Architectural Physics

Specialist Design Review

THE CONSTRUCTION INDUSTRY IS AT A CROSSROADS

Projects have become much larger and **more complex.**

Architects use powerful modelling software to generate **increasingly elaborate** designs, yet are resolving them in **less & less detail.**

Contractors are required to take on **more design risk.**

Ken McBryde
Architectural Physics Pty Ltd

HOW CAN WE BUILD SIMPLER • FASTER • SAFER • SUSTAINABLY?

Our work helps our clients build **faster, safer, and more sustainably,** without affecting design intent.

Architectural Physics advises on solutions to **simplify the construction** of complex, high-end architecture & infrastructure projects.

Collaborating with world leaders in their fields, at the nexus of art, science and technology, **Architectural Physics** produces specialised independent design reviews for our clients to **mitigate construction risks.**

ARCHITECTURAL PHYSICS DELIVERS SPECIALIST ADVICE WITH THREE MODULAR ENGAGEMENTS

Package One
Fundamentals

A high-level strategic report focussing on fundamentals.

Our internationally recognized multi-disciplinary experts review the incumbents' design and report back to you on risks and opportunities.

We approach this analytical process from the point of view of strengthening the design outcomes rather than undermining.

We want the ECI / D&C team we support to become the lead designers' best chance of delivering the outcomes they seek.

WIN WIN MORE OFTEN

Package Two
Finessed Design Leadership

In collaboration with our clients, we choose the initiatives that provide the best value.

Our team will produce a detailed report on selected initiatives, that the clients team can price for inclusion in the tender.

The report typically comprises:

_Solutions to address identified risks

_Improved speed of assembly

_Safer methods of construction

_Improved sustainability outcomes

_Finite Element Analysis

_Material weights and volumes

_Connection details

Package Three
Deliver on the promise

Expert engagement typically comprising:

This is the part where we assist the consultant team to deliver the initiatives.

FASTER x SIMPLER x SAFER

MORE SUSTAINABLE

MORE PROFITABLE

RECENT SPECIALIST INDEPENDENT DESIGN REVIEWS

Multiplex Sydney Modern

SANAA designed Art Gallery
Damon Jones. Probuild
+61 415 574 312.

We created a method to remove two rammed-earth walls from the critical path, allowing significant reductions in risk and construction time without changing the appearance of the rammed earth. We designed a more effective way to build & assemble a wavy glass canopy to require less cleaning and eliminate unattractive silicon joints.

Schools Infrastructure NSW

Schools pipeline DfMA roll-out
James Marsden. TSA Management
+61 411 311 509

We assisted TSA in developing & explaining the benefits of P-DfMA (Platform approach to Design for Manufacture & Assembly). This approach speeds-up and improves the quality & sustainability of the delivery of NSW schools.

John Holland Group SFSR

Sydney Football Stadium Redevelopment
Tom Roche. JHG
+61 411 602 122

After assessing the risks and opportunities of the existing design, AP designed an alternate scheme that did not materially change the overall appearance of the stadium, but was significantly simpler and faster to build.

Multiplex MEP

Meadowbank Education Precinct
Damon Jones. Probuild
+61 415 574 312.

We designed & sized 16 different construction methods ranging from partially pre-fabricated to highly innovative DfMA methods that lend themselves to a platform approach.

Multiplex ECI

Atlassian HQ, Sydney
Simon Trimnell-Ritchard
+61 412 925 547

AP provided state of the art blue sky sustainability thinking, construction methodology and highly innovative workplace ideas for what is to be a breakthrough world class HQ for a high profile tech company.

James Turrell SKYSPACE Hinge MASS MoCA

Undisclosed

We invented a hinge & drive mechanism to open and close a 7m diameter roof hatch. It first lifts the hatch 50mm off the seal, then rotates 180 degrees, and back again. The mechanism is solar powered, electrically driven, and includes a manual back-up.

Global Expertise

UK
DfMA
While at Laing O'Rourke, John played a key role in solving the active alignments for the very complex assembly of the The Leadenhall Building (the 'Cheesegrater'). He also contributed to the London Olympics, & Tottenham Football Club (bid only).

UAE
D1 Tower & Dubai Ski
As a cofounder of innovarchi, Ken McBryde drove the design & documentation of the 80 story D1 Tower for Sunland. We found meaningful connections to stitch the tower into the historic context of this gateway site.

