

AUSTRALIAN NATIONAL

CONSTRUCTION

MAJOR PROJECT REVIEW

LENLEASE ENGINEERING'S
**THE NORTHERN
ROAD UPGRADE
TNR3**
CIVIL MASTERPIECE

ALSO INSIDE :

THE NORTHERN ROAD UPGRADE - TNR3 *Lendlease Engineering* **RSL LIFECARE BIRDWOOD PARK** *Hansen Yuncken* **VIBE HOTEL** *Icon* **SYDNEY COLISEUM THEATRE** *Hansen Yuncken* **DARLING PARK** *Cerno* **MID NORTH COAST CORRECTIONAL CENTRE** *Watpac Limited* **KOI APARTMENTS** *Miramax Projects* **UNI OF WOLLONGONG MOLECULAR HORIZONS** *University of Wollongong* **ARKADIA** *Icon* **STELLAR RYDE** *Alliance Project Group* **HARBORD DIGGERS STAGE 2** *Cerno and Mounties Group* **ESSENCE** *BGC Construction* **REPUBLIC & DUSK** *Geocon* **PRAHRAN SQUARE** *Kane Constructions* **CHADSTONE HOTEL** *Hickory* **GEELONG ARTS CENTRE** *Kane Constructions*

LARGER THAN LIFE

The Sydney Coliseum Theatre is a world class performing arts centre, the biggest cultural development to hit Western Sydney. The building's 2,000 seat proscenium arch theatre will host world famous stage shows, musicals, concerts, ballet and symphony orchestras.

The Sydney Coliseum Theatre is part of the ongoing transformation of the Greater Western Sydney region. Constructed as an extension of West HQ's existing entertainment precinct, the building features a multi mode auditorium along with three foyers, seven bars, multiple entertaining areas, a VIP room, a large rehearsal room and an onsite commercial kitchen.

With an industry leading immersive sound system and entirely LED based lighting rigs, the theatre sets a new standard for musical theatre, not just in Sydney but in the Southern Hemisphere.

The flexible venue can accommodate 2,000 people as a conventional lyric theatre; 600 people for a banquet; or 2,200 people for a concert. The venue is able to change between modes within an hour thanks to a top of the line retractable seating system, specially designed and manufactured in Belgium.

The new venue integrates seamlessly into the existing West HQ facilities via a glass link bridge, which provides patrons the only public access to the theatre.

DEVELOPER : West HQ
MAIN CONSTRUCTION COMPANY : Hansen Yuncken
ARCHITECT : COX Architecture
STRUCTURAL ENGINEER : Taylor Thomson Whitting
CONSTRUCTION VALUE : \$100 million

The theatre was delivered in December 2019 and opened with a line-up of impressive international and local acts performing sold out shows.

Constructed by Hansen Yuncken, the project employed a range of innovative construction techniques to ensure a timely and safe delivery. The uniquely designed, segmented building facade created a complex construction sequence. "The use of technology assisted in understanding the building's form and how we could best achieve the design intent. We used Building Information Modelling (BIM) processes and Virtual Design & Construction (VDC) technologies, such as 4D programming, 5D cost management, UAV reality capture, digital setouts, to name a few," said Vanja Krumpacnik, Hansen Yuncken Project Manager.

Due to the complex form of the building, creative solutions were required to ensure efficient and safe construction. The whole installation sequence was carefully planned, with safety the number

Image by Justin Mackintosh Photography

one priority. "The way we installed elements of the project wasn't conventional," said Vanja. "An unusually shaped building brings unusual construction methodologies. We focused on reducing the risks of the project, taking into consideration working from height, movement of plant, material handling and program risks."

Collaboration across the entire project team was essential in the safe and timely delivery of the project. "We worked closely with the consultants and our team of subcontractors and suppliers from the outset of the project. We carefully reviewed, adjusted and fine-tuned our methodology to make sure we were building in the safest and most streamlined way possible."

"For example, a lot of temporary engineering went into the build, such as a temporary bridge across the basement that we could situate cranes on. We also redesigned two services risers to a modular solution

that was prefabricated offsite with integrated ductwork and pipework," said Vanja.

Hansen Yuncken were well equipped to manage both the scale and complexity of this iconic new development. "The Sydney Coliseum Theatre complements our extensive project portfolio including two other major theatre projects currently under construction in Hobart and Adelaide. We pride ourselves on delivering unique and complex projects – the Sydney Coliseum Theatre definitely falls into that bracket."

For more information contact Hansen Yuncken, Building 1, Level 3, 75-85 O'Riordan Street, Alexandria NSW 2015, phone 02 9770 7600, email sydney@hansenyuncken.com.au, website www.hansenyuncken.com.au





Below Calcono Formwork designed, supplied and installed 23,000m² of formwork and jump form for the double lift core.



Calcono Formwork are one of Sydney's leading formwork contractors, providing commercial, industrial, residential and formwork project services. They have a 30 year track record of successfully delivering quality work across the Sydney region.

With such a sterling reputation, the company was appointed as the formwork contractor for the Sydney Coliseum Theatre at Rooty Hill. The project creates a striking architectural landmark with an iconic form and a new cultural destination for Western Sydney.

