, and perfectly anchor the corners of the block. Both also unashamedly embrace an industrial steel shed aesthetic and celebrate steel construction in every way.

Design architect for the project John Hayball explains why the choice of steel for both the cladding and structure was so fitting for the project. "Steel is the only material you can use for an institution like this," he says. "It gives you the required strength and loading requirements and the ability to precisely design the steel sections because of the nature of the material. It is also very flexible and cost-effective."

Structurally, the new facilities are a clever advancement from the Sidney Myer Performance building. Where the Bates Smart-designed facilities proudly expressed the portal structure externally, Cox strategically contained the framing within. To some extent, it sits in counterpoint to many other Cox projects that heroically express the structure externally, but there were good functional reasons for not doing that here. The beams and columns are also used to support added trusses and circus apparatus for performance and rehearsal configurations. Importantly, the space can be partitioned into quarters to enable four simultaneous acts to take place in conjunction with aerial acts.

The portal frame spans a seven metre grid to allow maximum space for performers to move without crossover. It also incorporates a double truss system to allow access to all aspects of the roof. Steel catwalks span beneath the five trusses, with one across the centre and one at the south-west corner. These incorporate structural steel mesh traversable floors that withstand loads of attached apparatus.

Arup, the project's structural and civil engineer, devised an inverted box section for the truss system. According to John Hayball, this enables rigging off the top chord of the truss, with free clearance so that both top and bottom members can be loaded.

The new space also provides optimum conditions for performers and performances. Its concrete floor is hydronically heated to maintain a moderate temperature for the performers, who need to keep their muscles warm. It's a marked improvement from the timber floors of the original studio, which was continually carved up for performance requirements, making maintenance difficult. Another advance is the incorporation of a solid louvre blade in the hopper windows, rather than the glazed ones used at the original facilities. These allow 90 per cent blackout for visual projections during performances.

Walking through the new buildings with NICA production operations manager Nick Barclay and architect John Hayball, it was clear the facilities were not only functioning well, but also much loved. School children were training as part of a holiday program and were clearly excited by their activities. "Most people are quite impressed and surprised about how big and modern a facility it is," Barclay says.

Hayball believes the briefing process greatly boosted the building's ultimate success. "When we won the commission, we had the opportunity not just to meet with the project control group, but with staff and riggers," he explains, "so it was a real hands-on briefing, enabling us to fine-tune the facilities for all aspects of circus performance and training."

This building is undoubtedly a fine addition to Swinburne Prahran's steel architecture. Its celebration of steel offers a modern interpretation of the circus tent, while giving NICA a new-found public presence and identity. SP

PROJECT NICA National Circus Centre, Prahran Victoria **CLIENT** Swinburne University of Technology, National Institute of Circus Arts (NICA) **ARCHITECT** Cox Architects and Planners **PROJECT TEAM** Ian Sutter, Patrick Ness, John Hayball, Merran Porjazoski, Andrew Tucker **STRUCTURAL & CIVIL ENGINEER** Arup **STEEL FABRICATOR** John Staff **BUILDER** Mackie **LANDSCAPE ARCHITECTS** Land Design **PRINCIPAL STEEL COMPONENTS** Wall cladding (including internal lining to parapets and roof structures): LYSAGHT SPANDEK HI-TEN® made from COLORBOND® Metallic steel in the colour Facade®, Stramit Longspan made from ZINCALUME® steel; Roofing: LYSAGHT SPANDEK® made from COLORBOND® Metallic steel in the colour Facade®; and LYSAGHT KLIPLOK 700HS® made from COLORBOND® steel in the colour SurfMist®; Structural decking for concrete: LYSAGHT BONDEK®; Wall & ceiling battens: LYSAGHT TOPSPAN®; Roof Purlins: GALVASPAN® steel **AWARDS** Winner, Architectural Steel Design Award, Large Project 2008 **BUILDING SIZE** 2,200m² floor area **COST** $7.5 million



Purpose-fit BlueScope Buildings Azure™ panels made from XLERPLATE® weathered steel adorn PGOB's eastern face and provide crisp detailing and a unique presence

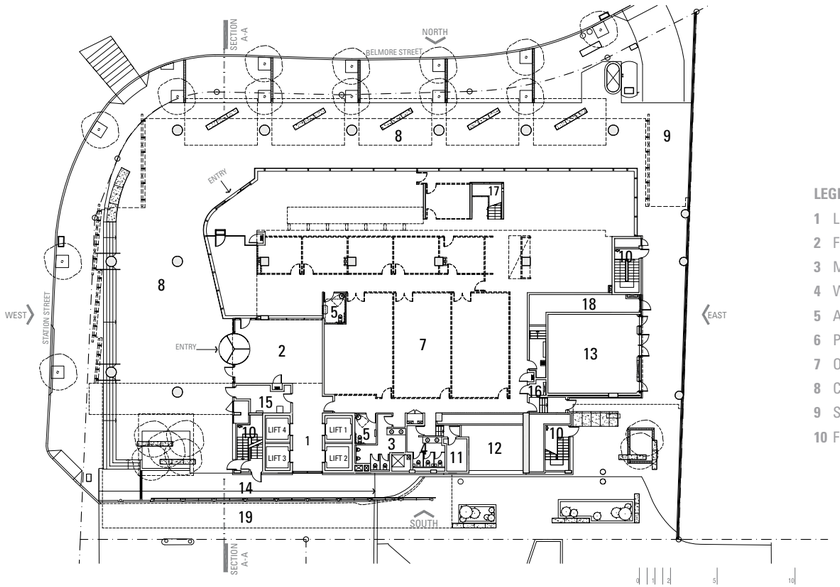
LEADING LIGHT

A new government office building has injected a sense of vitality into Penrith in Sydney's west. The prominent building, with its weathered steel and louvred facade, sits proudly alongside its neighbours in the city's commercial heart, and offers a new vision of sustainable design for the region. Words **Alex Taylor** Photography **Paul Bradshaw**

ARCHITECT Kann Finch Architects
PROJECT Penrith Government Office Building
LOCATION Penrith, New South Wales



The weathered steel's oxidised layer is a protective patina that will last the building's lifetime and is effectively maintenance-free



FLOOR PLAN - GROUND

LEGEND

1 Lift lobby
2 Foyer
3 Men's toilet
4 Women's toilet
5 Access toilet
6 Public area
7 Office
8 Colonnade
9 Service driveway
10 Fire stairs
11 Data
12 Plant
13 Substation
14 Pedestrian ramp
15 Fire control room
16 Cleaner's room
17 Stairs
18 Store room
19 Vehicular entry/exit shared with ATO

The striking new building at the corner of Belmore and Station Streets in Penrith, opposite the railway station and next door to the Australian Tax Office, is the city's tallest structure and it instils a new mood of confidence in the outer-west hub.

The Penrith Government Office Building (PGOB) provides locals with a one-stop-shop to access government services, including the Office of Fair Trading, the Department of Community Services and the Sydney Catchment Authority.