Working for Hyder Consulting, John had a significant role in the Dubai Ski Centre, and also the Burj Khalifa tower.

VIETNAM
NOKIA Hanoi Facilities
Invited to assist PTW VN, Ken lead a wide range of projects in the region, including a new manufacturing facility for NOKIA on a 17ha site. We designed and documented a facility comprising 85,000sqm, for 10,000 workers producing 45 million handsets per quarter. The main factory was approximately 7ha under one roof.

PERTH
Perth Stadium
As principle at Advanced Sciences and Engineers, John collaborated alongside Prof. James Murray-Parkes in developing structural solutions for the multi-award winning 80,000 seat Perth Stadium. Inspired by the shock absorber swingarm joint of a MotoGP motorcycle, James and team created a cylindrical multiple hinge connection making the roof structure safer, simpler and easier to build.

OSAKA
Kansai International
Ken was on Renzo Piano's Kansai International Airport Terminal team from Expression of Interest stage, right through to start of Construction. Working on a daily basis with Renzo Piano and Peter Rice, Ken was the Team Leader of the building envelope. This included the cladding, glazing, structure and services of the 1.8km long terminal building on a 500ha artificial island.

MELBOURNE
FED SQUARE EAST
Awataha & AwareHouse
Working closely with James Murray-Parkes & the team at Brookfield Scientific Solutions Group (BSSG), Ken contributed to the concept stage of this major and very challenging project. The highly significant reconciliation project comprises extensive public domain including green roofs, and urban lanes that serve a range of public and private mixed use spaces. The project spans 108m approx uninterrupted over 17 rail lines.

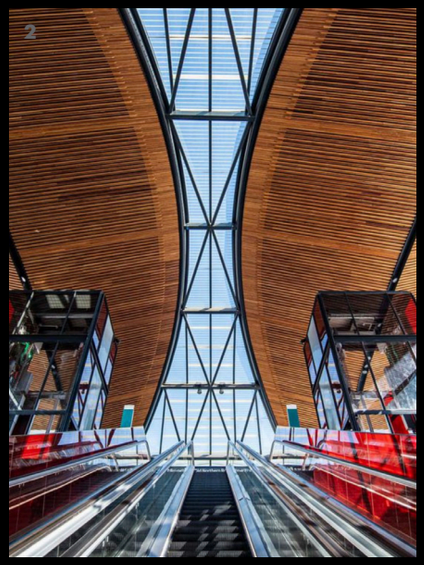
SYDNEY
SFS, ICC DHL & AP
Ken and his team were invited to compete by iNSW on the design excellence competition. We are delighted to have since assisted JHG with their successful bid.
While Principal at Hassell, and Design Leader in the Sydney Studio, Ken was responsible for the design of the ICC Convention, and design reviewer on all of the Darling Harbour Live project. Ken was Renzo Piano's local representative architect for Aurora Place.

MEXICO
Infonavit Communities
Invited by the Government sponsored housing organisation Infonavit, we prepared designs for medium-density affordable villas & row housing for Atlixco Puebla, Mexico.

Catering for climatic extremes, hot & cold, wet and windy, earthquakes and cyclones our flexible prefab kit allowed additional living areas and bedrooms to cater for extended families.

Engineered Timbers
Renewable resources

Understanding and exploiting the possibilities of engineered timber has been a career-long focus for Architectural Physics. Extensive project experience with Renzo Piano Building Workshop led Ken to a Research Masters into prefabricated Engineered Timber Applications in Architecture, (University of Queensland).
With timber as one of our few renewable building materials, Architectural Physics continues to develop expertise & experience in advanced mass timber design.



1. D1 Tower, Dubai (designed by innovarchi)
Award winning prefabricated timber shade canopy used traditional Arabic techniques to capture cooling breezes and provide human scale at the base of an 80 floor tower.
2. Sydney Metro Northwest (designed by Hassell)
Ken was the architectural design leader for Metro North West. He drove elegant detailing and resolution of these roof typologies, car parks and public domain.
3. St Andrew's Church, Gracemere (designed by innovarchi)
An award winning project for a community church in Gracemere. This project was one of the first to use LVL (previously only used for industrial sheds only) in a visually exposed architectural application.
Images include experience gained under engagement with former practices.