Calcono Formwork's role required the supply and installation of approximately 23,000m² of formwork. They also completed the formwork design, preparing and submitting shop drawings for approval by the project design team.

"We started in 2018 and provided formwork as well as the jump form system for the double lift core," said Contract Manager, Damir Kukic. "It was a difficult and highly detailed job with high strutting slabs, beams going in different directions and curved stairs coming up from the bottom. The grandstand seating was also challenging. Not many formwork contractors could do a job of that size and complexity but we have a number of years experience on difficult jobs."

Successful completion of such a complex project required a combination of skills and experience. "We put one of our best foremen, on the job," said Damir. "He has 30 years of formwork experience."

Calcono Formwork's role on the project also required coordination with the main contractor, Hansen Yuncken, and other trades. "Hansen Yuncken are a great builder and we look forward to partnering with them again in the future," said Damir.

Established in the back of the family home in Caringbah, New South Wales back in 1989, Calcono Formwork have built a name for themselves for their quality and reliability in formwork. They have successfully completed many complex and challenging projects in the commercial and residential sectors.

The company has built a large stock of materials and systems to enable them to

take on any project regardless of scale or complexity. "We hold approximately 100,000m² of material and formwork systems and there are several systems that we are using," said Damir. "Currently we have around 120 personnel and in the last few years we have grown significantly."

"We have been mainly focused on the market in Sydney but recently we have been expanding into the Central Coast and Newcastle as well. The market is very competitive but we are well established and I believe we have the resources and materials to take on any job that comes up," said Damir.

"Another high profile job we have started is the Eastlakes Live Town Centre for Crown Group," said Damir. "We've also done other big jobs including the South Village development in Kirrawee Town Centre for Deicorp which was 750 units and more than 250,000m² of formwork. That was a huge achievement for us whilst concurrently completing the redevelopment of Harbord Diggers Club Freshwater for Ganellen and also Tailors Walk Botany Residential complex for Richard Crookes."

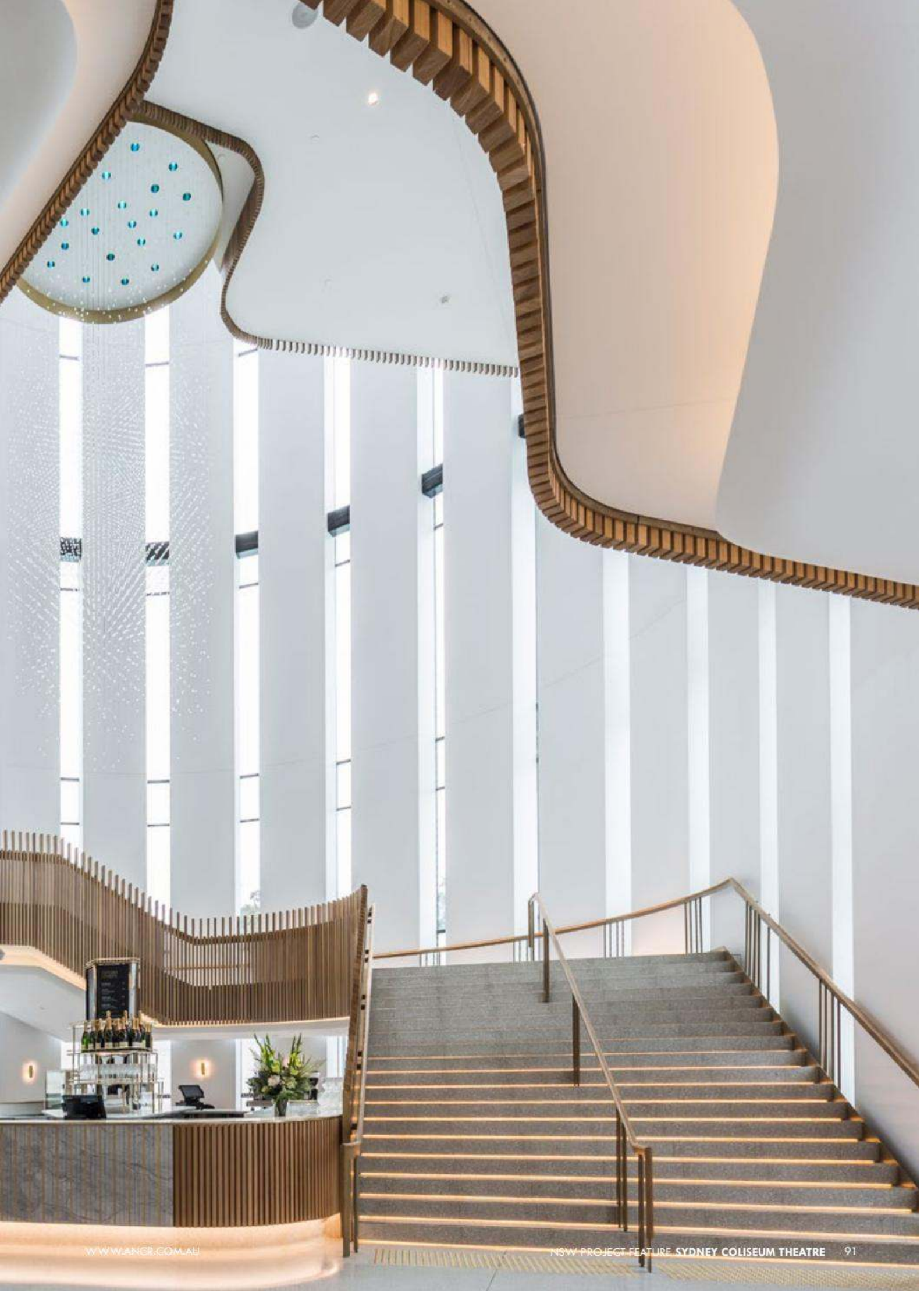
The company is currently working on a range of projects including the Newmarket master planned neighbourhood in Randwick with Ganellen and the Gunyama Park Aquatic and Sporting Complex in Zetland with CPB Contractors. They are excited to have been recently awarded the tender to work with Hutchinson Builders on the \$55 million Dee Why RSL Club Redevelopment and also Gosford Hospital Redevelopment Health & Well-Being Precinct.