From an aesthetic point of view, the building appears impressive thanks to the integration of a new BlueScope Buildings Facades product, one of the first projects in Sydney to use the innovative technology. The panels are BlueScope Buildings Azure™, which are made from WR350 XLERPLATE® weathered steel and pre-painted GALVABOND® steel, which run the full height of the seven-storey structure, giving it a unique presence in the city. At its pinnacle, an innovative roof terrace provides the building's occupants with a pleasant place to take a break or eat lunch while taking in sweeping district views, under the shade of a weathered steel pergola.

The selection of weathered steel for the facades and roof terrace was a deliberate attempt by Kann Finch Architects, led by design director Bob Nation, to create a new focal point and sense of place in the commercial hub of Penrith.

"We wanted to recognise Penrith as a place where, in a sense, the country and the city meet," says project director Trevor De Waal. "The use of weathered steel as a featured material in concert with other contemporary treatments reflects a modern city in a rural backdrop."

The architects also aimed to take advantage of the local climatic conditions and the site's prime location, to set a new benchmark for green design in Sydney's outer west.

The building's Ecologically Sustainable Development (ESD) features include operable louvres to the eastern and western facades; extended floor plates that shade the level below; and proprietary-technology anodised aluminium screen blades on the northern facade to provide sunshade.

All of the materials, and particularly the weathered steel, were chosen for their longevity, to meet the client's demands for a building that would last a minimum of 15 years and require little maintenance over that time.

The BlueScope Buildings Facades' system's absence of sealant-filled joints provided crisp and articulate detailing

"The longevity of weathered steel is many years, well into the 20-30 year plus range," De Waal says.

"And provided that it's installed correctly, the product will last the lifetime of the building. Also, weathered steel is effectively maintenance free, so while the panels made from pre-painted GALVABOND® steel might need a wash down, the whole building has been designed to provide reasonable access for maintenance. The panels and glass can be cleaned from the extended floor plates."

With Kann Finch undertaking the interior fit-outs for all of the government agency tenants, the same ESD principles were applied inside. "We also provided sun penetration control on the east and west facades via a series of louvres that are individually operated on each floor, and excellent common spaces for workplace interaction," De Waal adds.

"These include the superb roof-top terrace that frames the broad view via the timber and weathered steel pergola."

Bob Nation had used weathered steel in previous projects such as the Sidney Myer Asia Centre at The University of Melbourne. "We did a lot of research and through that process we contacted BlueScope Buildings Facades," De Waal explains. "Although there were some concerns about using weathered steel in the facade, we came to the same conclusion through a number of routes: that provided it was pre-weathered and treated properly in its detailing, the product would be fit-for-purpose."

To that end, Nation proposed a 'rain screen' facade system which, according to De Waal, is not common in Australia but has been widely adopted throughout Europe and the United States over many years. "The panelised facade is not a water-tight skin," he explains. "The first layer is a backup wall made of concrete block within a concrete frame, which is waterproof, then the panelised system sits like a screen in front of that. The assembly enables the wall to 'breathe' behind the panels, which are open at the top and bottom.

"The 'rain screen' facade system offered the best outcome in relation to our desire to use weathered steel as a featured material, and the need to generate a facade that was well detailed and articulated," De Waal says. "The BlueScope Buildings Facade system provided the best fit for the facade performance criteria, which included longevity, crisp detailing, a prefinished surface and value for money.

"It also allowed for a crisp expression of the panels which was possible because of the absence of sealant-filled joints.

"The idea that you can be supported by good facade engineers who effectively operate a one-stop-shop, and achieve that level of crispness in detailing, makes the BlueScope Buildings Facades product an attractive proposition," he adds. SP



ABOVE: BlueScope Buildings Azure™ pre-painted GALVABOND® steel panels run the full height of the seven-storey structure

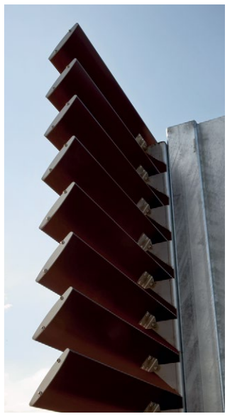
BELOW AND BELOW RIGHT: Louvres individually operable by floor provide sun penetration control



The BlueScope Buildings Azure™ panels provide fine detailing



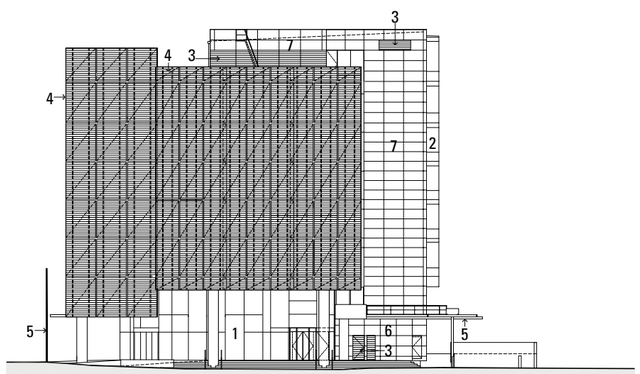
A roof terrace with sweeping district views is shaded by a weathered steel pergola



PANEL SAYS

This is one of the first applications of the new BlueScope Buildings Facade system that we have seen. The BlueScope Buildings Azure™ panels provide strong colouration and a graphic quality to the facade.

The WR350 XLERPLATE® weathered steel panels in particular give the building a presence that would be hard to accomplish with other cladding products, and the panelised system is beautifully integrated with the overall design.



BUILDING ELEVATION - WEST

LEGEND

1 Glazing
2 Unitised curtain wall glazing system with IGU's
3 Round windows or aluminium louvres
4 Motorised operable aluminium louvres
5 Flagpoles
6 Stone panels
7 Aluminium panels

PROJECT Penrith Government Office Building **CLIENT** NSW Department of Commerce and State Property Authority **ARCHITECT** Kann Finch Architects **PROJECT TEAM** Bob Nation, Trevor De Waal, Michael Gaston, Liljana Ermilova, Bethan Gregory, David Drover **STRUCTURAL & FACADE ENGINEER** Meinhardt **STEEL FABRICATOR** Cullen Steel Fabrication **CLADDING CONTRACTOR** BlueScope Buildings Facades **BUILDER** Richard Crookes Constructions **LANDSCAPE ARCHITECTS** EDAW **PRINCIPAL STEEL COMPONENTS** Wall cladding: Bluescope Buildings Azure™ facade system made with AS/NZS 3678 – WR350 XLERPLATE® weathered steel; Bluescope Buildings Azure™ facade system using pre-painted panels made from GALVABOND® steel **BUILDING SIZE** 8400m² **COST** $46 million

SPRING CLEAN

Guided by a simple philosophy about the role of, and respect for, water, Cox Architects and Planners has revived Victoria's Hepburn Springs Bathhouse.

