BUILDING INFORMATION MODELLING & DIGITAL TECHNOLOGIES

RLB | Rider Levett Bucknall

INDUSTRY TRANSFORMATION

Digital engineering and technological advancements are fundamentally impacting the built environment and transforming the way our industry operates. Rider Levett Bucknall (RLB) understands that this presents enormous challenges but also immense opportunities for our company. RLB remains a catalyst for change, promoting a culture of innovation to ensure that we are strategically positioned to benefit from a digitalised built environment.

With a significant increase in global construction output anticipated over the next 5 years,

the need for efficient processes is required to meet the demand.

Emerging technologies and digital advancement in the industry are therefore essential. RLB has identified and invested in a range of technology to enhance the delivery of services to our clients.

OUR POLICY STATEMENT

RLB is committed to the implementation of Building Information Modelling (BIM) and other emerging technologies. We fully support collaborative working environments, to enhance transparency and rising standards within the built environment.

We focus on driving change

to achieve the benefits of an integrated digital process allowing us to focus on exceeding our clients' expectations.

OUR
APPROACH

RLB embraces BIM and we are working within BIM environments across all of our service areas.

To support this change in our working environment, RLB has developed its own in-house software which interfaces with numerous file formats created by common software used by designers and consultants. Our software also dynamically links to our extensive cost database creating an integrated and consistent service for our clients. We conduct in-house training to RLB staff in BIM and emerging technologies, and we have developed training manuals to up skill our Cost Managers, building surveyors and project managers in the principles and day-to-day benefits of BIM.

INTEGRATION

Through existing and new relationships, RLB has collaborated with design teams to fully understand how designers input data and information. This knowledge allows effective communication on both our requirements and expectations, to meet a common goal for the client and ultimately achieve the best outcome for the project. Our in-house specialised software enables us to link the model parameters, creating efficiencies and productive outcomes.

GLOBAL EXPERIENCE

RLB has invested over a decade of research and development in BIM, and is leading the implementation of BIM and emerging technologies that support cost planning, procurement and cost management throughout the whole project cycle. RLB has a dedicated Global Digital Advancement Committee which pools international knowledge and skills within the organisation, and distributes it throughout an established global network. The committee also has dedicated subgroups that focus on the production of standardised protocols, training strategies and implementation, analytical thinking of models and the information received within them. These subgroups also oversee the super-user groups and facilitate a BIM and technology forum for RLB globally.

OUR DIGITAL TECHNOLOGY

ROSS 5D

ROSS 5D is a leading-edge in-house software tool for planning, estimating, and bills of quantities. It integrates data from numerous sources, including BIM models that RLB cost records, enabling on-screen analysis, benchmarking and flexibility reporting project estimates.

RLB Pulse

RLB Pulse is project/contract management, in-house software that ties the financial modelling of a project from inception to completion into one robust package that provides clients with a real-time picture of their budget, expenditure and financial commitments and risks.

RLB Focus

A dashboard reporting tool that provides specific client analysis and analytics for project portfolios.

RLB Field

Our in-house tablet/mobile application that provides RLB staff with the ability to capture client data live on site.

RLB has always been an innovator in the production of custom cost management software. Nearly 40 years ago, during the transition from paper-based processes, we started writing our own software systems to automate the production of estimates, bills of quantities and financial reporting.

Since then, we have continued to invest in in-house software and now utilise four softwares, ROSS 5D, RLB Pulse, RLB Focus and RLB Field. We also have an RLB app that provides on-the-go cost advice.

Developed within RLB, the software is being utilised in various parts of the world. A current team of six software developers are employed permanently, improving and adding to the functionality of the software. We have a Global Digital Advancement Committee and numerous regional digital advancement, IT and BIM Committees. All these groups and individuals are dedicated to the common goal of keeping RLB at the leading edge of technology.

RLB has pursued this path after reviewing commercially available products in the market, and determining that we need more power and flexibility in order to provide an outstanding service to our clients. Our software can adapt very rapidly to changes in project and brief requirements, and provides legible and easy to understand reports.

ROSS 5D

Our in-house ROSS 5D software enables us to prepare accurate cost plans, estimates and bills of quantities from diverse information sources including 2D and BIM models, illustrations, data sheets and other project documentation.

We have invested our intellectual property and finances over many years to develop ROSS 5D as a dedicated software that supports the BIM process by using digital design data to accurately estimate quantities, within a live electronic environment. The ROSS 5D software is capable of a dynamic review of the 3D models and its data by allowing the user to manipulate the models. It allows us to turn on and off layers, elements and parameters in the data, and also to cut through sections as required to give RLB the opportunity to investigate the models before any quantity take-off is undertaken.

ROSS 5D is a unique tool that enables RLB staff to model map the data contained within BIM to produce an accurate and efficient quantity take-off process, reducing physical measuring time. The model mapping process is versatile and a user-friendly process gives RLB staff the ability to pull parameters, as entered by the design teams, in the native files through to our front-of-house reporting in ROSS 5D to give our clients a tailored set of data for their projects.

ROSS 5D is a cutting-edge software with the powerful ability to download data from a BIM file while we attach our own specific data to the existing parameters and reupload it to the model for an enhanced take-off process. This feature means that RLB can utilise existing and updated quantities to produce value add reporting for our clients. RLB has templates pre-set to provide a consistent and standardised take-off process. This can then be altered as required for any specific project issues and tailored to suit the client reporting requirements.

Within ROSS 5D we have a variables function that allows the entry of standard metrics in our cost reports and estimates which are linked to the quantities produced from the BIM files. This marriage gives RLB a commanding and adaptable cost planning tool (ie identifying cost per no. of cars, beds, units, m^2 etc).

Through the design process, ROSS 5D has the ability to report against revisions of documents effectively and with enhanced clarity. The revisioning feature allows a BIM file to replace the previous version, and ROSS 5D produces a report on the differences in the quantities of the models, showing on the 3D model, what has been deleted, added and amended, using a traffic light system of colours on the model.

These features, coupled with our dynamic reporting tools, demonstrates that ROSS 5D is at the forefront of cost estimating software.

RLB PULSE

This project/contract management in-house software ties the financial modelling of a project into one robust software package that provides clients with a real-time picture of their budget, expenditures, and financial risks. RLB Pulse boasts inclusive vendor interaction, and gives overviews of change orders, cashflow forecast, currency conversion for international projects, and it ties in with ROSS 5D for benchmarking.

RLB FOCUS

Our in-house business intelligence solution is RLB Focus. This business intelligence dashboard reporting service provides specific client analysis and analytics for their projects and portfolios. It provides visually engaging, interactive reports that can be accessed across desktop, mobile and tablet platforms. RLB Focus fully integrates with ROSS 5D and RLB Pulse data with live links.
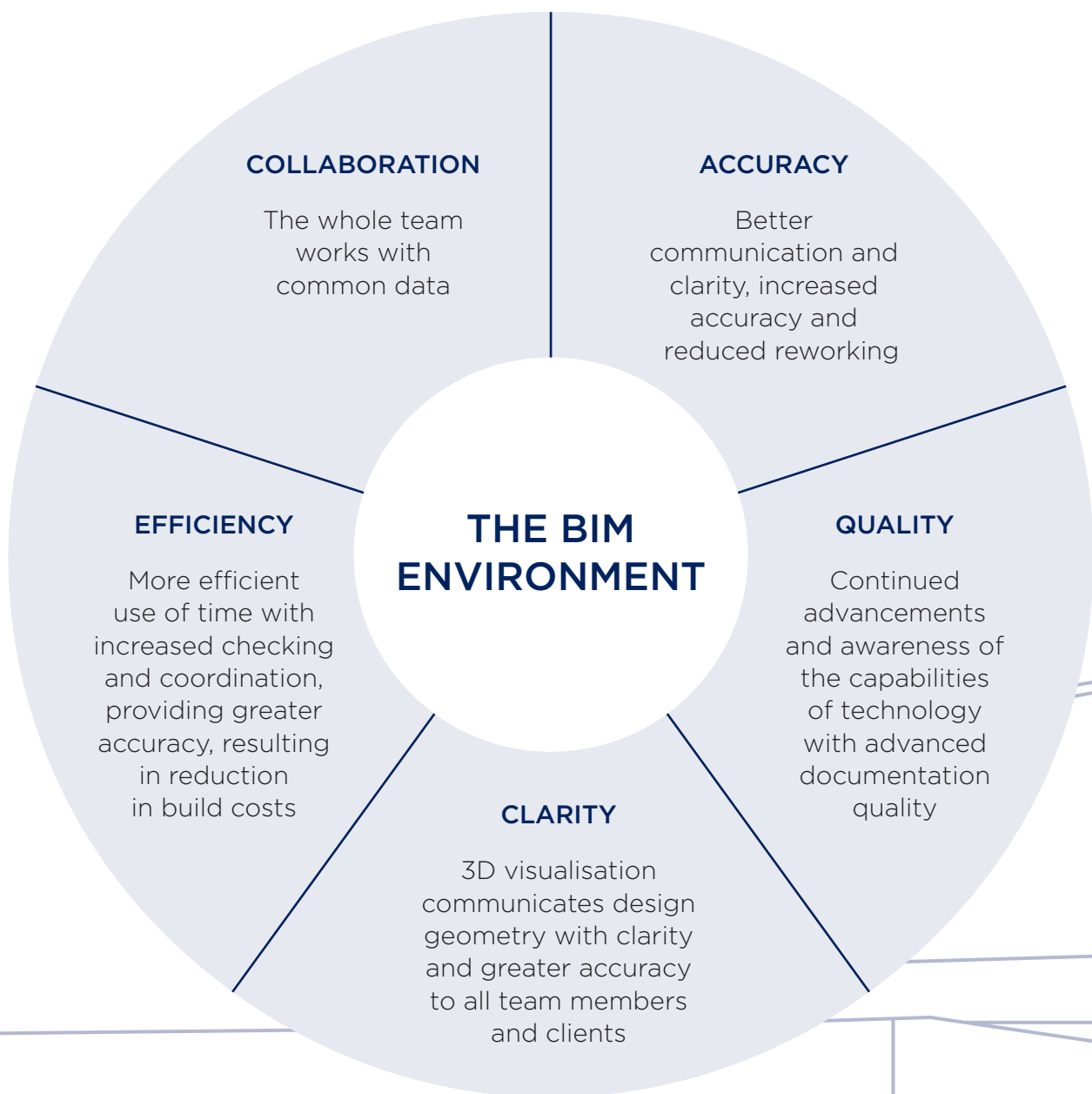
RLB FIELD

Our tablet-based solution enhances the productivity of our staff by collecting data electronically, eliminating the need for paper based data collection and/or reports. The system has pre-defined fields, rules and selection options. It provides a more consistent and accurate method for capturing data. The system is flexible so that each data capture form is tailored for the customer and project and can be used for a wide range of data types.