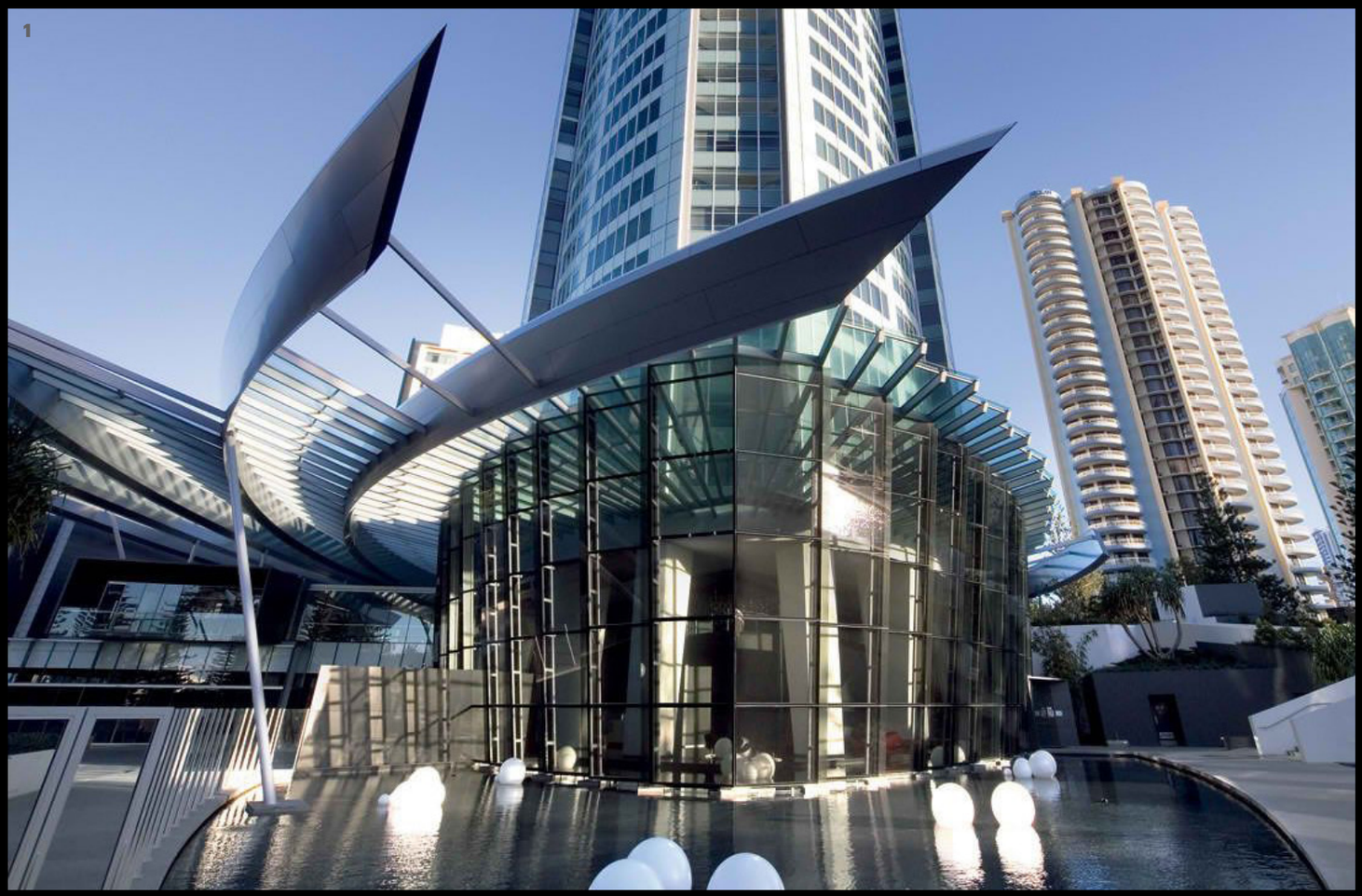
Movin' on up
Tall buildings

The ultimate test of architecture is to bring beauty and allure to the highly complex engineering challenges of the skyscraper. Architectural Physics has global experience applying sensitive, contextual design solutions to deliver elegant construction approaches that dance in the light of their environment.

1. D1 Tower, Dubai (designed by innovarchi)
Designed & oriented to capture cooling breezes off the Dubai Creek.
2. Burj Khalifa, Duba (designed by SOM)
John identified risks in the Laing O'Rourke D&C bid for the Burj Khalifa tower.
3. The Cheesegrater, London (designed by Rogers Stirk Harbour + Partners)
John played a key role in solving the active alignments to simplify the assembly this complex symmetric tower.
Images include experience gained under engagement with former practices.