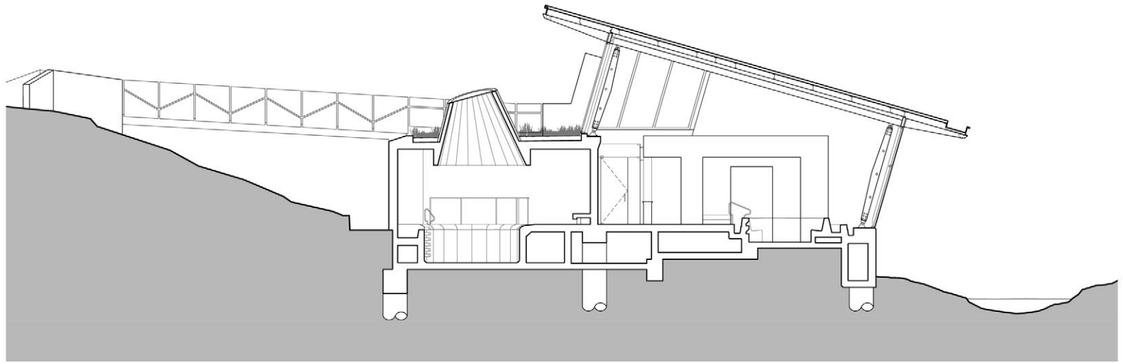
Words **Peter Hyatt** Photography **Derek Swalwell; Peter Hyatt**

ARCHITECT Cox Architects and Planners
PROJECT Hepburn Springs Bathhouse Redevelopment
LOCATION Hepburn Springs, Victoria



The Bathhouse roof is supported by fine steel roof beams, which in turn attach to steel-reinforced columns

Steel fins form the skeleton of recycled ironbark glazing frames. Insulated from external elements, these are further protected from chlorine and mineral water with a MIO finish



VALLEY CROSS SECTION

That hotbed of hydrotherapy, Hepburn Springs, has undergone a renaissance in recent times. Tourism has acted as a stimulus to oxygenate and revive the tired spa and bathhouses that, until recently, occupied pride of place.

Just 110 kilometres north-west of Melbourne, near Daylesford in Victoria's historic mineral springs district, the springs have been born again with some fine design by Cox Architects and Planners. Recognising the need for frisson, rather than fission, the practice has created a facility grounded in practicality and lofted with environmental aspiration.

Guided by a simple philosophy about the role of and respect for water, the practice evolved a distinctly pared result that strips away all artifice. Its high performance materials provide a highly legible elegance, while steel and glass wrap the package in a way that is sustainably sharp rather than hair-shirt woolly.

Inclined glazing and an inclined roof made from COLORBOND® Metallic steel are key components in subtly realising Hepburn Spa's sublime environmental circumstances. Peter Hyatt spoke with project architect Marc Raszewski of Cox Architects and Planners in Melbourne about the role of design in better realising the region's fabled therapeutic waters:

How long did it take to arrive at such a distilled result?
It took around five to six attempts to reach this final iteration. The project had a long gestation of almost six years from commission to opening.

Was it difficult to let go of the design at each point, when you felt as if you had already arrived at the answer?

In many ways the design continued to be refined and resulted in a more appropriate solution. We felt gutted quite a few times. We were sure we had it, but on each occasion we realised some part could be improved.

How mindful were you of the opportunity to deliver a truly 'green' building?

The entire basis of the project is about sustainability. We began with the idea of remaking a direct connection between the water, the land and those that inhabit it. Thus the building had to be part of that system. By definition, spas require high-energy input. It's a building type that inherently uses a lot of resources and energy to heat the water, and it uses the water itself.

The big issue for the local community, which has been on water restriction due to the drought, was to ensure that it wasn't just a case of visitors coming up from Melbourne and using all of their water. The whole premise for the development was no increase in water usage.

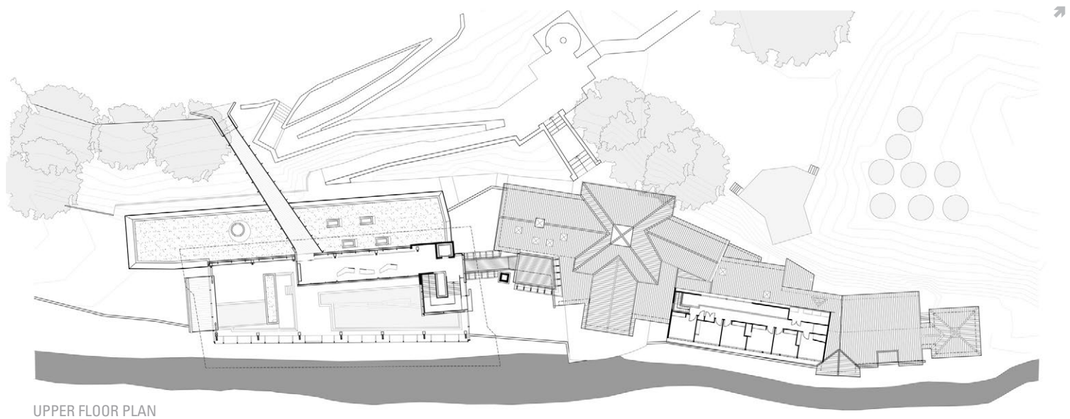
What was the brief for the new building?

The brief looked simply at the number of pools and therapy rooms. We came up with the idea of a landform building in which the pools were 'cut' from the site itself, and the notion of the bathing pavilion. We managed to maintain the strong community aspect to the bath-house. It's not designed as a private club or hotel-style spa resort. What's here is a natural resource that only occurs in this location and that everyone has access to.

What were the major design constraints?

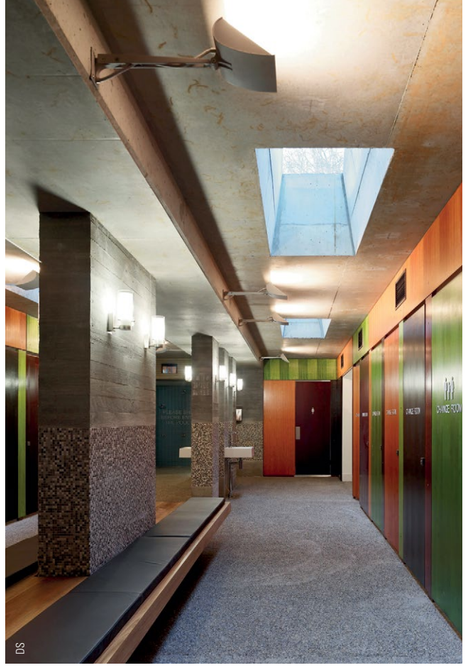
The whole of Daylesford's plumbing runs down the side of our site. The creek on the other side has a boundary we could work to, and we sought advice

Steel was really instrumental in creating the appropriate lightness in the roof and this allowed it to 'float' and fit in with the spirit of the design



UPPER FLOOR PLAN





ABOVE LEFT AND RIGHT: The salt pool and change rooms are top-lit via light chimneys

from the Department of Sustainability. There were flood levels we had to pay regard to and we had to watch that we didn't uncap any springs while we were setting the foundations. The design was really about lifting the plane rather than excavating and possibly damaging the aquifers.

There are some convincing applications of steel that go a long way towards 'slenderising' the package and avoiding the ponderous.

As the design focused on the water, it was important to minimise and refine the structure, to lighten it as far as possible. There's a lot of steel used in the lightest way possible. It has the lightest of roofs that works with the very fine roof beams, and these in turn attach to the recycled ironbark columns.

The roof personifies with a 'cocked hat', friendly disposition that presents such a sunny face on the east elevation.