We also have a library of guide presentations and documents to help those involved in BIM and emerging technology-related projects, both internally and externally. These guides and documents include; BIM Execution Plans (BEP), model export instructions, software extraction requirements, client guides, design team guides and design team collaboration requirements.

BENEFITS OF THE BIM ENVIRONMENT

BIM represents a massive opportunity for our industry to improve the effectiveness and efficiency in various aspects of design, construction, operation and maintenance. RLB believes projects are rapidly moving towards an Integrated Project Delivery (IPD) approach. This move will see further procurement benefits as all stakeholders collaborate and share risks / returns to achieve optimised outcomes.

THE BIM ENVIRONMENT

COLLABORATION

The whole team works with common data

ACCURACY

Better communication and clarity, increased accuracy and reduced reworking

EFFICIENCY

More efficient use of time with increased checking and coordination, providing greater accuracy, resulting in reduction in build costs

QUALITY

Continued advancements and awareness of the capabilities of technology with advanced documentation quality

CLARITY

3D visualisation communicates design geometry with clarity and greater accuracy to all team members and clients

USES & BENEFITS OF OUR BIM SOFTWARE

Cost planning and estimating

Value engineering

Cashflow projection and financial management

Quantity take-offs

Bills of quantities

Interim payment valuations

Design visualisation

Change management

Model investigation

Planning / Scheduling / Programming

Improved control and coordination

Reduced project administration

Highlights clashes during construction

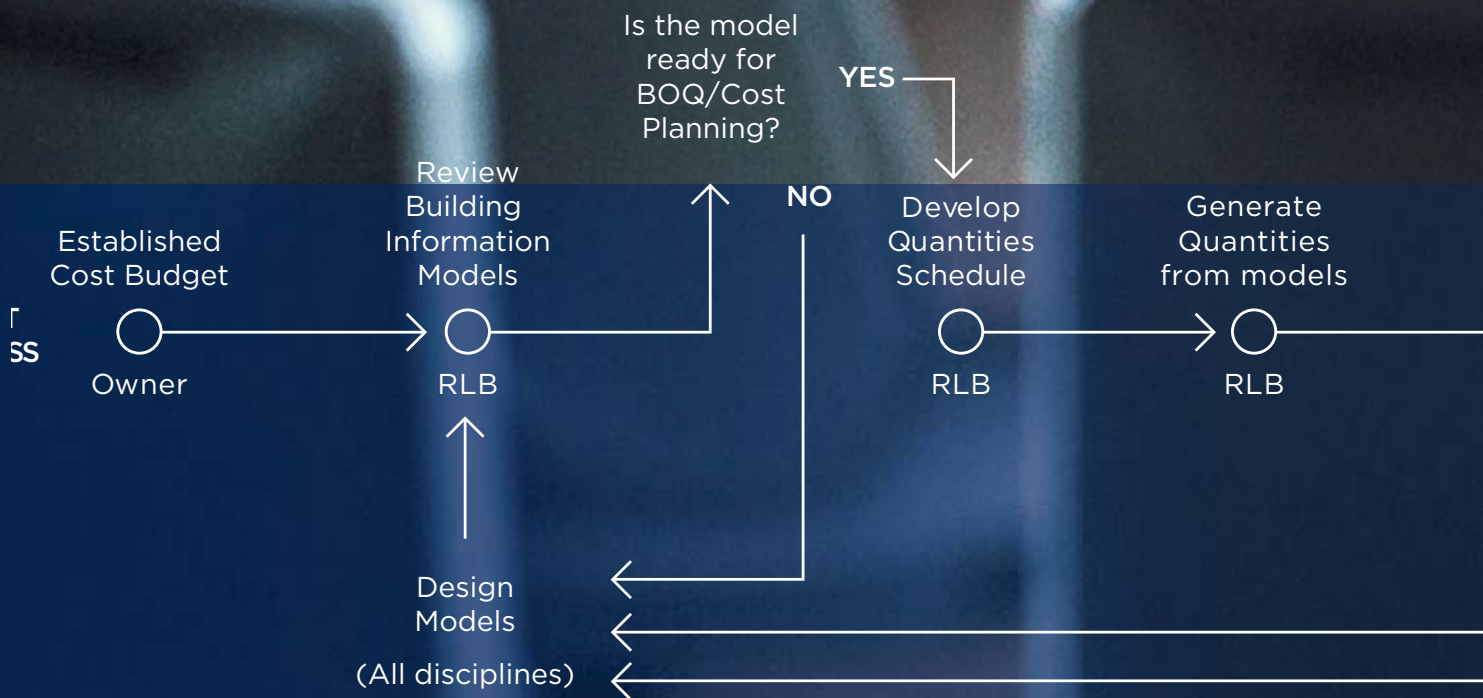Final account settlements

Reduced reworking

Minimises potential claims

Saves time and money

WE UNDERSTAND BIM

RLB understands BIM and has tested protocols and guidance in place for BIM projects. When appropriate our approach is that each BIM project has a dedicated BIM Champion. Each champion takes the lead role throughout a project to coordinate and collaborate with the other BIM Coordinators of the design team, to ensure the requirements of the cost consultant are incorporated in the BIM models without jeopardising the project's BIM goals.

Below is an outline of how RLB BIM Champions and superusers integrate throughout the design phases:

Q Preparation/
t Estimation

Is the model ready for BOQ/Cost Planning?

YES

NO

Established Cost Budget	Review Building Information Models		Develop Quantities Schedule	Generate Quantities from models
Owner	RLB		RLB	RLB

Design Models

(All disciplines)

Perform
Quantity QA
Sanity Check

YES

Are the results
acceptable?

NO

BOQ/Cost
Planning

○

RLB

Review Cost
Results

○

RLB

Incorporate Fees,
Contingencies,
other costs

○

RLB

On budget?   **YES —**

NO

PF

Value
Engineering

○

All disciplines

OUR BIM
SERVICE

When providing our service on BIM projects, we are able to investigate the model, identifying inconsistencies and raising queries for clarification by the design team, which will ultimately help the contractor in reducing risk, variations and cost of a project.
It will also set the foundations for clients requiring asset models.

In 2020, RLB in the UK was **the first specialist cost consultancy in the world to obtain the BSI Kitemark for 'BIM Design and Construction'** with international standard BS EN ISO 19650:2018

bsi
BIM
Design and
Construction
KITEMARK™

BIM EXECUTION PLAN (BEP) AND DOCUMENT INPUT

This provides advice and input into the documents as they advance from a cost consultant's perspective. BEP input will include (but not be limited to) project specifics, software requirements, level of information/development needed at each stage, as well as the appropriate standards, guides and references to be incorporated, measurement requirements and input for the model structure.

DESIGNER LIAISON

The BIM requirements for cost estimation in the draft BEP, often need careful liaison with the designers, project managers and BIM managers at particular stages of the project in order to effectively communicate specific issues that need to be solved to meet the BEP objectives. RLB's BIM Champions can provide lessons learnt and efficiencies in the BIM process from previous BIM projects for consideration by designers and the project team.

This communication is fundamental to ensure all parties fully understand the importance of a standardised approach to the level of detail, object presentation, standard naming convention and adopting a consistent approach to classification. This will result in the design team (model element author) clearly understanding why we, as cost consultants, require certain information at each data drop and how we use that information to strike the right balance between too much or not enough. Hence, the importance of providing clear requirements from the outset in the BEP is vital to achieving collaboration and interoperability.

MODEL REVIEW AND INTERROGATION

At specific design stages, the RLB BIM Champions will review and interrogate the model in the first instance prior to issue to the wider RLB team for take-off and quantity extraction. During review and interrogation, the RLB BIM Champions will check for accuracy, completeness and to ensure that the BEP requirements are properly incorporated, including the LOD requirements as set out in the BEP.

RLB completes internal quality control checks (visual check, information requirement checks, interference check, standards check and model integrity checks). RLB will communicate with the relevant model element author if the model does not coordinate with agreed information requirements and prevents RLB from meeting their deliverables.

INTERNAL COORDINATION

Once issued to the wider RLB team for quantity take-off and cost estimation, the RLB BIM Champions will coordinate the extraction process to capture all relevant and accurate data from the model. The RLB BIM Champions will provide any additional training software advice to the RLB team. The BIM Champions will communicate to the wider RLB team the findings from interrogation which may include any gaps or accuracy issues with particular modelled elements.

NATIONAL AND GLOBAL COORDINATION

The BIM Champions within RLB have formed an international network that enables them to collaborate on emerging technologies and share advice on the best approach to utilising BIM and solving project specific issues.

>300

RLB BIM projects
completed globally

'RLB shares project data and lessons learned and **uses BIM as a facilitator to work collaboratively with the design team and clients** to create positive working relationships.'

OUR BIM CAPABILITIES

RLB has been involved in hundreds of BIM projects globally. RLB is proactive and dedicated to training its users for BIM and other integrated technology, through seminars and webinars, training videos, and step-by-step guides. We have trackers and training guides to identify individuals within the organisation that are valuable to the BIM process.

As an industry leader, RLB has both the knowledge and expertise to contribute to projects throughout all phases, from concept design to facility management. Our vast experience includes working with architects, engineers and facility managers across a variety of platforms and BIM software.

RLB consistently leverages our skill sets and tools to realise the benefits of working in a collaborative BIM environment. We are confident that effective collaboration across the project team can provide greater value to our clients and project outcomes.

RLB aims to be involved at the outset of any BIM project as a necessary way of meeting the project's deliverables adequately and efficiently.