Calcono Formwork prides themselves on delivering projects on time, on budget and on target for quality. They are a founding member of the Formwork Industry Association (FIA) through which they are hopeful they can assist in improving the safety and competence of the formwork industry as a whole.

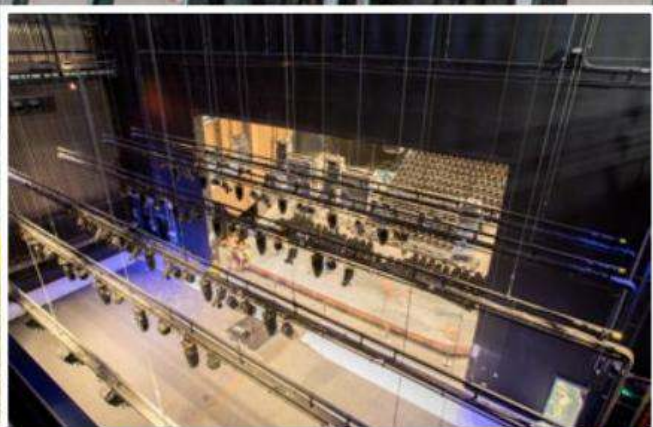
For more information contact Calcono Formwork, 1600 Canterbury Road, Punchbowl NSW 2196, phone 02 9793 9233, email admin@calcono.com.au, website www.calcono.com.au



Image by John McRae Photography



Below Marshall Day Acoustics and Marshall Day Entertech completed the acoustic design, theatre planning and technical design of the audio visual, lighting and sound systems.



With their international experience in acoustics including performing arts design, Marshall Day Acoustics were a perfect match for the Sydney Coliseum Theatre. Together with their theatre consulting division Marshall Day Entertech, specialising in venue consulting services including a broad range of theatre design elements, they were well placed to deliver value for the project.

Marshall Day Acoustics carried out all the acoustic design works for the Sydney Coliseum Theatre including room and building acoustics, noise penetration through the building envelope and environmental planning assessments. Marshall Day Entertech provided theatre planning and the technical design of audio visual, rigging, lighting and sound systems.

One aim of the project was to activate ancillary spaces for multiple uses including standalone events and corporate functions, requiring careful consideration of acoustics. Another challenge was the range of planned auditorium uses, from concerts to banquets and corporate events.

Marshall Day Acoustics utilised acoustic banners and all other available room surfaces to ensure the acoustic performance was optimised for each use mode. They also provided a venue design that incorporates

cutting edge audio and lighting technology, one of the first major theatrical venues in Australia to employ an entirely LED based lighting rig as well as an industry leading sound system.

“A project as complex as this is a team effort,” said Matthey Ottley, Managing Associate. “An exceptional result can only be achieved by working with the architects, client, designers and other consultants. The level of teamwork on this was great.”

Founded in Auckland, New Zealand in 1981, Marshall Day Acoustics now employs more than 90 technical staff throughout New Zealand, Australia, China, Hong Kong and France and are one of the largest acoustic engineering firms worldwide.

Some recent projects include the Melbourne Conservatorium Ian Potter Southbank Centre and the Marvel Stadium renewal and work has commenced on the Sverdlovsk Philharmonic Concert Hall with Zaha Hadid Architects in Russia.

For more information contact Marshall Day Acoustics, 4/46 Balfour Street, Chippendale NSW 2008, phone 02 9282 9422, email sydney@marshallday.com, website www.marshallday.com

Below GWA Consultants used 3D Revit Modelling to design mechanical services that were draught free and met tight acoustic parameters.



GWA Consultants Australia Pty Ltd are a specialist mechanical and controls engineering firm with over 25 years experience and were appointed to the landmark Sydney Coliseum project.

The company designed the mechanical services for the Sydney Coliseum Theatre. “The design process presented some challenges including the air conditioning for the auditorium which had three different modes of operation. In theatre mode the auditorium had to be draught free with low noise levels. The same system had to also cater for banquet mode and band mode all of which have different population loads and requirements,” said Managing Director, Colin Derome.

“One of the largest challenges was the amount of coordination required both with the architect and the acoustic engineers,” said Associate, Mikaila Ganado. “The architect had a very specific brief for the foyer, they wanted the diffusers to be invisible.”