The roof pitch follows the topography. We wanted to minimise the impact of a new object on such a beautiful site. We've done a lot of steel buildings and so we are pretty experienced at getting these sorts of buildings right. The structure behind the thermal break is all steel so that you get that tremendous lightness. We placed 150mm x 10mm steel fins along the glazed facades to provide strength. They're sandwiched between relatively fine ironbark glazing frames, so the steel never actually makes contact with the outside. A stable 29-degree internal temperature sees the steel protected from the corrosive effects of condensation. The steel is protected with an MIO finish, similar to that used on bridges and the Melbourne Cricket Ground Northern Stand.

How was steel able to contribute to the result?

Steel was really instrumental in creating the appropriate lightness in the roof and this allowed it to 'float' and fit in with the spirit of the design.

Could the building have been realised using materials other than steel?

Steel was vital in achieving the structural slenderness and lightness. Condensation and energy efficiency concerns necessitated a built-up roof with high thermal values.

An alternative timber solution for the primary span could not have been achieved in a single solid section and would have required a composite product – with the associated risks of de-lamination and instability in the aggressive chlorine and mineral water environment. In this design the use of timber, as either a truss or laminated member, would have required a greater beam depth, undermining the design concept of the light floating canopy. The slenderness of the structure adds to the legibility of the building as a modern addition to the bath-house complex.

What is the project's best attribute?

The variety of the crafted spaces and the intimate levels of engagement with the mineral water, the landscape setting and the site's continuation of historic traditions.

Why did you specify COLORBOND® Metallic steel for the roof?

The roof wasn't a case of using the cheapest available material. We specified LYSAGHT SPANDEK® made from COLORBOND® Metallic steel because it was quite cost-effective. When you see it from above, you recognise the number of different colours used – Facade®, Axis® and Conservatory®. We wanted to minimise the scale of the roof and allow for a semi-camouflaged nature when viewed through the tree canopies from above. It probably resembles the dazzle paint used on battleships – and the result is that it visually breaks up that whole, quite vast, roof surface.

Your use of grain and careful details is really integral to the result.

Detail and grain are of paramount importance. You are in contact with the detail here and have the time to experience the grain as part of the relaxation process. What looks minimal at first glance slowly reveals depth of detail. There are many of those details. The eaves, for instance, are all in steel to achieve that sharp edge along the perimeter. There's just one downpipe that's structural and it runs directly from one corner. Here, steel is working both in uplift and compression.

We also used steel for the sun-shades on the link between the old and new. The idea was to make it a fine, delicate connection and to see it almost dissolve. It's a very fine structure that references Edwardian-era eaves, but done here in steel. A similar approach was taken with the access footbridge that uses unfinished 3mm folded XLERPLATE® and stainless steel mesh. There is no attempt or desire to cover up or use applied finishes, so the component parts that provide the formal expression are celebrated.

The result has to embody tranquillity and calm. Is that how the design process unfolded? Was it all tranquility, or were there moments of panic?

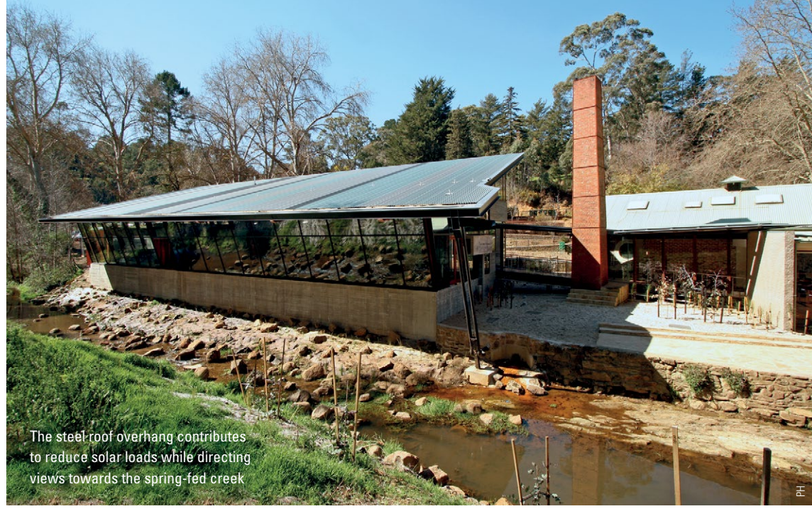
The client, the operator and our own people really did meet in a spirit that was unique and special. We began with a strong philosophy about the water, the site and its history. We had a clear idea and a set of principles evolved with our client and were maintained throughout.

To what extent were you informed by the need to satisfy the desire for creature comforts, the hedonistic aspects if you like, that dictate so much modern architecture?

The true quality here is in the nothingness. The pure and direct connection that can be made between the person, the water and the environment. To have embroidered would have been to disrupt this simplicity. Hedonism and the architecture that supports it can prevent us from achieving this simplicity. In a world full of clutter, luxury can also be about sparseness. We didn't have a huge budget and so it was never going to be a case of marbled columns and gold-plated taps. SP



Marc Raszewski



The steel roof overhang contributes to reduce solar loads while directing views towards the spring-fed creek



The Bathhouse's roof pitch follows the topography to harmonise with the site, its slender and light LYSAGHT SPANDEK® roof made from COLORBOND® Metallic steel achieving a sharp perimeter edge

PANEL SAYS

The new bathhouse at Hepburn Springs boasts a serene materiality with its combination of steel framing and roof, timber detailing and concrete structure. The steel appears to be turned on its side, which results in a clearly expressed section. The choice of materials imparts a degree of clarity to the whole which is pleasing to the eye. The combination of solid base and lighter upper section – which opens to the sky – creates a calming and cocooning environment for the spa activities that take place there.

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PROJECT Hepburn Springs Bathhouse Redevelopment, Hepburn Springs, Victoria **ARCHITECT** Cox Architects and Planners **PROJECT TEAM** Patrick Ness, Marc Raszewski, Andrew Hayes, Brian Renehan, Amanda Moore **STRUCTURAL ENGINEER** Arup **BUILDER** A.W. Nicholson **STEEL FABRICATOR** SJ &TA Structural **STEEL DETAILING** JBD Steel **LANDSCAPE ARCHITECT** Land Design Partnership **PRINCIPAL STEEL COMPONENTS** Exposed steel roof beams and purlins; unfinished 3mm folded plate XLERPLATE® steel cladding to entry bridge; steel eave facias and folded plate sun shades; steel fin facade support; stainless steel tension rod support to Heritage-listed relaxation room; roofing – LYSAGHT SPANDEK® made from COLORBOND® Metallic steel in the colours Facade®, Axis® and Conservatory® **BUILDING SIZE** 1750m² **COST** $10.6 million

PERFORMING ART

35

Melbourne practice Ashton Raggatt McDougall (ARM) is interested in history, culture and nuances, and other ideas that are far more abstract. ARM's commission to design the adjacent Melbourne Theatre Company Theatre and Melbourne Recital Centre was a dream and, not surprisingly, the result is rich.