We work collaboratively with design teams and avoid the traditional approach, where the cost consultant receives the design late in the process and produces their required output reactively as a 'bolt-on' service. In providing our services we:

- Understand the process undertaken to produce the design, and we utilise the data in the model from an early stage

- Work as part of the design team, enabling them to produce commercially viable projects without stifling their creativity

- Highlight potential issues and strive to solve them before they become a problem

- Encourage joint decision-making, which allows all viewpoints to be considered with a speedier resolution

- Spend time with other project BIM teams to agree on the information required for the agreed outputs, reducing unnecessary reworking
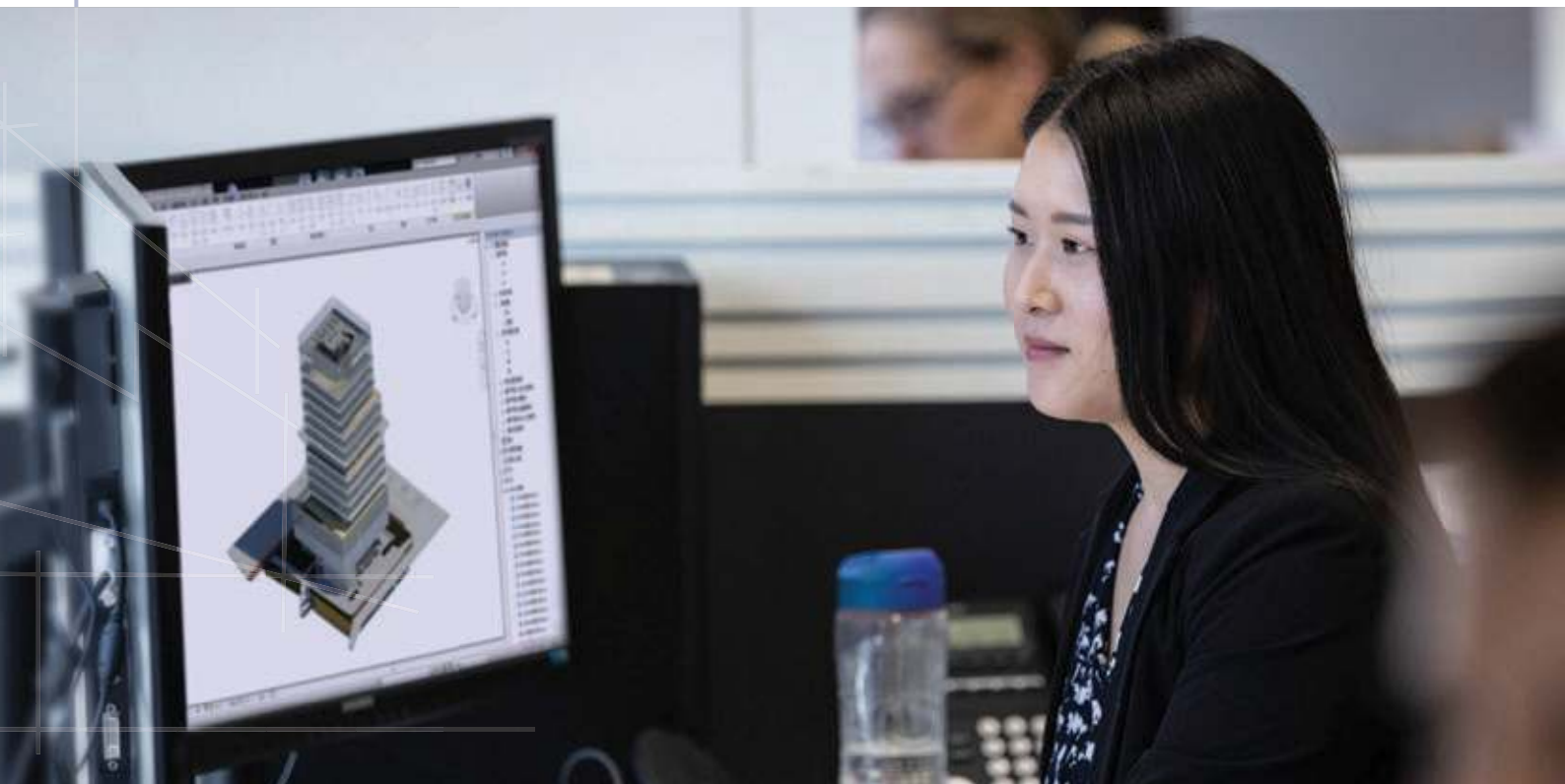
In the past, RLB has found that models do not meet all the requirements for efficient measurement/quantities extraction. Often, these models lack key information necessary for the preparation of cost estimates and bills of quantities.

With early, upfront discussions with the client and design team, alongside an adopted collaborative approach, RLB and the design team can work together to produce mutually beneficial results, and improved deliverables for the project. Consequently, RLB has developed techniques and our own in-house global software, which allows us to work with the BIM model and designers to gain the maximum benefit at each stage of design development.

We have tools that allow us to see all the data in the model, not just that relating to the quantities of the specific object required, as is often the case with standard industry software. Rather than designers adding additional information to the model for elements not yet drawn, we can identify, extract and re-use existing data, enabling us to derive quantities without creating additional work for the designers, and saving time. More cost information can be included earlier than by using standard industry software and techniques. This enables RLB to produce more accurate results, checking the accuracy of data in the model and saving time, allowing us to concentrate on adding value and detail for the client and the overall project.

One of the key challenges when extracting quantities from the BIM model, is to align the extracted information with the measurement requirements for estimating, such as the Standard Method of Measurement and conforming to standard cost classifications. Often data in the model is not entered to align with these requirements. However, RLB finds this challenge as an opportunity to enhance our collaboration and work towards a common goal with the design team.
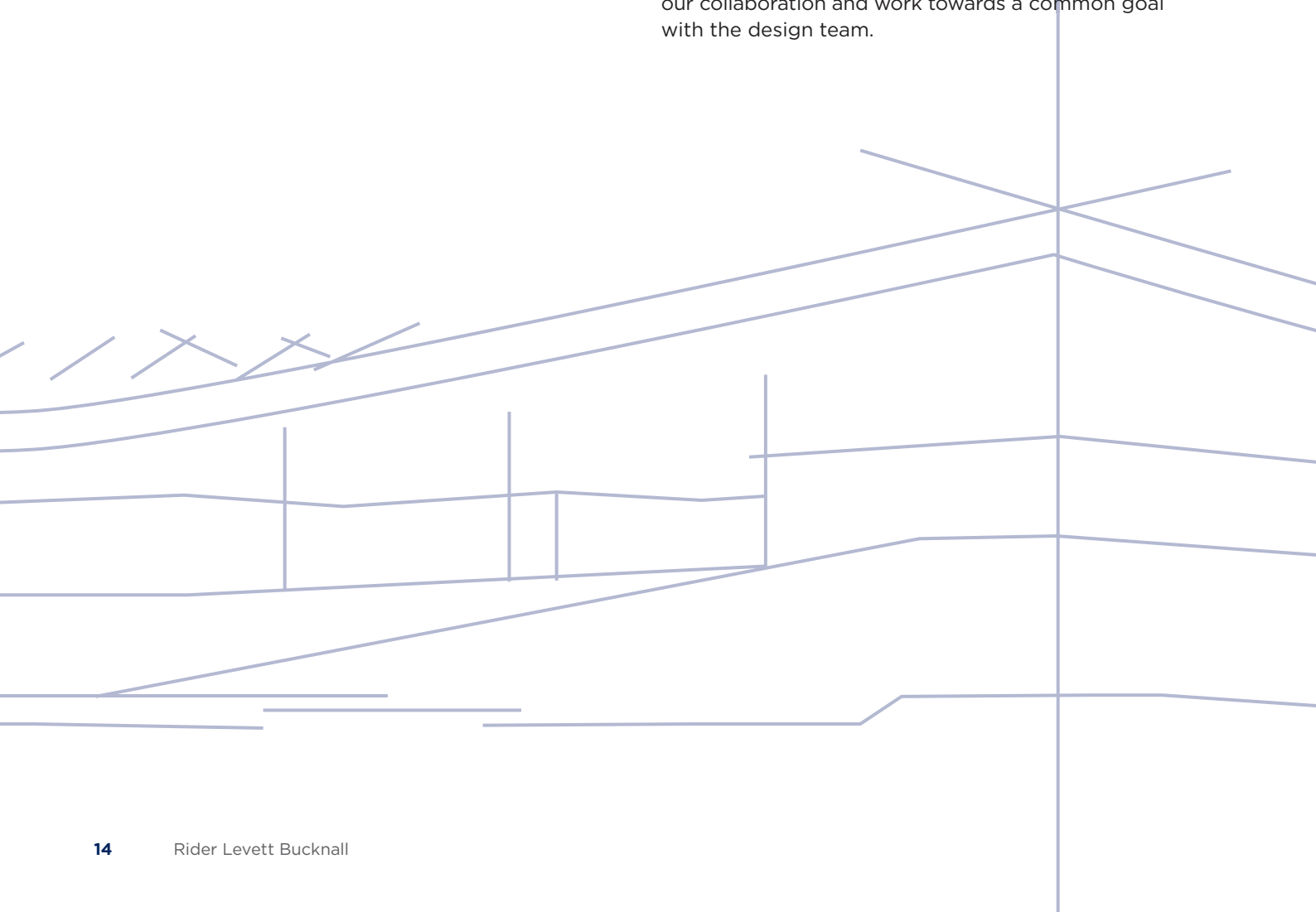
To ensure models are appropriate for quantification purposes, RLB endeavours to:

- Provide input into the BEP at the beginning of a project

- Analyse the model and work with the design team to suggest any additional objects or information required to streamline the process of quantification

- Work collaboratively with the designers and BIM modellers to understand the information contained in the model, and what additional data may be required to speed up the production of the project deliverables

- Discuss with the design team assumptions made regarding composite items, or items with similar quantities, to streamline work flows

- Always aim to minimise any reworking or additional design by using information already contained in the model for multiple purposes. This information is often not visible using standard QS software tools designed exclusively for quantity take-off purposes. We use various BIM software tools, including design tools, to identify and utilise all information contained within the model

- Use our extensive global experience and shared knowledge as Cost Managers, building surveyors and project managers to produce cost plans, estimates and bills of quantities, building surveyor's reports and successful project delivery not captured through BIM processes

- To understand the opportunity a digital twin presents, one must understand the source of data. It is imperative that this data is intelligent, structured and standardised allowing RLB to capture the design team's intent and ultimately position our clients to make informed decisions to efficiently procure, operate and maximise the value of their asset over its entire life

RLB BIM PROJECTS

PHOENIX SKY HARBOR INTERNATIONAL AIRPORT TERMINAL 3 MODERNIZATION

PHOENIX, ARIZONA, NORTH AMERICA

CLIENT	CITY OF PHOENIX AVIATION DIVISION
ARCHITECT	DWL / SMITHGROUP JJR / CORGAN
SERVICES	COST MANAGEMENT & QUANTITY SURVEYING
COMPLETION	2020