Sky-lines, ok
But Ground-lines really count

Ken was the founder of Council on Tall Buildings and Urban Habitat in NSW. He has been instrumental in moving the conversation around sky-lines to "ground-lines". IE: to us the most important aspect of tall buildings is how to meet the ground and contribute to the making of a vibrant and memorable



1. Q1 Tower (lower 3 levels only) (designed by Sunland)
Sunland invited us to provide an alternate design for the lowest 3 levels and public domain of Q1 well after construction had commenced. We developed a canopy for pedestrian wind comfort, that also forms a retail arcade and porte cochere.

2. Aurora Place, Sydney
(designed by Renzo Piano Building Workshop)
As Local Representative architect for Renzo Piano, Ken worked on every aspect and component of this Sulman Award winning project from the DA Stages to completion. Even after 15 years, Aurora Place continues to command top rents and maintains occupancy well above industry averages.

3. 60 Martin Place, Sydney (designed by Hassell)
Ken had design review role on this project which captures valuable commercial floor space over the 1937 St Stephen's Church and delivers an important "civic room" off Martin Place.

Images include experience gained under engagement with former practices.

Clarity of Purpose
Connecting indoors to outdoors

The continuity of space from inside to outside is an underlying principle of our approach. Our designs allow occupants to enjoy the biophilic benefits of nature, and also deliver benefits of larger flexible live-work-play spaces. We explore and develop initiatives to moderate and filter nature. Motivated by passive climatic design and sustainability, we deliver elegance and delight for users.

1. Sydney Football Stadium (designed by SAS)
Our Design Excellence Competition entry proposed significant public access to the stadium including during no-game days. Working with TTW and Inhabit Group our design was the fastest and most cost effective proposal.

2 & 3. Darling Harbour ICC Exhibition Centre (designed by Hassell + Populous)
The integration of architecture and the public domain is fundamental to our design philosophy. Ken had a design review role on the entire darling harbour live project. The glazed circulation & smaller facilities on the edges of the large exhibition spaces ensure Darling Harbour is activated between the big events.
Images include experience gained under engagement with former practices.

Clarity of Form
Responds to urban context

Each project will be unique because of our design research methodology. Our clients benefit from this approach that requires every element in a project to perform at least three roles - our ideas have to earn their place in your project.

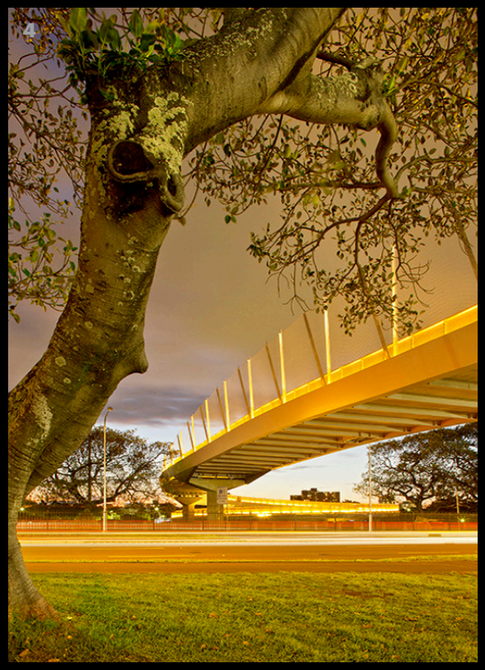
1. ICC Convention Centre (designed by Hassell + Populous)
As design leader during the post tender stages of the ICC Convention, Ken introduced the concept of the up-lit folding tiled roof inspired by the Sydney Opera House.

2. M4 Westconnex (designed by Hassell)
Ken prepared alternate design schemes for two vent stack facilities on M4 Westconnex Motorway. These cost effective facilities have been extremely well received by the client and the independent design review panels.