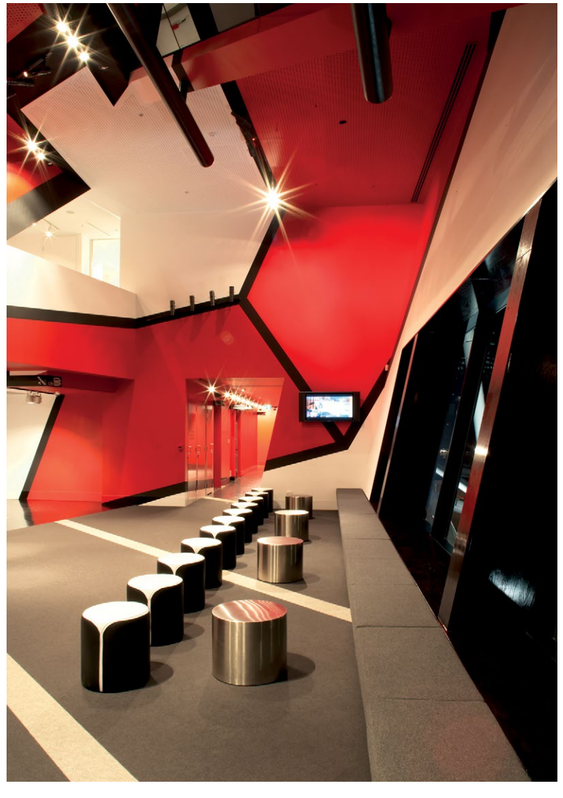
Words **Anna Johnson** Photography **Paul Bradshaw**

ARCHITECT Ashton Raggatt McDougall (ARM)
PROJECT Melbourne Recital Centre and Melbourne Theatre Company Theatre
LOCATION Melbourne, Victoria









THIS PAGE: The MTC is a complex building comprised of difficult-to-determine shapes. Its illusionistic and perspectival qualities are expressive of the theatrical activities within

OPPOSITE: The MTC's steel pipework facade challenges spatial perception by shifting from two- to three-dimensions

The dedicated abode that ARM has designed for the long-established Melbourne Theatre Company (MTC) and the new home it has created for chamber music in the Melbourne Recital Centre (MRC) are complex and inventive, offering a vibrant street condition. The architects began with a strong desire to extend the arts precinct and expand its material themes, providing new legibility for existing materials – such as the pipework of the Melbourne Arts Centre spire and the bluestone of the National Gallery of Victoria – and sought to suggest alternative ways of understanding them.

ARM's (modestly) stated desire was to make a "decent bit of Melbourne street with two buildings that had a strong promenade experience". To this end, it has reimagined an entire block. The two buildings, side-by-side on Southbank Boulevard, each occupying their own corner, with the MTC flanked by Dodds Street and the MRC continuing on Sturt Street.

ARM describes this realignment of the Boulevard as providing "a rich but ordinary street feel, with the two separate programs remaining identifiable as two collaborative yet distinct personalities." In other words, a set of non-identical Siamese twins.

Although ARM's buildings are always structurally inventive and highly precise, structure and materiality alone are not issues that interest the firm. As director Howard Raggatt says: "We have always been overtly disinterested in that tradition of structure, and whilst some of our buildings are quite complex and difficult structurally, it hasn't been our interest to turn them into some kind of engineering object."

Nevertheless, in the MRC and MTC we indeed find a lot of structure – in fact 1200 tonnes of steel with over 14,000 individual members. The steel elements in the MTC Theatre alone include the dominant white 219mm-diameter pipework, lightweight metal cladding supported by a steel stud and structural steel system, and the lightweight metal-clad roof.

Both buildings are roofed with LYSAGHT KLIPLOK® 700 made from COLORBOND® steel in the colour Night Sky®*.

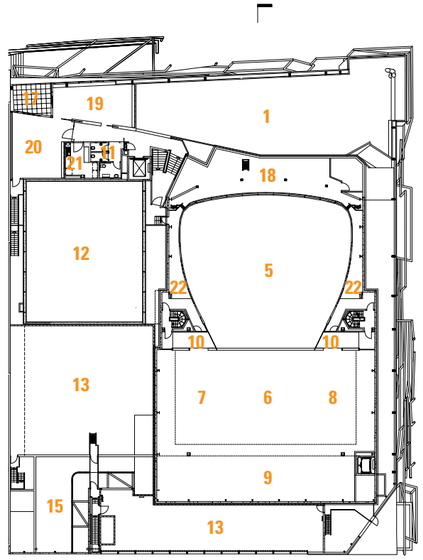
Inclined at a 14-degree angle, the MTC's facade frame also supports the upper floor levels. The fly tower is an all-steel structure clad in concrete panels for sound-proofing. The sheer size and quantity of the MTC's steel elements meant they needed to be manufactured in the street and erected in one piece.

And so, while the pipework is an intentional reference to Melbourne's love affair with expressive piping – as seen most overtly in the Rod Laver Arena – the MTC's piping doesn't aim for a synergy of engineering and architecture.

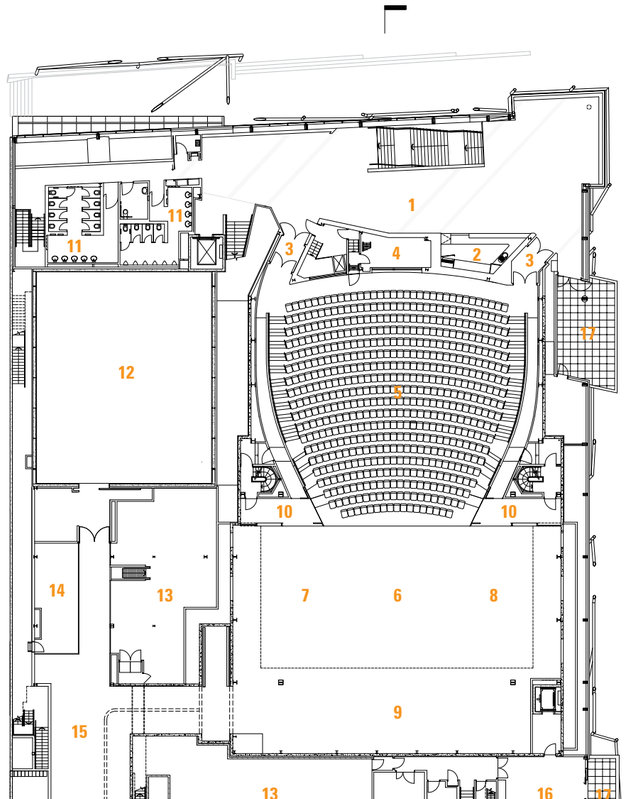
Instead, as Raggatt explains: "There is a lot more interest in the freedom of that steelwork to convey ideas, rather than always being subject to the necessities of structure. The facade system, composed of iridescent painted steel pipework that is mounted proud of black aluminium cladding, is almost entirely a visual decorative element. The pipework is expressive of the illusionistic, the perspectival, in relationship to the theatre and the activities within. Challenging spatial perceptions, the facade pipework shifts from two to three dimensions, from real to illusion."

During the day, the pipework facade evokes an almost tacky, 'lights-on-in-the nightclub' feel, but at night, when patrons arrive for a performance, it is transformed, taking on a flickering, joyous character.