RLB utilized BIM to provide independent cost estimating services to validate cost projections submitted by the program team. This three story world-class building of 676,000ft^2 has been refurbished and modernized to improve passenger flow and airline efficiency.
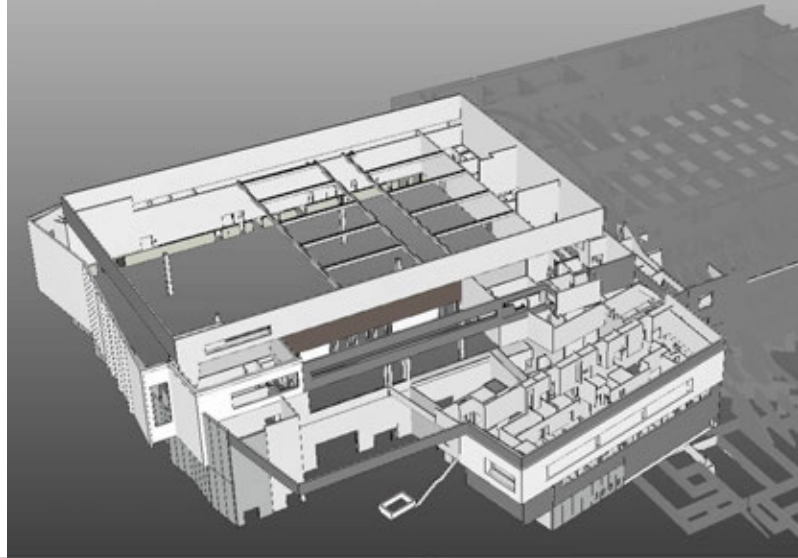
CHAMPION HILL REDEVELOPMENT

LONDON, UK

CLIENT	KING'S COLLEGE LONDON
ARCHITECT	WOODS BAGOT
SERVICES	PROJECT MANAGEMENT, EMPLOYERS AGENT, COST MANAGEMENT & QUANTITY SURVEYING, CDM, BIM & SOFT LANDINGS
COMPLETION	2014

The project consists of the redevelopment of the Champion Hill site in south London to provide 720 new student residences, social and support accommodation on an existing site.
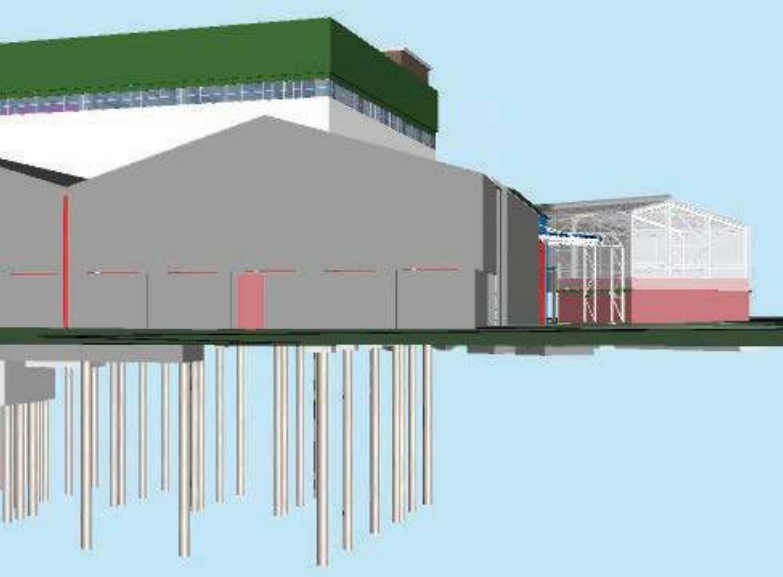
TWINSAVER TISSUE MILL

JOHANNESBURG, SOUTH AFRICA

CLIENT	TWINSAVER
ARCHITECT	NPN ARCHITECTS
SERVICES	COST MANAGEMENT & QUANTITY SURVEYING
COMPLETION	2017

The tissue mill located in Klipriver Johannesburg was designed and built to increase the production of the current tissue mill site.

Various anomalies had to be considered due to unfavourable soil conditions. BIM was used for initial designs, estimates, bill preparation as well as the running cost and closeout of the project.

SAFE CREDIT UNION CONVENTION CENTER

SACRAMENTO, CALIFORNIA, NORTH AMERICA

CLIENT	CITY OF SACRAMENTO
ARCHITECT	POPULOUS
SERVICES	COST MANAGEMENT & QUANTITY SURVEYING, PROJECT MANAGEMENT
COMPLETION	2021

RLB, in association with Conventional Wisdom, is providing providing a variety of services to the City of Sacramento for the renovations project. RLB is responsible for overseeing the integrated planning, design and some construction processes as an extension of the city staff. RLB's management approach includes extensive stakeholder and City Council participation, coordination and presentations. In addition, RLB utilized BIM during design phases for cost estimation services.
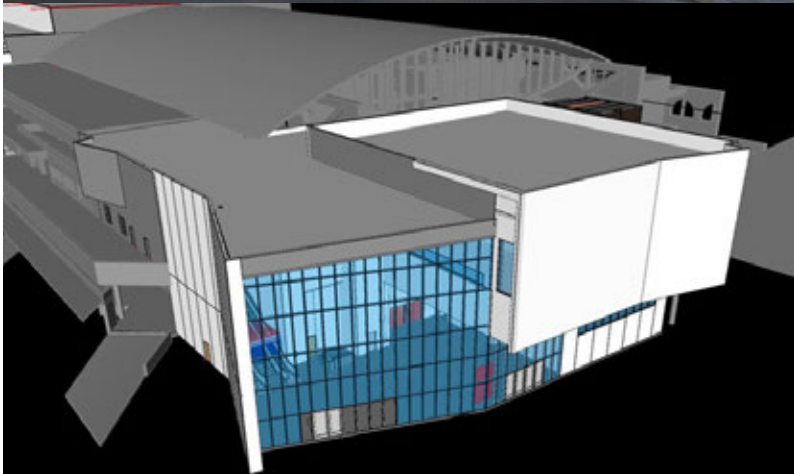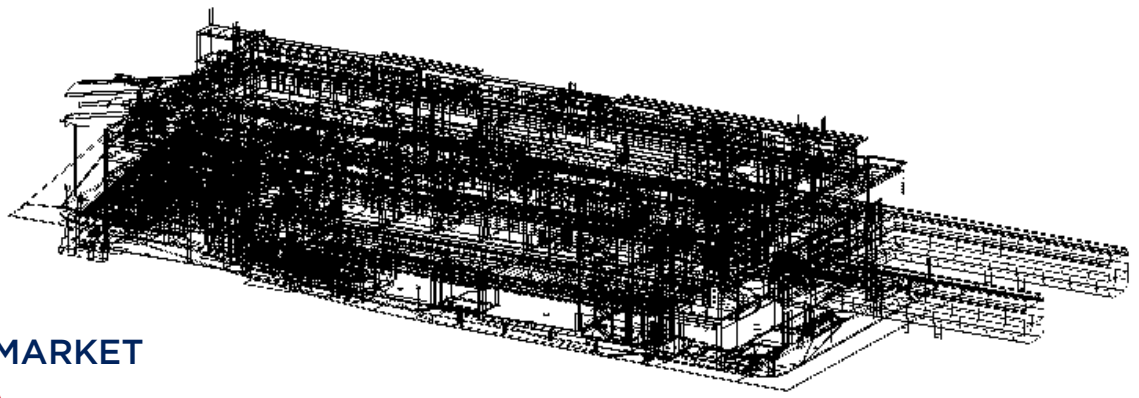
THE CENTRAL MARKET

HONG KONG, CHINA

CLIENT   URBAN RENEWAL AUTHORITY

ARCHITECT   AGC DESIGN LTD.

SERVICES   COST MANAGEMENT &
QUANTITY SURVEYING

COMPLETION   2020/2021

The project will provide a total floor area of 12,900m² including the roof and other ancillary facilities, for affordable cultural and retail facilities.

BIM was used for cost estimates, tender preparation in the pre-contract stage, and it is being used for variations, cash flow and payment valuation in the post-contract stage.
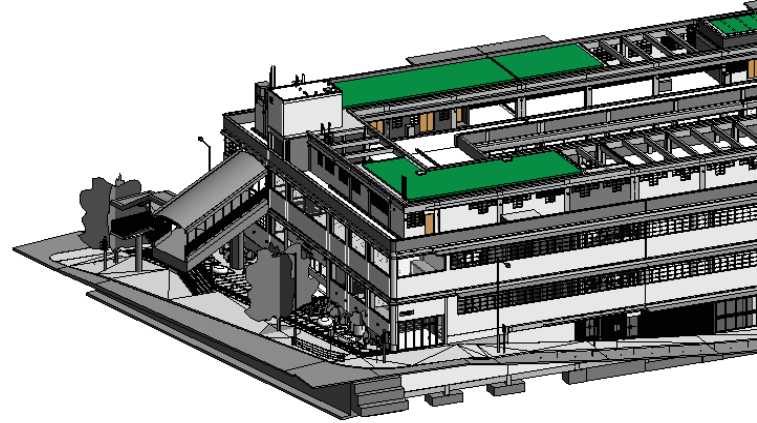
KATHERINE TOWERS

JOHANNESBURG, SOUTH AFRICA

CLIENT	ALCHEMY PROPERTIES
ARCHITECT	PARAGON ARCHITECTS
SERVICES	COST MANAGEMENT & QUANTITY SURVEYING
COMPLETION	2019

Commercial building of 23 000m² GLA, including parking built to accommodate multiple tenants. It is a single-phase development in the heart of Sandton.