3. Sydney Football Stadium Competition (designed by SAS)
This design was said to be lightest & most efficient roof structure

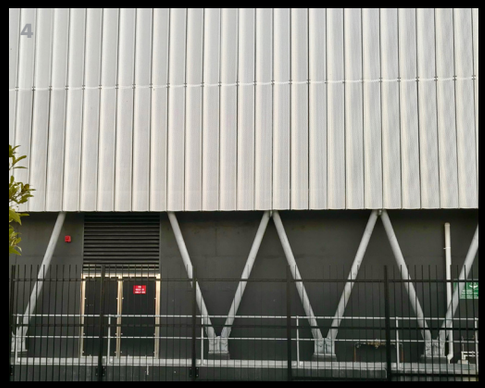
4. Albert "Tibby" Cotter Bridge (designed by Hassell)
Ken's design review role on this pedestrian bridge resulted in an elegant expression of the bridge deck which "floats" over the sculptured concrete supporting piers.

Images include experience gained under engagement with former practices.



Structural expression
Architectural elements tell the story

The art of design works with movement through space.
Like directing a film sequence, we craft the experience, and the emotional responses spaces can deliver. The techniques we draw upon include expansion, compression, release, focus, framing, discovery, suspense and surprise.



1. DHL ICC Exhibition, upper level, Sydney (designed by Hassell)
40,000sqm, 104m clear span: strategic use of paint was ou
VE solution to ceilings.
2. DHL ICC Exhibition, lower level Sydney
Strategic use of paint and lighting were cost effective alternatives to ceilings.
3. Kansai Airport (designed by Renzo Piano Building Workshop), Osaka
The entire envelope follows the principal of efficient air treatment and distribution.
4. WCX M4 Underwood Road, Sydney (designed by Hassell)
Grunty vent stacks have been welcomed as desirable additions to urban context thanks Ken's reworking of the reference design. He created a highly efficient and elegant cladding & integrated LED lighting system.
Images include experience gained under engagement with former practices.

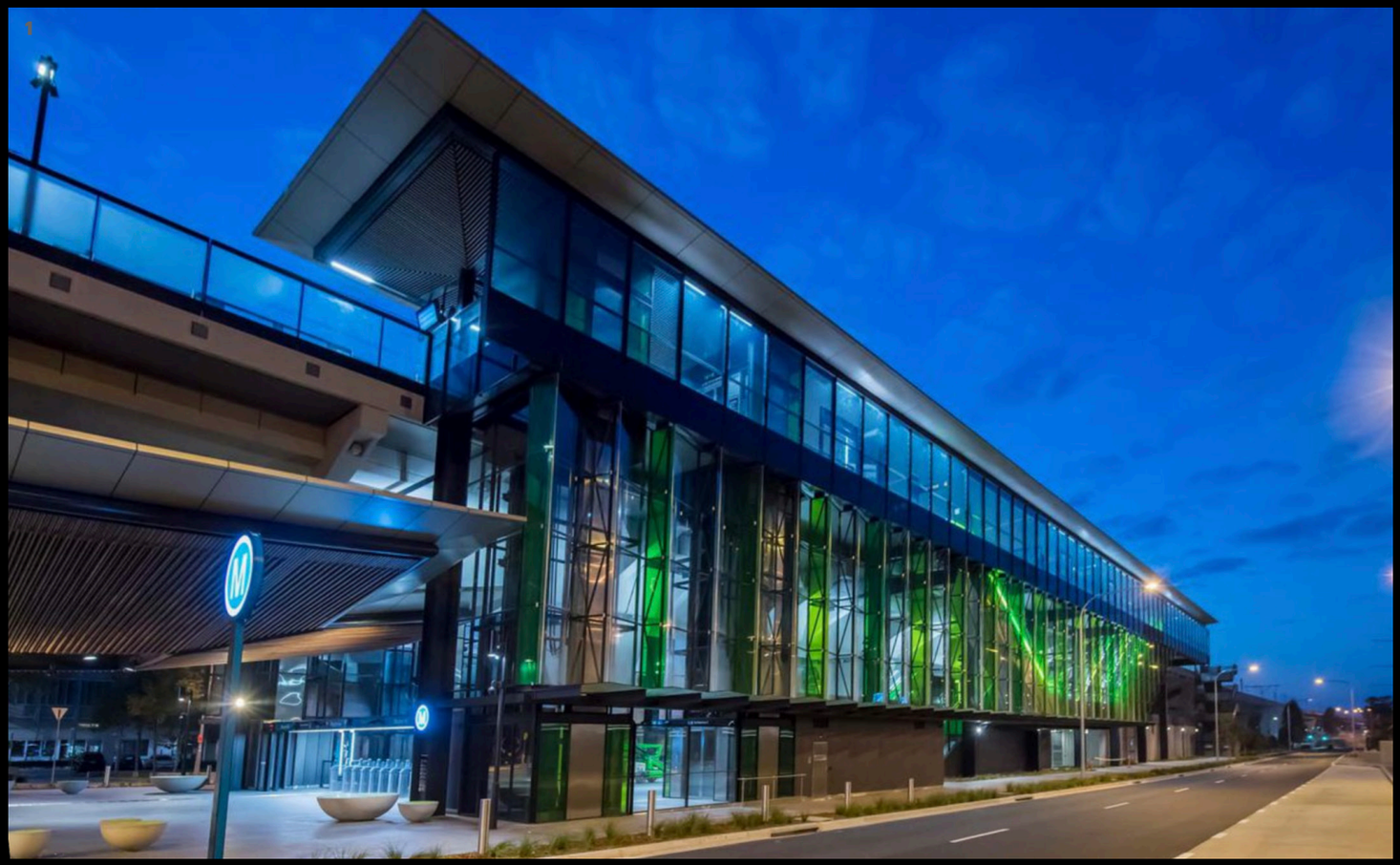
Bang for your buck
Resonance of Light x Sound x Materials