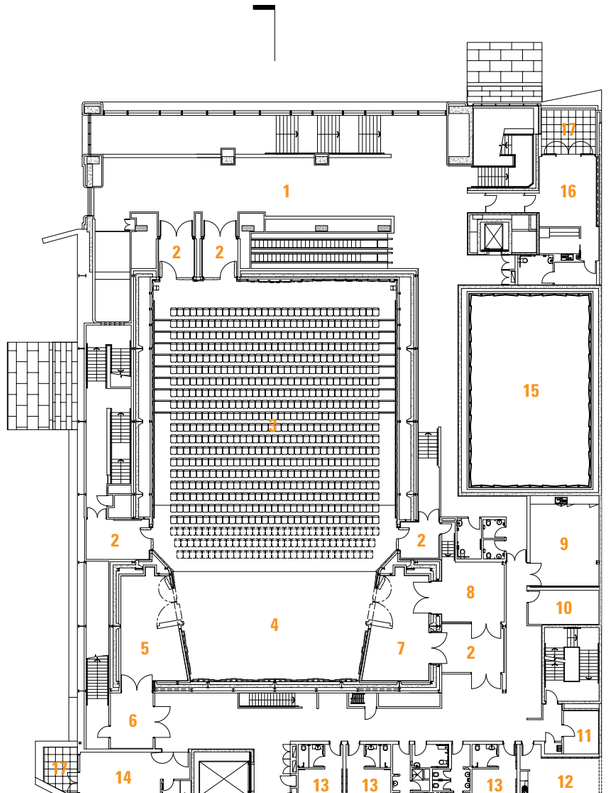
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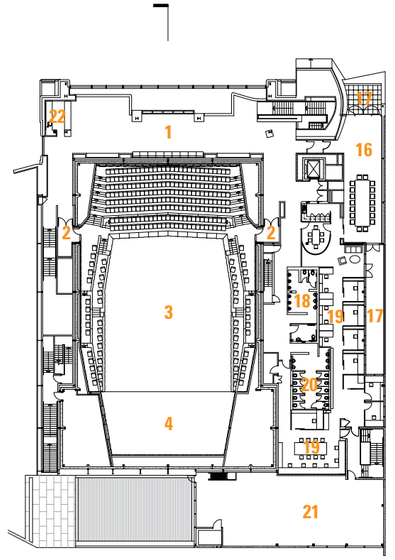
LEVEL 2 (MTC)



LEVEL 1 (MTC)



LEVEL 1 (MRC)



LEVEL 2 (MRC)

LEGEND

1 Foyer
2 Bar
3 Soundblock
4 Control room
5 Auditorium
6 Stage
7 Prompt wing
8 OP wing
9 Rear stage
10 Juliet Balcony
11 Amenities
12 Rehearsal room
13 Plant
14 Store
15 Loading
16 Green room
17 Balcony
18 Follow spot
19 VIP room
20 Sponsor's room
21 Kitchen
22 Catwalk

LEGEND

1 Foyer
2 Soundblock
3 Auditorium
4 Stage
5 Assembly wing
6 Instrument store
7 OP wing
8 Piano store
9 Choir room
10 Crew room
11 Visiting manager's office
12 Band room
13 Soloist room
14 Conductor's room
15 Salon
16 VIP room
17 Balcony
18 Male ammenity
19 Office
20 Female ammenity
21 Plant
22 Bar

PANEL SAYS

These two projects – sitting side-by-side on Southbank Boulevard – generated a love/hate response from us, perhaps indicative of how the public might react to them?

The geometry of the white boxes on the MTC Theatre facade makes the flat surface appear three-dimensional. What reads on first glance as neon tubes is actually a steel framing that is eye-catching from the street. The optical illusion is enhanced by the fact that it's difficult to read the form underneath, resulting in structure that changes shape depending on view point.

In contrast, the 'bubble' facade of the MRC invites passersby to observe the activities within. Both buildings embody ARM's ability to elevate the ordinary – in this case the large volumes of theatres and concert halls – into immediately identifiable and intriguing forms.

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Raggatt says the client wanted a "pretty rattly" building that did what it had to. "Theatre buildings are notoriously lumpy – things have to go exactly where they have to go," he says. "There's not much room for a whole lot of architectural affectation in a modestly budgeted building."

In ARM's hands, even such a straightforward approach was likely to result in a complex building, one that is almost difficult to visualise, where it is difficult to determine its actual shape. The architects refer to this as "designing in the dark", an idea to produce an architecture that is non-formal, almost non-compositional.

The Melbourne Recital Centre is a studied contrast. The clients' conception of the space and its operation was driven by music – the very nature of sound – and its history. While the MTC Theatre was conceived as "a direct, non-glitzy, knockabout-on-the-street kind of building", according to Raggatt, the MRC's design strategy was driven by ideas of the precious – how music and its history could be contained and protected.

The MRC's main auditorium, a large concrete box loaded onto 38 banks of eight massive springs, is isolated from the ground, and therefore from any structural-born noise. Surrounding this is a separate steel-framed structure. The two are not connected, so the exterior becomes a protective armature for the auditorium.

ARM's interest in packaging – the relationship between what is contained and the container – is evident in the polystyrene aesthetic of the facade and street-level promenade.

"It's a fairly grand scale for a piece of polystyrene!" Raggatt admits. "It's certainly meant to transcend that humble origin, but we did explore some of the manners, or style, that emerges from that kind of technology. It gives us a figuration that conveys a kind of precision. Polystyrene is very engineered and not designed for aesthetic purposes. Rather, it's about a fit-for-purpose attitude and we quite liked that as an aesthetic approach – rather than launching into some sort of typically angular or contemporary manner."

As is characteristic of ARM's work, the final building – rich with other subtle and some more direct architectural references – also opens up to other readings. In the grotto-like space of the MRC's polystyrene promenade, the famous stone passageway of Antonio Gaudi's Parc Guell in Barcelona seems not so distant.

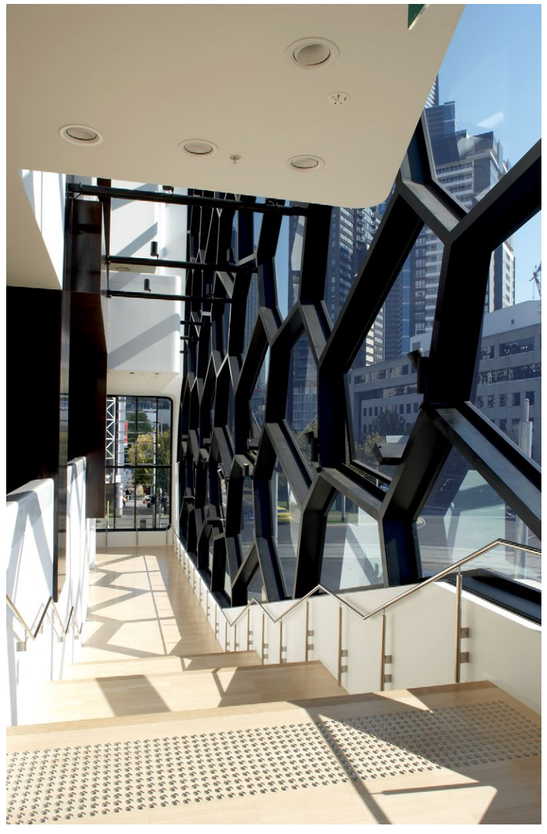
The steel work on the MRC's northern facade has perhaps the most interesting application of steel. The 28-metre-high elevation features a dramatic window wall segmented into 3.5-metre panes. To be structurally robust, the window wall was constructed from a steel ladder frame system and is therefore structural as well as being a glazing system.