“We overcame these problems with a lot of engineering and some fairly high tech diffusers,” said Colin. “We involved the air diffusion supplier throughout the process, with every potential diffuser selection requiring not only mechanical assessment but also acoustic and architectural assessment.”

“The 3D Revit Model assisted with the detailed coordination required to accommodate the final diffuser solution,” said Mikaila. There was a large amount of coordination onsite and with the mechanical contractor for installation, but the finished product looks fantastic and I think the final result speaks for itself.”

“We also documented the building monitoring and control system, including configuration of the control strategies which were designed to run the building as efficiently as possible,” said Colin. “Heat recovery wheels and demand control ventilation based on carbon dioxide monitoring significantly reduced the amount of energy needed to heat and cool the building.”

Based in Sydney, GWA Consultants can deliver projects nationwide. They offer a range of professional engineering services focusing on a variety of sectors including commercial, industrial, retail, aged care and education as well as the clubs and hospitality sector.

For more information contact GWA Consultants Australia Pty Ltd, Unit 38, 8 Herbert Street, St Leonards NSW 2065, phone 02 9906 3688, email admin@gwaconsultants.com.au, website www.gwaconsultants.com.au

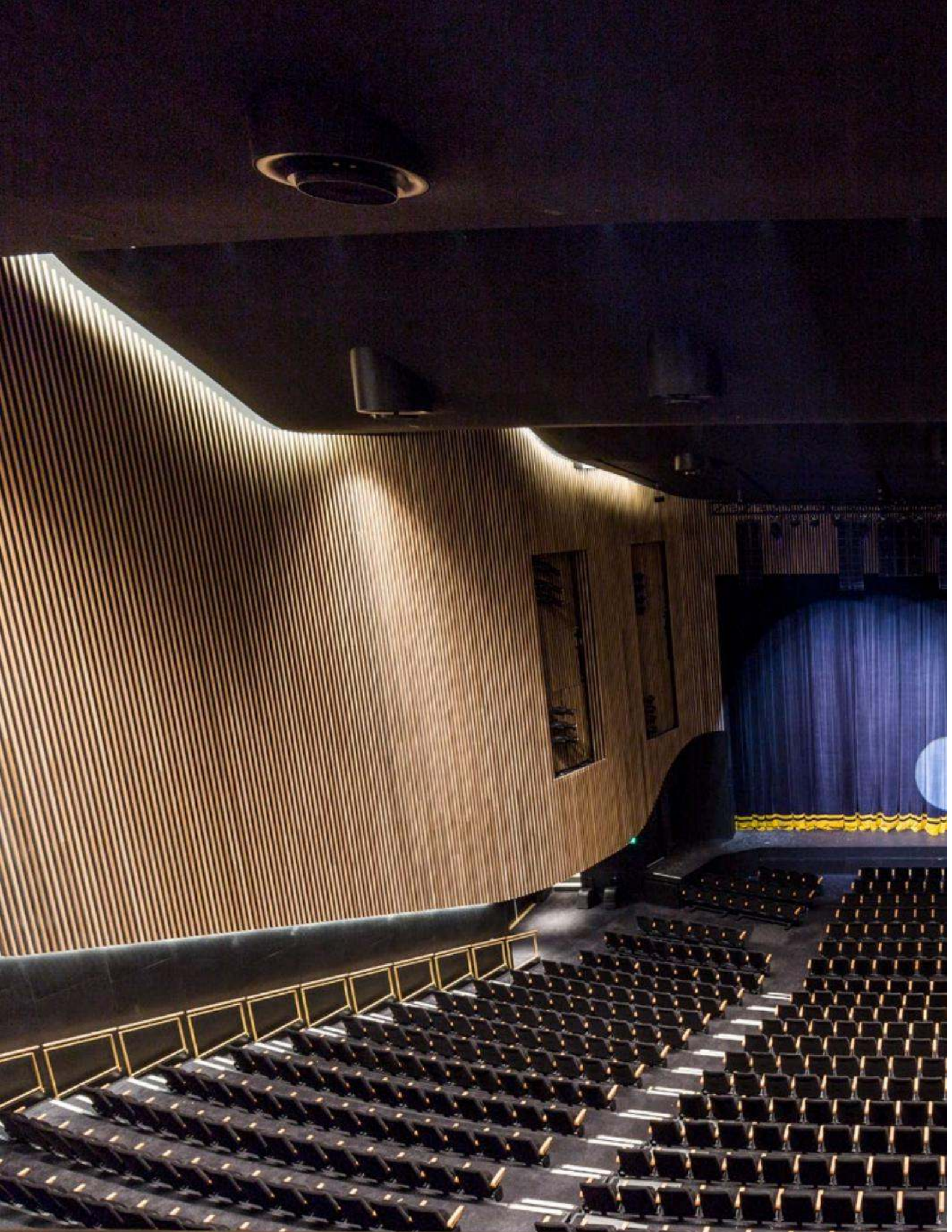
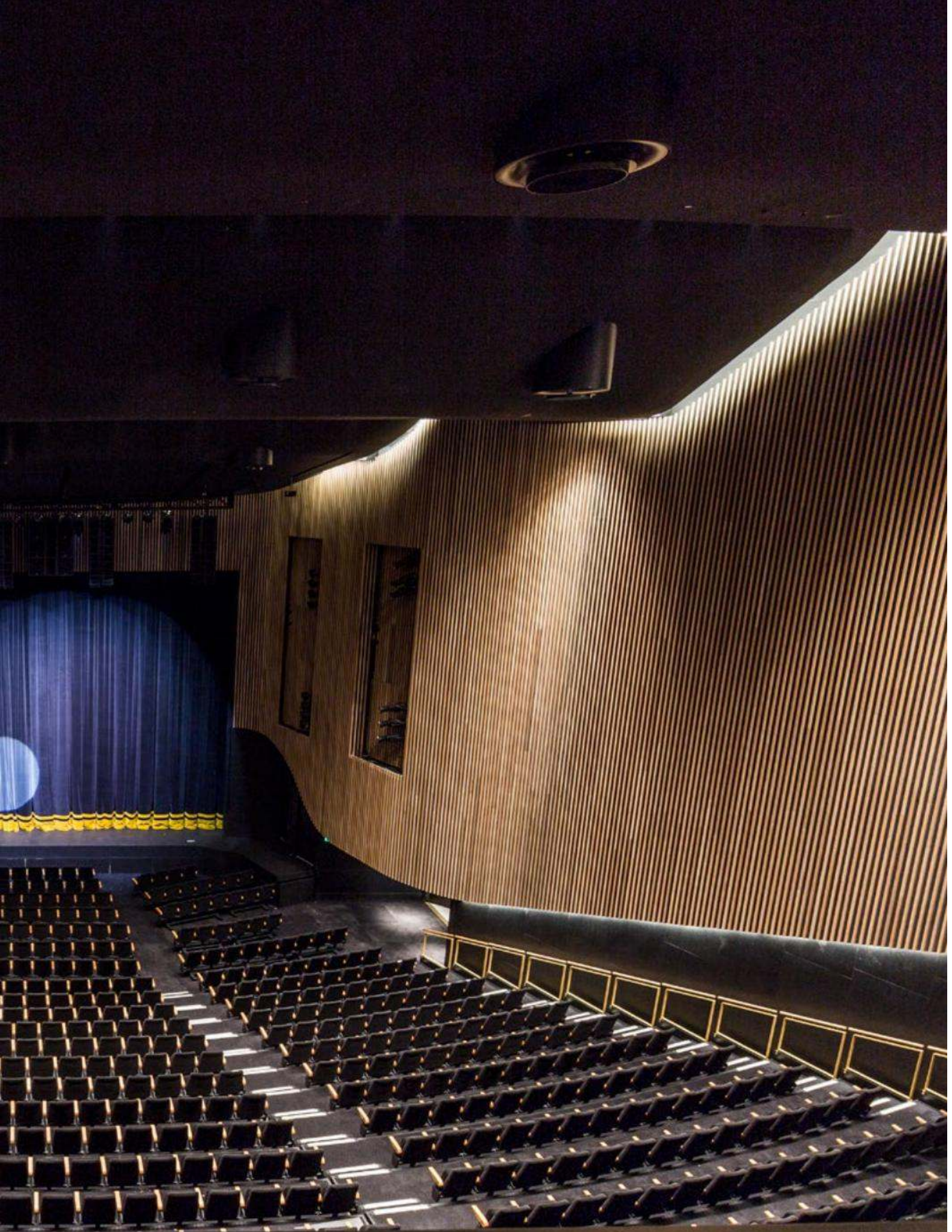