BIM was used for structural remeasurements in order to settle valuations and final account purposes.
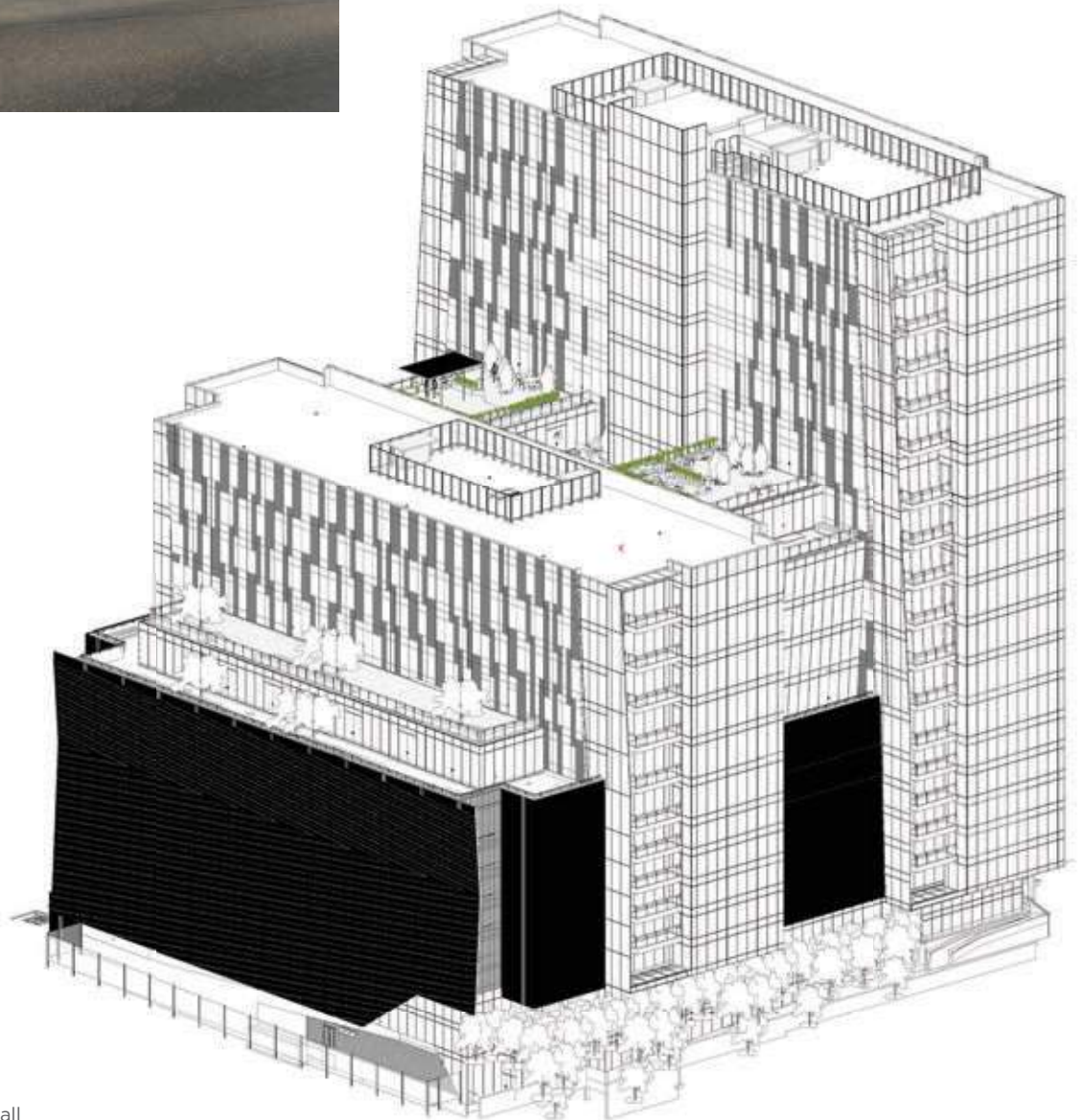
FULFILMENT CENTRE

DURHAM, UK

CLIENT	INTERNATIONAL ONLINE RETAILER
ARCHITECT	SMR ARCHITECTS
SERVICES	COST MANAGEMENT & QUANTITY SURVEYING
COMPLETION	2021

The project consists of the development of a 2 square feet multi-level fulfilment centre, welfare and office facilities, hgv dock doors, truck parking, bus park and associated car parking.

HAMPTON GARDENS SECONDARY SCHOOL

PETERBOROUGH, UK

CLIENT	PETERBOROUGH CITY COUNCIL
ARCHITECT	FRANK SHAW ARCHITECTS
SERVICES	PROJECT MANAGEMENT, TECHNICAL ADVISOR, COST MANAGEMENT & QUANTITY SURVEYING, BIM & SOFT LANDINGS
COMPLETION	2017

The project consists of a new 1,200 place secondary school with 200 place Sixth Form Provision. RLB undertook to deliver key BIM roles to the scheme: Fully compliant level 2 BIM model at handover (PAS 1192:Part 2) as a 3D Design model and a separate data model, soft landings strategy using the BIM Data model as the validation mechanism, a fully populated CAFM model with all asset data and PPM schedules which are linked to the electronic O&M manual. The COBie format was used as one of the data transfer mediums between the BIM model and CAFM system.

EDGE CULTURE CENTRE

SHANGHAI, CHINA

CLIENT K. WAH GROUP

ARCHITECT JIANG ARCHITECTS & ENGINEERS (JAE)

SERVICES COST MANAGEMENT &
QUANTITY SURVEYING

COMPLETION 2020

This 27,500m² shopping mall in Shanghai is where BIM was used for design, construction and facility maintenance purposes. A VR room was set up for clients/customers to view the space and progress of the building via virtual reality.
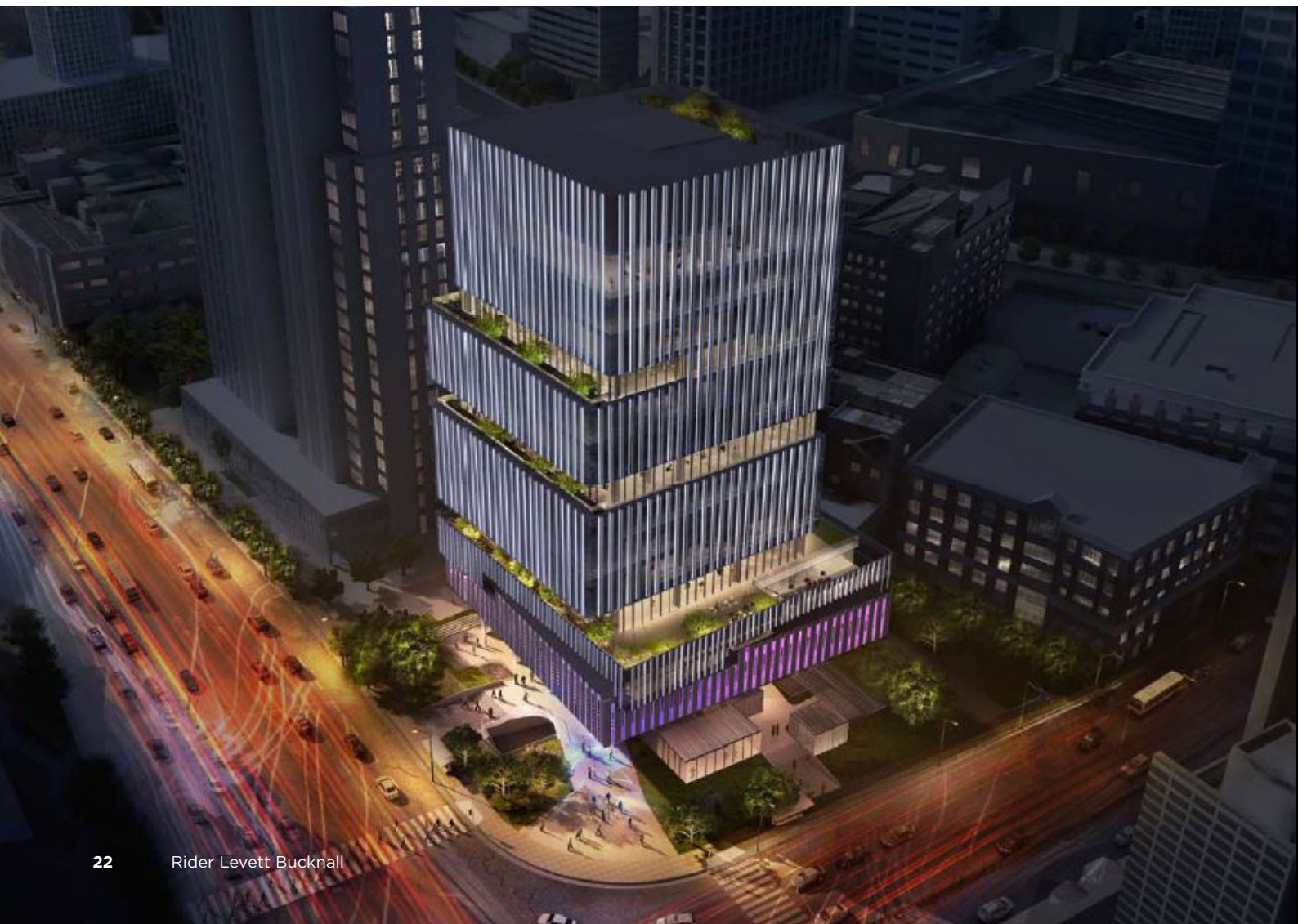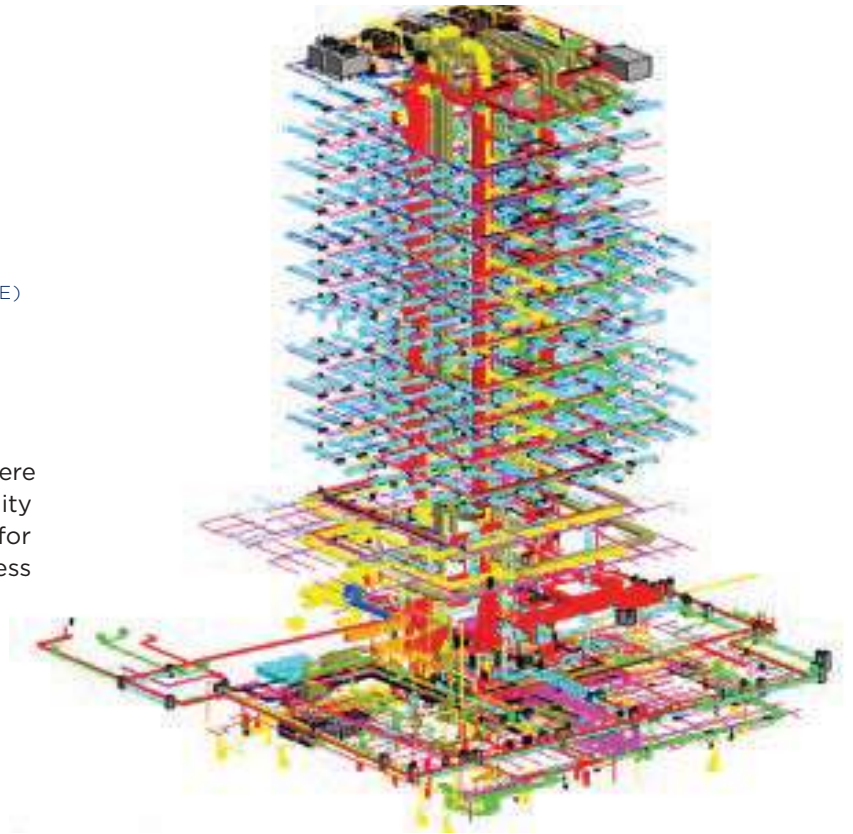
JEANELLA SOUTH CHICKEN FARM

GOOLGOWI, AUSTRALIA

CLIENT	PROTEN/COMMONWEALTH BANK OF AUSTRALIA & RABOBANK AUSTRALIA
ARCHITECT	SOUTHERNVALE HOMES
SERVICES	BANK REPORTS
COMPLETION	2016

Development consists of the construction of 16 chicken broiler sheds together with workers accommodation and associated support buildings and infrastructure. Drones have been deployed to facilitate and speed up progress claims, with photos used to improve holistic views.