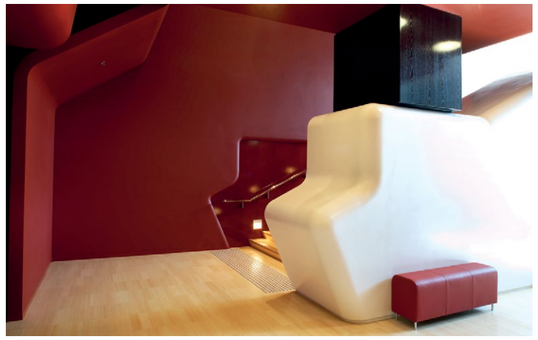
BELOW: The MRC's acoustically neutral main auditorium is isolated from ground-born structural noise by massive banks of springs and encased in a separate steel-framed structure

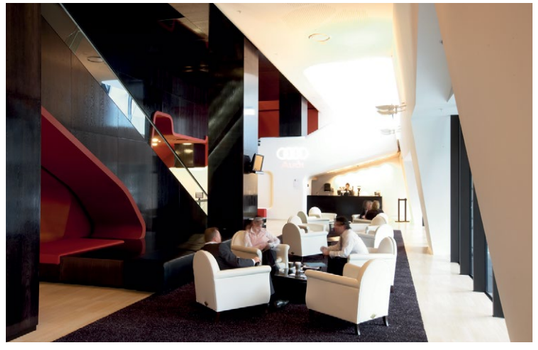




ABOVE: The two buildings – sitting side-by-side and each occupying its own corner of Southbank Boulevard– reimagine an entire block by using known materials to convey new ideas







LEFT: The MRC features a dramatic 'bubble' window wall that is segmented by steel members into 3.5-metre hexagonal panes. The steel frame system is structural as well as forming a glazing system

TOP AND ABOVE: Barcelona's famous Parc Guell stone passageway seems not so distant in the grotto-like space of the MRC's promenade

Because it was a one-off and required particular integration with structural engineering, the entire wall was prototyped before being constructed to ensure design integrity.

With its characteristic non-uniform hexagonal frame, the glazing becomes a kind of bubble-wrap that extends the ideas of protection and packaging. The size and weight of these steel members – more than 80 tonnes of 80mm x 200mm structural boxed sections – required that the elevation be manufactured off-site in a number of 'ladders' which were brought to site and constructed piece by piece.

This wall also acts as a thermal chimney. Six operable windows at Level One and a further four windows at Level Four open automatically to expel air when the building reaches a pre-set temperature.

The bubble window's encasement – the polystyrene element that wraps around the glass and forms the promenade – is cast Glass-fibre Reinforced Concrete (GRC) mounted on steel panels.

The size of these panels required them to have their own steel frame bracing system. The stiffening steel frame that was cast into them was in turn used to connect them to the building's structural steel sub-frame.

This precisely made and modelled, relatively lightweight, precast system enabled ARM to achieve fine-grained surface patterning.

The MRC's western facade is different again, with its bluestone treatment directly referencing Roy Grounds' nearby big bluestone container: the National Gallery of Victoria. Marking this surface are soft folds and lines that resolve in a bronze aluminium-clad rotated expression. Here, the architects drew on their interest in operative geometry – a reference perhaps to Minifie Nixon's adjacent Centre for Ideas building with its shiny aluminium Voronoi-patterned surface treatment. As Raggatt states: "It's not so much the fold, as the operation of the fold, that interested us".

Precision was a pre-eminent issue for the clients of both the MTC and the MRC. For the MRC, the auditorium's acoustics had to be as close as possible to so-called perfect "non-adjusted natural acoustics". The final acoustic result is so accomplished that some performers are reportedly nervous playing in the hall because it is aurally so transparent and revealing.

ARM's skill and established working knowledge of advanced digital technologies and modelling were paramount in meeting the client's precise acoustical requirements. Programs such as *RHINO* and *Odeon* were used to test volumes and the manner in which sound moves around spaces.

Engineers and contractors are central to ARM's design process. For the steel structure of both buildings, ARM worked directly with engineers to virtually test all connections and structures through computer-generated 3D modelling and 3D shop-fitting. "Nearly all of our consultants work in 3D," Raggatt says. "If they don't, we tend not to work with them because we want things modelled as we go along."

Ironically, in view of ARM's direct engagement with manufacturers and its hands-on production of the building, these architects, known as digital masters, are more than a little bit 'arty-crafty.'

The resulting steelwork is precisely tailored for its structural requirements, and the buildings assemble together fantastically well. The steel plays an integral role in realising the architects' vision of expanding Melbourne's arts precinct by using known materials to convey new ideas.

Actively conversing with their architectural counterparts, the MRC and MTC Theatre projects' unusual and complex forms serve as new icons that contribute further character and nuance to an already richly cultured city. SP

** Night Sky® is no longer part of the standard COLORBOND® steel colour range. Please talk to your nearest BlueScope Steel office regarding availability of non-standard colours for future projects.*



The bubble window's encasement is Glass-fibre Reinforced Concrete (GRC) mounted on steel panels that required their own cast steel frame bracing system. The lightweight system helped achieve the GRC's geometric surface patterning



PROJECT Melbourne Recital Centre and Melbourne Theatre Company Theatre project, Southbank Boulevard, Melbourne **CLIENT** MRC: Arts Victoria, Melbourne Recital Centre. MTC Theatre: The University of Melbourne and Melbourne Theatre Company. The project was delivered by Major Projects Victoria on behalf of the clients for the State Government of Victoria **ARCHITECT** Ashton Raggatt McDougall Architects **PROJECT TEAM** Ian Mcdougall, Howard Raggatt, Neil Masterton, Andrew Lilleyman, Peter Bickle, Stephen Ashton, Paul Buckley, Jonathan Cowle, Stephen Davies, Doug Dickson, Jessica Jen, Ray Marshall, Antony McPhee, Rhonda Mitchell, Will Pritchard, Simon Shiel, Ivan Turcinov, Andrea Wilson **STRUCTURAL & CIVIL ENGINEER** Bonacci Group **BUILDER** Bovis Lend Lease **STEEL FABRICATOR** Alfasi Design and Drafting **CLADDING CONTRACTOR** Asurco Contracting **LANDSCAPE ARCHITECTS** Rush/Wright **INTERPRETIVE DESIGN AND CONTENT** Interpretive Solutions **PRINCIPAL STEEL PRODUCTS** Both buildings are roofed with LYSAGHT KLIPLOK® 700 made from COLORBOND® steel in the colour Night Sky®* **AWARDS** 2009 Dulux Colour Awards Grand Prix and Commercial Interior categories **BUILDING SIZE** MTC: 4500m²; MRC: 5000 m² **COST** $128 million (both)

TAKING FLIGHT

The form of the Hinkler Hall of Aviation in Bundaberg unmistakeably takes its cues from aeronautical engineering, especially the bi-plane that Bert Hinkler flew from London to Darwin in 1928, while the facade treatment subtly references the local landscape of the pioneer aviator's birthplace. Photography **Nathan Hildebrandt**

Paul Sekava, associate at Fulton Trotter Architects in Brisbane, says that when you fly over Bundaberg you see the patchwork appearance of farmland. It was from this image that his firm drew its inspiration for the innovative cladding system that adorns the Hinkler Hall of Aviation.