Image by John McRae Photography



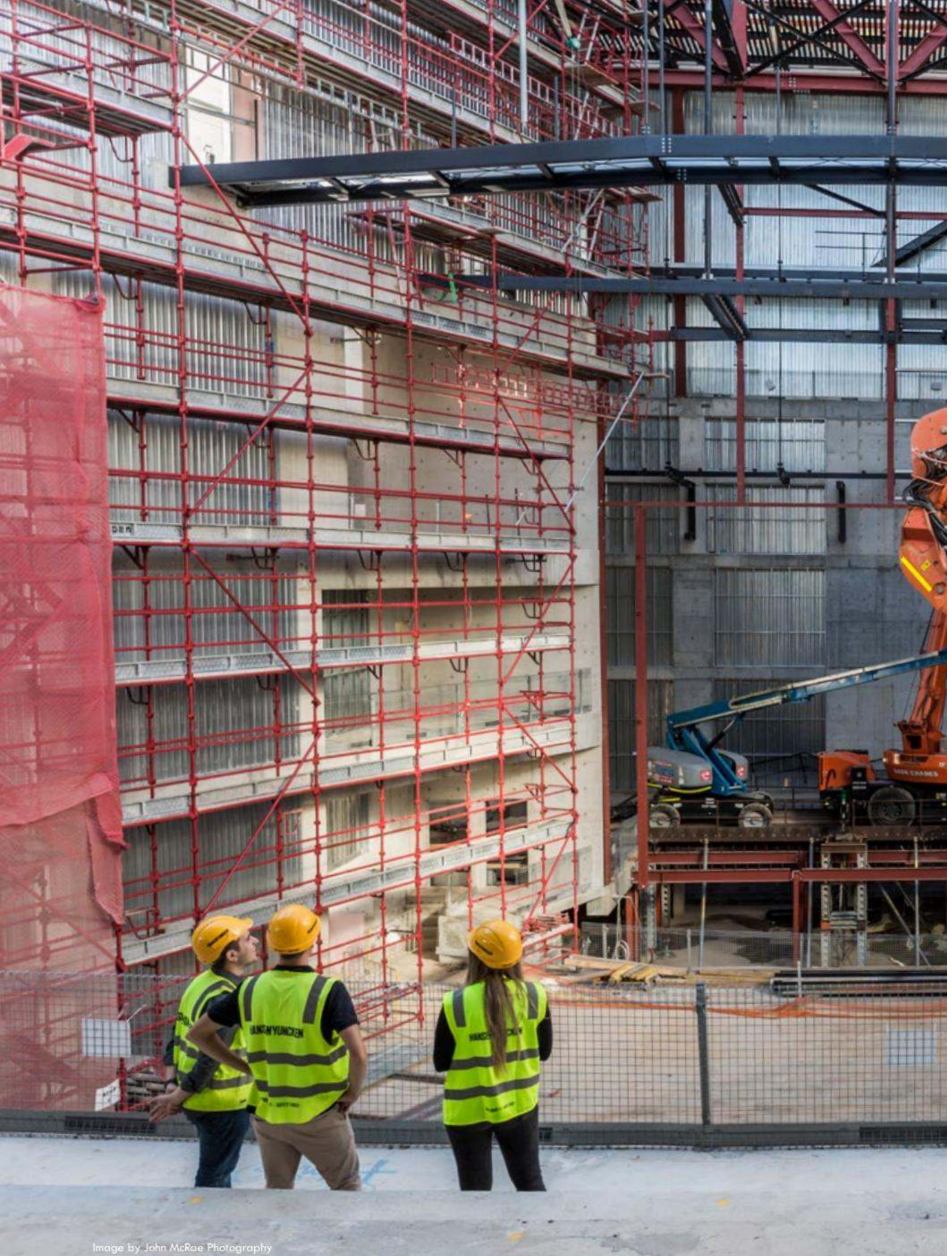
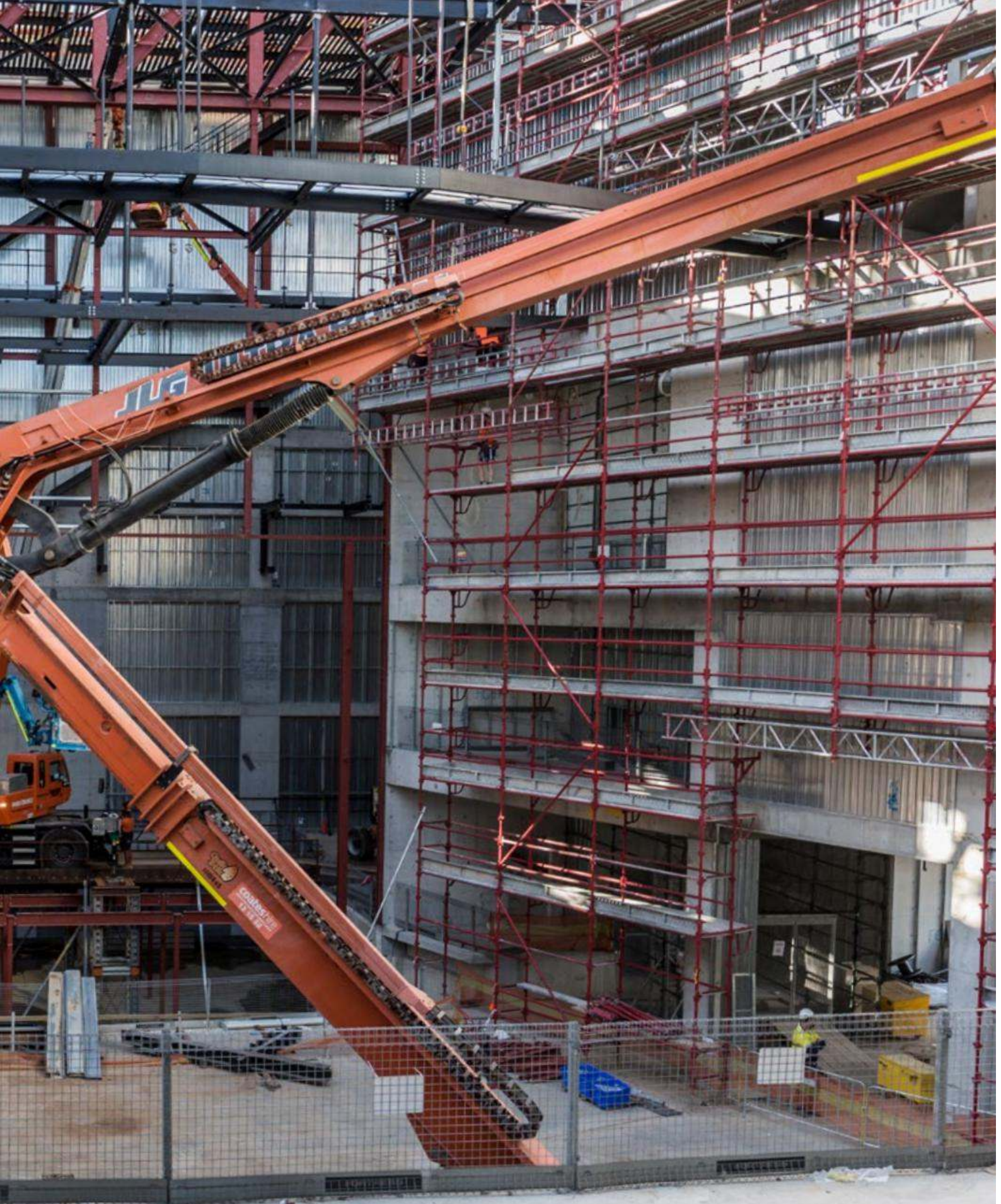