IP9, IPORT

DONCASTER, UK

CLIENT	VERDION GROUP LTD.
ARCHITECT	AJA ARCHITECTS
SERVICES	PROJECT MANAGEMENT, COST MANAGEMENT & QUANTITY SURVEYING, EA AND CDMA
COMPLETION	2020

The project consists of the development of a 784,000 distribution facility including ancillary welfare and office facilities, hgv dock doors, truck parking and associated car parking.

# AUSTRALIAN NATIONAL UNIVERSITY – RESEARCH SCHOOL OF PHYSICS

CANBERRA, AUSTRALIA

CLIENT	AUSTRALIAN NATIONAL UNIVERSITY
ARCHITECT	HASSELL
SERVICES	COST MANAGEMENT & QUANTITY SURVEYING
COMPLETION	STAGE 1 – 2021; STAGE 2,3,4 – ESTIMATED 2030

The renewal and redevelopment is done over a four-phase masterplan where RLB is using BIM for cost planning, extraction of bulk quantities for market response as well as the extraction of structural components, façade and finishes.

Total GFA Stages 1-4: 43,500m² comprising high-end laboratory, workshop, offices and auditorium with new build and refurbishment.
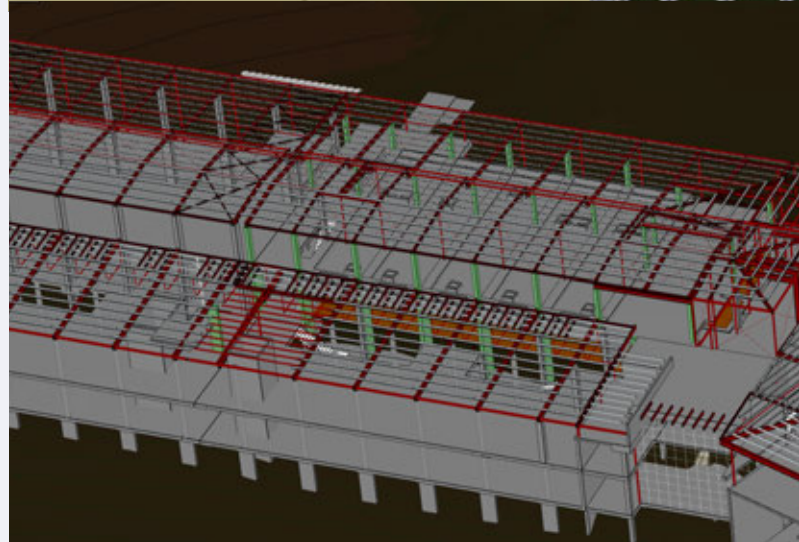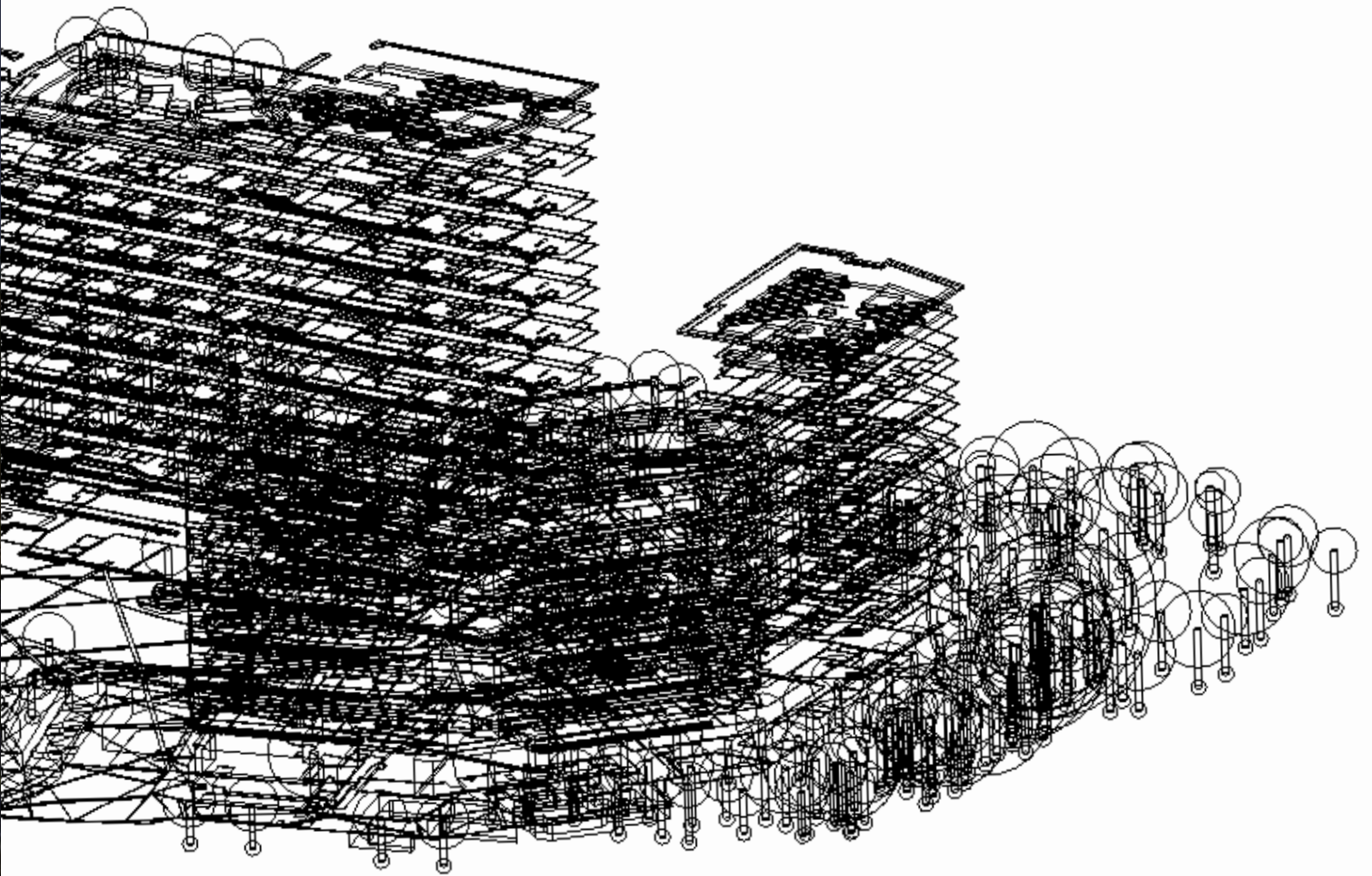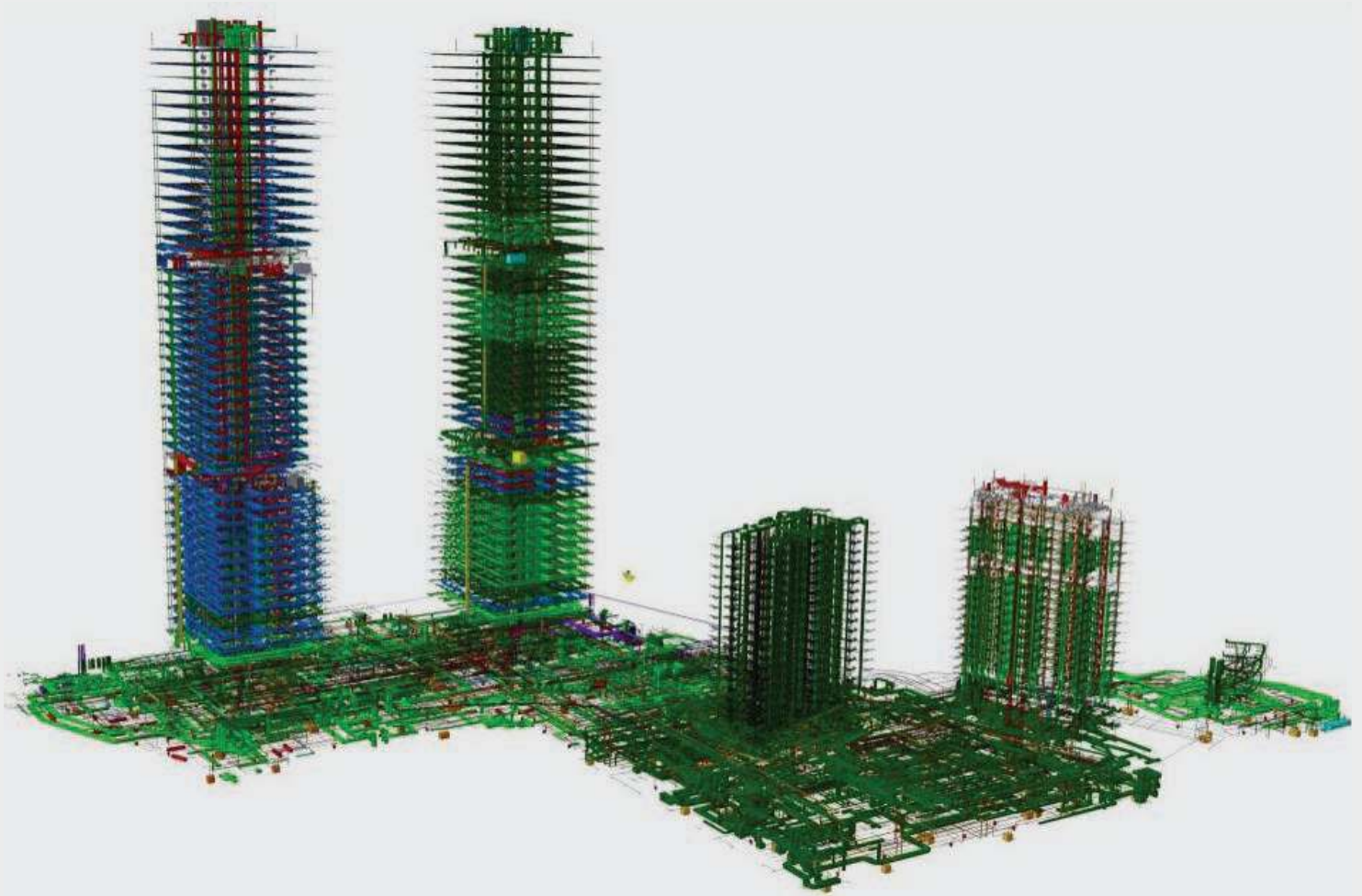
HSUHK JOCKEY CLUB RESIDENTIAL COLLEGES

HONG KONG, CHINA

CLIENT	THE HANG SENG UNIVERSITY OF HONG KONG
ARCHITECT	WONG & OUYANG (HK) LTD.
SERVICES	COST MANAGEMENT & QUANTITY SURVEYING
COMPLETION	2015

The residential colleges comprise three blocks, providing 400 accommodation rooms with 1,200 bed spaces.