Architectural Physics: yep, we like to work from first principals. Our ideas spring from resolving complex challenges to do with context, appropriate materials & technology, advanced engineering and simplifying construction methodologies.
"More Maths, Less Mass" (Prof. James Murray-Parkes)

1. WCX M4 Parramatta Road, Sydney (designed by Hassell)
Ken combined the role of the boundary security fence and building facades into screen wall made of single skin brick. This allowed us to give part of the site over to the public domain in a form of a generous native landscape buffer along the 3 boundary streets.
2. Service entry at night WCX M4, Sydney (designed by Hassell)
The perimeter brick screen wall opens to create a service entry and provides glimpses inside the Motorway Operations Centre
3. Prototype Testing for WCX M4 (designed by Hassell)
The elements with which we design with are sometimes difficult to capture in a drawing. Scale 1:1 prototypical studies with the full design team and our clients are a key tool in our design methodology.
Images include experience gained under engagement with former practices.

City making projects
Infrastructure delivering value

Well designed infrastructure delivers a memorable sense of place. We base design on stitching into, and/or healing the prevailing context. That context includes climatic geographic, urban and of course political. We look for what's missing. When do our work well, the by-product is the creation of higher value real-estate for our clients & stakeholders.



1. Showground Station Metro Northwest, Sydney (designed by Hassell)
Post tender, Ken lead the architectural design including providing an alternate design for this viaduct typology that was more cost effective and more suited to its urban context.
2. Kansai International Airport (designed by Renzo Piano Building Workshop)
Built during the "bubble economy" we needed to respond quickly with solutions to repeated cycles of Value Engineering.
3. Nokia Facility, Hanoi, Vietnam (designed by PTW VN)
Given the burgeoning manufacturing sector in VN, competition for talent was key factor in Ken's design leadership. He drove the design to include easy access to fresh air, and natural light for the 10,000 workers in this facility of 7ha under one roof.
Images include experience gained under engagement with former practices.

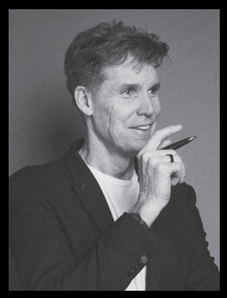
Biophilic & Regenerative design
Designing to heal

Most importantly, underpinning our work is a preoccupation to leave the world a better place than we found it. We like to make our client's children proud of them, for the contribution they have made to saving the planet. And for delivering projects that actually heal us and this finite planet we call earth.

1. St Vincent's Private Hospital Redevelopment, Sydney (designed by Hassell)
Connecting patients to the light, sounds, and street trees of Darlinghurst, Ken drove a biophilic agenda in order that patients at SVPH would heal more quickly.
2. 155 Macquarie Apartments, Sydney (Designed by Renzo Piano Building Workshop)
The low iron glass louvers open like a flower to give occupants unhindered connection to the botanic gardens.
3. 88 Phillip Street, Sydney (Designed by Renzo Piano Building Workshop)
Access to fresh air and night purging were the result of a drive to design a more healthy workplace, a first in Australian commercial property market. The by-product is a more enjoyable & productive workplace. And of course higher returns on the property. (Enlightened self-interest)
Images include experience gained under engagement with former practices.