"We used an abstracted version of the aerial perspective to suit the building's appearance. The shape of the COLORBOND® steel sheets on the entry wall, with its diagonal edges, evokes the feeling of speed," Sekava says.

The wall features randomly placed Stramit Corrugated panels made from COLORBOND® Metallic steel in the colours Citi®, Conservatory®, Cortex®, Facade® and Skybridge®.

"Although in the standard COLORBOND® steel range there is more variety of colour, and while some of those shades are closer to the actual landscape colours, we decided to use the COLORBOND® Metallic steel range because you get slight variations in different light and the colour change is more subtle.

"We didn't want to end up with a checkerboard effect. If we'd used the standard range, the wall would have looked more literal, but we wanted an abstraction of the landscape idea."

The effect of overlapping steel sheets wasn't easy to translate from paper to built form, and involved several challenges, Sekava says.

"Fundamental issues were how to get reasonably watertight cladding, achieve variation in the colours, and not solely conform to the structural grid.

"We worked out with the builder that if we put down the first base sheet, that would provide waterproof cladding by running full-length sheets from grid to grid, varying the colour vertically, with the second colour overlaying directly onto the first sheet," the architect explains.

"We then added a third layer – in what we called the 'cloud' sheets – to achieve the three-dimensional effect.

"It went together quite quickly, although we had to innovate to get very neat diagonal edges on the sheets. Also, in some cases the sheet edges don't coincide with the stud behind, so where necessary, we riveted the second sheet against the first sheet."

The eye-catching final result is a testament to the considerable efforts of many individuals who, like Bert Hinkler, endeavoured to pioneer new techniques and push known boundaries. SP

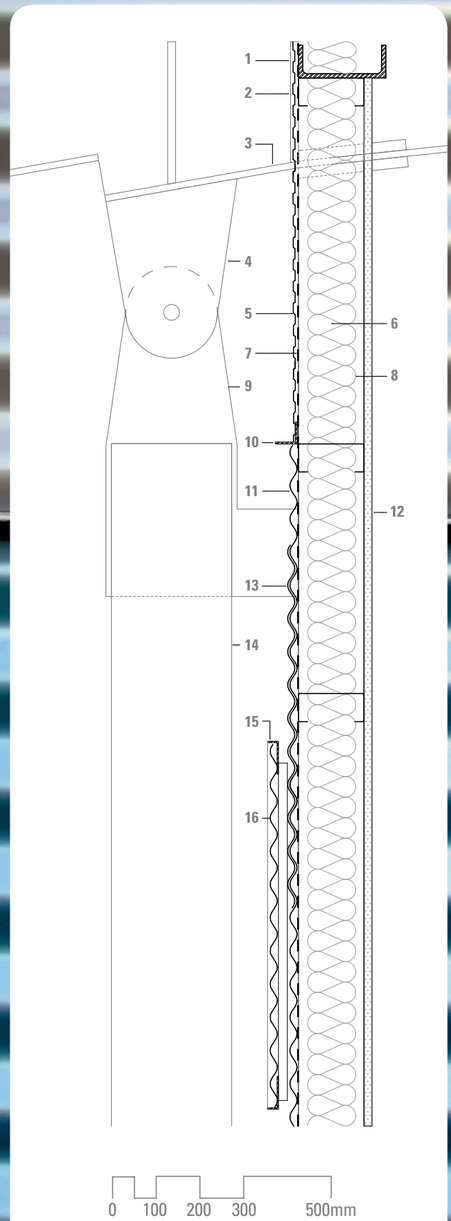


The effect of overlapping steel sheets wasn't easy to translate from paper to built form, and involved several challenges

PROJECT Hinkler Hall of Aviation **CLIENT** Bundaberg Regional Council **ARCHITECT** Fulton Trotter Architects **PROJECT TEAM** Paul Sekava, Paul Trotter, Nathan Hildebrandt, Wendy Hay, Frank Moss, Louisa McCoy, Cherissa McCaughey **STRUCTURAL & CIVIL ENGINEER** GHD (formerly Leddy Sergiacomi Engineers) **BUILDER** Jeff Lennox Builder **STEEL FABRICATOR** Caneland Engineering **CLADDING CONTRACTOR** Jeff Lennox Builder **LANDSCAPE ARCHITECTS** Fulton Trotter Architects / Bundaberg Regional Council **INTERPRETIVE DESIGN AND CONTENT** Interpretive Solutions **PRINCIPAL STEEL PRODUCTS** Roof: Stramit Monoclad made from ZINCALUME® steel; Walls: Stramit Corrugated made from COLORBOND® Metallic steel in the colours Citi®, Conservatory®, Cortex®, Facade® and Skybridge®; Structural steel from BlueScope Steel **BUILDING SIZE** 1100m² GFA **COST** $4.8 million

HINKLER HALL OF AVIATION CLADDING DETAILS

1. 200 PFC
2. 16mm steel plate stiffener
3. 460UB75 & 360UB57 rafter finish painted with Dulux Quantum FX
4. 2x20mm steel plate cleats finish painted with Dulux Quantum FX
5. Metal Wall Sheeting using Stramit Corrugated made from COLORBOND® Metallic steel in the colour Facade®
6. Rondo lipped C150x1.15 BMT stud
7. Vapour barrier
8. 75mm Bradford Glasswool Partition Batts @ 11kg/m³
9. 25mm steel plate cleat slotted into column finish painted with Dulux Quantum FX
10. 50x50x3mm aluminium EA powdercoat finish
11. Metal Wall Sheeting (MWS): Layer 1 screw-fixed to studs using Stramit Corrugated made from COLORBOND® Metallic steel in the colour Skybridge®
12. 13mm Plasterboard with a perforated finish painted black
13. MWS: Layer 2 screw-fixed directly through MWS Layer 2 using Stramit Corrugated made from COLORBOND® Metallic steel in the colour Cortex®
14. 273x9mm CHS column finish painted with Dulux Quantum FX
15. 75x25x3mm aluminium EA pop-riveted to full perimeter of MWS layer 3 powdercoat finish
16. MWS: Layer 3 pop-riveted fixed to 20mm top hat sections; 20mm top hat sections pop-riveted fixed to ridges of MWS 1 & 2 using Stramit Corrugated made from COLORBOND® Metallic steel in the colour Citi®. Pop rivets and Class 3 cladding fixings colour matched to adjacent COLORBOND® Metallic steel cladding





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