BIM was used for structural remeasurement including the checking of BIM quantities extracted in compliance with the standard method of measurement.

ONE ISLAND EAST

HONG KONG, CHINA

CLIENT	SWIRE PROPERTIES LTD.
ARCHITECT	WONG & OUYANG (HK) LTD.
SERVICES	COST MANAGEMENT & QUANTITY SURVEYING
COMPLETION	2008

Located at the centre of Taikoo Place, One Island East is the tallest building in the eastern area of Hong Kong Island. The 70-storey office skyscraper consists of over 140,000m^2 in GFA.

The project was aided by 3D BIM. RLB prepared the bills of quantities by using the BIM models provided by the client. This is the first project in Hong Kong using such high-tech software.
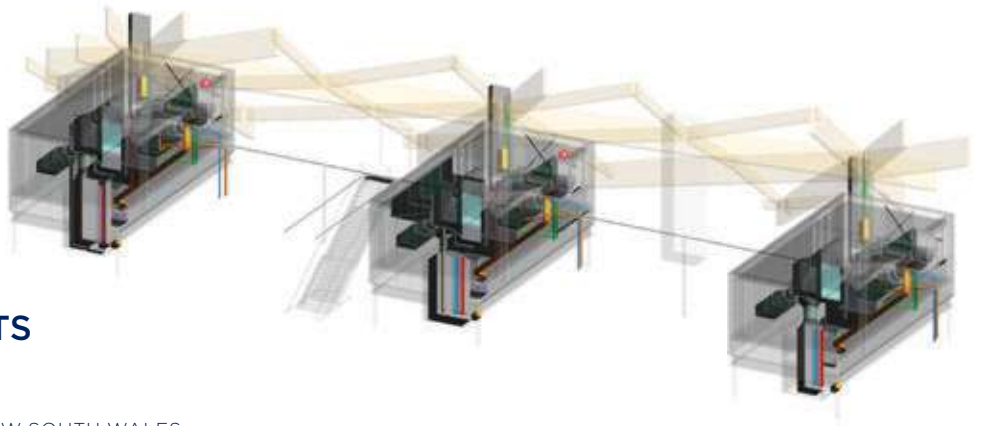
SYDNEY FISH MARKETS

SYDNEY, AUSTRALIA

CLIENT   INFRASTRUCTURE NEW SOUTH WALES

ARCHITECT   3XN/BVN

SERVICES   COST MANAGEMENT & QUANTITY
                    SURVEYING, ADVISORY

COMPLETION   2024

The new 68,000m^2 Sydney Fish Markets will have a contemporary urban design and provide unique experiences for visitors as well as world-class auction and wholesale facilities, a new foreshore promenade, and wharves. RLB utilised BIM for cost planning, extraction of bulk quantities for market response, as well as the extraction of structural and services engineering components.
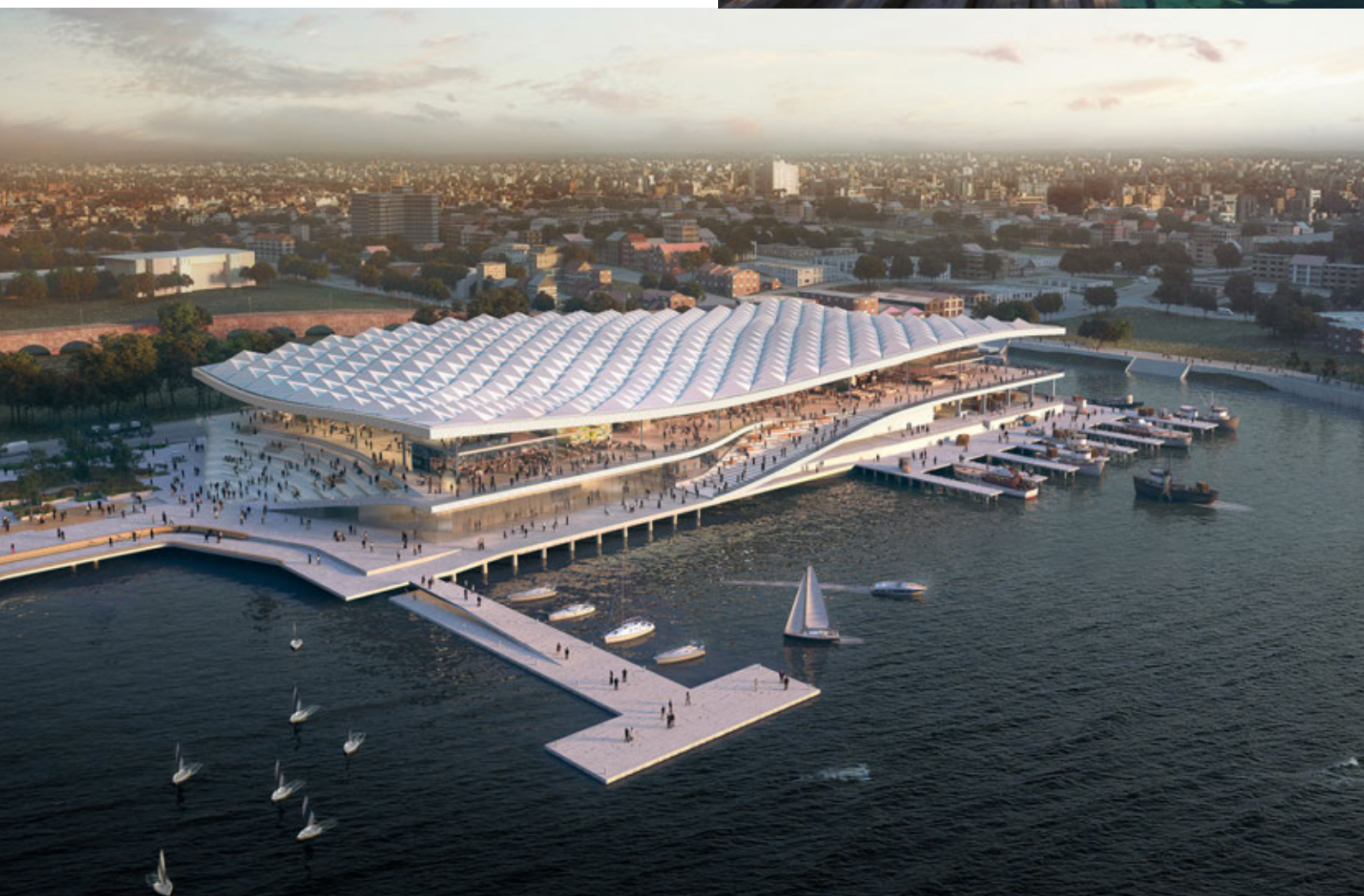
HIGH PARK RESIDENCES, SINGAPORE

SINGAPORE, SINGAPORE

CLIENT FERNVALE DEVELOPMENT

ARCHITECT P&T CONSULTANTS

SERVICES COST MANAGEMENT & QUANTITY SURVEYING

COMPLETION 2019

Large scale condominium consisting of 6 residential blocks with an average of 24 storeys each, strata landed units, basement carparks, communal facilities and retail units.

BIM was used for multidisciplinary design coordination, progress claim valuation, virtual mock ups and virtual design construction (VDC) simulation. High Park Residences achieved an industry award of Gold standing at the BCA BIM Awards.
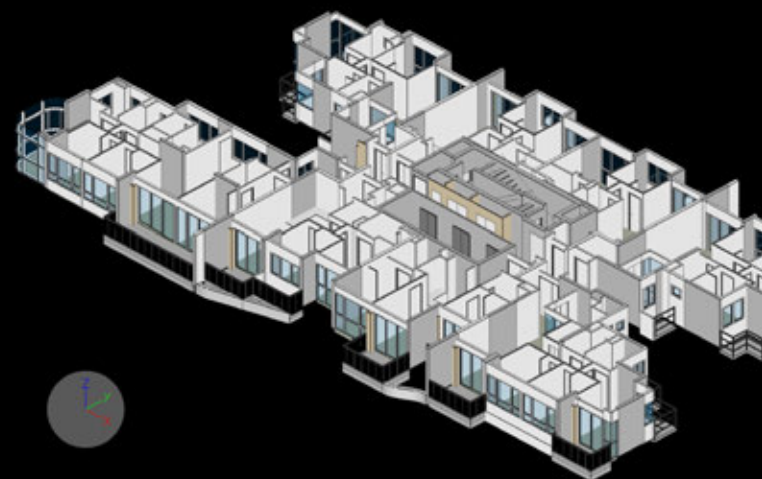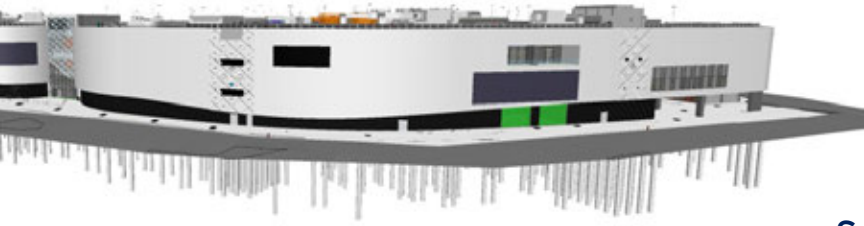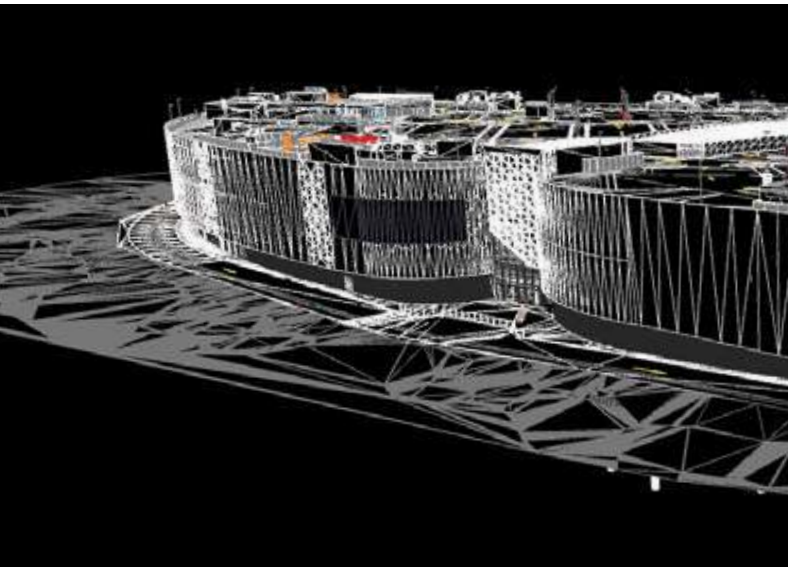
SAMANEA MALL