Image by John McRae Photography



Below BildaVOID Concrete's products were utilised for the Sydney Coliseum Theatre's foundation.



Photos this page: Supplied by client from other projects



BildaVOID Concrete's range of innovative products comprise an environmentally friendly, easily applied and low cost system that creates an effective void between clay based, reactive soils and the structure built upon it.

Reactive soils expand and contract during extreme weather events which can cause concrete slabs to move, causing negative consequences for buildings ranging from wall and door misalignment to significant structural damage. BildaVOID offers a proven and cost effective method of minimising the risks associated with reactive soil sites. This made them an ideal choice for the Sydney Coliseum Theatre with the site's reactive clay based soil common in Western Sydney.

"We are the foundation that the project was built on," said Owner, Christine Mancer.

"Our void forming systems were developed by Fred Mancer, Owner of the successful construction company F J Mancer Building Company Pty. Ltd. It was during the 1970s that he saw the need for a new product that would create a void under the concrete slab to protect it from the damage caused to foundations and structures by reactive soils that resulted in costly remedial work."

"Fred Mancer spent many years perfecting such a system and successfully patented these products in Australia and New Zealand. In December 2002, we commenced operating to supply these products to the construction industry," said Christine.

Since their conception, BildaVOID Concrete have been used extensively throughout Australia and New Zealand, on many small to major projects as an economical and viable solution to difficult situations.

BildaVOID are a leading void forming specialist and their products have provided the foundation to a diverse range of projects around Australia, from the Penguin Parade in Phillip Island, Victoria to the Jewel in Surfers Paradise, Queensland. Some recent major developments that have benefited from the BildaVOID system include Barangaroo in Sydney's CBD and the Australian Technology Park in Redfern.

For more information contact BildaVOID Concrete, PO. Box 3288, Umina Beach NSW 2257, phone 1300 369 253, email info@bildavoid.com.au, website www.bildavoid.com.au



Statewide Mechanical Services specialises in the design, supply, installation, commissioning and service of mechanical services to commercial, industrial and residential projects.

Hansen Yuncken appointed Statewide Mechanical Services to undertake the construction of the mechanical services for the Sydney Coliseum Theatre, with work starting onsite in 2018. Given the complex geometric shapes of the building, services coordination began immediately. 3D BIM modelling was utilised, and greatly assisted the coordination of the structure and services, during both shop drawing development and construction.

A key to the success of the project was to design, construct, and install prefabricated riser modules, complete with pipework and ductwork, for the large complicated northern risers. This streamlined the installation, reducing time required onsite, and allowed Hansen Yuncken to maintain their critical structure construction programme.

Statewide Mechanical Services prides themselves on their engineering and managerial abilities, which allow for quick, educated decisions to be made onsite, to keep construction moving forward with minimal disruption and delay.

Statewide Mechanical Services values Hansen Yuncken as a key client and partner, with many past projects successfully delivered together, achieving mutually successful outcomes for both parties. The successful completion of the Sydney Coliseum Theatre not only adds to this portfolio, it is a project that both Hansen Yuncken and Statewide Mechanical Services can be proud of.

Other projects Statewide Mechanical Services have successfully completed include Hillsong Epicentre, Dubbo Regional Theatre and Convention Centre, Sutherland Hospital, Kiama Aged Care Centre of Excellence, Cessnock Correctional Centre, Oran Park Commercial, HMAS Creswell, AHM Building, Holsworthy Special Operations Accommodation, Warrawong Plaza, and Parkes Hospital.

For more information contact Statewide Mechanical Services, Unit 1, 17 Industrial Road Unanderra NSW 2526, phone 02 4272 1299, email statewide@statewidemechanical.com.au, website www.statewidemechanical.com.au



Image by Justin Mackintosh Photography

Below Aitken Civil Engineering carried out the civil works including shoring, piling and in-ground concrete foundations.



The construction of the Sydney Coliseum Theatre project in Western Sydney was a challenging endeavour involving complex geometries and difficult ground conditions.

To ensure a positive outcome for the project a mix of innovation and experience was provided by Aitken Civil Engineering for the civil component of the project.