The Architectural Physics Collaboration

Prof. Ken McBryde
Founder & Design Director



Ken McBryde founded Architectural Physics with the specific intention of working with very selective clients that seek unique and dedicated multi-disciplinary design & advisory services.

His thought-leader in the construction industry results in regular speaking engagements at conferences and contributions to international research projects.

In parallel with professional practice, Ken is involved in ongoing applied research into prefabrication and is Professor of Architecture at the Universities of Sydney & Newcastle

The team at Architectural Physics benefit greatly from the friendship and tutelage of Professor James Murray-Parkes

Kevin Berry TTW
Mass Timber

Kevin is a top bloke and a regular collaborator of ours. Oh yeh, also one of the most talented enginners around, particularly when it comes to timber. After working in NZ and the UK, Kevin has emphatically demonstrated his leadership ability resulting in his appointments to TTW Associate Director, Technical Director and Director in 2017. Kevin leads by example in his relationships with clients, architects, builders and project managers. His extensive project portfolio testifies to his technical ability and engineering foresight. He has contributed to various multiaward winning projects including The Star Casino and has shown his expertise across various fields including education, residential, public, commercial and health.

Dr. John Stehle
Leader advanced science & engineering

John is highly valued & unique contributor to the Architectural Physics team, leading our specialist endeavours in advanced science and engineering.

John is responsible for the development of innovative technical solutions for a range of our projects. An internationally experienced structural engineering expert, John has worked on an impressive range of major engineering projects for over 20 years. He is widely recognised as an innovator and a prolific inventor of construction products and solutions.

He regularly speaks at local and international conferences and has published many technical papers. He has also contributed to the development of technical standards for industry.

James de Vries
Strategic design + communication leadership

James's work sits at the intersection of design, innovation and strategy.

He helps organisations realise the value of design, to harness its unique strengths across disciplines and join strategy and design outcomes.

Recently James has worked as a strategy consultant building Strategic Vision for clients. He is an experienced advisor in design and design management, and he has worked around the globe with organisations to position their visual communications and build strong design cultures for competitive advantage.

James also works with UTS faculty of Design and is currently building a suite of courses on 'The Business Power of Beauty'.

Sue Francis Cityplan
Approvals Risk & Pathways

Sue helps us assess the level of risk that alternate designs may present. This permits our clients to make informed decisions on our independent design work. As a professional planner who has worked at an executive level both in the public and private sector, Sue has invaluable skills in terms of input and consideration of projects and planning issues. These skills relate to the interpretation of planning legislation and its application and also to regulatory and procedural reform. Sue has had in excess of 40 years extensive experience in local government in New South Wales and the United Kingdom. She has worked at executive levels at Woollahra, North Sydney & Warringah Councils where her expertise in planning policy, statutory planning, regulatory, structural & organisational reform has seen her appointed to several significant State Government advisory panels.

Ken Eppleston EPES
Services Engineering Lead

Ken is an experienced mechanical engineer with 20 years of vast project experience across a wide variety of sectors and types. He has delivered projects in Australia, the Middle East, and South East Asia.

He recognises the importance of the link between complexity and practicality in modern projects, and the importance of clear communication between design engineers and contractors. Ken is passionate about the efficient use of resources in our built environment and finding new ways to do more with less.

He is a Fellow of Engineers Australia and Chartered with Engineers Australia and the Institute of Mechanical Engineers UK.

“Ken’s designs don’t come from books of other people’s work and what is more remarkable is that they don’t just come from his imagination either.

On many occasions I’ve personally witnessed his ideas come to life, and it’s from his intimate and intuitive relationship with our earth and it’s inhabitants that they spawn. Ken’s designs aren’t forced upon his clients, they are carefully interpreted from what his clients want and then sculpted into our planet...

...Ken is truly unique, as he is fluid and genuinely in touch with his clients’ wishes. His amazing ability to complement those wishes into our planet is his gift to all of us. Ken McBryde, an artist, interpreter and architect for the ages.”

Prof. James B. Murray-Parkes
Technotia Laboratories
CEO & Chief Scientist
Newcastle & Melbourne,
Australia

Technotia is an exclusive Brookfield Asset Management research group.
James is also a qualified structural engineer and has influenced and/or been responsible for over 30 patents and more than 1100 major projects.