DUBAI, UNITED ARAB EMIRATES

CLIENT LESSO GROUP

ARCHITECT AUKETT SWANKE

SERVICES COST MANAGEMENT &
QUANTITY SURVEYING

COMPLETION TBD

RLB has been appointed to provide post-contract cost management services to Lesso Group on the Samanea Mall located in International City, Dubai. The mall has an estimated Gross Floor Area of 153,461 m² with three retail floors and roof top parking area holding 1,800 parking spaces. The retail outlet will focus on home appliances and furniture from small, medium and big Chinese businesses seeking a foothold in the GCC market.
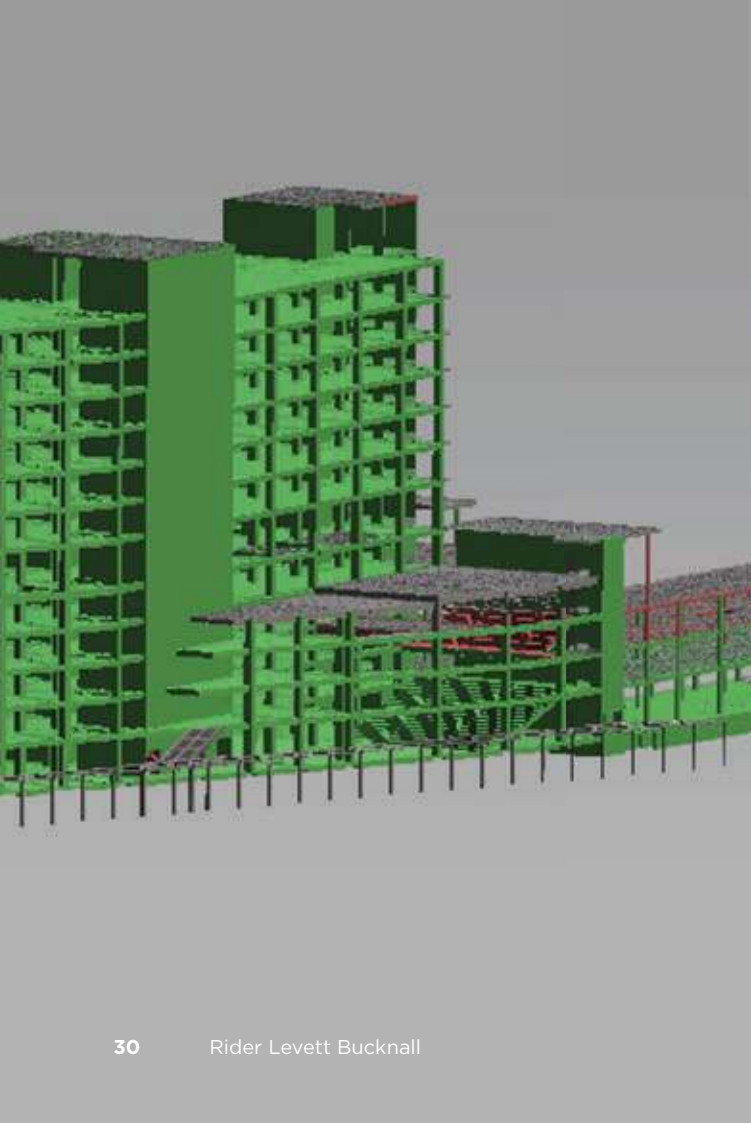
NEXUS INTERNATIONAL SCHOOL, SINGAPORE

SINGAPORE, SINGAPORE

CLIENT	NEXUS INTERNATIONAL SCHOOL (SINGAPORE)
ARCHITECT	BROADWAY MALYAN / ONG & ONG
SERVICES	COST MANAGEMENT & QUANTITY SURVEYING
COMPLETION	2019

Designed by renowned international architects, Broadway Malyan, the campus boasts cutting-edge modern facilities with a strong environmental focus. It includes an Innovation Hub, flexible learning spaces, state-of-the-art sports field, large capacity theatre and an Olympic-size swimming pool.

BIM was used for pre-contract estimates, design coordination and progress claim valuations.

EMERGING TECHNOLOGY INTEGRATION

'RLB is **committed to the future** through investment and innovation in the digital arena.'

KENNETH KWAN
CHAIRMAN, GLOBAL BOARD

EMERGING TECHNOLOGY INTEGRATION

As a number of technologies emerge various RLB offices continue to investigate and experiment to produce efficient outputs. The following highlights various examples of technology we are involved with.

AUGMENTED REALITY (AR)

AR is used to preview the design and future installation by means of a simple scanner (e.g. tablet or cellphone). Image targets (or QR codes) are placed on preselected areas. The 3D scanner is used to superimpose the BIM model in the same location as the image targets. We are able to view the BIM model though augmented reality in order to:

- Compare current progress with the finished product

- Avoid possible clashes

- Improve coordination

- Ease the process of decision making

VIRTUAL REALITY (VR) & CAVE SYSTEM

VR is being used to speed up the entire process of inception. Design and costing issues can be established from early on in the project. This not only speeds up the approval process for the project but also enhances a forward drive to the general project. We have found VR to be a top marketing tool for any type of project, where buyers can virtually walk through or look at the product on offer. With VR's growing demand, along with the need to accommodate larger groups within the virtual environment, many have set up the Cave Automatic Virtual Environment (CAVE) system for broader collaboration. As VR technology becomes a common process, the industry is witnessing a paradigm shift where multidisciplinary teams, owners and operators are now embracing a design-thinking approach by exercising collaboration and identification of pragmatic solutions at the onset, closing the gap between design and operation needs.

PARAMETRIC MODELLING

Parametric modelling is the use of algorithms in design. Based on the needs of the client, we are able to use these algorithms in order to quantify the product and work closely with the designers to find a 5-stage solution of creating and costing the algorithmic design. Parametric designs can be quite complicated and risky to the client's budget if they are not properly evaluated.

CLOUD BASED INTEGRATED PLATFORM

The burgeoning rate of cloud computing and applications enables secured common data environments (CDE) to hold a project's single source of truth via BIM documentation, design coordination, version control and traceability within the same platform. With APIs, these platforms scale by integrating with focused applications based on various stakeholders' needs while offering unrestricted accessibility for all authorised users.

DRONES (UAVs)

Drones can be used for a variety of reasons including fly throughs, capturing progress on site, topographical models, bulk earthwork quantity take offs and real time valuations. We are also exploring future possibilities to improve the quality of client service we provide.

DYNAMO

Dynamo Scripts plays a vital role in achieving our outputs efficiently on a digital platform. Dynamo is a visual programming tool that works with Revit, an Autodesk product (the most dominant software used by engineering and multidisciplinary companies). This add-on allows us to perform specific tasks to solve problems using input and output nodes connected via wires, all completed via algorithms, offering a valuable tool to streamlining and simplifying model interrogation, manipulation, and visualisation. Ultimately this saves time, improves quality control and results in a high quality product for our clients.

RLB has developed templates which automate our quantification process using data sheets and dynamo scripts. This workflow retrieves the correct technical parameters as per our method of measurement and can be tailored to accommodate naming conventions used by different engineering firms. This is an extremely efficient process that reduces the time spent on quantification and allows us to focus on adding value. For example, allowing more time to market test a higher percentage of the project, resulting in a truer representation of the current market and ultimately reducing the risk to both our business and clients.

Furthermore, The Global Digital Advancement Committee is currently exploring dynamo scripts to streamline our internal quality control check (visual check, information requirement checks, interference check, standards check and model integrity checks) with an imminent vision of implementing machine learning for these processes.

INTEGRATION

GIS

We have explored and investigated the benefits of overlapping multiple software types such as Geographic Information Systems (GIS) with Topographical models obtained from Lidar scanning Drones with multispectral cameras, and coupled it with BIM to provide clients with the next level of asset management.

3D PRINTING

We understand the implications of moving from traditional building methods, so we can advise our clients on the bespoke risks and benefits with 3D printing for their projects.

BLOCKCHAIN

Blockchain is a highly reliable public ledger that can act as an open book of financial transactions from manufacturer to financier. RLB are investigating how we can help facilitate the process to enable our clients to have more visibility over the finances of their project's Smart Contracts.

A Smart Contract is a self executing contract with the terms of the agreement between buyer and seller being directly written into lines of code. The code and the agreements contained therein exist across a distributed, decentralised blockchain network.

The Global Digital Advancement Committee has been exploring the subject of Smart Contracts, how they can be utilised for projects and what the benefits may be for the client.

ARTIFICIAL INTELLIGENCE

Artificial intelligence is being utilised by many companies around the world to help automate repetitive and mundane tasks. RLB has identified that Artificial Intelligence (AI) is not to be feared but leveraged to obtain efficient outputs. RLB is talking with clients who have adopted AI techniques in their systems, as well as testing our own in-house software with machine learning in the market to date for automating some of the take-off and reporting processes.

DATA MINING

RLB captures and utilises the information we receive on a day-to-day basis and to process it in order to provide a unique and accurate benchmarking system.

TRAINING FOR THE FUTURE

We are committed to training RLB employees for future technologies. Our Hong Kong office has a dedicated specialised suite with leading hardware and software to train our people.

We have created global networks with training platforms for RLB to share and train one another from their local innovations and experiences.

RLB has created a standardised approach whilst still maintaining regional flexibility in a suite of protocols designed to help, guide and standardise our global approach to providing digital services.

BRINGING
IMAGINATION
TO LIFE

With a network that covers the globe and a heritage spanning over two centuries, RLB is a leading independent organisation in cost management and cost management, project management and advisory services.

Our achievements are renowned from the early days of pioneering cost management, to landmark projects such as the Sydney Opera House, HSBC Headquarters Building in Hong Kong, the 2012 London Olympic Games and CityCenter in Las Vegas.

We continue this successful legacy with our dedication to the value, quality and sustainability of the built environment. Our innovative thinking, global reach, and flawless execution push the boundaries, taking ambitious projects from an idea to reality.

Rider Levett Bucknall has been voted the number one Cost Consultant by the world's top 100 Architectural practices. With approximately 4,000 staff operating from more than 120 offices worldwide, we take great pride in our vision and values as we continue to pioneer the latest technologies for the delivery of our services for the benefits of our clients now and in the future.