Aitken Civil Engineering were one of the first contractors onsite and coordination with Hansen Yuncken's site team was vital for the delivery the project. "We were handing over the most crucial elements progressively for commencing other trades and critical works onsite through effective communication," said Alex Aitken, Aitken Civil Engineering Manager. "We also completed the pavements in time with the other trades onsite. The site team are always willing to help and open to working together to find a better way."

"The building was built on a highly reactive clay. This caused some challenges especially after inclement weather," said Alex. "There were also level differences across the site with large changes in grades as well as a curved structure that made setting out very hard. Our scope included piling works, shoring, in-ground concrete foundations and

maximising the effectiveness of all items throughout the works on a tight programme."

Aitken Civil Engineering is a small family owned business and this is reflected in their philosophy. "It's amazing the amount of work you can get done with a passionate and small crew that really knows how to work together," said Alex. "We have a small team that knows their trade. Our senior staff have 40 years experience in civil engineering and with them we can do anything."

The Sydney Coliseum Theatre is Aitken Civil Engineering's first major completed project which is cause for celebration. "I would like to thank our employees and Hansen Yuncken," said Alex.

For more information contact Aitken Civil Engineering, Suite 2, 102 Queens Road, Five Dock NSW 2046, phone 02 9705 1611, website www.aitkencivilengineering.com.au



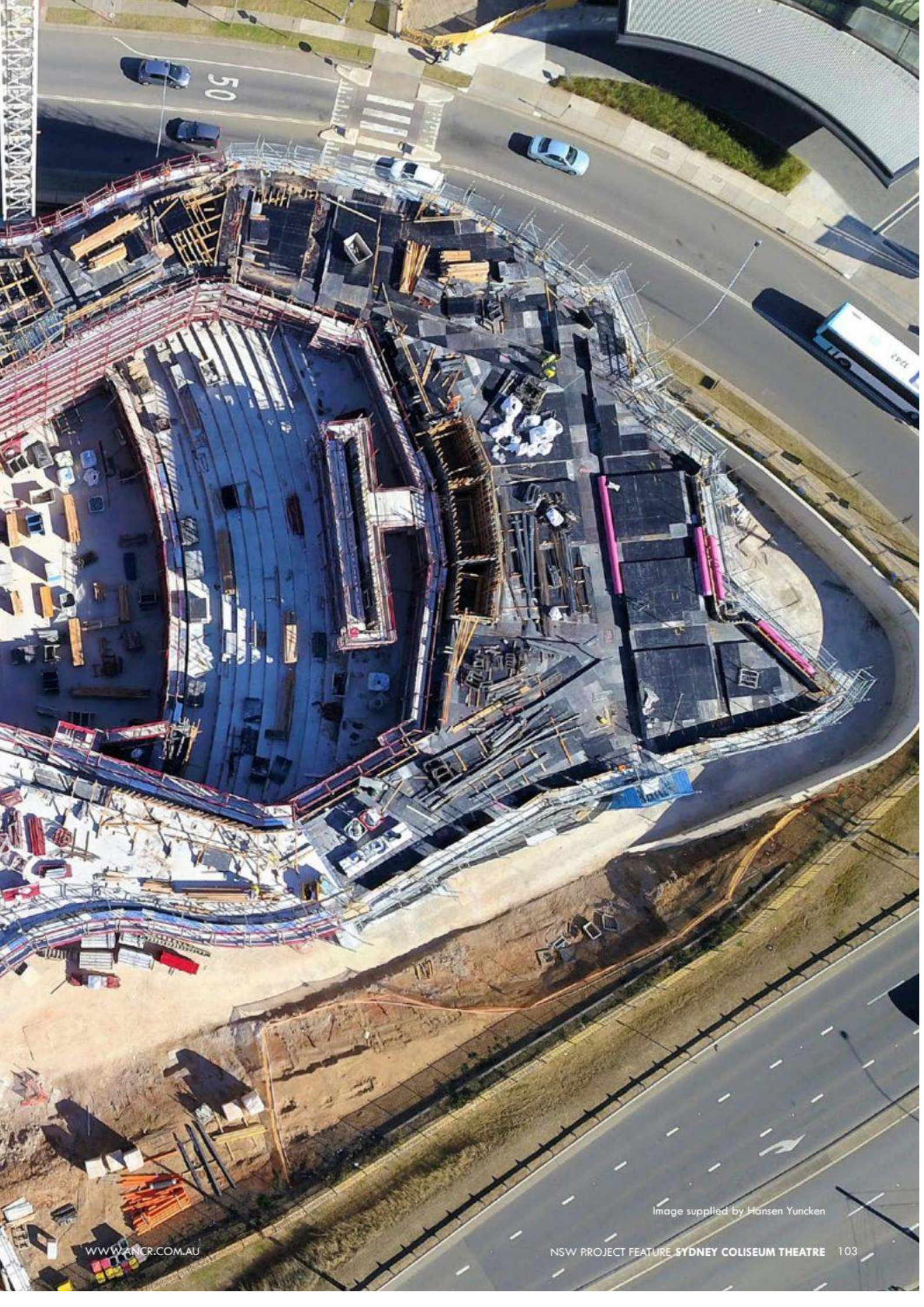


Image supplied by Hansen Yuncken